



Systematic Review Of Clinical Efficacy Of Ayurvedic Formulations In The Management Of Iron Deficiency Anemia (Pandu Roga)

1Dr. Rita Singh, 2Dr. Anurag Singh Rajput, 3Dr. Garima Sisodiya

1Professor (I/C) & HOD, Rog Nidan & Vikriti Vigyan Department, 2Professor & Principal, Department of Ras Shastra evum Bhaishajya Kalpana, 3MD Scholar, Rog Nidan & Vikriti Vigyan Department

1Pt. Khushilal Sharma Government Autonomous Ayurveda College & Institute, Bhopal (M.P.),

2Mansarovar Ayurvedic Medical College, Hospital and Research Centre, Bhopal (M.P.),

3Pt. Khushilal Sharma Government Autonomous Ayurveda College & Institute, Bhopal (M.P.)

Background:

Iron Deficiency Anemia (IDA) is a common nutritional deficiency disorder worldwide and a major public health concern in developing countries, including India. It predominantly affects children, women of reproductive age, and pregnant women, leading to reduced physical capacity, impaired quality of life, and increased morbidity. In Ayurveda, the clinical manifestations of IDA closely resemble *Pandu Roga*, which is associated with *Rasa Dhatu Kshaya*, *Agnimandya*, and imbalance of *Tridosha*.

Objective:

To systematically review clinical evidence on the efficacy and safety of selected Ayurvedic formulations in the management of Iron Deficiency Anemia (*Pandu Roga*).

Materials and Methods:

A systematic review with descriptive synthesis was conducted using six peer-reviewed Indian clinical studies published between 2012 and 2025. Studies evaluating Ayurvedic herbal or herbomineral formulations in human subjects with defined hematological outcomes were included. Data on hemoglobin levels, red blood cell indices, iron parameters, clinical symptoms, and adverse drug reactions were extracted and analyzed.

Results:

More than 650 patients aged 2–60 years were included, with a predominance of female participants. Formulations such as *Dhatri Lauha*, *Punarnavadi Mandura*, *Trikatrayadi Lauha*, *Loha Churna Vatakam*, *Yogaraja Rasayana*, and *Pandughni Vati* showed significant improvement in hemoglobin levels, red blood cell indices, and iron parameters. Clinical symptoms improved in up to 85% of patients. No serious adverse drug reactions were reported.

Conclusion:

Ayurvedic formulations appear effective and safe for managing Iron Deficiency Anemia. Their multidimensional action offers a holistic alternative or adjunct to conventional iron therapy, though larger randomized controlled trials are required for confirmation.

Keywords: *Iron Deficiency Anemia; Pandu Roga; Ayurvedic formulations; Lauha Kalpa; Hematological parameters.*

Introduction

Iron Deficiency Anemia (IDA), one of the most prevalent nutritional deficiency illnesses worldwide, is a major public health issue, especially in developing nations like India. Children, women of reproductive age, and pregnant women are particularly affected, leading to cumulative adverse effects on growth, development, and overall health.¹ Clinical signs and symptoms of IDA include fatigue, pallor, physical weakness, dyspnea, and impaired cognitive function. According to Ayurveda, these clinical features closely resemble those of *Pandu Roga*, a condition primarily attributed to *Rasa Dhatu Kshaya* along with derangement of *Agni* and imbalance of *Tridosha*, particularly *Pitta* and *Vata*.²

Conventional management of IDA typically relies on oral or parenteral iron supplementation. However, long-term patient compliance is often compromised due to gastrointestinal adverse effects such as nausea, constipation, and metallic taste, thereby limiting therapeutic effectiveness.¹ Ayurveda, with its holistic concept of *Dhatu Poshana*, offers an integrated therapeutic approach through herbal and herbomineral formulations that not only replenish iron stores but also correct underlying digestive and metabolic dysfunctions.²

Classical Ayurvedic texts describe several *Lauha Kalpas* and composite formulations containing naturally processed iron (*Lauha Bhasma*), *Deepana–Pachana Dravyas*, and *Rasayana* agents. These formulations are designed to enhance iron bioavailability, strengthen *Agni*, and promote proper formation of *Rasa Dhatu*.² Despite their extensive traditional use and encouraging clinical outcomes, consolidated scientific evidence regarding their efficacy and safety remains limited.

