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EVALUATING THE SPERMATOGENIC EFFECTS OF *Jatamansi*: A COMPREHENSIVE STUDY ON CLINICAL OUTCOMES IN OLIGOSPERMIA

Gaurav Kumar, Sushma* and Banshidhar Behera

Department of Dravyaguna vigyan, A & U Tibbia College & Hospital Karol Bagh, New Delhi-110005, India

*Corresponding author E-mail: sushmasingh2602@gmail.com

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ABSTRACT

Oligospermia, characterised by low sperm count, significantly contributes to male infertility. The Ayurvedic herb *Jatamansi* (*Nardostachys jatamansi* DC) has been traditionally recognised for its *Shukrajanana* (spermatogenic) properties. To evaluate the clinical efficacy of *Jatamansi churna* in the management of oligospermia (*ksheena Shukra*). A randomised, prospective clinical trial was conducted on 50 male patients aged 21-40 years with sperm counts between 5-15 million/ml. Patients received *Jatamansi churna* (3g twice daily with lukewarm water) for 90 days. Seminal parameters and sexual health indicators were evaluated pre- and post-treatment. Clinically, 74% of patients showed mild improvement, 20% moderate improvement, and 6% remained unchanged. Statistically significant improvements ($p < 0.05$) were observed in sperm count (42.88%), motility (57.40%), morphology, and testosterone levels (52%). *Jatamansi churna* demonstrated notable *Shukrajanana* effects with significant improvement in seminal parameters and sexual health without adverse effects, validating its use in Ayurvedic management of oligospermia.

Key words: *Jatamansi*, Oligospermia, *Shukrajanana*, *Nardostachys jatamansi*, Ayurveda, Male infertility

Introduction

Infertility is a significant global health concern, affecting approximately 15% of couples worldwide, with male factors contributing to nearly 40–50% of all cases (Agarwal *et al.*, 2015; Kumar & Singh, 2015). The condition is clinically defined as the inability to conceive after one year or more of regular, unprotected sexual intercourse (Zegers-Hochschild *et al.*, 2017). In India, the prevalence of infertility ranges from 10% to 14%, which aligns closely with global trends (Unisa, 1999). The increasing incidence of male factor infertility highlights the importance of addressing male reproductive health in the context of overall fertility management.

The etiological factors contributing to male infertility are diverse and multifactorial. Key contributors include oligospermia (sperm count < 15 million/mL), asthenozoospermia (poor motility), and teratozoospermia (abnormal morphology), all of which can significantly impair the fertilization process (World Health Organization, 2010). Lifestyle habits such as smoking,

excessive alcohol intake, obesity, and sedentary behaviour are widely documented to adversely affect semen parameters (Sharma *et al.*, 2013). In addition, environmental exposures to toxins and heavy metals, genetic abnormalities, endocrine disturbances, and various systemic illnesses further complicate the clinical picture (de Kretser, 1997; Dohle, 2010). Understanding and addressing these multifaceted causes is essential to developing effective diagnostic and therapeutic strategies.

Among these conditions, oligospermia plays a particularly significant role. According to World Health Organization (WHO) criteria, oligospermia is defined as a sperm concentration below 15 million/mL, which is considered suboptimal for natural conception (World Health Organization, 2010). Although modern medical science provides advanced diagnostic techniques, hormonal therapies, and assisted reproductive technologies (ART) such as intrauterine insemination (IUI) and in vitro fertilization (IVF), these interventions are often expensive, emotionally taxing, and not uniformly effective (Collins

Table 1: Comparative Evaluation of Sperm Motility Before and After Therapy (N = 47).

Parameter	B.T. Mean	A.T. Mean	% Change	S.D.	S.E.	t	p-value
Semen Volume (ml)	1.63	1.87	↑35.64%	0.59	0.16	2.86	<0.01
Semen Viscosity	1.38	1.63	↑20.72%	0.83	0.36	1.53	<0.01
Sperm Count (million/mL)	12.65	26.65	↑42.88%	7.83	2.36	2.67	<0.01

& Van Steirteghem, 2004).

