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# ROLE OF MALE FACTORS IN INFERTILITY: AN INTEGRATIVE REVIEW OF ETIOLOGY AND AYURVEDIC MANAGEMENT

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## ABSTRACT

Male factor infertility contributes significantly to the global burden of infertility and is responsible for nearly 40–50% of cases, either independently or in combination with female factors. Common abnormalities include oligospermia, asthenozoospermia, teratozoospermia, azoospermia, cryptospermia and OAT syndrome, which primarily affect sperm count, motility and morphology. Contemporary medicine attributes these conditions to hormonal imbalance, oxidative stress, infections, genetic defects, lifestyle factors, genital tract obstruction and erectile dysfunction. Ayurveda explains male infertility mainly under the concepts of *Shukra Dushti*, *Ksheena Shukra*, *Beeja Dosha* and *Vata-Pitta* vitiation with a predominant role of *Apana Vayu*. Improper diet (*Ahara*), faulty lifestyle (*Vihara*), psychological stress (*Manasika Nidana*), suppression of natural urges, excessive heat exposure, addictions and chronic systemic illnesses are described as important causative factors leading to quantitative and qualitative impairment of *Shukra Dhatu*. Ayurvedic management follows a holistic approach comprising *Nidana Parivarjana*, *Deepana-Pachana*, *Shodhana* (especially *Basti therapy*) and *Rasayana-Vajikarana Chikitsa*. Classical formulations and drugs such as *Ashwagandha*, *Kapikacchu*, *Shatavari*, *Gokshura*, *Vidarikanda*, *Makardhwaja*, *Shilajatu* and

medicated *Ghrita* preparations are indicated based on *Dosha* dominance and clinical presentation. Dietary modifications, stress management, adequate sleep, abstinence from harmful habits, and incorporation of Yoga and meditation further enhance therapeutic outcomes. This review aims to compile classical Ayurvedic concepts, correlate them with modern semen abnormalities, and highlight evidence-based Ayurvedic interventions for male infertility. An integrative understanding may offer safe, cost-effective and sustainable management options, improving reproductive health and overall well-being.

**KEYWORDS:** Male infertility, *Shukra Dhatu, ksheen shukra*, Oligospermia.

## INTRODUCTION

Infertility is a growing global reproductive health concern, with approximately one in six people worldwide experiencing infertility during their reproductive lifetime.[1] Traditionally, infertility was predominantly attributed to female factors; however, contemporary evidence clearly indicates that male factors contribute to nearly 40–50% of infertility cases, either as an isolated cause or in combination with female factors.[2] This epidemiological shift highlights the importance of focused evaluation and management of male infertility.

Male factor infertility primarily manifests as abnormalities in semen parameters, including oligospermia (low sperm count), asthenozoospermia (reduced sperm motility), teratozoospermia (abnormal sperm morphology), azoospermia, cryptospermia and OAT syndrome, which collectively compromise fertilization potential. These abnormalities may result from altered semen volume, impaired spermatogenesis, structural defects of sperm, genital tract obstruction, erectile dysfunction, endocrine disturbances, oxidative stress, infections and lifestyle-related factors such as stress, addictions, improper diet and sedentary habits.

From an Ayurvedic perspective, male infertility is described under conditions such as Shukra Dushti, *Ksheena Shukra, Beeja Dosha* and *Vandhyatva*, where impairment of *Shukra Dhatu* plays a central role. Classical texts emphasize the influence of *Vata Dosha*, particularly *Apana Vayu*, along with *Pitta*-induced heat and oxidative imbalance, leading to quantitative and qualitative deterioration of semen. Improper *Ahara* (diet), faulty *Vihara* (lifestyle), *Manasika Nidana* (psychological stress), suppression of natural urges, excessive sexual activity and chronic illnesses are considered important etiological factors.

Ayurveda offers a comprehensive and individualized management approach through *Nidana Parivarjana*, *Deepana–Pachana*, *Shodhana* therapies (especially *Basti*) and *Vajikarana–Rasayana Chikitsa*, aiming not only at improving sperm parameters but also restoring systemic and mental balance. Given the rising prevalence of male infertility and limitations of conventional treatments, an integrative understanding of Ayurvedic principles and therapeutic modalities is of significant clinical relevance.

