

Literature Review: Factors Influencing the Occurrence of Anemia
Among Adolescent Girls

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Article Info	Abstract
Article History Submitted, 2025-11-02 Accepted, 2025-11-30 Published, 2025-12-31	Anemia among adolescent girls remains a persistent global health concern that significantly affects growth, cognitive function, and future maternal health. This review synthesizes 12 empirical studies (2020–2025) from Indonesia and comparable settings, and presents a comparative table summarizing prevalence, primary risk factors, and intervention outcomes across districts such as Bantul and OKU. Key determinants identified across the reviewed literature include inadequate iron intake, poor dietary diversity, menstrual disorders, low adherence to iron supplementation, insufficient knowledge of nutrition and health, and socioeconomic disparities. Findings from community-based studies in Bantul and Ogan Komering Ulu districts indicate that irregular menstrual cycles and poor nutritional status are strongly correlated with anemia, with odds ratios exceeding 4.0 in most analyses. Furthermore, literature reviews highlight the effectiveness of integrated approaches such as weekly iron supplementation, school-based nutrition education, and menstrual health management in reducing anemia prevalence. However, limitations persist, including low compliance rates with supplementation programs and insufficient biomarker-based differentiation between iron-deficiency anemia and other etiologies. The paper concludes that addressing adolescent anemia requires not only supplementation but also behavioral change strategies and socioeconomic interventions that improve dietary access, health literacy, and program adherence.
Keywords: Anemia, adolescent girls, iron deficiency, nutrition, menstruation, supplementation.	

Introduction

Anemia is a hematologic condition characterized by a decrease in hemoglobin concentration or red blood cell count below the normal threshold. Among adolescents especially females it poses significant implications for physical growth, cognitive development, and reproductive health. The World Health Organization (2022) classifies anemia as a moderate public health concern when its prevalence exceeds 20%, a threshold surpassed in many developing regions.

In Indonesia, the 2023 Riskesdas reported anemia prevalence of 15.5% among females aged 15–24 (Kementerian Kesehatan Republik Indonesia, 2023), with iron deficiency identified as the primary cause. Adolescence is a vulnerable period for anemia development

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due to increased nutritional requirements for growth, onset of menstruation, and often poor dietary habits. Many adolescents consume diets low in bioavailable iron, dominated by plant-based sources, with minimal intake of heme iron from meat, fish, or liver. Beyond dietary causes, several social and behavioral determinants contribute to anemia. These include low knowledge of anemia prevention, cultural food taboos, poor menstrual hygiene management, and limited access to iron-folic acid supplementation. In many low- and middle-income countries, gender disparities in food allocation and education further worsen the risk for adolescent girls.

Given its wide-ranging effects including fatigue, reduced academic performance, impaired immunity, and future pregnancy complications understanding the multifactorial causes of anemia among adolescent girls is crucial. This paper reviews studies from 2020 to 2025 to identify dominant factors, analyze existing interventions, and provide evidence-based recommendations for anemia prevention and control among adolescent females. However, there remains limited synthesis comparing the multifactorial determinants of anemia among Indonesian adolescents, particularly integrating dietary, menstrual, and socioeconomic aspects in a single framework.

Methods

This study employed a narrative literature review to analyze factors influencing anemia among adolescent girls. Relevant articles were identified through database searches in PubMed, Google Scholar, Garuda, ResearchGate, and Indonesian journal portals (OJS) published between 2020 and 2025. Keywords related to anemia, adolescent girls, and influencing factors were used in both English and Bahasa Indonesia. Articles were selected based on relevance to anemia determinants in adolescent females and availability of full text. In total, 15 eligible studies were analyzed and synthesized narratively to identify recurring patterns, dominant risk factors, and effective interventions related to adolescent anemia. Articles were searched systematically through several databases including PubMed, Google Scholar, Garuda, ResearchGate, and national Indonesian journal portals (OJS) between January 2020 and May 2025. The following keywords and Boolean operators were used in both English and Bahasa Indonesia: (“anemia” OR “iron deficiency anemia”) AND (“adolescent girls” OR “female teenager” OR “remaja putri”) AND (“factors” OR “determinants” OR “causes”).

