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The Association Between Knowledge, Iron Tablet Compliance, And Iron Deficiency Anaemia

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Abstract
Background: *Iron deficiency anemia among adolescent girls in Indonesia remains a public health concern, with a reported prevalence of 21.7%. Anemia may impair learning concentration, reduce productivity, and increase susceptibility to infection. The government has implemented weekly iron tablet supplementation for adolescent girls in junior and senior high schools; however, low adherence remains a major challenge, partly due to limited knowledge about anemia and iron supplementation.*
Objective: *This literature review aims to examine the relationship between knowledge, adherence to iron tablet consumption, and the incidence of anemia among adolescent girls.*
Methods: *Articles published within the last 10 years were searched through Google Scholar and PubMed. Of 25 articles identified, 12 were selected based on their relevance to the topic, objectives, and study findings.*
Results: *Most reviewed studies showed that better knowledge about anemia prevention, nutrition, and iron intake was associated with higher adherence to iron supplementation. Consistent consumption of iron tablets was also linked to increased hemoglobin levels and lower anemia prevalence.*
Conclusion: *Knowledge of anemia and adherence to iron tablet supplementation influence hemoglobin levels among adolescent girls.*

1. Introduction

Iron deficiency anemia is anemia caused by decreased iron reserves in the body, resulting in reduced hemoglobin levels in the blood. The normal hemoglobin level in adolescent girls is 12 g/dL (WHO, 2011). In Indonesia, the incidence of iron deficiency anemia reaches 21.7%, and the prevalence among young women remains quite high at 22.7% (Ministry of Health of the Republic of Indonesia, 2014). If the prevalence of iron deficiency anemia is in the range of 20-39.9%, it can be considered a moderate public health problem (WHO, 2011).

Adolescent girls are the most vulnerable group to iron deficiency anemia, due to their monthly menstruation and increased iron requirements to replace iron lost during menstruation (Briawan, Adriyani, and Pusporini, 2009). Lack of knowledge also contributes to the problem of anemia (Listiana, 2016).

Low hemoglobin in people with iron deficiency anemia can lead to decreased oxygen binding and transport from the lungs throughout the body (Suryani, Hafiani, and Junita, 2015). The long-term impact of iron deficiency anemia on adolescent girls is increased maternal mortality, increased rates of low birth weight (LBW), and increased prenatal mortality (Suryani, Hafiani, and Junita, 2015).

The government has launched the Iron Deficiency Anemia Prevention and Management (PPAGB) program for women of childbearing age, which aims to reduce the prevalence of iron deficiency anemia among high school (SMA) and junior high school (SMP) students. This program includes two main activities: providing Information, Education, and Counseling (KIE) such as counseling, promotion, campaigns about anemia, and routine distribution of iron supplements (Ministry of Health, 2016). In practice, this program has not been effective due to low compliance with iron supplementation among adolescent girls. Compliance with iron supplementation is one measure of program success (Taye, Abeje, and Mekonen, 2015).

Nutritional knowledge encompasses an understanding of food and its nutritional components, nutrient sources, safe foods, proper preparation methods, and a healthy lifestyle (Putri, Simanjuntak, and Kusdalinah, 2017). Research conducted by Putri (2018) found that adolescent girls' knowledge of anemia remains low. Of the 39 respondents, 23 (59%) had low knowledge. This low nutritional knowledge among adolescent girls also contributes to the high incidence of anemia. Good nutritional knowledge about anemia will influence the tendency of adolescent girls in choosing food sources of iron, avoiding foods that inhibit iron, and compliance in consuming iron-fortified tablets (Putri, Simanjuntak and Kusdalinah, 2017). To assess the nutritional knowledge of adolescent girls can be done by filling out a questionnaire. Nutritional knowledge can be classified as good if the adolescent girl is able to answer >80% of the questions asked, is classified as sufficient if the adolescent girl is able to answer 60-80% of the questions asked, and is classified as low if the adolescent girl is able to answer <60% of the questions asked. The purpose of this journal review is to determine the effect of nutritional knowledge and compliance in consuming iron-fortified tablets on the incidence of anemia in adolescent girls.

This literature review provides a comprehensive synthesis highlighting that the interaction between knowledge and adherence plays a critical role in anemia prevention among adolescents. Unlike previous studies that mainly examined these factors separately, this review emphasizes the combined influence of health knowledge and supplementation compliance on hemoglobin status and anemia outcomes. The findings suggest that integrated educational and behavioral interventions may be more effective in reducing iron deficiency anemia among adolescents.

2. Research Method

This study used a literature review design to analyze the relationship between knowledge, adherence to iron supplementation, and the incidence of iron deficiency anemia among adolescent girls. The literature search was conducted using electronic databases, including Google Scholar and PubMed, for articles published between 2014 and 2024. The keywords used in the search process were "anemia," "adolescent girls," "knowledge of anemia," "iron supplementation," and "adherence to iron supplement consumption." Boolean operators such as AND and OR were applied to refine the search strategy.

The article selection process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Initially, 25 articles were identified through database searching. After removing duplicate articles and screening titles and abstracts based on relevance to the research topic, 18 articles remained for full-text review. Subsequently, 12 articles met the eligibility criteria and were included in the final analysis.

The inclusion criteria were: (1) original research articles published in English or Indonesian; (2) articles published within the last 10 years; (3) studies examining the relationship between knowledge of anemia, adherence to iron supplementation, and anemia incidence; and (4) studies involving adolescent girls as the research population. The exclusion criteria included review articles, systematic reviews, meta-analyses, conference papers, and articles with incomplete data or irrelevant outcomes.