## MATERIALS AND METHODS

### Sources of Literature

The review is based on classical Ayurvedic texts including *Charaka Samhita*, *Sushruta* Samhita and *Ashtanga Hridaya*, along with their commentaries and published research articles and reviews related to male infertility available in peer-reviewed journals.

### Conceptual Framework and Ayurvedic Understanding of Male Factor Infertility

Male factor infertility was reviewed and interpreted through classical Ayurvedic concepts including *Shukra Dushti*, *Ksheena Shukra*, *Beeja Dosha*, *Vandhyatva* and *Klaibya*. Ayurveda recognizes that successful conception depends not only on female factors but equally on the purity, quantity and functional integrity of *Shukra Dhatu*, also *Shukra* is described as essential for *Garbha Sambhava*.[3]

The etiopathogenesis was analysed with emphasis on *Dosha* vitiation, particularly *Apana Vayu*, which governs ejaculation, erection and reproductive function.[4] Also *Shukra is described as Saumya*, *Sheeta* and *Snigdha* in nature Due to *Guna-viruddhata*, aggravated *Pitta* with *Ushna and Tikshna properties* leads to *Shukra Kshaya and Dushti*, while *Kapha*, characterized by *Guru*, *Snigdha* and *Picchila* qualities, predisposes to *Srotorodha*. When involving *Shukravaha Srotas*, *Kapha* aggravation may lead *to* increased viscosity, *Abhishyanda* and obstructive pathology affecting semen quality.

Also *Agnimandya* leading to *Ama* formation may impair proper *Dhatu* formation, and when involving *Shukravaha Srotas*, can result in qualitative and quantitative defects of Shukra.

### Male Factors Contributing to Infertility: Ayurvedic Perspective

**Quantitative and qualitative defects of semen-** Quantitative abnormalities of *Shukra* are described under conditions such as *Shukra Kshaya* and *Alpa Shukra*, indicating reduced quantity or depletion of semen. Qualitative abnormalities are explained under *Shukra Dushti*,

where *Dosha* vitiation alters the normal properties of *Shukra* including its colour, consistency, smell and functional capacity.[5]

***Beeja Dosha* -** The concept of *Beeja*, *Beeja-Bhaga* and *Beeja-Bhaga-Avayava Dushti* described in *Charaka Samhita*, provides the classical basis for understanding congenital and genetic defects affecting fertility.[6]

**Erectile dysfunction and ejaculatory disorders** The Ayurvedic classics describe disorders of sexual function and seminal activity under *Klaibya*, *Shandhatva*, and the sequelae of *Shukra Vega Dharana*. Such conditions involve derangement of *Maithuna Shakti* and *Shukra-pravritti*, both essential for successful *Garbha-sambhava*; hence their impairment directly hinders the process of conception.

**Psychological stress, excessive sexual activity**-Excessive sexual indulgence (*Ati-Maithuna*), mental factors such as fear, grief and anxiety, and *Dhatu-kshaya*-inducing lifestyle practices are described in the classics as causes of *Klaibya* and *Shukra Kshaya*. These factors weaken *Maithuna Shakti* and deplete *Shukra Dhatu*, thereby reducing reproductive capacity.[7]

**Role and Importance of *Shodhana Chikitsa***

*Shodhana Chikitsa* was critically reviewed as a foundational therapeutic approach in male infertility. Classical texts clearly state that *Shukra Dhatu*, being a *Prasada Dhatu*, cannot attain normalcy without prior purification. *Shodhana* eliminates vitiated *Doshas*, clears *Shukravaha Srotas*, restores *Agni* and creates a favourable internal environment for *Shukra Utpadana*.

**Based on *Dosha* predominance, the following *Shodhana* procedures were reviewed**

***Deepana–Pachana,*** as a preparatory measure to correct Agni and digest *Ama*.

***Virechana Karma,*** *Virechana Karma* is indicated in Pitta-dominant conditions as and is therefore applicable in Pitta-associated *Shukra Dushti* characterized by impaired vitality and altered semen quality.

