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COMPARATIVE EFFICACY AND SAFETY OF AYURVEDIC INTERVENTIONS IN MANAGING GARBHINI PANDU (GESTATIONAL ANEMIA): A COMPREHENSIVE REVIEW

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Abstract

Background: Pregnancy increases nutritional and metabolic demands, and inadequate fulfillment commonly results in *Garbhini Pandu* (anemia in pregnancy). *Garbhini Pandu* is not described as a distinct disease in Ayurveda, it is understood through *Pandutva* (pallor), *Vivarnatva* (discoloration), and *Rasapradoshaja Vikara* (disorders from impairment or vitiation of *Rasa Dhatu*) arising from *Mandagni* (decreased digestive fire), *Rasa–Rakta Dhatu Kshaya* (depletion of plasma and blood tissues), impaired *Dhatu Poshana* (tissue nourishment and metabolism.), and *Pitta* predominance. Clinically, it manifests as pallor, weakness, giddiness, palpitations, and low hemoglobin, posing risks to maternal and fetal health.

Objectives: To evaluate the efficacy and safety of Ayurvedic formulations in *Garbhini Pandu*, with emphasis on hematological outcomes and *Samprapti*-based therapeutic rationale.

Materials and Methods: Databases including PubMed, Scopus, Google Scholar, AYUSH Research Portal, and DHARA were searched for studies (2016–2025) on Ayurvedic interventions such as *Lauha- Mandura* formulations, *Ghrita*, and *Avaleha*. Outcomes included hematological parameters, clinical symptoms, safety, and tolerability.

Results & Discussion: The majority of studies demonstrated statistically significant improvement in hemoglobin levels, red cell indices, and iron stores, along with marked relief in clinical symptoms. *Lauha-Mandura* based drugs such as *Punarnava Mandura, Dhatri Lauha, Lakshmana Lauha, Shatavari Mandura, Mandura Bhashma* produced faster hematological correction through *Raktavardhana* (hematopoiesis) and *Agni Deepana* (Stimulation of digestion and metabolism) actions, while *Ghrita* (clarified butter) and *Avaleha* (herbal paste) preparations improved digestion, nutrient assimilation, tolerability, and patient compliance. No major adverse maternal or fetal outcomes were reported. Ayurveda interventions correct anemia acting at the levels of *Agni* (digestion and metabolism), *Rasa* formation (formation of plasma nutrients), *Rakta Poshana* (formation of red cell mass), and *Srotas* (microcirculatory channels) function, rather than providing isolated iron supplementation. When compared with conventional iron–folic acid therapy, several Ayurvedic formulations showed comparable or superior efficacy with better tolerability.

Conclusion: Ayurvedic management of *Garbhini Pandu* is effective, safe, and holistic, offering a rational integrative approach to anemia in pregnancy. Further well-designed, multicentric randomized controlled trials are warranted to strengthen evidence and facilitate wider clinical adoption.

Keywords: Anemia in pregnancy, Ayurveda, Gestational anemia, *Garbhini Pandu*, *Lauha–Mandura*.

Introduction

Pregnancy is a physiologically dynamic state characterized by increased nutritional, hematological, and metabolic demands to support maternal well-being and optimal fetal growth. When these demands are inadequately met, anemia (hemoglobin less than 11g/dl and hematocrit less than 0.33g/dl) (1) emerges as one of the most common medical complications of pregnancy. The physiological demands of gestation, coupled with inadequate nutrition, improper dietary habits, or pre-existing anemia, predispose pregnant women to this condition. In Ayurveda, this condition can be explained as *Garbhini Pandu* (anemia in pregnancy). *Garbhini Pandu* may develop due to excessive intake of *Amla* (sour), *Lavana* (salty), and *Katu* (pungent) *Rasa* in the diet, along with unhealthy practices such as *Diwaswapa* (daytime sleep), *Vishamashana* (irregular and improper dietary habits), *Vegavidharana* (suppression of natural urges), and the influence of adverse *Manasika Bhavas* (psychological factors (2) primarily resulting to *Pitta dushti* (inadequate enzymatic function) causing depletion and qualitative impairment of *Rasa* and *Rakta Dhatu* (blood tissues), leading to manifestations such as *Vaivarnya* (pallor), *Daurbalya* (generalized weakness), *Shrama* (fatigue), *Bhrama* (giddiness), *Hridspandana* (palpitations), and *Rukshta* (dryness) (3) which closely resembles anemia of pregnancy as understood in modern medicine. Untreated *Garbhini Pandu* is believed to adversely affect maternal strength (*Matru Bala*) and fetal nourishment (*Garbha Poshana*), potentially leading to unfavorable pregnancy outcomes like increased risks of preterm birth, low birth weight, intrauterine growth restriction, long-term neurodevelopmental impairments, postpartum hemorrhage, heightened susceptibility to infections, maternal mortality, etc. making it a critical target for preventive and therapeutic interventions.(4) Anemia in pregnancy remains a major public health concern. 35.5% of pregnant women worldwide, suffered from anemia in 2023 (5) while the prevalence of anemia among pregnant women in India is 52.2%, (6) thus affecting more than half of pregnant women despite the implementation of national iron supplementation and maternal health programs.

