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Effectiveness of Moringa Leaf Decoction as Supportive Therapy for Anemia Patients

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ABSTRACT

Anemia remains a significant global public health problems, particularly among women of reproductive age , pregnant women , adolescents , and older adults . It is characterized by low hemoglobin levels , resulting in reduced oxygen-carrying capacity of the blood . Besides iron supplementation , complementary therapies using natural products have gained increasing attention , including the use of *Moringa oleifera* Moringa leaves leaves are rich in iron , vitamin C, vitamin A, folate , protein, and antioxidants , which contribute to erythropoiesis and hemoglobin synthesis .

This study aimed to review scientific evidence regarding the effectiveness of Moringa leaf decoction as an adjunctive therapy for improving hemoglobin levels in patients with anemia. A literature review was conducted using scientific articles published between 2019 and 2025 from Google Scholar , PubMed , and ScienceDirect . Relevant studies discussing the effects of Moringa leaf consumption on hemoglobin levels were selected and analyzed descriptively .

The review revealed that most studies reported significant improvements in hemoglobin levels following regular consumption of Moringa leaf preparations . The beneficial effects were associated with the high iron content and vitamin C, which enhances iron absorption . However , treatment outcomes varied depending on dosage , duration of administration , nutritional status, patient adherence , and the underlying cause of anemia. Therefore , Moringa leaf decoction May serve as a safe and affordable complementary therapy but should not replace standard medical treatment .

Keywords : *Anemia, Hemoglobin, Moringa Oleifera , Complementary Therapy , Iron .*

1. Introduction

Anemia is a public health problem that remains a global concern. This condition occurs when hemoglobin (Hb) levels in the blood fall below normal, reducing the blood's ability to transport oxygen to body tissues. The effects of anemia not only cause physical symptoms such as fatigue, weakness, dizziness, shortness of breath, and decreased

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concentration, but can also reduce productivity, impair cognitive development, increase the risk of pregnancy complications, and worsen a person's quality of life. Therefore, anemia management is a priority in public health programs in various countries.

World Health Organization (WHO) The World Health Organization (WHO) states that anemia remains a global health problem affecting billions of people worldwide. The groups most vulnerable to anemia are adolescent girls, pregnant women, toddlers, and women of reproductive age. In Indonesia, the prevalence of anemia remains relatively high, especially among adolescents and pregnant women. This condition is influenced by various factors, such as low iron intake, folic acid and vitamin B12 deficiencies, infectious diseases, chronic bleeding, and impaired nutrient absorption.

Primary therapy for anemia depends on the cause, such as iron supplementation for iron deficiency anemia, vitamin B12 or folate supplementation for specific nutritional deficiencies, and management of the underlying disease if the anemia is caused by a chronic condition. In addition to medical therapy, various natural ingredients are increasingly being researched as adjunctive therapies. therapy **)** which can help improve hemoglobin status and nutritional intake, one of which is Moringa leaves (*Moringa oleifera*).

Moringa leaves are known for their high nutritional value. Various studies have shown that moringa leaves contain protein, iron, vitamin A, vitamin C, vitamin E, calcium, potassium, magnesium, zinc, folic acid , and antioxidant compounds such as flavonoids and polyphenols . The vitamin C content in moringa leaves also plays a role in increasing iron absorption in the intestines, thus supporting hemoglobin formation. This combination of nutrients makes moringa leaves a potential supportive therapy for anemia sufferers.

The use of moringa leaves in the health sector has developed into various forms, such as capsules, powder, extract, and fresh leaf decoction. Moringa leaf decoction is a method of preparation that is easily accessible to the public due to its readily available raw materials, relatively low cost, and simple processing method. Therefore, moringa leaf decoction has the potential to be developed as a local food-based intervention to support anemia management.

Research results on the effectiveness of boiled moringa leaves vary. Some studies report significant increases in hemoglobin levels after regular consumption of moringa leaves, while others show smaller increases, influenced by factors such as adherence, dosage, duration of administration, nutritional status, and the cause of anemia. These varying results highlight the need for a comprehensive review of published scientific evidence.