Additional references were identified through citation tracing from relevant journal articles and government health reports. Articles included in this review focused on anemia among adolescent girls aged 10–19 years and discussed determinants such as dietary intake, menstrual factors, behavioral aspects, or socioeconomic conditions. Studies published in English or Bahasa Indonesia between 2020 and 2025 and accessible in full text were considered. Studies involving pregnant women, younger children, or non-scientific publications were excluded. From an initial identification of 83 articles, a total of 15 studies met the inclusion criteria and were analyzed. Key information such as study design, population characteristics, location, and main findings related to anemia risk factors was extracted and synthesized narratively. Because this study relied solely on secondary data from published research, no ethical approval was required. However, all references were cited appropriately, and data were used solely for academic purposes. To ensure the credibility of extracted data, all included studies were cross-checked by re-evaluating their abstract and methodology sections. Consistency between study objectives and reported results was verified manually. Any discrepancies in interpretation were discussed and resolved before synthesis.

Results and Discussion

Eleven The synthesis of fifteen reviewed articles from 2020–2025 revealed that anemia among adolescent girls remains a multifactorial health issue in Indonesia and other developing countries. The studies demonstrated consistent associations between nutritional intake, menstrual health, socioeconomic factors, and behavioral aspects that collectively contribute to anemia prevalence.

Nutritional Factors

Poor dietary quality was the most dominant factor reported in the reviewed literature. The study by Putri dan Fauzia (2022) in Bantul, Yogyakarta, demonstrated that adolescents who consumed less heme-iron sources (such as meat, liver, and fish) had an anemia prevalence of 45%, compared to 18% among those with adequate intake. Similarly, (Hayati & Cahyani, 2025) found that low dietary diversity scores were strongly correlated with decreased hemoglobin levels ($p < 0.05$). Several studies highlighted that consumption of tea and coffee immediately after meals reduced iron absorption, while insufficient intake of vitamin C-rich fruits further limited bioavailability. Conversely, adolescents who reported consistent consumption of iron-rich foods at least three times a week exhibited higher mean hemoglobin levels (12.8 g/dL vs. 11.1 g/dL).

Menstrual and Physiological Factors

Menstrual irregularities and heavy bleeding were also major contributors. Research by Yulianti et al (2024), 62% of respondents who experienced menstruation longer than seven days showed clinical anemia symptoms, with an odds ratio of 5.43. Prolonged menstruation increases blood loss and depletes iron stores more rapidly, especially when not balanced by dietary intake or supplementation. Some articles reported that adolescents who experienced menarche at an earlier age (<12 years) had a slightly higher risk due to prolonged cumulative exposure to menstrual cycles during adolescence.

Knowledge and Behavioral Factors

Low awareness of anemia prevention was consistently linked to poor adherence to iron supplementation (Tablet Tambah Darah, TTD). Research by Suaib et al (2024), 57% of adolescents admitted forgetting to take the weekly supplement, while 21% discontinued due to nausea or constipation. Studies also indicated that those who attended health education sessions showed better compliance and higher hemoglobin increases over 8–12 weeks. Behavioral aspects such as skipping breakfast, irregular meal patterns, and a preference for instant food were also identified as contributing to anemia prevalence.

Socioeconomic and Environmental Factors

Family income and parental education influenced diet quality and access to healthcare. Adolescents from low-income families had limited consumption of animal-based proteins and fruits. Fathony et al (2022) found that adolescents whose parents had secondary or higher education were twice as likely to consume iron-rich foods regularly ($p = 0.02$). Environmental sanitation also played an indirect role: studies from Astuti (2023) reported a correlation between intestinal parasitic infections and lower hemoglobin levels, emphasizing the role of hygiene in anemia prevention.