Considering *Panduta* (pallor) as the predominant sign, the nearest correlation of iron deficiency anemia (IDA) can be made with *Pandu Roga*, because of the predominance of *Panduta* or pallor in the whole body. While modern management predominantly relies on iron and folic acid supplementation, issues such as poor compliance, gastrointestinal intolerance, and limited effectiveness in multifactorial anemia highlight the need for alternative or complementary approaches. Ayurveda offers a wide range of therapeutic interventions that are gentle, holistic, and can be tailored to the pregnant state, emphasizing correction of *Agni* (digestion and metabolism), nourishment of *Dhatus* (body tissues), and restoration of physiological balance without compromising fetal safety. However, variations exist in the choice of formulations, mode of administration, duration of therapy, and reported clinical outcomes across classical references and contemporary clinical studies.

Given the growing body of Ayurvedic clinical research on *Garbhini Pandu*, there is a need for a critical synthesis of available evidence to understand the comparative effectiveness of different Ayurveda interventions. This review article aims to compare various Ayurveda therapeutic modalities employed in the management of *Garbhini Pandu* and analyze their effects on hematological parameters, clinical symptoms and maternal well-being. By evaluating strengths, limitations, and safety considerations of these interventions, the review seeks to provide a comprehensive evidence-based perspective to support informed clinical decision-making and integrative antenatal care practices.

Objective

To review, compare, and analyze the effects of various Ayurvedic interventions employed in the management of *Garbhini Pandu*, with particular emphasis on their effects on clinical outcomes, hematological parameters, maternal well-being, and safety during pregnancy.

Material and methods: This review was conducted to assess the efficacy and safety of Ayurvedic interventions in *Garbhini Pandu* (Gestational anemia). A comprehensive literature search was carried out in PubMed, Scopus, Google Scholar, AYUSH Research Portal, and DHARA databases for studies published between January 2016 and December 2025 using keywords related to *Garbhini Pandu*, anemia in pregnancy, *Lauha Mandur* and 8 studies were selected for critical review. Randomized controlled trials, clinical studies, and observational studies involving pregnant women with anemia treated using Ayurvedic interventions were included. Studies involving non-pregnant populations, conventional therapy alone, reviews, case reports, and animal studies were excluded. Data were extracted on study design, interventions, hematological and clinical outcomes, maternal-fetal outcomes, and safety. Methodological quality was assessed using standard risk of bias tools, and findings were synthesized narratively due to heterogeneity across studies.

Etiology and pathogenesis

Garbhini Pandu develops due to faulty dietary habits (excess intake of *Amla* (sour), *Lavana* (salty), and *Katu* (pungent) *Rasa* (taste), *Viruddha* and *Vishamashana* (dietary incompatibility and irregular eating habits), lifestyle factors such as *Diwaswapa* (daytime sleep) and *Vegavidharana* (holding urges), and psychological stress, which collectively vitiate *Pitta* (impairs hormonal and enzymatic regulation of metabolism) and Agni (digestion and metabolism). During pregnancy, *Garbhavastha Visheṣa Nidana* (causes specifically related to pregnancy)—including increased fetal nutritional demand, *Vata* aggravation, *Pitta* vitiation, increased *Dravatva* and *Garbhaja Kleda* (physiological fluid retention with hemodilution)—further leads to *Agni Mandya* (weakening of digestive and metabolic efficiency). This results in formation of *Apakva Rasa Dhatu*. Also, there is progressive *Rasa Kṣhaya* (poorly formed & deficient nutritional component) due to continuous fetal nourishment. This is followed by *Rakta Dhatu Kṣhaya* (quantitative & qualitative deficiency of blood tissue) and *Raktavaha Srotodushti* (*Sanga* and *Kṣhaya*) (~impaired blood microcirculation and Hematopoietic dysfunction). The cumulative effect manifests clinically as *Garbhini Pandu*, correlating with gestational iron deficiency anemia. [Figure: 1]