2. RESEARCH METHODS

a. Research Design

This research uses the Literature method Review with a descriptive approach. Literature A review is a research method that involves identifying, evaluating, and

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synthesizing various published research findings on a specific topic. This approach was chosen to obtain a comprehensive overview of the effectiveness of Moringa leaf decoction . *oleifera*) as a supportive therapy to increase hemoglobin levels in anemia sufferers.

Through this method, researchers do not intervene directly with respondents, but rather collect and analyze various research results that have been published in national and international scientific journals.

b. Data source

The data sources used are **secondary data** obtained from scientific articles published through several scientific databases, namely:

1) Google Scholar
2) PubMed
3) ScienceDirect
4) DOAJ (Directory of Open Access Journals)

c. Inclusion and Exclusion Criteria

Table 1. Article Selection Criteria

Criteria	Inclusion	Exclusion
Publication Year	2019–2025	< 2019
Language	Indonesian and English	Besides Indonesian & English
Article Type	Original Research	Review , Editorial
Access	Full text	Abstract only
Topic	Moringa leaves and anemia	Not related

d. Article Selection Process

The article selection stages are as follows:

1) Identify articles through databases .
2) Duplicate article removal.
3) Selection by title.
4) Abstract selection.
5) Full article eligibility assessment text .
6) Eligible articles were analyzed further.

e. Data Analysis Techniques

The analysis was carried out using the narrative analysis method (Narrative Synthesis) .

The analysis stages include:

1) data reduction
2) data extraction
3) grouping of research results
4) synthesis of results
5) drawing conclusions

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The data analyzed includes:

1) respondent characteristics
2) research design
3) form of intervention
4) duration of administration
5) Hb increase results
6) research conclusions

3. RESEARCH RESULTS AND DISCUSSION

a. Literature Review Results

Literature This review analyzes various articles discussing the use of moringa leaves as a supportive therapy for anemia sufferers. The articles reviewed come from national and international journals with various research designs, including *randomized controlled trials* . *controlled trial* (RCT), *quasi experiment* , *pre-test post-test* , and *systematic review* . In general, all studies examined changes in hemoglobin levels after administering moringa leaves in the form of decoction, capsules, powder, tea, or extract.

Table 2. Synthesis of Research Results

Variables	Synthesis Results
Form of intervention	Moringa leaf decoction, capsules, powder, extract
Duration of intervention	14 days–6 months
Respondent group	Pregnant women, adolescent girls, women of childbearing age, iron deficiency anemia patients
Main outcome	Increased hemoglobin levels
General conclusion	The majority of studies show an increase in hemoglobin levels after consuming Moringa leaves as a supportive therapy.

Based on this synthesis, most studies show an increase in hemoglobin levels after regular administration of moringa leaves. Although the magnitude of the increase varies between studies , the results tend to point to positive benefits as a supportive therapy.

1) Nutritional Content of Moringa Leaves

The advantage of moringa leaves lies in their comprehensive nutritional content. These leaves contain iron, vitamin C, vitamin A, folic acid , protein, calcium, magnesium, potassium, and various antioxidant compounds such as flavonoids and polyphenols . This combination of nutrients supports red blood cell formation (erythropoiesis) and hemoglobin synthesis.

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Table 3. Important Nutritional Content of Moringa Leaves

Contents	Benefits for Anemia
Iron	The main ingredient in the formation of hemoglobin
Vitamin C	Increase iron absorption
Folic acid	Supports erythrocyte formation
Protein	Helps hemoglobin synthesis
Vitamin A	Supports iron metabolism
Antioxidants	Reduces oxidative stress on blood cells

2) Hemoglobin Increase Mechanism

The increase in hemoglobin levels after consuming Moringa leaves occurs through several mechanisms.

First, iron content provides the main raw material for the formation of hemoglobin.

Second, vitamin C increases iron absorption in the intestines, thus improving the availability of iron for hemoglobin formation.

Third, folic acid plays a role in the formation of red blood cell DNA, thereby accelerating the process of erythropoiesis.

Fourth, the antioxidant content helps protect red blood cells from damage caused by free radicals.

3) Effectiveness of Moringa Leaf Decoction

Boiled moringa leaves are one of the simplest and most readily available consumption methods. Besides being inexpensive and readily available, boiled moringa leaves can be prepared without special technology, making them a potential source of locally-based functional food.