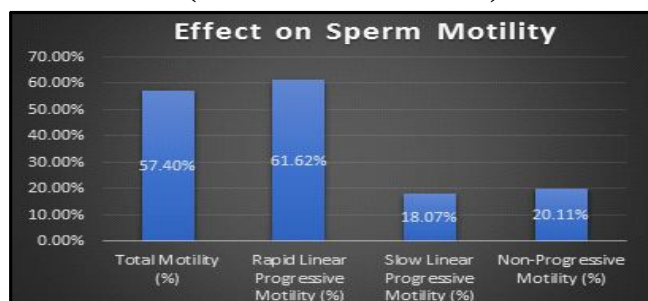
In this context, Ayurveda offers a holistic approach to male infertility management. The traditional system emphasizes balancing bodily humors (doshas) and enhancing tissue quality, particularly *Shukra Dhatu* (the reproductive tissue), through the use of *Rasayana* (rejuvenative) and *Shukrajanana* (spermatogenic) herbs (Lad, 2002). Among the herbs used in Ayurvedic practice, *Jatamansi* (*Nardostachys jatamansi* DC.) has been recognized for its neuroprotective, adaptogenic, and reproductive health-enhancing properties (Sharma *et al.*, 2010) (Bhat *et al.*, 2011).

Belonging to the Valerianaceae family, *Jatamansi* is cited in classical Ayurvedic texts such as the *Charaka Samhita* and *Bhavaprakasha Nighantu* for its rejuvenative effects on the nervous system and reproductive tissues (Chunekar & Pandey, 2006). It is believed to act on the neuroendocrine axis, improve hormonal balance, and mitigate stress factors that are crucial for healthy spermatogenesis. The present study investigates the phytochemical profile and clinical efficacy of *Jatamansi* in improving sperm parameters in oligospermic males, thereby offering an integrative, affordable, and potentially effective alternative to conventional therapies.

Materials and Methods

Study Design

This was a Randomized, prospective, single-blind, interventional clinical study. The study protocol and related documents were reviewed and approved by the Institutional Ethics Committee (IEC), A & U Tibbia College and Hospital, (Govt. of NCT of Delhi), Ajmal Khan Road, Karol Bagh, New Delhi, India. The CTRI registration number is CTRI/2023/05/052503, registered on 11/05/2023 (document attached below).

**Fig. 1:** Effect of Therapy on Sperm Motility (N = 47).

Sample Size

A total of 50 patients diagnosed with oligospermia and fulfilling the inclusion criteria were enrolled in the study. Three patients dropped out during the treatment period, and 47 patients completed the study, whose data were considered for final evaluation. All participants received the trial drug and were categorised under a single arm designated as the Treatment Group.

Study Setting

Patients were selected on the basis of predefined inclusion and exclusion criteria of the study from the Out-Patient Department (OPD) and In-Patient Department (IPD) of the Department of Dravyaguna, Ayurvedic & Unani Tibbia College and Hospital, Karol Bagh, New Delhi.

Study Duration

The duration of treatment for the study group was 90 days. The intervention was administered continuously throughout this period to assess its therapeutic efficacy on semen parameters and related clinical features of oligospermia. Follow-up assessments were conducted at an interval of every 15 days to evaluate treatment compliance, monitor clinical progress, and observe any adverse effects. Detailed evaluations were carried out at baseline and at the completion of the treatment period.

Intervention details

Jatamansi (*Nardostachys jatamansi* DC.) Churna was administered orally in a dose of 3 g twice daily with warm water as *Anupana* for a treatment duration of 90 days.

Inclusion and Exclusion criteria:

- Inclusion criteria:**

- Male Patients between the age group of 21-40 years of age.