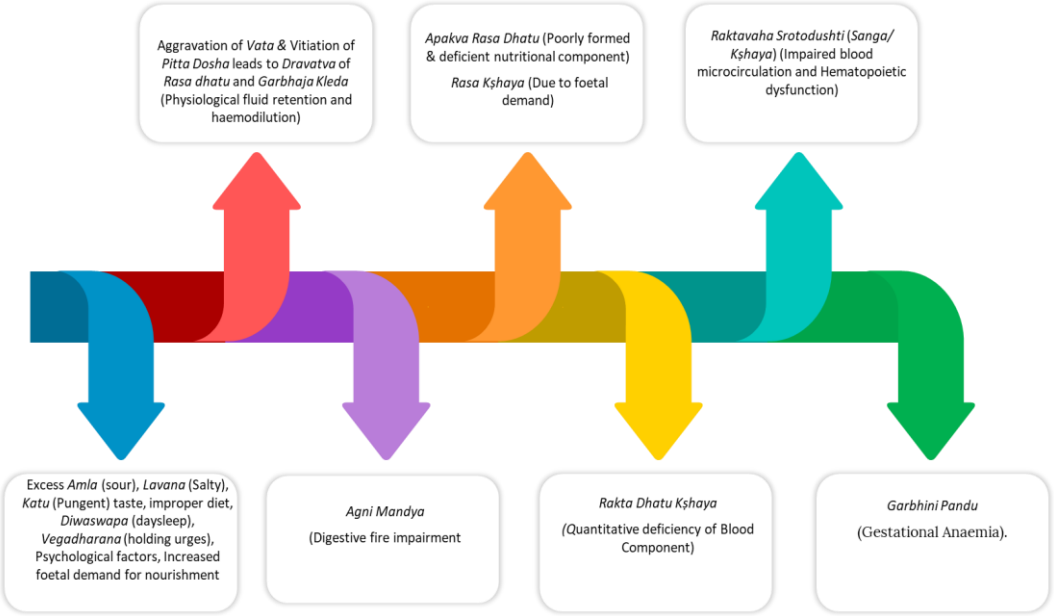


Figure 1: Etiology and Pathogenesis of Garbhini Pandu

Acharya Charaka, has described *Pandu* as a *Santarpanajanya Vyadhi* (an overnutrition-related metabolic disorder) (7), wherein the pathogenesis is attributed to *Margavarodha of Srotas*, signifying obstruction of physiological microchannels. [Figure: 2]

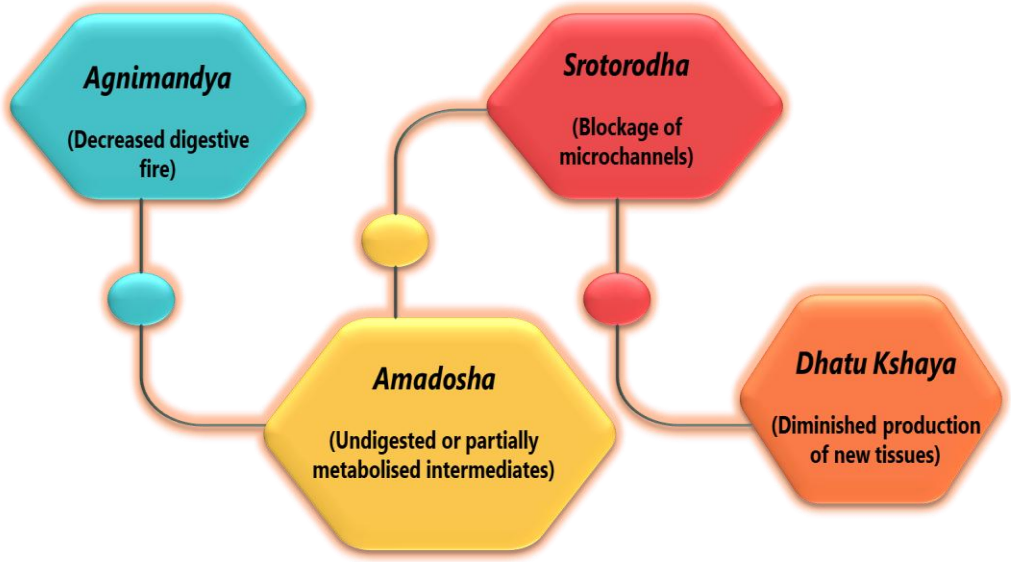


Figure 2: *Santarpanajanya* Pathogenesis of *Garbhini Pandu*

Mrudbhakṣhaṇajanya Pandu arises due to the consumption of soil or pica, which leads to vitiation of the *Doṣhas* (functional regulatory systems of the body) and adversely affects digestive and metabolic functions. (8) This practice interferes with the digestion of food and the absorption of essential nutrients, resulting in nutritional deficiencies. Additionally, ingestion of soil causes obstruction of the microcirculatory channels (*Rasavaha Srotas*), impairing proper tissue nourishment. As a result, the pathogenetic process of *Pandu* is initiated, and the disease progresses along the same pathway as described for other forms of *Pandu*.

GARBHINI PANDU

Classical Ayurveda literature provides limited references to *Garbhini Pandu*. Acharya Kashyapa has described *Pandu* as a clinical manifestation in *Garbhini* (Pregnant woman) in the context of *Rakta Gulma*, while a detailed description of this condition is notably absent in the *Bṛihattrayi*, namely Charaka Samhita, Sushruta Samhita, and Ashtanga Hridaya.(9) In contrast, Acharya Harita has explicitly included *Garbhini Pandu* among the *Ashta Garbhopadravas*, (eight complications that occur during pregnancy) recognizing it as one of the commonly encountered disorders during pregnancy arising due to fetal-related physiological influences on the mother. In recent decades, this conceptual framework has been expanded through multiple clinical studies evaluating diverse Ayurveda interventions for the management of *Garbhini Pandu*. The following table presents a comparative overview of selected research articles, highlighting the range of therapeutic approaches employed and their reported clinical outcomes, thereby facilitating a critical appraisal of their relative effectiveness. (**Refer to Table 1)**

