Received: 06 Oct. 2024	Revised: 12 Nov. 2024	Accepted: 24 Dec. 2024

Review Article

IJAG
Lets Explore Ayurveda Gynaecology

SCITEKHUB

ISSN: 3048-5592

"*SHATAVARI* (ASPARAGUS RACEMOSUS) IN THE REGULATION OF MENSTRUAL CYCLE: AN INTEGRATIVE REVIEW"

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FUNDING INFORMATION:
Not Applicable

How to cite this article:
Shital Gaikwad. "*Shatavari* (Asparagus racemosus) in the Regulation of Menstrual Cycle: An Integrative Review" International Journal of Ayurveda Gynecology. 2024;1(4):18-23

ABSTRACT:

Introduction: Menstrual cycle disorders, including dysmenorrhea, oligomenorrhea, menorrhagia, and premenstrual syndrome, are prevalent health concerns that affect quality of life and reproductive health in women. *Shatavari* (*Asparagus racemosus*), a renowned Ayurvedic herb, has been traditionally prescribed as a *stree-rasayana* (rejuvenative for women), particularly for regulating menstrual and reproductive functions. This review aims to critically evaluate its role in menstrual cycle regulation based on Ayurvedic principles and modern scientific evidence. **Methods:** A comprehensive literature search was conducted across Ayurvedic classics (*Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya*), modern pharmacognosy texts, and scientific databases including PubMed, Scopus, and Web of Science (2000–2025). Search terms included "*Shatavari*," "Asparagus racemosus," "menstrual regulation," "Ayurveda," and "women's reproductive health." Clinical trials, animal studies, review articles, and pharmacological investigations were included. Data were synthesized thematically to assess classical indications, phytochemical profile, pharmacodynamics, and clinical outcomes. **Results:** Classical texts describe *Shatavari* as cooling, nourishing, galactagogue, and regulator of menstrual disorders. Modern studies reveal its bioactive constituents—steroidal saponins (shatavarins), flavonoids, and phytoestrogens—exert estrogenic, adaptogenic, and anti-inflammatory activities. Preclinical studies support its role in modulating gonadotropin levels, regulating ovarian function, and relieving dysmenorrhea. Clinical studies demonstrate benefits in menstrual irregularities, premenstrual symptoms, and infertility management. However, heterogeneity in dosage forms and limited large-scale randomized trials remain gaps in evidence. **Discussion:** *Shatavari* shows promising potential in menstrual regulation by harmonizing endocrine, immune, and psychological factors. Integrating traditional wisdom with pharmacological insights may expand its therapeutic applications, though standardized clinical validation is required. **Conclusion:** *Shatavari* represents a bridge between traditional Ayurvedic regimens and modern gynecological care. Its use in regulating menstrual cycles highlights a holistic and evidence-based approach to women's reproductive health.

KEYWORDS: Adaptogen, Ayurveda, Menstrual regulation, Phytoestrogen, *Shatavari*

INTRODUCTION

Menstrual health is an essential component of women's overall well-being. Disorders such as dysmenorrhea, oligomenorrhea, menorrhagia, and premenstrual syndrome are among the most common gynecological complaints globally, contributing significantly to absenteeism, reduced productivity, and compromised quality of life. [1-3] These conditions are often multifactorial, involving hormonal imbalances, nutritional deficiencies, stress, and lifestyle factors. [4]

Ayurveda provides a holistic framework for understanding women's health, emphasizing *dosha* balance, nutritional adequacy, and rejuvenation therapies. [5] *Shatavari* (*Asparagus racemosus*), traditionally described as *stree-rasayana* (female tonic), has been used for centuries in menstrual regulation, fertility, lactation, and overall reproductive well-being. [6-7] The herb is noted in the classics for its cooling, nourishing, and strengthening properties, and has been indicated in *rajah-krita vikaras* (menstrual disorders), infertility, and menopausal symptoms. [8]

The present review aims to systematically examine the role of *Shatavari* in regulating the menstrual cycle by integrating Ayurvedic principles with modern scientific evidence. [9] The objectives are: (1) to document classical references and traditional uses of *Shatavari* in menstrual regulation, (2) to analyze its pharmacological and phytochemical basis, and (3) to evaluate preclinical and clinical evidence regarding its efficacy and safety. [10]

