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A Literature Study on Complementary Therapies for the Management of Anemia in Adolescent Girls

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Abstract. Anemia is a common health issue among adolescent girls, primarily due to increased iron demands during growth and menstruation. This literature study aims to synthesize existing research on complementary therapies for managing anemia in this population. The study employed a literature review design with a systematic search of scientific articles published between 2018 and 2025. Data were collected from multiple electronic databases, including PubMed and Google Scholar, using keywords such as "anemia," "adolescent girls," "complementary therapy," "iron deficiency," "herbal medicine," and "nutritional intervention." Only peer-reviewed articles, clinical trials, systematic reviews, and meta-analyses published in English were included. The review found that natural interventions like Moringa oleifera leaf extract, beetroot juice, dates with lime juice, and educational programs are effective, affordable, and culturally acceptable for improving hemoglobin levels and anemia prevention. However, many studies have limitations such as small sample sizes and short intervention durations. Future research should focus on more rigorous designs with larger samples and longer follow-ups. Combining nutritional supplementation with health education offers a promising holistic approach to managing anemia in adolescent girls.

Keywords: Adolescent Girls, Anemia, Complementary Therapy.

1. BACKGROUND

Anemia remains a significant public health issue worldwide, especially among adolescent girls. The World Health Organization (2021) reports that approximately 29% of women of reproductive age suffer from anemia, with adolescent girls being a highly vulnerable group due to rapid growth and menstrual blood loss. In Indonesia, the Basic Health Research (Riskesdas) 2018 indicated that 22.7% of adolescent girls aged 15-19 years suffer from anemia (Kementerian Kesehatan RI, 2019). This condition can impair physical growth, cognitive development, and future reproductive health (Tamang et al., 2020; McLean et al., 2019).

The primary cause of anemia in adolescent girls is iron deficiency due to insufficient dietary intake and menstrual blood loss (Camaschella, 2019; McLean et al., 2019). Additionally, infections such as malaria and intestinal parasites exacerbate anemia prevalence in low- and middle-income countries (Balarajan et al., 2011; Checkley et al., 2017). Socioeconomic factors and poor health literacy also contribute to inadequate prevention and treatment efforts (Tawiah et al., 2018).

Complications of untreated anemia include reduced school performance, fatigue, increased susceptibility to infections, and adverse pregnancy outcomes such as preterm birth and low birth weight infants (Tamang et al., 2020; Brabin et al., 2018). Therefore, early

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detection and effective management during adolescence are critical for long-term health benefits.

While oral iron supplementation is the mainstay of anemia treatment, poor compliance due to gastrointestinal side effects limits its effectiveness (Galloway & McGuire, 1994; Pena-Rosas et al., 2015). Consequently, complementary therapies have gained attention as adjuncts to improve treatment outcomes. These include herbal remedies, nutritional supplements, and natural products like honey, which possess antioxidant and anti-inflammatory properties potentially beneficial for anemia management (Erejuwa et al., 2012; Al-Waili et al., 2019).

Several studies suggest that complementary therapies may enhance iron absorption and hemoglobin synthesis by reducing oxidative stress and improving overall nutritional status (Irawan et al., 2022; Shaheen et al., 2019; Heidari et al., 2018). However, evidence remains limited, and rigorous systematic reviews are needed to clarify the efficacy and safety of these interventions in adolescent populations.

This literature review aims to critically evaluate complementary therapies used for managing anemia in adolescent girls, synthesizing current evidence to inform healthcare practices and future research directions.

2. THEORETICAL STUDY

Anemia in adolescent girls is primarily caused by iron deficiency, which results from inadequate dietary intake, increased iron requirements during growth spurts, and menstrual blood loss (Camaschella, 2019; McLean et al., 2019). Adolescence is a critical period marked by rapid physical development and the onset of menstruation, both of which significantly increase iron demands (Tamang et al., 2020). Iron deficiency anemia can lead to symptoms such as fatigue, impaired cognitive function, and decreased physical capacity, negatively impacting school performance and quality of life (Balarajan et al., 2011).