To critically assess the therapeutic potential of formulations such as *Dhatri Lauha*, *Punarnavadi Mandura*, *Trikatrayadi Lauha*, *Loha Churna Vatakam*, *Yogaraja Rasayana*, and *Pandughni Vati* in the management of Iron Deficiency Anemia (*Pandu Roga*), the present study undertakes a systematic review of six clinical trials conducted in Indian Ayurvedic research settings.^{3–8} The objective of this study is to synthesize available clinical evidence, compare therapeutic outcomes, and evaluate safety profiles, thereby bridging traditional Ayurvedic knowledge with contemporary scientific research methodologies.

Materials and Methods

Data Sources and Study Selection

Six peer-reviewed Indian clinical trials published between 2012 and 2025 were selected based on predefined criteria, including safety reporting, clearly defined outcome measures with hematological parameters, inclusion of Ayurvedic herbomineral interventions for Iron Deficiency Anemia (*Pandu Roga*), and adequate sample size.^{3–8} All included studies were conducted at recognized academic or clinical research centers and reported appropriate ethical approval.^{3–8}

Study Characteristics

The included studies collectively enrolled more than 650 patients aged between 2 and 60 years, with a predominance of female participants.^{3–8} Study settings comprised outpatient departments, maternity clinics, and pediatric wards.^{3–8} The study designs included single-arm open-label trials, prospective multicenter studies, and comparative randomized clinical trials.^{3–8}

Intervention Details

The evaluated formulations varied in composition but commonly contained iron-based *Bhasmas* (*Lauha* and *Mandura*) combined with herbal bioenhancers such as *Emblica officinalis* Gaertn. (*Amalaki*), *Glycyrrhiza glabra* L. (*Yashtimadhu*), and *Boerhavia diffusa* L. (*Punarnava*).^{3–8} These formulations were administered orally in doses ranging from 125 mg to 3 g per day for treatment durations varying between 30 and 90 days.^{3–8}

Outcomes Assessed

The primary outcome measure across studies was the change in hemoglobin (Hb) concentration from baseline to post-treatment.^{3–8} Secondary outcome measures included red blood cell indices (MCV, MCH, MCHC), serum iron, serum ferritin, transferrin saturation, and improvement in clinical symptoms such as fatigue, pallor, and dyspnea.^{3–8} Safety assessment included monitoring of adverse drug reactions and evaluation of liver and kidney function parameters, where reported.^{3–8}

Statistical Analysis

Changes in outcome parameters from baseline to the end of treatment were recorded in each study. The original trials employed paired *t*-tests or appropriate non-parametric tests and reported statistical significance at $p < 0.05$.^{3–8} Due to heterogeneity in study design, population characteristics, interventions, and outcome assessment methods, a pooled quantitative meta-analysis was not performed. Instead, a descriptive synthesis was undertaken to evaluate overall trends in efficacy and safety across studies.^{3–}

Result and Discussion

The six included studies enrolled patients from diverse backgrounds, predominantly residing in regions with limited healthcare resources across India.^{3–8} Female participants constituted more than 65% of the study population, reflecting the higher prevalence of anemia in this group.^{3–8} At baseline, most participants presented with mild to moderate anemia, with hemoglobin levels ranging between approximately 6 and 11 g/dL.^{3–8}

Hematological Efficacy

All evaluated Ayurvedic formulations demonstrated statistically significant increases in hemoglobin levels following treatment.^{3–8} *Yogaraja Rasayana* showed the greatest improvement, whereas *Pandughni Vati* exhibited comparatively lower elevation, likely attributable to differences in study population and treatment duration.^{3–8} The comparative changes in hemoglobin levels across formulations are summarized in **Tables 1 and 2**.^{3–8}