Table 1: Clinical Research studies in *Garbhini Pandu* (Anemia in Pregnancy)

S.No.	Formulation	Author/Journal Details	Methodology	Major Outcome	Duration & Anupaan
1.	Shatavari Mandura v/s Iron folic acid (10)	Kanwar R, Sharma S, Dave HH. Journal of Ayurveda. 2016;10(1): 4-11	Total 30 pregnant females with Hb ≤10gm/dl were enrolled in **Group A –** Shatavari Mandur - 500 mg BD **Group B –** Iron folic acid tablet - (1 Tablet BD).	Both groups showed highly significant improvement in Hb% (P<0.001) with 32.93% in Group A and 27.93% in Group B. Shatavari Mandur was found highly significant in case of Hb%, & other haematological parameters. But % of relief was more in Group A (98.28%) than Group B (52.91%).	**Treatment Duration: 3months. Anupaan:** with water
2.	Mandura Bhasma (11)	Vanishree S.K. Ramesh M. International Ayurvedic Medical Journal. 2018; 6(6): 1215-1219.	20 pregnant females in 2nd Trimester were given Capsule Mandura Bhasma powder 125 mg BD for 60 days. Mandura Bhasma powder filled capsules were opened & mixed with honey to make paste for use. **Dose:** powder of 125mg, twice daily licked with honey AF for 60 days	Highly significant effect in Pallor, Anorexia & Giddiness and Hb% relief with p<0.001. Mean difference BT-AT was 9.23 that raised to 10.25 (BT-FU)	**Treatment Duration:** 90days **Anupaan:** Honey
3.	Padmadi Lauham v/s Iron Folic Acid (12)	Sharma J, Sharma S, Journal of Ayurveda XIII-3, 2019; 32 – 38.	30 pregnant patients were enrolled with Hb ≤10gm/dl Group A: 15, Padmadi lauha 500mg BD with Takra Group B: 15, Iron folic acid tablets (ferrous sulphate 100mg+ folic acid 0.5mg) 1tab BD	In Group A significant results were seen in Hb (3.24%) TRBC (6.57%), and PCV (1.37%) while in all other parameters results were insignificant. In Group B, a highly significant result was seen in Hb (7.24%), followed by significant results in TRBC (7.41%), PCV (8.29%), MCV (7.3%). Overall clinical improvement was highly significant in both groups but % relief was more in Group A (60.28%) than Group B (40.34%).	**Treatment duration: 3months Anupaan:** Padmadi Lauham 500mg BD with Takra
4.	Draksha Ghrita v/s Lakshmana Lauha (13)	Vishwanath Tekam, B. Pushpalatha, K. Bharathi, Sujata Kadam. AYUSHDHARA, 2020;7(4): 2781-2790.	2nd Trimester females with Hb ≥ 8 were enrolled. **Group A**: 30 Draksha Ghrita 5gms thrice daily, taken	Group A and Group B have shown moderate relief in 10% & 30% of cases respectively. 6% and 10% patients in	**Treatment Period= 3months. Anupaan:** Ushna Udaka for Draksha Ghrita