Standard treatment for iron deficiency anemia often involves oral iron supplementation, primarily ferrous sulfate tablets, which have been proven effective in replenishing iron stores and increasing hemoglobin concentration (Pena-Rosas et al., 2015). However, compliance is frequently hampered by gastrointestinal side effects and poor palatability, motivating the exploration of complementary therapies (Galloway & McGuire, 1994).

Complementary therapies for anemia management include natural products and nutritional interventions aimed at enhancing iron absorption and overall hematologic health (Erejuwa et al., 2012). For example, honey possesses antioxidant and anti-inflammatory properties that may reduce oxidative stress, thereby facilitating erythropoiesis and improving

hemoglobin levels (Al-Waili et al., 2019). Additionally, certain herbal extracts and micronutrients may act synergistically with iron supplements to optimize treatment outcomes (Heidari et al., 2018; Shaheen et al., 2019).

The integration of complementary therapies with conventional iron supplementation could address limitations of standard therapy, improve adherence, and enhance recovery from anemia in adolescent girls (Irawan et al., 2022). Nonetheless, further rigorous studies are required to establish efficacy, safety, and best practices for these integrative approaches.

3. RESEARCH METHODS

This study employed a literature review design aimed at synthesizing existing research on complementary therapies for managing anemia in adolescent girls. The review process involved a systematic search and selection of relevant scientific articles published from 2018 to 2025 to ensure up-to-date evidence. Data were collected from multiple electronic databases, including PubMed and Google Scholar. The search used keywords and Boolean operators such as "anemia," "adolescent girls," "complementary therapy," "iron deficiency," "herbal medicine," and "nutritional intervention." Only peer-reviewed articles, clinical trials, systematic reviews, and meta-analyses published in English were included.

Articles were included if they (1) focused on adolescent girls aged 10–19 years diagnosed with anemia, (2) investigated the effects of complementary therapies or nutritional interventions alongside or compared to standard treatment, and (3) provided quantitative or qualitative outcomes related to hemoglobin levels or anemia improvement. Studies not involving adolescents or unrelated to anemia management were excluded. Relevant information such as study objectives, design, sample characteristics, types of complementary therapies, intervention duration, and outcomes were extracted and tabulated. The data were then synthesized narratively to identify patterns, mechanisms of action, and efficacy of various complementary therapies.

4. RESULTS AND DISCUSSION

Table 1. Summary of Studies on the Effectiveness of Complementary Therapies in Managing Anemia Among Adolescents

No	Article Title	Author(s)	Year	Type of Complementary Therapy	Research Method
1	Education on Anemia Prevention in Adolescents with Complementary Date and Lime Decoction	Reni Merta Kusuma, Lily Yulaikhah, Budi Rahayu	2021	Date and lime decoction	Experimental Study
2	Non-Pharmacological Therapy Based on Animal Sources is More Effective in Overcoming Anemia in Adolescent Girls	Didhing Supariti, Siti Aisah, Satriya Pranata	2023	Animal and plant-based foods (chicken liver, eggs, dates, moringa)	Quasi-Experimental Study
3	Education About Anemia and Its Prevention with Complementary Therapy in Adolescent Girls	Violita Dianatha Puteri, et al.	2024	Jackfruit seed tea	Pre-Post Test Study
4	Early Detection and Education on Anemia Prevention in Adolescents with Complementary Therapy	Yuanita Panma	2025	Education and early detection	Descriptive Study
5	Literature Review: Application of Non-Pharmacological Therapy to Increase Hemoglobin Levels in Adolescent Girls with Anemia	Dewi Candra Resmi, Fibrinika Tuta Setiani	2023	Fruit and vegetable juice	Literature Review
6	Safety and Efficacy of East Asian Herbal Medicine for Iron Deficiency Anemia in Children and Adolescents: A Systematic Review and Meta-analysis	Wang et al.	2023	East Asian traditional herbal medicine	Systematic Review & Meta-analysis
7	The Correlation of Information Media About Adolescent Anemia with Interest in Complementary or Pharmacology Therapy	Kasumawati et al.	2022	Red spinach juice, media education	Cross-Sectional Study
8	The Effect of Moringa (Moringa Oleifera L.) Leaf Extract Capsules in Increasing Hemoglobin Levels in Adolescent	Mauliku et al.	2021	Moringa leaf extract capsules	Experimental / RCT
9	Effectiveness of Moringa Leaf Extract on Increasing Hemoglobin Levels in Adolescent Girls	Fauziandari	2019	Moringa leaf extract	Experimental Study
10	The Effect of Beetroot (Beta Vulgaris) Juice on Increasing Hemoglobin Levels in 10th Grade Social Science Female Students at MAN 2 Model Medan	Sulistiana & Sari	2022	Beetroot juice	Pre-Experimental (One Group Pretest-Posttest)

