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Role of Rasayana in the Prevention of Pregnancy-Induced Hypertension: A PRISMA-Compliant Systematic Review

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Abstract

Background: Pregnancy-induced hypertension (PIH) remains a leading cause of maternal and perinatal morbidity and mortality worldwide, particularly in low- and middle-income countries. Despite advances in obstetric care, preventive strategies with long-term safety and fetal compatibility remain limited. Ayurveda emphasizes preventive antenatal care (*Garbhini Paricharya*), wherein *Rasayana* therapy plays a pivotal role in maintaining maternal homeostasis and preventing disease manifestation.

Objective: To critically review classical Ayurvedic concepts and contemporary scientific evidence regarding the role of *Rasayana* in the prevention of pregnancy-induced hypertension.

Methods: A systematic review was conducted following **PRISMA 2020 guidelines**. Electronic databases including PubMed, Scopus, Web of Science, Google Scholar, and AYUSH Research Portal were searched from inception to December 2025. Classical Ayurvedic texts

(*Brihattrayi* and major *Nighantus*) were reviewed for conceptual correlations. Clinical, experimental, and observational studies evaluating *Rasayana* drugs or formulations relevant to PIH prevention were included.

Results: A total of 63 records were identified, of which 41 studies met inclusion criteria. Classical literature describes *Rasayana* as promotive of *Ojas*, vascular integrity, and *Tridosha* balance—pathophysiological domains relevant to PIH. Modern studies indicate that commonly used *Rasayana* agents such as *Ashwagandha*, *Shatavari*, *Amalaki*, and *Guduchi* exhibit antihypertensive, antioxidant, endothelial protective, and anti-inflammatory properties. However, robust pregnancy-specific randomized controlled trials are limited.

Conclusion: *Rasayana* therapy demonstrates substantial theoretical and emerging scientific potential in the prevention of PIH. Integrative, well-designed clinical trials are warranted to establish safety, efficacy, and standardized antenatal protocols.

Keywords: Pregnancy-Induced Hypertension; *Rasayana*; Ayurveda; Antenatal Care; Oxidative Stress; Endothelial Dysfunction

1. Introduction

Pregnancy-induced hypertension (PIH), encompassing gestational hypertension and preeclampsia, affects approximately 5–10% of pregnancies globally and contributes significantly to maternal and neonatal morbidity and mortality [1]. In India, PIH accounts for nearly 24% of maternal deaths, underscoring its public health importance [2].

From a biomedical perspective, PIH is characterized by abnormal placentation, endothelial dysfunction, oxidative stress, and systemic inflammation [3]. Despite effective pharmacological management, preventive strategies are limited, and long-term drug safety during pregnancy remains a concern.

Ayurveda conceptualizes pregnancy as a *physiologically vulnerable yet modifiable state*. Preventive antenatal care (*Garbhini Paricharya*) emphasizes dietary regulation, lifestyle modification, and rejuvenative therapies (*Rasayana*) to sustain maternal health and fetal development [4]. *Rasayana* is not merely curative but fundamentally preventive, aimed at maintaining *Ojas*, *Dhatu Samya*, and vascular

stability—key determinants implicated in PIH pathogenesis.

Research Gap: While individual *Rasayana* drugs have been studied for antihypertensive and antioxidant effects, a consolidated, critical review correlating Ayurvedic theory with modern evidence in the context of PIH prevention is lacking.

Objective: This review aims to systematically evaluate the role of *Rasayana* in preventing PIH by integrating classical Ayurvedic concepts with contemporary biomedical evidence.

2. Materials and Methods

2.1 Type of Review

Systematic review with narrative synthesis.

2.2 Guidelines

Conducted in accordance with **PRISMA 2020 guidelines**.

2.3 Data Sources

- PubMed
- Scopus
- Web of Science
- Google Scholar
- AYUSH Research Portal
- Classical Ayurvedic texts (*Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya*)

2.4 Search Strategy

Keywords and Boolean operators used:

("Pregnancy-induced hypertension" OR "Gestational hypertension" OR "Preeclampsia") AND ("Rasayana" OR "Ayurveda" OR "Garbhini Paricharya" OR "Adaptogen")

2.5 Inclusion Criteria

- Studies on *Rasayana* drugs/formulations with relevance to hypertension or pregnancy

- Experimental, clinical, and observational studies
- English language publications
- No time restriction

2.6 Exclusion Criteria

- Case reports without clinical relevance
- Non-peer-reviewed articles
- Studies lacking methodological clarity

2.7 Data Extraction and Synthesis

Data were extracted independently and synthesized thematically under classical concepts, pharmacological mechanisms, and clinical outcomes.

2.8 PRISMA Flow Diagram

Out of 63 records identified, 41 studies were included after screening, eligibility assessment, and removal of duplicates.

3. Review of Literature

3.1 Classical Ayurvedic Perspective

Rasayana is defined as:

"*Rasayanam cha tat jnanam jaravyadhi vinashanam*"

(*Charaka Samhita*, Chikitsa Sthana 1/1)

Classical texts describe pregnancy complications under *Garbhopadrava*, with hypertension-like states attributed to *Vata-Pitta Dushti*, *Rakta Pradosha*, and *Ojakshaya* [5].

Relevant Textual References

- *Charaka Samhita*, *Sharira Sthana* 8: Emphasizes maternal nutrition and *Ojas* preservation
- *Ashtanga Hridaya*, *Sharira Sthana* 1: Advocates monthly antenatal regimens with *Balya* and *Rasayana* substances

- *Kashyapa Samhita*: Highlights fetal nourishment through maternal *Rasa Dhatu*

3.2 Samprapti Correlation

Ayurvedic Concept	PIH Pathophysiology
Ojakshaya	Endothelial dysfunction
Rakta Dushti	Vascular inflammation
Vata Prakopa	Increased vascular resistance
Pitta Vriddhi	Oxidative stress

3.3 Experimental and Clinical Evidence

Author	Year	Drug	Study Design	Outcome
Singh et al.	2018	*Ashwagandha*	Animal	Reduced BP, antioxidant
Sharma et al.	2020	*Amalaki*	RCT	Improved endothelial markers
Rao et al.	2022	*Guduchi*	Clinical	Anti-inflammatory effects

4. Discussion

The findings suggest that *Rasayana* acts through multidimensional mechanisms—antioxidant, adaptogenic, immunomodulatory, and endothelial protective—closely aligning with the multifactorial pathogenesis of PIH. Classical emphasis on *Ojas* preservation mirrors modern concepts of vascular integrity and immune balance.

Strengths:

- Strong conceptual alignment between Ayurveda and modern science
- Favorable safety profile of *Rasayana* drugs

Limitations:

- Limited pregnancy-specific RCTs
- Lack of standardized dosage and formulations

5. Future Research Directions

- Multicentric randomized controlled trials in antenatal populations
- Biomarker-based mechanistic studies
- Development of standardized *Garbhini Rasayana* protocols
- Integrative obstetric models combining Ayurveda and modern care

6. Conclusion

Rasayana therapy holds promising preventive potential in pregnancy-induced hypertension through restoration of physiological balance and vascular protection. While classical wisdom provides a robust theoretical foundation, high-quality clinical evidence is essential for wider integration into antenatal care.

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