Red Blood Cell Indices and Iron Markers

Mean Corpuscular Volume (MCV) and Mean Corpuscular Hemoglobin Concentration (MCHC) showed statistically significant improvement ($p < 0.01$) in major trials, indicating effective erythropoiesis.^{3–5} Serum ferritin levels and iron stores demonstrated significant positive changes, particularly in studies evaluating

Dhatri Lauha, *Punarnavadi Mandura*, and *Trikatrayadi Lauha*.^{3–5} Corresponding improvement in transferrin saturation further suggested enhanced iron metabolism.^{3–5} Detailed changes in red blood cell indices and iron parameters are presented in **Table 3**.^{3–5}

Symptomatic and Clinical Outcomes

Clinical symptoms such as fatigue, pallor, exertional dyspnea, palpitations, and generalized weakness showed substantial reduction across studies, with up to 85% symptomatic relief reported following treatment.^{3–8} These improvements correlated with enhancement in hematological parameters and improved oxygen delivery capacity.^{3–8}

Safety Profile

None of the reviewed studies reported serious adverse drug reactions among the more than 650 patients included.^{3–8} Minor, self-limiting adverse effects such as mild nausea and abdominal discomfort were reported in a small proportion of participants.^{3–8} Notably, Ayurvedic formulations demonstrated superior gastrointestinal tolerability compared to conventional iron therapy, which is frequently associated with constipation and intolerance.^{3–8} The incidence of adverse events is detailed in **Table 4**.^{3–8}

Comparative Observations

In pregnant women, *Punarnavadi Mandura* showed slightly superior improvement in objective hematological parameters compared to *Dhatri Lauha*.⁴ In pediatric populations, *Pandughni Vati* provided a mineral-free therapeutic option with efficacy comparable to *Punarnavadi Mandura*.⁶ *Trikatrayadi Lauha* demonstrated efficacy comparable to ferrous salt preparations while exhibiting a more favorable safety profile.⁵ Herbal bioenhancers such as *Amalaki* (vitamin C-rich) and *Trikatu* were found to facilitate improved iron absorption and hematopoiesis.^{3–8} The combined presence of *Rasayana*, *Deepana*, and *Srotoshodhaka* properties in these formulations addressed both nutritional deficiency and metabolic dysfunction underlying *Pandu Roga*.^{2–8} A comparative summary of efficacy and safety across formulations is presented in Table 5.^{3–8}

This systematic review presents solid clinical evidence showing that *Ayurvedic* formulations are both safe and effective for managing Iron Deficiency Anemia (IDA). Across several studies, these traditional therapies consistently improved hemoglobin levels, red blood cell counts, iron stores, and even symptoms reported by patients such as fatigue, weakness, and breathlessness.

One key reason for their broad benefits appears to be their combination approach. *Ayurvedic* remedies usually mix herbomineral preparations that provide easily absorbable forms of iron with herbal ingredients that support digestion, metabolism, and immune function. This multi-targeted design offers benefits beyond what conventional iron supplements can provide, tackling both the root causes and the symptoms of Anemia. Importantly, these formulations have shown good results in diverse groups, including adults, pregnant women, and children. This demonstrates their flexibility and safety across various populations, including those most vulnerable to iron deficiency. Importantly, these formulations have shown good results in diverse groups, including adults, pregnant women, and children. This demonstrates their flexibility and safety across various populations, including those most vulnerable to iron deficiency.

However, the current body of evidence has limitations. Many studies were small, open-label, and had short follow-up periods. Some lacked placebo controls, making it hard to draw clear conclusions. To strengthen scientific confidence, future research should include larger, double-blind, randomized controlled trials with standardized dosages and long-term monitoring.

