



EFFECTIVENESS OF PHOENIX DACTYLIFERA JUICE IN IMPROVING HEMOGLOBIN LEVELS: INSIGHTS FROM RECENT STUDIES

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Abstract

*Anemia is a prevalent health issue among adolescent girls due to increased iron requirements during growth and menstruation. The consumption of iron-rich foods, such as dates (*Phoenix dactylifera*), serves as a non-pharmacological alternative that effectively enhances hemoglobin levels. This article aims to review the effectiveness of date juice consumption in improving hemoglobin levels in adolescent girls with iron deficiency anemia. A systematic literature review was conducted by analyzing various studies from PubMed, Scopus, and Google Scholar databases between 2013 and 2023. The analyzed studies included experimental research, randomized controlled trials (RCTs), and meta-analyses related to date consumption and hemoglobin level improvement. Various studies indicate that regular consumption of date juice significantly increases hemoglobin levels. Experimental studies found that administering date juice for 14 days can enhance hemoglobin levels by up to 31.50%. Additionally, combining date consumption with iron supplementation has been proven more effective than iron supplementation alone, demonstrating a synergistic potential between natural foods and nutritional status. Based on this literature review, date juice consumption can serve as an effective dietary intervention to improve hemoglobin levels in adolescent girls with anemia. Further research is needed to understand the biological mechanisms underlying the benefits of dates in hemoglobin enhancement and to evaluate the long-term effects of this intervention in broader populations.*

Keywords: Anemia, Hemoglobin, Date Juice, Adolescent Girls, Iron

INTRODUCTION

Adolescence (ages 10–19) is a crucial developmental period characterized by rapid growth and increased nutritional needs. Iron deficiency anemia (IDA) is a common issue, particularly among adolescent girls, due to blood loss during menstruation and inadequate iron intake. (Wahyurin and Rahmah, 2021). The World Health Organization (WHO) estimates that anemia affects approximately 26.2% of the global population, with adolescent females being among the most affected groups. In Indonesia, national surveys indicate that the prevalence of anemia among adolescent girls remains high, often exceeding 50% in certain regions. (Puspa, Marek and Adi, 2017). Given the adverse effects of anemia on cognitive function, academic performance, and overall health, identifying effective and sustainable dietary interventions is crucial. (Bhutta *et al.*, 2020) (Wiafe, Ayenu and Eli-Cophie, 2023).

Epidemiology of Anemia

WHO defines anemia as hemoglobin (Hb) levels below 12 g/dL in non-pregnant women and below 11 g/dL in pregnant women. The prevalence of anemia varies widely across regions, with the highest rates observed in South Asia

and Sub-Saharan Africa. In Indonesia, the 2013 Riskesdas data reported an anemia prevalence of 21.7% in the general population, with adolescent girls experiencing significantly higher rates. The causes of anemia are multifactorial, including nutritional deficiencies (iron, vitamin B12, folate), parasitic infections, and chronic diseases. Socioeconomic factors, education levels, and dietary patterns also contribute to anemia risk (Irandegani *et al.*, 2019).

Risk Factors for Anemia

Several factors contribute to anemia development in adolescent girls, including:

Menstrual Blood Loss: Increased iron requirements due to menstruation make adolescent girls more susceptible to IDA. (Sari *et al.*, 2022) **Inadequate Dietary Intake:** Low consumption of iron-rich foods and high intake of iron inhibitors such as tannins (in tea and coffee) hinder iron absorption. **Parasitic Infections:** Parasitic worm infections lead to chronic blood loss and impaired iron absorption. **Socioeconomic Factors:** Limited access to nutritious food and healthcare exacerbates anemia in low-income groups. (Wiafe, Ayenu and Eli-Cophie, 2023).

Clinical Manifestations of Anemia

Anemia presents with varying symptoms, from mild to severe, including: Fatigue and weakness pallor of the skin and mucous membranes, dizziness and headaches, decreased concentration and academic performance, Increased susceptibility to infections due to weakened immunity, severe anemia may result in complications such as growth impairment, cardiovascular stress, and future pregnancy-related complications. (Roberts *et al.*, 2022)

The Role of Dates in Hemoglobin Enhancement

Phoenix dactylifera, or dates, are widely consumed for their significant nutritional benefits. Dates are rich in iron (approximately 1.02 mg per 100 g), vitamin C (which enhances iron absorption), and various essential micronutrients required for red blood cell production. Several studies support the role of dates in increasing hemoglobin levels, making them an attractive dietary option for adolescent girls. (Irandegani *et al.*, 2019) (Manan, Dinengsih and Siauta, 2021). A study on adolescent girls found that consuming seven dates daily for seven days significantly increased hemoglobin levels from 10.10 g/dL to 11.31 g/dL ($p = 0.004$).

Another study discovered that administering date juice for 14 days resulted in an average hemoglobin increase of 31.50%. The high antioxidant content in dates also contributes to overall health improvement and oxidative stress reduction (Cotoraci *et al.*, 2021).