			empty stomach with Ushna Udaka. **Group B:** 30 Laksmana lauha orally thrice, empty stomach with honey.	Group A and B group showed marked (12-13) relief while 6.66% showed mild relief in A.% relief more in Group B. Lakshmana lauha is comparatively better to cure subjective and objective parameter of Pandu than Draksha Ghrita	Lakshmana lauha with Madhu
5.	Draksha Ghrita v/s Dadimadi Ghrita (14)	Laxmi Singh, Rachana HV. Journal of Ayurveda and Integrated Medical Sciences. 2020; 5(5):21-30.	**Group A:** 15 anaemic females were administered Draksha Ghrita in the dose of 15 ml twice daily before food with hot water for 60 days. **Group B:** 15 Dadimadi Ghrita in the dose of 15ml twice daily before food with hot water for 60 days.	**Group A:** Haemoglobin was increased up to 0.5-1.0 gm% in 6 patients, 1.2-1.7 gm% in 5 patients and > 2gms in 4 patients. **Group B:** Hb 0.5-1.0% in 7 patients, 1.2-1.7gm% in 6 & >2g% increase in 2 patients	**Treatment Period= 60days** **Anupaan=** Ushnoudaka
6.	Dhatryavleha (15)	Arsheen GA. W. Shaikh Hridaynath Lad. Jayashri R. Patil WJPR. 2020, 9(8): 2061-2065.	A Primi with 22^{+1} weeks amenorrhea and Hb gm% 8.8. **Drug-** Dhatryavleha for 45days **Dose:** 10gms in two divided doses	Hb level increased from 8.8 to 10.0gm%. Daurbalya, giddiness, Palpitation and Anorexia get relieved AT.	**Treatment period: 45days** **Anupaan:** Water
7.	Punarnava Mandura v/s Punarnava Mandura & Shatavari Avaleha (16)	Moushami Kulhare, K. Bharathi, & B. Pushpalatha. International Journal of Applied Ayurved Research. 2025; 7(2), 67–76.	**Group A** = 15Punarnava Mandura (500 mg each) 2Capsules twice daily with buttermilk half hour before meal for 60 days **Group B=** 15 Punarnava Mandura (500 mg each) 2Capsules twice daily; half an hour before meals with buttermilk and Shatavari Avaleha (5 gms) twice with milk for 60 days.	Both the groups are equally effective but Group- B Punarnava Mandura showed better results with Shatavari Avaleha with % improvement in Hb (11.14%), HCT (8.70%), TRBC (12.67%), MCH (4.21%), MCHC (3.38%), Serum iron (11.69%), serum ferritin (8.90%) and TIBC (15.90%). Hb gm% in group B BT 9.267 raised to 10.30gm% AT while in Group B from 9.047 to 10.00gm%.	**Treatment period= 60 days** **Anupaan:** Buttermilk
8.	Ayaschurnadi Yoga v/s Dhatri lauh (17)	Kalyani Kharad, Madhulika D Tiwari, Archana Chikate. International Journal of Ayurvedic Medicine. 2025; 16(1):44-51.	**Group A:** 40 Ayaschurnadi Yoga (Churna) 500mg Twice daily AF with Takra for 45days. **Group B:** 40 patients were given Dhatri Lauh (Churna) 500mg with Madhu 10gm Ghrita 5gms & Sharkara 10gms after meal.	Significant difference in the scores for groups A & B (p-value <0.05). As a result, treatment A and B are equally effective in raising the level of Hb % and decreasing subjective symptoms. 87.5% had shown good improvement in Group A while 80% in Group B.	**Treatment period= 45days** **Anupaan+** Takra for Ayashchurnadi Yoga

The reviewed clinical studies highlight the effectiveness of classical *Lauha–Mandura* preparations, *Ghrita*-based formulations, and *Avaleha Kalpanas*, used with suitable *Anupaan*, in correcting both subjective and objective parameters of *Garbhini Pandu*. **(Refer Figure 3)**

