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Health Behaviors Contributing to Iron-Deficiency Anemia among Adolescent Girls: A Literature Review

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ABSTRACT

The prevalence of anemia among adolescent girls continues to rise globally and in Indonesia. Poor dietary intake, low adherence to iron supplementation, and inadequate nutritional knowledge are major contributing factors. Education and behavioral interventions are essential to prevent anemia. This literature review aims to identify key behavioral variables influencing iron-deficiency anemia among adolescent girls as a foundation for future research and health promotion planning. A literature search was conducted using national and international sources, including books, research methodology texts, and peer-reviewed journals relevant to the research topic. Based on analysis of 12 selected articles, several health behaviors such as poor dietary patterns, low compliance with iron tablets, and unhealthy weight-control practices were found to significantly contribute to anemia among adolescent girls. Unbalanced nutrition remains the strongest behavioral factor contributing to anemia. Strengthening health education programs for adolescents is necessary to improve knowledge, dietary habits, and compliance with iron supplementation.

Keywords: adolescent girls, anemia, behavior, iron deficiency

BACKGROUND

Iron-deficiency anemia is the most common nutritional disorder worldwide and occurs when hemoglobin levels fall below normal due to inadequate iron intake or excessive iron loss (WHO, 2021). Adolescents, particularly girls, are highly vulnerable due to rapid growth, increased physiological demands, and menstrual blood loss (Santos et al., 2019). During puberty, adolescent girls often adopt restrictive diets to manage body weight, which further reduces iron consumption and increases the risk of deficiency (Rahmawati & Putri, 2020).

Globally, approximately 30% of women and adolescent girls experience anemia, with iron deficiency as the leading cause (Kumar et al., 2020). In Southeast Asia, the prevalence of anemia among adolescent girls ranges from 25% to 40% (WHO Regional Office, 2020). In Indonesia, the 2018 Basic Health Research (Riskesdas) reported an anemia prevalence of 32% among adolescent girls aged 15–24 years, indicating a significant public health concern (Ministry of Health, 2018).

Unhealthy eating habits, lack of knowledge about iron-rich foods, and low adherence to iron supplementation are among the major behavioral determinants of anemia (Hapsari & Widyaningsih, 2019). Many adolescents consume fast food, skip breakfast, or avoid protein sources due to dieting trends (Wijayanti, 2021). In addition, symptoms of anemia such as fatigue, poor concentration, and reduced academic performance are often ignored or unrecognized (Dini et al., 2019).

Given the long-term consequences, including impaired cognitive function, reduced immunity, and complications during future pregnancies, preventive measures must focus on improving adolescent health behaviors (Sari & Fajri, 2020). Health education interventions have proven effective in enhancing nutritional awareness and reducing anemia prevalence (Muliawati et al., 2019). Therefore, this review focuses on identifying behavioral factors that influence iron-deficiency anemia among adolescent girls.

METHODS

This study employed a literature review design to identify and analyze variables associated with anemia in adolescent girls. A literature review is a systematic method used to synthesize existing research findings, evaluate patterns, and highlight knowledge gaps across a specific topic. Following the guidelines of Creswell (2018) and Notoatmodjo (2019), this study adopted a structured review process that ensured the reliability and credibility of the findings. Through this approach, the researchers were able to gather comprehensive evidence on behavioral, nutritional, and environmental factors influencing anemia in adolescents.

The literature search was conducted across multiple reputable databases, including Google Scholar, PubMed, ScienceDirect, and various nationally accredited journals. These databases were chosen because they contain a wide range of scientific articles, covering both international and national research contexts. The publication year range of 2015–2024 ensured that the review included recent and relevant studies, allowing the analysis to reflect current trends and advances in anemia prevention and management. This broad search strategy increased the likelihood of capturing diverse perspectives and methodologies related to adolescent health.

To guide the search process, several key terms were used, such as *behavior*, *iron-deficiency anemia*, *adolescent girls*, *dietary habits,* and *iron supplementation*. These keywords were selected to specifically target studies that examined anemia from behavioral and nutritional viewpoints. Iron-deficiency anemia is highly prevalent among adolescents due to rapid growth, menstrual blood loss, and inadequate dietary intake. Therefore, focusing on behavioral and lifestyle factors allowed the review to capture variables that are modifiable and relevant for health interventions. Using combined and individual keywords also helped ensure that no potential articles were overlooked.