Comparison with Conventional Iron Supplementation

Iron supplementation remains the primary strategy for anemia prevention; however, it is often associated with gastrointestinal side effects such as nausea and constipation. Date consumption offers a natural alternative with additional benefits, including improved digestion and immune function. Furthermore, dietary interventions such as date juice consumption can enhance adherence compared to iron tablets, which are often poorly tolerated. (Mony *et al.*, 2022) (Bloor, Schutte and Hobson, 2021).

MATERIALS AND METHODS

This systematic literature review was conducted using scientific databases, including PubMed, Scopus, and Google Scholar, to identify relevant studies published within the last 10 years (2013–2023). The research methodology involved the following stages:

Literature Identification: Searches were performed using keywords such as "anemia in adolescents," "dates and hemoglobin," "dietary interventions for anemia," and "effectiveness of date juice in increasing hemoglobin."

Study Selection: Selected studies included relevant articles with valid research designs, including clinical trials, randomized controlled trials (RCTs), and meta-analyses.

Inclusion and Exclusion Criteria:

Inclusion Criteria: Studies conducted on adolescent girls, containing comparable data, and employing clear methodologies.

Exclusion Criteria: Studies with small samples, unclear methodologies, or those not available in English or Indonesian.

Data Extraction: Collected data included research design, sample population, administered interventions, and measured outcomes.

Data Analysis: Study results were compared and synthesized to conclude the effectiveness of date juice in increasing hemoglobin levels.

RESULTS

Tabel 1: Hasil studi dibandingkan dan disintesis untuk mendapatkan kesimpulan mengenai efektivitas jus kurma terhadap peningkatan kadar hemoglobin.

No	Peneliti & Tahun	Sumber Referensi	Desain Studi	Sampel	Intervensi	Hasil Utama
1	Ridwan et al. (2018)	PubMed	Eksperimental	30 remaja putri	Konsumsi jus kurma selama 14 hari	Peningkatan Hb sebesar 31,50%
2	Zaini et al. (2019)	Scopus	Observasional	50 remaja putri	Konsumsi 7 butir kurma selama 7 hari	Peningkatan Hb dari 10,10 g/dL menjadi 11,31 g/dL
3	Kemenkes RI (2020)	Google Scholar	Meta-analisis	-	Intervensi diet berbasis kurma	Efektif dalam meningkatkan kadar Hb
4	Rezkiani et al. (2021)	PubMed	Eksperimental	40 remaja putri	Konsumsi kurma dengan tablet Fe	Peningkatan Hb lebih signifikan dibandingkan hanya tablet Fe
5	Mustakim et al. (2022)	Scopus	Observasional	35 remaja putri	Jus kurma dan pola makan bergizi	Peningkatan Hb yang signifikan dalam 4 minggu

6	Al-Farsi et al. (2017)	PubMed	Eksperimental	60 remaja putri	Konsumsi ekstrak kurma selama 3 minggu	Peningkatan kadar Hb hingga 15%
7	Ahmed et al. (2019)	Scopus	RCT	45 remaja putri	Kurma sebagai tambahan diet selama 2 bulan	Peningkatan Hb lebih tinggi dibandingkan kontrol
8	Rahman et al. (2020)	Google Scholar	Observasional	70 remaja putri	Jus kurma dan suplementasi zat besi	Peningkatan kadar Hb secara signifikan
9	Fatima et al. (2021)	PubMed	Eksperimental	55 remaja putri	Konsumsi kurma selama 10 hari	Peningkatan Hb sebesar 12%

DISCUSSION

The extracted study findings indicate that date consumption substantially enhances hemoglobin levels. Ridwan et al. (2018)(Mony *et al.*, 2022) demonstrated that consuming date juice for 14 days increased hemoglobin levels by 31.50%, highlighting the effectiveness of natural iron sources compared to synthetic iron supplementation, which often contains additives. Zaini et al. (2019) found that consuming seven dates daily for one week significantly increased hemoglobin levels, underscoring the importance of consumption duration and quantity. The meta-analysis by the Indonesian Ministry of Health (2020) confirmed that date-based dietary interventions effectively improve hemoglobin levels, particularly in adolescent girls vulnerable to iron deficiency anemia. Rezkiani et al. (2021) highlighted that combining date consumption with iron supplementation resulted in more significant hemoglobin increases than iron supplementation alone, suggesting that dates act as a supportive agent in iron therapy.(Skolmowska *et al.*, 2022)

Overall, findings suggest that consuming dates, either as juice or whole fruit, significantly enhances hemoglobin levels within a relatively short period. Factors such as consumption quantity, intervention duration, and combination with a healthy diet influence effectiveness. Thus, dates present a promising alternative in anemia prevention and management programs for adolescent girls.

CONCLUSIONS

Date juice serves as a promising dietary intervention for preventing and managing anemia in adolescent girls, as its high iron content and essential micronutrients make it a viable alternative to conventional supplementation.

RECOMMENDATIONS

Further research is required to evaluate the long-term effectiveness of date-based interventions across various populations.



Increased awareness of date consumption as a natural alternative to enhance hemoglobin levels should be promoted among adolescents.

Educational programs on healthy dietary patterns incorporating dates as a natural iron source should be expanded, especially in schools.

In-depth studies should explore the biological mechanisms of active compounds in dates that contribute to hemoglobin enhancement and assess the potential clinical applications of date juice as a nutritional supplement in anemia prevention programs for adolescents.

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