***Basti Chikitsa,*** described as *Ardha Chikitsa* and the most effective therapy for *Apana vayu* disorders influencing erection, ejaculation and spermatogenesis. Various *Niruha*, *Anuvasana* and *Matra Basti* formulations mentioned for Shukra Dushti were included.

***Shamana, Vajikarana* and *Rasayana Therapies***

Post-*Shodhana* management was reviewed through *Shamana Chikitsa*, followed by *Vajikarana* and *Rasayana* therapies, as emphasized in *Charaka Samhita*. Drugs such as *Ashwagandha*, *Kapikacchu*, *Shatavari*, *Gokshura*, and *Vidarikanda*, along with formulations like *Makardhwaja*, *Shilajatu*, medicated *Ghrita* and *Churna*, were analysed for their role in enhancing sperm parameters, libido, erectile function, and overall reproductive strength.

**Dietary and Lifestyle Measures**

*Shukra-vardhaka Ahara* such as milk, *Ghrita*, *Navaneeta*, *Godhuma*, *Shali* rice, *Draksha*, *Kharjura*, sesame seeds and nuts support nourishment of *Shukra Dhatu* and improvement of sperm count, motility and vitality. *Rasayana* foods including *Amalaki* help in reducing oxidative stress and enhancing sperm quality. Avoidance of *Ruksha*, *Ati-Tikta* and *Ati-Katu Ahara*, junk food, alcohol, tobacco and excessive caffeine prevents *Agnimandya* and Shukra *Dushti*. Regulation of sexual activity is essential, as excessive or suppressed intercourse leads to *Shukra Kshaya* and *Klaibya*. Adequate *Nidra* maintains hormonal balance and supports spermatogenesis. Stress reduction is crucial to prevent *Apana Vata* vitiation affecting erection and ejaculation. Yogic practices such as *Baddha Konasana*, *Vajrasana*, *Ashwini Mudra* and *Nadi Shodhana* improve pelvic circulation and reproductive function. Avoidance of prolonged sitting, excessive heat exposure and tight clothing helps preserve normal sperm morphology and viability.

## DISCUSSION

**Role of Male Factors in Infertility**

Male factor infertility is increasingly recognized as a significant contributor to reproductive failure, either as an independent cause or in combination with female factors. Impairment in sperm parameters, sexual function and systemic health substantially influences the probability of successful conception. Advances in semen analysis and reproductive endocrinology have clarified that abnormalities in sperm concentration, motility, morphology, and functional competence significantly impair fertilization potential. Conditions such as oligospermia, asthenozoospermia, teratozoospermia, azoospermia, cryptospermia and OAT syndrome represent different expressions of disrupted spermatogenesis and sperm maturation. In addition, erectile dysfunction and ejaculatory disorders play a crucial yet often under-recognized role, as normal semen parameters alone cannot ensure conception without adequate erection, ejaculation, and timely deposition of semen.

Contemporary biomedical research indicates that male infertility has multiple contributing factors beyond simplistic explanations, with hormonal imbalance, oxidative stress, infections, genetic defects, testicular dysfunction, metabolic disorders, psychological stress and adverse lifestyle practices all implicated. A growing body of evidence highlights oxidative stress as a key mechanism; elevated reactive oxygen species (ROS) can cause lipid peroxidation in sperm membranes, DNA damage and impaired motility, and are influenced by lifestyle, diet and environmental exposures, ultimately reducing seminal quality and fertilization potential[8]. Reviews have also shown that disruptions in ROS–antioxidant balance can affect hormonal regulation of spermatogenesis and hypothalamic–pituitary–gonadal axis function, further compromising fertility.[9] Additionally, lifestyle and psychosocial stressors such as chronic psychological stress, inadequate nutrition, sedentary behaviour, and elevated scrotal temperature are linked with decreased semen quality and reduced sperm output, illustrating how modifiable factors interact with biological mechanisms to influence male reproductive outcomes.[10]

Ayurveda provides a parallel and comprehensive explanation for these observations. Male infertility is primarily described under *Shukra Dushti*, *Ksheena Shukra*, *Beeja Dosha* and *Klaibya*, emphasizing both structural and functional impairment of *Shukra Dhatu*. Classical texts clearly state that conception depends equally on the integrity of male and female reproductive factors. Vitiation of *Apana vayu* disrupts ejaculation, erection, and sperm transport, while *Pitta Dushti* leads to heat-induced degeneration and qualitative deterioration of *Shukra*, comparable to oxidative stress described in modern medicine. *Kapha* imbalance contributes to *srotorodha* and stagnation, affecting semen liquefaction and motility.