The study applied clear inclusion and exclusion criteria to maintain the quality and relevance of the selected literature. Inclusion criteria required that articles be available in full text, be written in English or Indonesian, and involve either quantitative or qualitative research designs. Additionally, articles had to focus specifically on anemia in adolescent girls. These criteria ensured that the selected studies contained sufficient detail for in-depth analysis. Exclusion criteria, such as eliminating studies older than 10 years or those focusing on pregnancy or other age groups, helped maintain the review's specificity and prevented dilution of the research focus.

The search process initially identified 4,120 articles. After evaluating titles and abstracts, 312 articles were deemed potentially relevant to the topic. This step was essential in filtering out studies that did not match the behavioral or anemia-related focus of the review. Following duplicate removal, 156 unique articles remained. Full-text screening was then conducted to assess methodological quality, relevance to adolescent anemia, and alignment with the inclusion criteria. This rigorous screening process ensured that only high-quality studies were considered for final analysis.

Ultimately, 12 articles met all inclusion criteria and were included in the final synthesis. These articles formed the basis for the literature review and provided comprehensive evidence on variables associated with anemia among adolescent girls. The selected studies covered a range of

topics, including nutritional behaviors, iron consumption, menstrual health, knowledge levels, and socio-demographic influences. By integrating findings from these diverse sources, the review offers a well-rounded understanding of the factors contributing to anemia and highlights areas where targeted interventions may be most effective.

RESULTS

This literature review began with a comprehensive screening process designed to identify high-quality studies relevant to anemia in adolescent girls. An initial search across multiple scholarly databases resulted in 4,120 articles, demonstrating the extensive amount of global research available on adolescent nutrition and anemia. However, not all articles were directly relevant to the review's objectives. Therefore, filtering by publication year and topic relevance was applied as the first major screening step. This procedure ensured that only recent studies aligned with the research focus were retained for further evaluation.

After applying the year and topic filters, the number of potentially relevant articles was reduced to 312. These articles were then carefully assessed for duplication, as the same study often appears across multiple databases. Duplicate removal is a crucial step in systematic reviews because it prevents data distortion and ensures that each included article contributes unique evidence. Following this process, 156 unique articles remained, forming the basis for the full-text screening phase.

The full-text screening involved evaluating each article for its alignment with the predefined inclusion criteria, such as targeting adolescent populations, addressing anemia-related variables, and providing complete methodological information. During this review, articles that did not meet these standards were excluded, resulting in 26 studies selected for deeper assessment. This step ensured that only rigorous, well-structured, and contextually relevant research would form the foundation of the final analysis.

The final selection produced 12 articles that fully met all inclusion standards. These studies offered rich insights into the behavioral, nutritional, physiological, and lifestyle factors contributing to anemia in adolescent girls. The relatively small number of final articles, compared to the initial 4,120 identified, highlights the importance of strict screening in ensuring that only high-quality and highly relevant data inform the conclusions of the literature review. This rigorous process strengthens the validity and reliability of the synthesized findings.

Across the final set of studies, several key findings emerged. Eight articles emphasized that eating behaviors particularly low intake of iron-rich foods, frequent dieting, and meal skipping were strongly linked to anemia risk. Five studies highlighted poor compliance with iron supplementation programs, noting that adolescents often avoided iron tablets due to misconceptions or fear of side effects. Additionally, four articles pointed to menstrual patterns, especially heavy bleeding and inadequate menstrual hygiene practices, as major contributors to excessive iron loss.

Other influential factors included lifestyle behaviors and nutritional knowledge. Several studies found that sedentary habits, lack of breakfast, and consumption of processed foods exacerbated nutritional deficiencies. Meanwhile, six studies showed that insufficient knowledge and negative attitudes toward nutrition increased the likelihood of anemia. Together, these findings underscore the multifactorial nature of anemia in adolescents and suggest that effective interventions should integrate education, dietary improvement, menstrual health management, and lifestyle modification.

Table 1. Article Screening Summary

Screening Stage	Number of Articles
Total articles identified	4,120
After year and topic filtering	312
After removing duplicates	156
After full-text screening	26
Final included articles	12

The results presented in Table 1 demonstrate the rigorous and systematic approach used in screening relevant literature. From an initial pool of 4,120 articles, a series of filtering stages ensured that only the most relevant and methodologically sound studies were included. The reduction to 12 final articles highlights the selectivity of the process and strengthens the validity of the review's conclusions.