MATERIALS AND METHODS

A systematic review was conducted in two phases: (1) review of Ayurvedic classical texts and commentaries, and (2) review of modern biomedical databases. [11]

Ayurvedic sources: *Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya, Bhavaprakasha Nighantu, Dhanvantari Nighantu* were studied for references to *Shatavari* in relation to *stree-rogas* and menstrual health. Commentaries and secondary literature were included. [12]

Modern databases searched: PubMed, Scopus, Web of Science, and Google Scholar were searched using the terms "*Shatavari*," "Asparagus racemosus," "menstrual regulation," "dysmenorrhea," "PMS," "Ayurveda and reproductive health." Time frame: January 2000 – March 2025. [13]

Inclusion criteria: [14]

- Clinical studies (RCTs, observational, case reports) on *Shatavari* in menstrual health.
- Preclinical experimental studies on reproductive physiology.
- Review articles and pharmacological studies highlighting active compounds.
- English-language publications.

Exclusion criteria: [15]

- Studies unrelated to reproductive/menstrual health.
- Articles without peer review.
- Non-credible online sources.

Data extraction: Information was grouped into: (1) traditional references, (2) phytochemistry and pharmacology, (3) preclinical findings, (4) clinical outcomes. [15]

OBSERVATION AND RESULTS

1. Traditional Ayurvedic References

In Ayurveda, *Shatavari* (*Asparagus racemosus Willd.*) is regarded as one of the foremost herbs for women's reproductive health. Classical texts describe it as *stree-rasayana*—a rejuvenative specifically for women.

- **Charaka Samhita** lists *Shatavari* under *balya* (strength-promoting) and *vrishya* (aphrodisiac) drugs, indicating its role in fertility and reproductive health.
- **Sushruta Samhita** describes its *pittashamaka* (pitta-pacifying) and *vata-anulomana* (vata-regulating) properties, both essential in maintaining normal menstruation (*artava pravritti*).
- **Ashtanga Hridaya** and **Bhavaprakasha Nighantu** highlight its use in *rajahkrita vikaras* (menstrual disorders), *vandhyatva* (infertility), and *kshaya* (debility).

Ayurveda attributes its efficacy to its ***madhura* (sweet) *rasa***, ***snigdha* (unctuous) *guna***, ***shita* (cooling) *virya***, and ***madhura vipaka***. These properties are believed to nourish the *shukra dhatu* and *artava dhatu* (reproductive tissues), regulate menstrual bleeding, and enhance fertility. Traditional formulations such as *Shatavari kalpa* and *Shatavari ghrita* are widely prescribed for menstrual irregularities, dysmenorrhea, and menopausal symptoms.

2. Phytochemistry of *Shatavari*

Modern research has identified multiple bioactive constituents in *Shatavari* that explain its diverse therapeutic actions:

- **Steroidal saponins (Shatavarins I–IV):** Major bioactive compounds with structural similarity to estrogen, responsible for phytoestrogenic effects.
- **Isoflavones and flavonoids:** Contribute antioxidant, anti-inflammatory, and hormone-modulating properties.
- **Mucilage and polysaccharides:** Provide soothing and demulcent action, helpful in reducing uterine irritation.
- **Alkaloids and trace minerals (calcium, zinc, magnesium):** Support reproductive physiology.

The estrogenic activity of *Shatavari* is attributed primarily to shatavarin I, which binds to estrogen receptors and exerts mild agonistic effects, helping regulate the hypothalamic-pituitary-ovarian (HPO) axis.

3. Pharmacological Actions Relevant to Menstrual Regulation

Several pharmacological effects of *Shatavari* correlate with its traditional use in regulating the menstrual cycle:

- **Estrogenic and gonadotropic activity:** Enhances follicular development, endometrial growth, and cycle regularity.
- **Adaptogenic effect:** Reduces stress-induced menstrual disturbances through modulation of the hypothalamic-pituitary-adrenal (HPA) axis.
- **Anti-inflammatory and antispasmodic action:** Alleviates dysmenorrhea by reducing prostaglandin-induced uterine contractions.
- **Antioxidant properties:** Prevent oxidative stress in ovarian tissues, relevant for conditions such as PCOS.
- **Galactagogue effect:** Though mainly postnatal, it reflects its action on reproductive hormones, indirectly influencing menstrual balance.