If supported by such studies, integrating *Ayurvedic* therapies into public health efforts like the *Anemia Mukh Bharat* program could significantly improve national Anemia management strategies. These natural solutions may be especially valuable in areas with limited resources, where the side effects of standard iron tablets often lead to reduced patient compliance.

Conclusion

When examining various studies, *Ayurvedic* formulas such as *Dhatri Lauha*, *Punarnavadi Mandura*, *Trikatrayadi Lauha*, *Loha Churna Vatakam*, *Yogaraja Rasayana*, and *Pandughni Vati* often demonstrate strong improvements in hemoglobin levels, red blood cell counts, and symptoms of *Pandu Roga*, which is Iron Deficiency Anemia. Among these, *Dhatri Lauha* and *Punarnavadi Mandura* act quickly to improve blood health. *Trikatrayadi Lauha* and *Loha Churna Vatakam* are more effective at improving digestion and metabolism, which helps with iron absorption. *Yogaraja Rasayana* and *Pandughni Vati* enhance overall health, energy, and long-term wellness due to their *Rasayana* and *Tridosahara* properties.

Overall, these formulas are safe for long-term use and offer benefits beyond just improving hemoglobin levels. Compared to traditional iron treatments, *Ayurvedic* combinations provide a more complete approach by boosting *Agni*, increasing nutrient absorption, and reducing digestive side effects. Therefore, they serve as valuable additions or alternatives for managing Anemia and should be part of comprehensive Anemia control programs that include more extensive clinical testing.

References

- **World Health Organization.**
The global prevalence of anemia 2021 [Internet]. Geneva: World Health Organization; 2023 [cited 2025 Jan 10]. Available from: <https://www.who.int>
- **Agnivesha.** *Charaka Samhita*, with Chakrapani Datta commentary. Chikitsa Sthana, Pandu Roga Chikitsa Adhyaya. Varanasi: Chaukhambha Sanskrit Sansthan; Reprint edition.
- **Srikanth N, Rao BC, Yadav B, Rai AK, Jameela S, Rana RK, et al.**
Dhatri Lauha in the management of iron deficiency anemia: A prospective open-label single-arm multicenter trial. *Ayu.* 2021;42(2):69-75.
- **Khandelwal DA, Donga SB, Dei L.**
Clinical efficacy of Punarnava Mandura and Dhatri Lauha in the management of Garbhini Pandu (anemia in pregnancy). *Ayu.* 2015;36(4):397-403.
- **Khan SK, Vyas SN, Chandola HM.**
Efficacy of Trikatrayadi Lauha in Panduroga with special reference to iron deficiency anemia. *Ayu.* 2012;33(1):62-67.
- **Kori VK, Patel KS.**
Efficacy of Pandughni Vati and Punarnavadi Mandura Vati in the management of Pandu with special reference to iron deficiency anemia in children: An open-label comparative clinical trial. *Ayu.* 2020;41(4):218-224.
- **Mishra M, Dwivedi KK, Gupta K, Kumar A.**
A clinical study to evaluate the efficacy of Yogaraja Rasayana in Pandu Roga with special reference to iron deficiency anemia. *Medicine (India).* 2024;3(2):64-70. doi:10.25259/MEDINDIA_10_2024.
- **Gupta S, Vinayak JM, Gupta NK, Bhatt A.**
A single-arm open-label prospective trial on the efficacy of Loha Churna Vatakam on hemoglobin percentage in iron deficiency anemia (Pandu). *Asian J Pharm Res Health Care.* 2024;16(4):461-465. doi:10.4103/ajprhc.ajprhc_178_24.
- **National Health Mission.**
Anemia Mukht Bharat operational guidelines [Internet]. New Delhi: Ministry of Health and Family Welfare, Government of India; 2021 [cited 2025 Jan 10]. Available from: <https://anemiamukhtbharat.info>