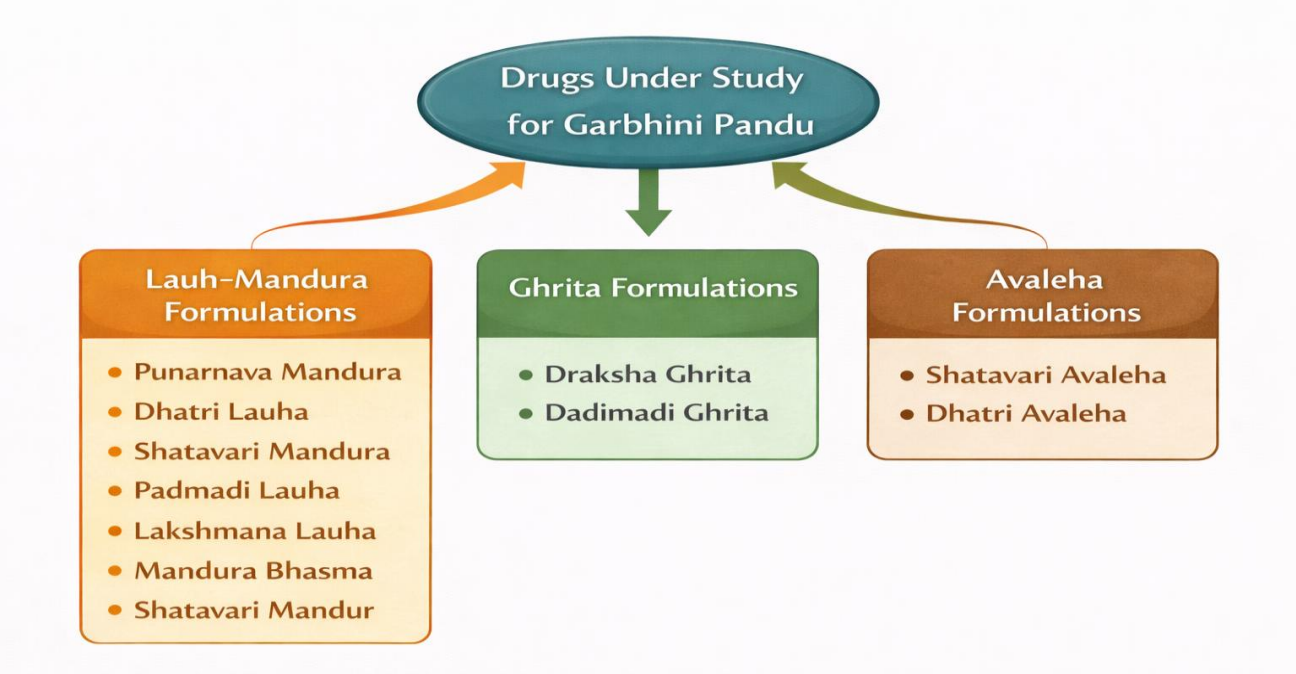


Figure 3. Showing the Categorization of Drugs under Clinical Research studies

Discussion

Garbhini Pandu is a common nutritional and metabolic disorder encountered during pregnancy, characterized by *Panduta*, *Daurbalya*, *Bhrama*, *Hridayaspandana* and *Alpa Rakta*, correlating clinically with iron deficiency anemia of pregnancy. According to Ayurveda, *Garbhini Pandu* primarily involves *Rasa–Rakta Dhatu Kshaya* (depletion of circulating plasma nutrients and reduced red blood cell mass), *Pitta* predominance, *Mandagni* **(**impaired digestive and metabolic efficiency leading to reduced nutrient absorption and utilization), and impaired *Dhatu Poshana* (defective tissue nourishment and compromised cellular nutrition), aggravated by increased fetal nutritional demand. As per review *Lauha-Mandura* (Iron-based hematinic formulation), *Avaleha* (Semisolid herbal formulation) and *Ghrita* based preparations were used to correct the gestational anemia in most of the studies. Maximum clinical evidence among the reviewed studies supports the use of *Punarnava Mandura, Dhatri Lauha, Lakshmana Lauha, Shatavari Mandura, Padmadi Lauha,* and *Mandura Bhasma*. These formulations primarily act by *Raktavardhana* (hematopoesis), and *Agni Deepana* (Stimulation of digestive and metabolic activity) properties. *Punarnava Mandura* and *Dhatri lauha* are the most frequently evaluated formulations. *Punarnava Mandura* has demonstrated statistically significant improvement in Hb%, PCV, serum iron, ferritin, and TIBC, indicating effective correction of iron deficiency. The presence of *Punarnava* (*Boerhavia diffusa*) with *Shothahara* (Anti-inflammatory and anti-edematous effect), *Deepana* actions along with *Mandura Bhasma* enhances iron bioavailability and reduces pregnancy associated edema and metabolic sluggishness. *Dhatri Lauha*, containing *Amalaki,* showed consistent improvement in Hb levels and subjective symptoms across multiple studies. *Amalaki* has *Rasayana* (Rejuvenative and adaptogenic), *Pitta-Shamana*, and *Agni Deepana* properties. *Amla* is rich in antioxidants such as gallic acid, ascorbic acid and phenolic compounds and thus helps the body's immune systems and digestion.(18) An important component found in amla fruit is ascorbic acid (vitamin C) (19) that enhances the absorption of non-heme (plant-based) iron, which is crucial for hemoglobin production, and by helping mobilize iron from storage, making it available for red blood cell formation. However, comparative studies suggest that *Dhatri Lauha* is more effective when used in combination with adjuvants like *Ghrita, Madhu* (honey), or

Avaleha, rather than as a standalone preparation. *Shatavari Mandura* due to presence of *Mandurbhasma*, *Shatavari Swarasa* (*Asparagus racemosus* Willd.), *Dadhi* (curd), *Dugdha* (milk), *Goghrita* (cow's ghee) showed superior outcomes compared to iron–folic acid tablets, with greater percentage improvement in hematological parameters and overall clinical relief due to *Brimhana* (Anabolic and nutritive effect), *Rasayana*, *Shothahara*, *Deepana*, and *Balya* (Anabolic and vitality enhancing effect) properties.(20) *Shatavari* also contains essential fatty acids, folic acid, Vitamins A, B1, B2, B6, C, E, K, various essential minerals, (21) thereby enhancing maternal tissue nourishment and fetal safety. *Lakshmana Lauha* contains *Lauha Bhasma*, *Til* (*Sesamum indicum*), *Shunthi* (*Zingiber officinale*), *Marich* (*Piper nigrum*), *Pippali* (*Piper longum*), and *Swarnamakshik Bhasma* (copper-iron pyrite ash) is potent *Rakta Vardhaka, Agni Deepaka* and *Ama Pachak* (metabolic detoxification and reduction of undigested metabolic by-products). Piperine in *Pippali* and *Maricha* acts as a bioavailability enhancer. (22) *Swarnamakshik Bhasma* provides trace copper, which is essential for iron metabolism, ceruloplasmin activity, and mobilization of iron for hemoglobin formation, thereby enhancing the utilization of iron (23) and leading to faster correction of Hb. *Padmadi Lauham* containing *Triphala* (*Emblica officinalis, Terminalia chebula, Terminalia belerica*), *Yasti Madhu* (*Glycyrrhiza glabra*), *Padma* (*Nelumbo nucifera*) and *Lauha Bhasma* also reduce pallor due to *Deepana* & *Raktavardhaka* effect. (24) *Lakshmana* (*Swetakantakari*) (*Solanum virginianum* L.), *Ashoka* (*Saraca asoca*), *Kusha* (*Desmostachya bipinnata*), *Madhuka* (*Madhuca longifolia*), *Bala* (*Sida cordifolia*), *Patha* (*Cissampelos pareira* (Linn.)), *Bilw*a (*Aegle marmelos* (L.)), *Yastimadhu* (*Glycyrrhiza glabra* Linn.), and *Lauha bhasma* (Iron calx) are the ingredients present in *Lakshmana Lauh* which possess *Tridoshashamaka* (restores body humors), *Vatanulomana* (normalization of bio-physiological system), *Deepana*, *Kriminashana* (antimicrobial), *Raktavardhaka* effect helps to reduce the *Srotorodha* (obstruction of microchannels) to correct gestational anemia. (25)