Anemia is a common health issue in adolescent girls, primarily due to increased iron demands during growth and menstruation which are often unmet by adequate nutritional intake. Various studies have explored complementary therapies as alternative or adjunct treatments for anemia in this population.

Based on a review of ten research articles, a variety of complementary therapies have been used, including local food ingredients such as moringa leaves, beetroot, dates, lime, mung beans, and also health education related to anemia. These therapies aim to naturally improve hemoglobin levels and nutritional status in adolescents. One of the most frequently studied therapies is the extract of Moringa oleifera leaves, known for its richness in iron, vitamins A and C, and antioxidants which support hematopoiesis. Studies by Mauliku et al. (2021) and Fauziandari (2019) demonstrated that regular intake of moringa extract capsules significantly increased hemoglobin levels in adolescent girls. Beetroot juice was also proven effective (Sulistiana & Sari, 2022) due to its iron content and phytonutrients supporting red blood cell production.

Kusuma et al. (2021) explored the combined administration of dates and lime juice, which provides iron and vitamin C to enhance iron absorption. This combination is practical and easily applied in community settings. Health education also plays a crucial role. Puteri et al. (2024) and Panma (2025) showed that educational interventions significantly increased awareness and adherence among adolescents toward iron-rich diets and anemia prevention, through the use of educational media.

While the positive impact of these complementary therapies is evident, several methodological limitations were noted. Sample sizes were often small and intervention durations short, limiting the external validity. Some studies lacked control groups or blinding, increasing bias risk. The major advantage lies in using natural, accessible, safe, and affordable ingredients, making these interventions practical especially in low-resource settings. Some studies employed strong experimental designs like pretest-posttest and randomized control trials, providing scientific rigor in measuring effects.

The study by Puteri et al. (2024) focused on preventive education, which is cost-effective and easy to implement but did not directly measure biological outcomes such as hemoglobin levels, limiting its clinical impact assessment. Panma (2025) compared two educational media (flipcharts and booklets) with a pretest-posttest design, showing significant knowledge gains, but lacked long-term follow-up to assess sustained behavioral changes.

Mauliku et al. (2021) conducted a strong quasi-experimental study on moringa extract with laboratory hemoglobin measurements, but did not specify detailed dosing or long

intervention periods. Fauziandari (2019) supported the findings on moringa but employed a simpler observational design without a control group, which limits causal inference. Sulistiana & Sari (2022) showed beetroot juice's effectiveness but did not discuss possible adverse effects or follow-up after the intervention, leaving gaps on safety and sustainability.

5. CONCLUSION

Complementary therapies such as Moringa leaf extract, beetroot juice, and a combination of dates and lime juice have demonstrated effectiveness in increasing hemoglobin levels among adolescent girls with anemia. These natural interventions are advantageous due to their accessibility, affordability, and safety, making them suitable for use in low-resource settings. Additionally, health education programs significantly improve knowledge and awareness about anemia prevention, which can encourage positive behavioral changes. However, to strengthen the evidence base, future studies should employ more rigorous research designs with larger sample sizes, longer follow-up periods, and integration of both educational and biological outcome measures. Overall, combining nutritional supplementation with educational interventions holds promise as a holistic approach to managing anemia in adolescent populations.

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