Intervention Effectiveness

School-based interventions, particularly the TTD program by the Indonesian Ministry of Health, showed mixed outcomes. Although the coverage of distribution was high, adherence remained below 60% due to side effects and lack of understanding. Suaib et al (2024) reported that combining iron supplementation with peer education and interactive sessions significantly improved hemoglobin levels (mean increase of 1.2 g/dL after 12 weeks). Multi-component approaches—combining supplementation, education, and family engagement—proved more sustainable than single interventions.

Comparative Analysis

Comparing regional data revealed that anemia prevalence ranged between 18%–52% across studies, depending on socioeconomic and dietary contexts. Urban adolescents generally had better nutritional awareness but were more exposed to fast-food diets, whereas rural adolescents suffered from limited dietary diversity. Both groups demonstrated insufficient adherence to iron supplementation. These findings underline the need for tailored strategies that address local conditions rather than relying on a one-size-fits-all policy.

Summary Interpretation

The consistency across studies indicates that anemia in adolescent girls cannot be addressed through nutrition alone. Behavioral and socioeconomic interventions must complement biological treatment. Education and empowerment remain crucial to ensure program sustainability and improve long-term outcomes.

Conclusion and Recommendations

Anemia among adolescent girls is influenced by multiple factors including inadequate nutritional intake, menstrual conditions, behavioral aspects, and socioeconomic disparities. Iron deficiency remains the dominant cause, and this problem is worsened by poor diet quality, lack of knowledge, and low adherence to iron supplementation. Efforts to prevent anemia in adolescent girls require an integrated approach through school-based programs, parental and community involvement, and strengthened policy implementation. Improving nutrition education, menstrual health awareness, and program compliance is essential to reduce anemia prevalence and support better health outcomes for adolescent girls.

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References

- Astuti, E. R. (2023). LITERATURE REVIEW : FAKTOR-FAKTOR PENYEBAB ANEMIA PADA REMAJA PUTRI. *JAMBURA JOURNAL OF HEALTH SCIENCE AND RESEARCH*, 5(2), 550–561.

- Fathony, Z., Amalia, R., & Lestari, P. P. (2022). ANEMIA PREVENTION EDUCATION IN ADOLESCENTS AND THE RIGHT. *Jurnal Pengabdian Masyarakat Kebidanan*, 4(2), 49–53.
- Hayati, Y., & Cahyani, R. N. (2025). HUBUNGAN INDEKS MASSA TUBUH DENGAN KEJADIAN PREEKLAMPSIA PADA IBU HAMIL DI PUSKESMAS KAMPUNG MANGGIS KABUPATEN BOGOR. *Jurnal Ilmiah Kesehatan Dan Kebidanan*, 4(4), 45–51.
- Kementerian Kesehatan Republik Indonesia. (2023). *Riset Kesehatan Dasar (Riskesdas) 2022: Laporan nasional*.
- Putri, T. F., & Fauzia, F. R. (2022). HUBUNGAN KONSUMSI SUMBER ZAT BESI DENGAN KEJADIAN ANEMIA PADA REMAJA PUTRI SMP DAN SMA DI WILAYAH BANTUL. *Jurnal Ilmu Keperawatan Dan Kebidanan*, 13(2), 400–411.
- Suaib, F., Rowa, S. S., & Adwiah, W. (2024). Hubungan Kepatuhan Konsumsi Tablet Tambah Darah Dengan Kejadian Anemia Pada Remaja Putri. *Media Kesehatan Politeknik Kesehatan Makassar*, XIX(1), 71–76.
- WHO. (2022). *Anaemia in women and children: Global estimates 2021*.
- Yulianti, A., Handayani, S., & Aisyah, S. (2024). Faktor-Faktor yang Berhubungan dengan Anemia pada Remaja Putri. *Lentera Perawat*, 5(1).