4. Preclinical Evidence

Multiple animal studies have validated the reproductive effects of *Shatavari*:

- **Hormonal regulation:** Studies on immature female rats demonstrated that *Shatavari* extract increased uterine weight and epithelial proliferation, confirming estrogenic action (Sharma et al., 1996).
- **Gonadotropin modulation:** Mandal et al. (2010) reported increased levels of LH and FSH in rats treated with *Shatavari*, leading to normalized ovarian cycles.
- **Anti-dysmenorrheic potential:** Animal models of induced dysmenorrhea showed reduced uterine spasms and prostaglandin activity after *Shatavari* administration.
- **Fertility enhancement:** Experimental studies indicated improved ovulation and higher conception rates in animals treated with *Shatavari* extracts.

These findings provide mechanistic insights into its classical indications of *vandhyatva* (infertility) and *rajah-pravartana* (regulation of menstruation).

5. Clinical Evidence

Although limited, several clinical studies support *Shatavari's* role in menstrual regulation:

- **Dysmenorrhea and Menstrual Irregularities:** A clinical trial by Singh et al. (2012) showed significant reduction in pain intensity and normalization of cycle length in women with primary dysmenorrhea after 3 months of *Shatavari* supplementation.
- **Premenstrual Syndrome (PMS):** Kumari et al. (2015) reported improvement in mood swings, irritability, and somatic symptoms of PMS with *Shatavari churna* (3 g/day).
- **PCOS and Oligomenorrhea:** Patel et al. (2020) found that *Shatavari* in combination with lifestyle modifications improved menstrual regularity and reduced cystic changes in PCOS patients.
- **Infertility:** Chauhan and Sharma (2017) documented improved ovulatory cycles and conception rates when *Shatavari* was administered as part of an Ayurvedic regimen.
- **Perimenopausal symptoms:** Though not directly menstrual, studies highlight its estrogenic and adaptogenic role in managing hot flashes, irregular cycles, and mood instability.

Despite these promising outcomes, most studies had small sample sizes, varied dosage forms (powder, tablets, extracts), and lacked placebo-controlled designs.

6. Safety and Dosage

- **Safety profile:** *Shatavari* is generally considered safe and well-tolerated. Reported side effects are rare but may include mild gastrointestinal discomfort.
- **Contraindications:** Should be used cautiously in women with estrogen-sensitive conditions (e.g., fibroids, endometriosis, breast cancer) until further safety data are available.
- **Dosage:** Classical texts recommend *Shatavari churna* 3–6 g/day with milk. Modern formulations range from 500 mg–2 g/day of standardized extract.

7. Integrative Perspective

The integration of Ayurvedic and modern perspectives reveals strong convergence:

- Ayurvedic description of *Shatavari* as *cooling, nourishing, and rasayana* aligns with its adaptogenic and estrogenic effects.
- Recommendations of *Shatavari* with milk or ghee may enhance bioavailability of fat-soluble saponins, a principle that modern pharmacology recognizes as a lipid-mediated absorption mechanism.
- Its multifaceted effects—on endocrine regulation, uterine physiology, and stress response—illustrate Ayurveda's holistic view of health.

At the same time, divergences exist. Ayurveda emphasizes individualized therapy based on *prakriti* and *dosha*, while modern research seeks universal standardized protocols. Bridging this gap requires interdisciplinary approaches, including clinical trials that evaluate classical formulations in modern settings.

DISCUSSION

The role of *Shatavari* in regulating the menstrual cycle reflects a unique confluence of Ayurvedic wisdom and modern biomedical evidence. Ayurveda describes *Shatavari* as *stree-rasayana*, specifically indicated for maintaining reproductive health, supporting fertility, and correcting *rajah-krita vikaras* (menstrual disorders). Its properties—*madhura rasa* (sweet taste), *snigdha guna* (unctuous), *shita virya* (cooling potency), and *madhura vipaka* (sweet post-digestive effect)—make it ideal for pacifying *pitta* and *vata doshas*, both of which play key roles in menstrual physiology. From this perspective, *Shatavari* ensures balanced hormonal activity, regulates *artava pravritti* (normal menstruation), and promotes fertility. [16]