Table 1-Clinical Efficacy of Ayurvedic Formulations in Iron Deficiency Anemia

Formulation	Baseline Hb Mean (g/dL)	Post-Treatment Hb Mean (g/dL)	Mean Increase (g/dL)	Statistical Significance
<i>Dhatri Lauha (400 pts)</i>	8.46	9.18	+0.72	p < 0.001
<i>Yogaraja Rasayana (100 pts)</i>	8.92	10.20	+1.28	p < 0.001
<i>Loha Churna Vatakam (43 pts)</i>	10.63	11.49	+0.86	p < 0.05
<i>Trikatrayadi Lauha (34 pts)</i>	9.71	10.13	+0.42	p < 0.001
<i>Punarnavadi Mandura (15 pts, pregnancy)</i>	8.84	9.50	+0.66	p < 0.05
<i>Pandughni Vati (30 pts, children)</i>	10.16	10.54	+0.38	p < 0.01

Table 2- Hemoglobin Improvement and Sample Sizes

Formulation	Sample Size (n)	Pre-Treatment Hb (g/dL)	Post-Treatment Hb (g/dL)	Mean Improvement (g/dL)
Dhatri Lauha	400	8.46	9.18	0.72
Punarnavadi Mandura	15 (pregnancy)	8.84	9.50	0.66
Trikatrayadi Lauha	34	9.71	10.13	0.42
Loha Churna Vatakam	43	10.63	11.49	0.86
Yogaraja Rasayana	100	8.92	10.20	1.28
Pandughni Vati	30 (children)	10.16	10.54	0.38

Table no 3- Hematological Efficacy of Ayurvedic Formulations in IDA:Changes in Key Blood Indices.

Parameter	Dhatri Lauha	Punarnavadi Mandura	Trikatrayadi Lauha	Other Formulations
Mean Corpuscular Volume (MCV) (fL)	Significant increase (p<0.01)	Significant increase (p<0.01)	Significant increase (p<0.01)	Improved in large trials
Mean Corpuscular Hemoglobin Concentration (MCHC) (g/dL)	Significant increase (p<0.01)	Significant increase (p<0.01)	Significant increase (p<0.01)	Improved in large trials
Serum Ferritin (ng/mL)	Statistically significant positive change	Statistically significant positive change	Statistically significant positive change	Positive change noted
Transferrin Saturation (%)	Significant improvement	Significant improvement	Significant improvement	Corresponding improvement

Table no 4- Incidence of Adverse Events in Patients

Adverse Event	Percentage of Patients (%)
None or Minor	98.5
Mild Nausea	0.8
Abdominal Discomfort	0.7

Table No 5-Comparative Efficacy and Safety Summary of Ayurvedic Formulations for IDA

Formulation Comparison	Superiority/E quality
<i>Dhatri Lauha vs Punarnavadi Mandura (Pregnancy)</i>	<i>Punarnavadi Mandura</i> slightly more effective in objective markers; both safe
<i>Pandughni Vati vs Punarnavadi Mandura (Kids)</i>	Both equally effective for most outcomes; <i>Mandura</i> slightly superior for ferritin increase
<i>Trikatrayadi Lauha vs Fersolate-CM</i>	Both improved Anemia; <i>Trikatrayadi Lauha</i> safer (no ADR)