Ghrita based preparations such as *Draksha Ghrita* and *Dadimadi Ghrita* demonstrated moderate yet consistent improvement in hemoglobin levels and pregnancy-related symptoms. *Ghrita*, by virtue of its *Yogavahi* (bioavailability enhancer and synergistic drug carrier), *Rasayana*, and *Pitta-Shamana*, *Balya* (26) properties, improves tissue penetration of iron and enhances digestion and assimilation. *Draksha Ghrita*, rich in *Draksha* (*Vitis vinife*ra) having *Madhura* (sweet), *Sheeta* (cold), *Rakta-Prasadana* (hematopoietic) properties showed better tolerability and gradual improvement in Hb, mainly in patients with *Pitta* dominance, anorexia, and gastrointestinal intolerance to metallic preparations. Comparative studies indicate that while *Lauha*-based drugs produce faster hematological correction, *Ghrita* formulations contribute significantly to symptomatic relief and maternal well-being as *Ghrita* serves as an energy-dense nutrient (approximately 9.3 kcal/g), contains 8% lower saturated fatty acids that enhance digestibility, and contains antioxidants such as β-carotene and vitamin E. (27) *Dhatri Avaleha* and *Shatavari Avaleha*, when used as adjuncts, enhanced therapeutic outcomes. The study combining *Punarnava Mandura* with *Shatavari Avaleha* showed superior improvement in Hb%, serum ferritin, and TIBC compared to *Punarnava Mandura* alone as *Avaleha Kalpana* improves palatability, compliance, and nutritional Supplementation, which is crucial in pregnant women. *Garbhini Pandu* originates from *Amashaya* and *Pakwashaya*, where *Agni Mandya* leads to defective *Rasa formation* which is manifested in *Twak, Rakta*, and *Hridaya* as pallor, weakness, and palpitations. *Ayashchurnadi Yoga*, containing *Trikatu* and *Lauha,* demonstrated significant improvement in Hb levels and subjective symptoms, indicating restoration of *Agni* function. **(Refer to Figure 4)**