Several studies have reported that regular consumption of boiled moringa leaves for several weeks has shown a tendency to increase hemoglobin levels, especially when combined with a nutritious diet or iron supplementation as recommended by healthcare professionals. However, results vary depending on dosage, frequency of consumption, nutritional status, compliance, and the cause of anemia.

4) Comparison between studies

In general, there are similar results that Moringa leaves have a positive effect on hematological parameters.

The difference lies in:

1) dosage form (decoction, extract, capsule, powder);
2) dose and duration of administration;
3) respondent characteristics (pregnant women, teenagers, or patients with certain conditions);
4) accompanying therapy used.

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Studies with RCT designs tend to provide stronger evidence than observational or pre -experimental studies, although the number of clinical trials in humans is still relatively limited.

b. Discussion

Literature results A review shows that moringa leaves have potential as a supportive therapy to increase hemoglobin levels in people with anemia. This potential is related to their content of iron, vitamin C, folic acid , protein, and various other micronutrients that support red blood cell formation. Furthermore, the antioxidant activity of moringa leaves is thought to help maintain red blood cell integrity and reduce oxidative stress.

These findings are in line with clinical trials evaluating moringa leaf extract as an adjunct to iron therapy, which showed improvements in hematological parameters in the intervention group.

The available evidence also presents several limitations. Variations in study design, dosage form, dosage, intervention duration, and participant characteristics mean that results are not always consistent across studies . Furthermore, most studies have relatively small sample sizes, necessitating more methodologically robust clinical trials to confirm efficacy, optimal dosage, and long-term safety.

Moringa leaf decoction can be considered as a supportive therapy in the management of anemia, particularly iron deficiency anemia, but it does not replace standard treatment . Anemia treatment should be tailored to the cause and administered under the supervision of a healthcare professional.

4. CONCLUSION AND SUGGESTIONS

a. Conclusion

Based on the results of the literature review that was analyzed, it can be concluded that Moringa leaves (*Moringa oleifera*) has the potential as an adjunctive therapy therapy) in increasing hemoglobin levels in anemia sufferers . Various studies have shown that consuming moringa leaves, whether in the form of decoctions, capsules, powder, tea, or extract, tends to increase hemoglobin levels, especially in people with iron deficiency anemia, pregnant women, adolescent girls, and women of childbearing age. This effect is supported by the content of iron, vitamin C, folic acid , protein, vitamin A, and antioxidants that play a role in erythropoiesis and iron absorption.

The effectiveness of moringa leaves is influenced by various factors, such as dosage form, dosage, duration of administration, adherence, nutritional status, and the cause of anemia. Therefore, results regarding hemoglobin levels may vary across studies and populations. Available scientific evidence also suggests that moringa leaves are more appropriate as a supportive therapy , not a substitute for standard

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medical therapy, especially for anemia requiring specific management tailored to its cause.

Literature results This review confirms that the use of boiled moringa leaves is a readily available, relatively inexpensive, functional food alternative with the potential to support anemia prevention and management programs in the community. However, clinical trials with more robust designs, larger sample sizes, and longer intervention durations are needed to confirm its effectiveness, safety, and optimal dosage.

b. Suggestion

Based on the results of the study that has been conducted, several suggestions that can be given are as follows.

1) For the Community
   People can use moringa leaves as a nutritious food source that helps prevent anemia. However, their use should be part of a balanced diet and should not replace medication recommended by a healthcare professional.
2) For Health Workers
   Healthcare workers are expected to provide education on the benefits of moringa leaves as a supportive therapy, while also explaining that anemia treatment must be tailored to the cause and adhere to clinical guidelines.
3) For the Government
   The government can encourage the use of moringa leaves as part of local food diversification programs and public nutrition education, especially in areas with a high prevalence of anemia, through an evidence-based approach.
4) For Further Researchers
   It is recommended that future research use a randomized design. Controlled A randomized trial (RCT) with a larger sample size, standardized dosage , and monitoring of other hematological parameters such as serum ferritin , hematocrit, erythrocytes, and transferrin saturation is needed. Furthermore, research is needed to evaluate the safety of long-term consumption and compare the effectiveness of Moringa leaf decoction with other dosage forms such as capsules, powders, or extracts.

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