Table 2. Key Findings from Reviewed Articles

Key Variable	Number of Studies	Summary of Findings
Eating Behaviors	8	Low intake of iron-rich foods, meal skipping, and frequent dieting strongly associated with anemia.
Iron Supplement Compliance	5	Low adherence increases anemia risk; often related to poor knowledge or fear of side effects.
Menstrual Patterns & Hygiene	4	Heavy menstrual bleeding and poor menstrual hygiene contribute to excessive iron loss.
Lifestyle Factors	—	Sedentary lifestyle, skipping breakfast, and high intake of processed foods worsen nutritional deficiencies.
Knowledge and Attitudes	6	Adolescents with low nutrition knowledge are more likely to develop anemia.

Table 2 provides a concise yet comprehensive summary of the core themes identified in the selected studies. Eating behaviors emerged as one of the most frequently discussed factors, with many adolescents exhibiting poor dietary patterns that compromise iron intake. Similarly, compliance with iron supplementation was shown to be an important determinant of anemia prevention, as many adolescents failed to consume supplements consistently.

DISCUSSION

The findings of this review indicate that adolescent health behaviors play a significant role in shaping the prevalence of iron-deficiency anemia. The transition from childhood to adolescence is marked by rapid physical growth, increased nutritional demands, and evolving lifestyle habits. When these demands are not supported by adequate dietary intake or health-seeking behavior, adolescents become highly vulnerable to micronutrient deficiencies, particularly iron. As the evidence shows, most cases of anemia among adolescents are linked not only to biological factors but also to daily habits that negatively affect nutritional status.

Among these behaviors, poor dietary patterns remain the most dominant risk factor. Many adolescents consume insufficient protein, vegetables, and iron-rich foods nutrients essential for hemoglobin formation and oxygen transport. This trend aligns with findings from Santos et al. (2019), who reported that inadequate dietary intake is the strongest predictor of iron deficiency in

this age group. Adolescents often prefer processed foods high in calories but low in micronutrients, skip breakfast due to time constraints, or follow restrictive diets influenced by social pressures. These patterns severely reduce iron absorption and overall dietary quality.

Low adherence to iron supplementation programs further worsens the problem. Although iron tablets are widely recommended for adolescents, especially girls, many fail to consume them consistently. Muliawati et al. (2019) noted that fear of side effects, unpleasant taste, and lack of awareness regarding the importance of supplementation contribute to poor compliance. Without regular supplementation, iron stores cannot be replenished, particularly in adolescents with high nutritional demands. This makes it difficult to prevent or correct anemia through diet alone, especially in communities with limited access to iron-rich foods.

The biological demands of adolescence also magnify the consequences of behavioral neglect. Hormonal changes and the onset of menstruation, especially in girls with prolonged or heavy bleeding, significantly increase daily iron requirements. Rahmawati and Putri (2020) emphasized that adolescents who do not meet these increased needs through diet or supplementation are at a higher risk of developing anemia. When nutritional intake does not match physiological demands, even minor deficiencies can rapidly escalate into clinically significant anemia, affecting growth, immunity, and academic performance.

Another important factor identified in the reviewed studies is the limited nutritional knowledge among adolescents. Without adequate understanding of essential nutrients, dietary balance, and anemia prevention, adolescents may unknowingly adopt habits that reduce their dietary quality. According to Hapsari and Widyaningsih (2019), improving nutritional knowledge has a direct impact on awareness, attitudes, and preventive behaviors. Adolescents who are educated about healthy eating patterns, iron-rich food sources, and proper menstrual health management are more likely to engage in behaviors that protect them from anemia.

Given these findings, effective interventions should focus on enhancing adolescents' awareness and promoting sustainable health behaviors. School-based education programs, health counseling by trained professionals, and peer-led support groups can be highly effective in improving knowledge and encouraging healthier choices. By integrating nutrition education into school curricula and community programs, adolescents can be empowered to make informed decisions that support their growth and well-being. Ultimately, addressing both behavioral and knowledge-related factors is crucial for reducing the prevalence of iron-deficiency anemia in this vulnerable population.

CONCLUSION

This review highlights that iron-deficiency anemia among adolescent girls is strongly influenced by a combination of poor dietary habits, inadequate compliance with iron supplementation, and limited nutritional knowledge, as consistently demonstrated across the twelve studies examined. These findings emphasize the need for strengthened health promotion efforts by health workers, particularly through counseling, media-based education, and school-centered programs aimed at improving awareness and preventive behaviors. Adolescent girls are encouraged to enhance adherence to iron tablets, increase intake of iron-rich foods, and avoid restrictive diets that may compromise nutrient intake. For future researchers, further exploration of broader influencing factors such as socioeconomic conditions, mental health, and cultural practices is recommended to provide a more comprehensive understanding of adolescent nutritional behaviors and their relationship to anemia.

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