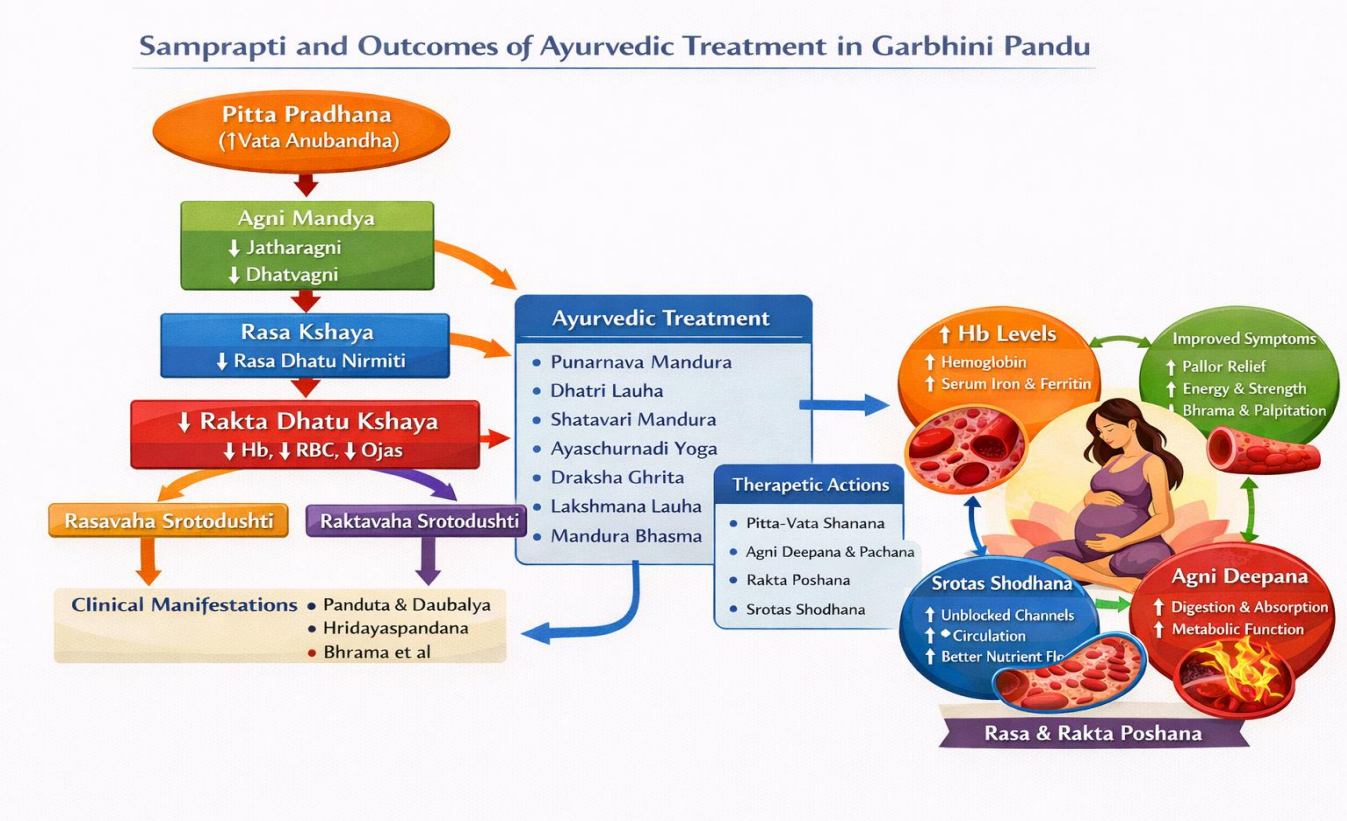


Figure 4: Pathogenesis and Outcome of Ayurvedic interventions in *Garbhini Pandu* (Anemia)

Use of appropriate *Anupaan* (adjuvant) such as *Takra* **(**buttermilk), *Dugdha* (milk), *Madhu* (honey)**,** and *Ushna Udaka* (lukewarm water) played a significant role in interrupting the pathological cascade. *Takra* enhances digestion, enhances gut immunity, and protects against gastrointestinal diseases. Furthermore, bioactive compounds present in *Takra* can play a role in metabolic control, immune modulation, and antioxidant defence.(28) *Madhu* has anti-inflammatory, antimicrobial, and antioxidant properties.(29) Furthermore, honey includes main compounds, such as proteins, vitamins, amino acids, minerals, and organic acids.(30) Milk provides important macro- and micronutrients.(31) *Avaleha* and *Ghrita Kalpanas* improved drug palatability, compliance, and sustained *Rasayana* effect which is essential in pregnancy. Most studies reported a rise in hemoglobin ranging from 0.5 to >2 g/dl, with longer treatment durations (60–90 days) producing superior outcomes. Despite prolonged administration of herbo-mineral formulations, there is not any reported adverse maternal or fetal outcomes. *Lauha–Mandura* formulations primarily act on quantitative hematological correction, *Ghrita* and *Avaleha* formulations contribute substantially to qualitative improvement in *Dhatu Bala* (tissue strength and functional integrity) and maternal health.

Safety

Safety is a critical consideration in antenatal therapeutics, particularly with herbo-mineral formulations containing *Lauha* and *Mandura*. Across the reviewed clinical studies, no serious adverse drug reactions were reported. Gastrointestinal side effects, including nausea, constipation, or epigastric discomfort, were minimal or absent, while *Ghrita* and *Avaleha* formulations demonstrated excellent tolerability. The safety of *Mandura Bhasma* is attributed to its extensive *Shodhana* and *Marana* (purification and incineration) processes, appropriate use of *Anupana*, and incorporation of *Deepana Pachana* and *Rasayana* drugs such as *Triphala*, *Shunthi*, *Pippali*, *Draksha*, and *Shatavari,* which mitigate *Agnimandya* and prevent *Ama* formation (undigested metabolic waste). Collectively, these factors support the safe and well-tolerated use of Ayurvedic formulations in the management of anemia during pregnancy.

Conclusion

Ayurvedic management of gestational anemia offers a physiologically integrative approach by enhancing digestion, metabolism, and hematopoiesis rather than relying solely on iron supplementation. *Lauha Mandura* formulations such as *Punarnava Mandura* and *Dhatri Lauha* consistently demonstrate significant improvement in hemoglobin, PCV, serum iron, ferritin, and TIBC, with good safety profiles. Supportive formulations like *Ghrita* and *Avaleha* improve tolerability, compliance, and nutritional assimilation, contributing to sustained maternal–fetal well-being. Overall, Ayurvedic interventions appear to be safe and effective alternatives or adjuncts to conventional therapy, addressing both quantitative hematological deficits and qualitative maternal health, warranting further validation through large-scale clinical trials.

Overall, the evidence suggests that Ayurveda interventions for *Garbhini Pandu* (Gestational Anemia) offer a holistic, safe, and effective alternative or complement to conventional therapy, addressing both quantitative hematological deficits and qualitative maternal health. Future well-designed, large-scale clinical trials with standardized protocols are warranted to further validate these findings and facilitate wider integration of Ayurveda based strategies in the management of gestational anemia.

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