Figure Legends

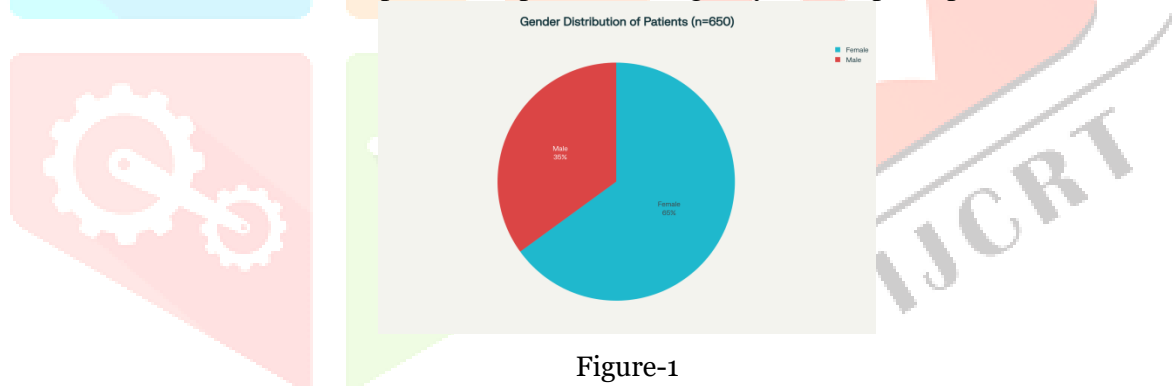
Figure 1. Gender distribution of patients included in the analyzed studies.

Figure 2. Hemoglobin improvement following Ayurvedic treatments.