Furthermore, Ayurvedic literature acknowledges the influence of *Manasika Nidana* such as stress, anxiety, and excessive sexual activity, which are increasingly recognized in modern research as contributors to erectile dysfunction, hormonal dysregulation, and poor semen quality. Thus, Ayurveda conceptualizes male infertility as a systemic disorder rather than an isolated reproductive pathology, aligning closely with contemporary holistic views.

**Effect of Ayurvedic Treatment Modalities in Male Infertility**

The Ayurvedic management of male infertility follows a stepwise and integrative therapeutic approach, addressing both root causes and clinical manifestations. Modern research increasingly supports this multi-targeted strategy, particularly in idiopathic and functional male infertility where conventional treatments often yield limited success.

*Shodhana Chikitsa* forms the cornerstone of Ayurvedic intervention. Studies have demonstrated that *Panchakarma* procedures, especially *Basti* therapy, significantly improve semen parameters by reducing oxidative stress, improving hormonal balance, and enhancing pelvic circulation.[11] From an Ayurvedic standpoint, *Shodhana* removes vitiated *Doshas*, clears *Shukravaha Srotas*, restores Agni, and prepares the body for effective tissue regeneration. The importance of purification before *Vajikarana* therapy is well emphasized in classical texts and contemporary clinical studies corroborate better therapeutic outcomes when detoxification precedes rejuvenation therapy.

*Basti Chikitsa*, described as *Ardha Chikitsa*, has shown promising results in improving sperm count, motility, erectile function, and ejaculatory control. Its direct action on *Apana Vayu* explains its effectiveness in conditions such as erectile dysfunction, premature ejaculation, and oligospermia. *Virechana Karma*, by correcting Pitta imbalance, helps reduce inflammatory and oxidative damage to sperm, improving morphology and vitality.

Post-*Shodhana*, *Vajikarana* and *Rasayana* therapies play a pivotal role in nourishing *Shukra* Dhatu and restoring reproductive strength. Experimental and clinical studies on drugs like *Ashwagandha*, *Kapikacchu*, *Shatavari*, *Gokshura* and *Vidarikanda* have demonstrated improvements in sperm concentration, motility, testosterone levels, libido, and psychological well-being.[12,13,14,15,16] Classical formulations such as *Makardhwaja*, *Shilajatu* preparations, and medicated *Ghrita* exhibit antioxidant, adaptogenic, and anabolic properties, supporting spermatogenesis and sexual function.

Additionally, dietary regulation, lifestyle modification, stress management, Yoga and meditation enhance therapeutic efficacy by addressing modifiable risk factors. Evidence suggests that Yoga and meditation reduce stress hormones, improve autonomic balance, and positively influence semen quality, resonating with Ayurvedic emphasis on mental equilibrium for *Shukra* preservation.

Overall, available research supports the Ayurvedic principle that purification, rejuvenation, and lifestyle correction together offer sustained improvement in male infertility. The integrative approach not only improves semen parameters but also enhances sexual function, mental health, and overall quality of life.

## CONCLUSION

Male factor infertility is a multifactorial condition involving abnormalities of sperm parameters, sexual function and systemic health. Ayurvedic concepts such as *Shukra Dushti*, *Ksheena Shukra*, *Beeja Dosha* and *Klaibya* provide a comprehensive understanding of its pathogenesis. The sequential approach of *Deepana–Pachana*, *Shodhana Chikitsa*—particularly *Basti* therapy—followed by *Vajikarana* and Rasayana measures addresses both the root cause and tissue-level dysfunction. An integrative Ayurvedic approach, supported by emerging scientific evidence, offers a holistic and promising strategy for the management of male infertility.

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