The quality of the selected articles was assessed based on the clarity of research objectives, study design, sampling methods, measurement instruments, data analysis, and relevance of findings to the review topic. Data extracted from the selected studies included author names, publication year, study design, sample characteristics, variables examined, and main findings. The article selection process was summarized using a PRISMA flow diagram to ensure transparency and reproducibility of the review process.

3. Results

No	Author(s)	Year	Subject/Population	Method	Main Findings

1	Zulaekah & Widajanti	2010	Adolescent girls	Experimental study	IEC increased hemoglobin levels
2	Dwiriani et al.	2011	Adolescent girls	Educational intervention	Nutrition education improved anemia knowledge
3	Putri & Simanjuntak	2015	Adolescent girls	Cross-sectional	Low knowledge associated with poor prevention behavior
4	Yuniarti et al.	2015	Adolescent girls	Cross-sectional	Low knowledge reduced compliance
5	Widiastuti & Rusmini	2019	Adolescent girls	Observational study	Side effects influenced non-compliance
6	Rahmadi	2019	High school adolescents	Comparative study	Schools with supplementation programs had lower anemia prevalence
7	Nuradhiani et al.	2017	Adolescent girls	Cross-sectional	Teacher support improved compliance
8	Nuraeni et al.	2019	Adolescent girls	Intervention study	Peer support increased adherence and Hb levels
9	Silitonga et al.	2023	Adolescent girls	Qualitative study	Social support and trust influenced adherence
10	Wardani	2024	Adolescent girls in Indonesia	Literature review	Compliance affected by social and behavioral factors
11	Losu et al.	2025	Adolescent girls	Quasi-experimental	Video education improved Hb but not adherence
12	Usman & Widiatrilupi	2025	Adolescent girls	Cross-sectional	Knowledge significantly associated with iron tablet adherence

4. Discussion

The findings of this literature review indicate that knowledge about anemia and adherence to iron supplementation are important factors associated with the incidence of iron deficiency anemia among adolescent girls. Most studies consistently reported that adolescents with better knowledge regarding anemia prevention, iron-rich nutrition, and the benefits of iron supplementation demonstrated higher adherence to iron tablet consumption and had better hemoglobin status. These findings are in line with studies by Usman and Widiatrilupi (2025) and Yati et al. (2025), which reported a significant relationship between anemia knowledge and adherence to iron supplementation among adolescent girls.

Several studies also emphasized that educational interventions could improve adolescents' awareness and adherence to iron supplementation programs. Zulaekah and Widajanti (2010) found that Communication, Information, and Education (IEC) interventions increased hemoglobin levels among adolescents. Similarly, recent studies showed that nutrition education, counseling, and school-based interventions positively influenced adolescents' understanding of anemia prevention and iron tablet consumption behavior. However, differences were identified regarding the effectiveness of educational media. A quasi-experimental study by Losu et al. (2025) reported that video-based education improved hemoglobin levels but did not significantly increase adherence compared with standard education methods. This suggests that improving knowledge alone may not always directly influence adherence behavior.

In addition, this review found variations in factors influencing adherence to iron supplementation. Several studies identified knowledge as the main determinant of adherence, while other studies emphasized the stronger influence of attitudes, social support, and environmental factors. For example, a study conducted in Samarinda reported that attitude had a more significant influence on adherence than knowledge itself. Similarly, Silitonga et al. (2023) highlighted that peer

support, parental involvement, teacher supervision, and interpersonal trust played important roles in improving adherence among adolescent girls. These findings indicate that adherence behavior is multidimensional and influenced not only by cognitive factors but also by psychosocial and environmental aspects.

Several barriers to iron tablet adherence were consistently identified across studies, including nausea, unpleasant taste and odor of iron tablets, boredom, forgetfulness, and low perceived susceptibility to anemia. Although many studies focused on individual knowledge and attitudes, limited studies comprehensively explored the interaction between educational interventions, psychosocial support, and behavioral compliance in preventing anemia among adolescent girls. This gap highlights the need for integrated interventions involving schools, families, healthcare workers, and peer groups to improve adherence to iron supplementation programs.

The novelty of this literature review lies in its comprehensive synthesis of both knowledge-related and behavioral factors affecting anemia prevention among adolescent girls. Unlike previous reviews that mainly focused on compliance or educational interventions separately, this review integrates evidence regarding the combined influence of anemia knowledge, adherence behavior, social support, and educational approaches on hemoglobin status and anemia incidence. The findings suggest that future anemia prevention programs should not only emphasize health education but also strengthen behavioral monitoring, family involvement, and peer support systems to achieve sustainable adherence to iron supplementation among adolescents

5. Conclusion

This literature review found that most of the 12 selected studies demonstrated a significant relationship between adolescents' knowledge of anemia, adherence to iron supplementation, and anemia status. Adolescent girls with better knowledge regarding anemia prevention, nutrition, and the benefits of iron supplementation were more likely to comply with iron tablet consumption and have better hemoglobin levels. The reviewed studies also showed that educational interventions, peer and teacher support, and family involvement contributed to improved adherence to iron supplementation, while side effects and negative perceptions toward iron tablets remained major barriers. In addition, several studies indicated that increasing knowledge alone was insufficient to improve adherence behavior, highlighting the importance of integrated educational, behavioral, and social support interventions in anemia prevention programs. Therefore, schools and healthcare providers are encouraged to strengthen continuous nutrition education, monitoring of iron tablet consumption, and psychosocial support to improve adherence and reduce anemia among adolescent girls.

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