Modern pharmacological studies corroborate many of these claims. *Shatavari* contains steroidal saponins (shatavarins), flavonoids, and phytoestrogens, which have been shown to exhibit estrogenic activity. These compounds mimic endogenous estrogen, influencing hypothalamic-pituitary-ovarian (HPO) axis regulation, follicular development, and endometrial receptivity. Preclinical studies have demonstrated that *Shatavari* extract can modulate gonadotropin secretion, normalize ovarian follicle maturation, and reduce uterine inflammation, providing a rational basis for its use in menstrual irregularities and dysmenorrhea. [17]

Comparing Ayurveda and modern science reveals several areas of alignment. Ayurvedic emphasis on the cooling, nourishing, and stabilizing effects of *Shatavari* corresponds well with its observed adaptogenic and anti-inflammatory activities. Clinical studies suggest improvement in dysmenorrhea, oligomenorrhea, premenstrual syndrome (PMS), and infertility, outcomes consistent with its classical indications. Moreover, *Shatavari's* anxiolytic and adaptogenic properties may address the psychoneuroendocrine aspect of menstrual disorders, such as stress-induced amenorrhea or PMS-related mood disturbances. [18]

Despite encouraging findings, gaps remain. Most clinical studies conducted so far are small in scale, heterogeneous in methodology, and often lack standardized dosage or formulations. For example, some trials have used powdered root, others aqueous or alcoholic extracts, while still others combined *Shatavari* with other herbs in compound formulations. This variability limits comparability and reproducibility of results. Furthermore, while preclinical studies strongly suggest estrogenic activity, human trials evaluating hormonal profiles (FSH, LH, estradiol, progesterone) before and after *Shatavari* therapy are scarce. Long-term safety, particularly concerning estrogen-sensitive conditions such as endometriosis, fibroids, or hormone-dependent cancers, also requires systematic evaluation. [19]

Another important point is cultural and contextual relevance. Ayurveda views *Shatavari* not merely as

a pharmacological agent but as part of a broader lifestyle and diet-based approach to women's health. Modern research, by contrast, often isolates the herb from its holistic context. While this reductionist approach is valuable for pharmacological validation, it risks overlooking synergistic effects that Ayurveda emphasizes—such as combining *Shatavari* with *ghee*, milk, or other herbs to enhance efficacy and bioavailability. Future research may benefit from designs that evaluate both single-drug and classical polyherbal formulations. [20]

Looking forward, integrating *Shatavari* into modern gynecological care requires multi-dimensional strategies. Rigorous randomized controlled trials with standardized extracts are needed to confirm efficacy in specific menstrual disorders such as PCOS, dysmenorrhea, and PMS. Mechanistic studies should explore molecular pathways of its phytoestrogens and adaptogens in relation to the HPO axis. Pharmacogenomic investigations could help identify subgroups of women who may benefit most. In addition, cross-disciplinary collaboration between Ayurveda, pharmacology, gynecology, and psychology could provide a more holistic understanding of menstrual health. [20]

In summary, the discussion of *Shatavari* highlights both convergence and divergence between classical Ayurveda and contemporary science. The convergence strengthens its credibility as a regulator of menstrual cycles, while the divergences underscore the need for more nuanced, integrative research. If these gaps are addressed, *Shatavari* has the potential to emerge as a safe, affordable, and culturally rooted intervention for menstrual health in both traditional and modern healthcare systems.

CONCLUSION

Shatavari demonstrates a strong potential as a holistic regulator of menstrual health. Classical texts highlight its role in maintaining *dosha* balance, ensuring regular menstruation, and promoting fertility. Modern studies substantiate these claims through identification of bioactive compounds with estrogenic, anti-inflammatory, and adaptogenic activities. Clinical trials suggest benefits in dysmenorrhea, PMS, menstrual irregularities, and infertility, although larger randomized controlled studies are needed to establish definitive efficacy and safety.

By integrating traditional wisdom with scientific validation, *Shatavari* could serve as a safe, accessible, and evidence-based intervention for menstrual health. Further research in pharmacognosy, clinical gynecology, and integrative medicine will expand its applications in women's healthcare.

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