Figure 3. Pre/Post Treatment Changes in Key Blood Indices

Figure 4. Clinical symptom improvement percentages after therapy

Figure 5. Mechanism of iron absorption as explained through Ayurvedic principles



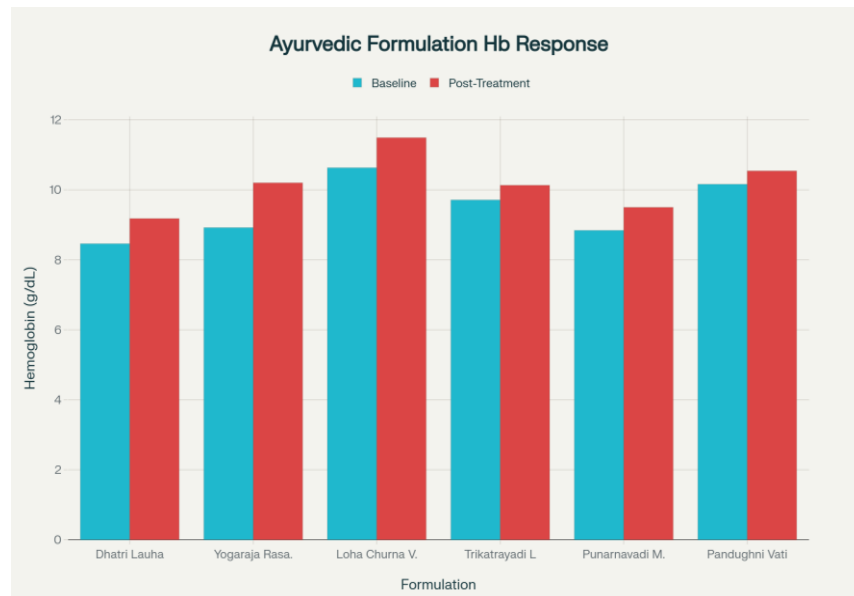


Figure-2

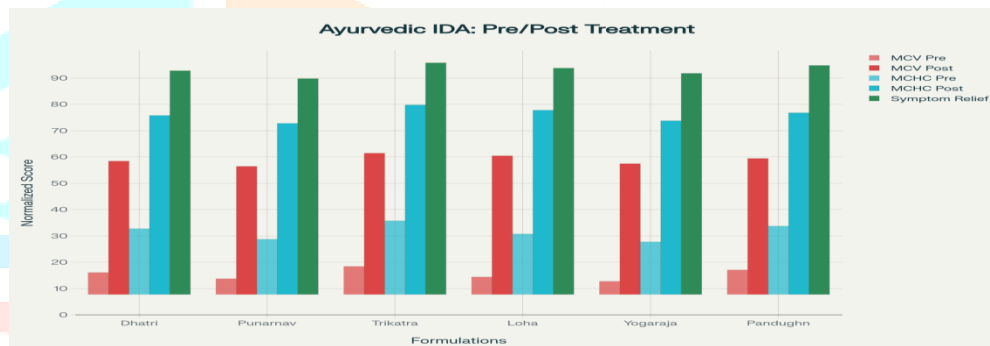


Figure-3

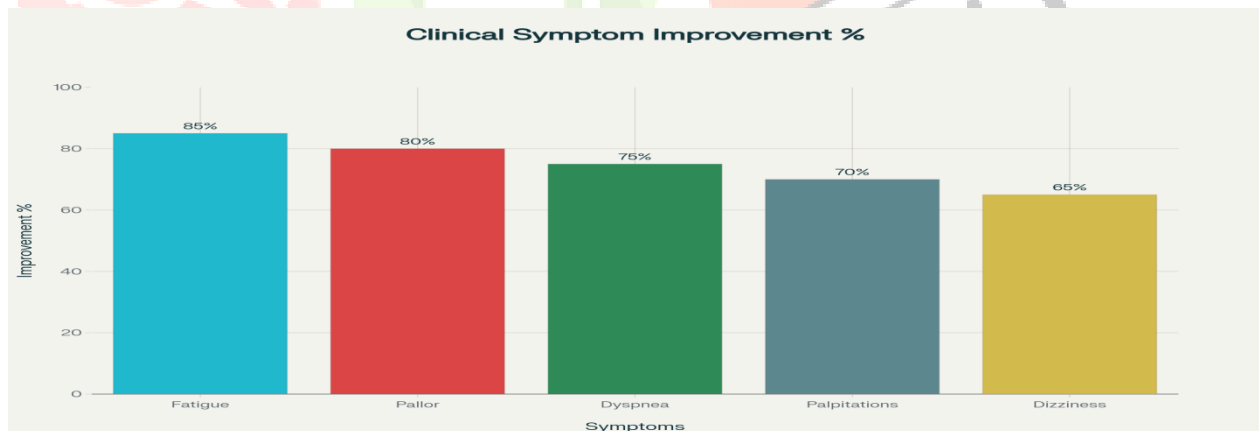


Figure-4

Aburvedic Pharmacology & Modern Hematology Integration Flowchart

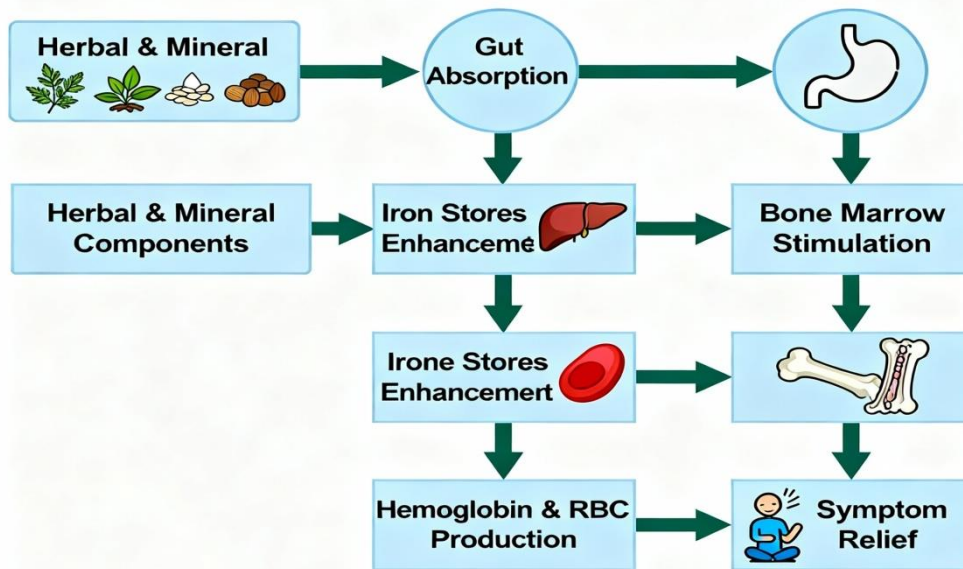


Figure-5