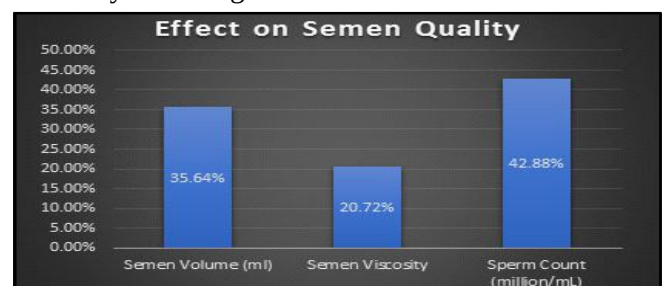
**Fig. 2:** Effect of Therapy on Sperm Quality (N = 47).

Table 2: Comparative Evaluation of Semen Quality Before and After Therapy (N = 47).

Parameter	B.T. Mean	A.T. Mean	% Change	S.D.	S.E.	t	p-value
Total Motility (%)	25.87	40.72	↑57.40%	14.72	3.72	3.73	<0.01
Rapid Linear Progressive Motility (%)	22.83	36.73	↑61.62%	16.54	4.86	3.87	<0.05
Slow Linear Progressive Motility (%)	20.97	24.76	↑18.07%	2.72	1.87	3.03	<0.05
Non-Progressive Motility (%)	44.73	35.73	↓20.11%	12.66	3.77	4.77	<0.05

- b) No history of serious illness or disease.
- c) Patients with History of Infertility for the past 3 years.
- d) Subjects having sperm count 05 to 15 million per ml.
- e) Subjects who are able to come for follow up on fixed visits and are well aware about the treatment plans.
- f) Subjects willing to participate and able to give written informed consent.

• **Exclusion Criteria:**

Patients having medical history of

- a) Men with a total sperm concentration of < 5 million/ml or > 20 million/mL.
- b) Patients having a history of congenital deformity in the genitals.
- c) Patients with evidence of Malignancy.
- d) Patients having any type of surgery of genitals.
- e) Known case of hypertension, diabetes mellitus and thyroid dysfunction.
- f) Patients having any sexually transmitted diseases.
- g) Patients on prolonged medication with corticosteroids, antidepressants, anticholinergics, immunosuppressants, etc. or any other drugs that may have an influence on the outcome of the study.
- h) Patients with poorly controlled hypertension (systolic >140 and diastolic >90 mm of Hg) despite of antihypertensive agents.
- i) Patients who have completed participation in any other clinical trial drugs or their ingredients.

• **Assessment Criteria:**

- a) All the patients were diagnosed pre- and post-treatment and assessed thoroughly on the basis of Ayurvedic classical signs & symptoms.
- b) A detailed history was taken. On the basis of seminal and sexual parameters, i.e. Semen Analysis (sperm count, motility, morphology, liquefaction time, viscosity), FSH, LH, Testosterone hormones.
- c) Semen analysis was also carried out to exclude any other pathology.

Results

Post-Treatment Outcomes

Following the administration of the trial drug, statistically significant improvements were observed across multiple semen parameters, hormonal levels, and sexual health indicators. Semen volume increased by 35.64% ($p < 0.01$), and viscosity improved by 20.72% ($p < 0.01$), indicating enhanced seminal fluid quality. A marked rise in sperm count was recorded, from a baseline average of 12.65 million/mL to 26.65 million/mL—an increase of 42.88% ($p < 0.01$). Similarly, total motility improved significantly from 25.87% to 40.72% (57.40% increase; $p < 0.01$). Regionally progressive linear (RLP) motility showed a 61.62% increase ($p < 0.05$), while slow linear progression (SLP) motility rose by 18.07% ($p < 0.05$). The percentage of sperm with abnormal morphology decreased considerably by 42.38% ($p < 0.001$), indicating improved sperm structure.

Endocrine evaluations revealed a 52% increase in serum testosterone levels ($p < 0.001$), alongside a 42% increase in luteinizing hormone (LH) and a 34% reduction in follicle-stimulating hormone (FSH), both statistically

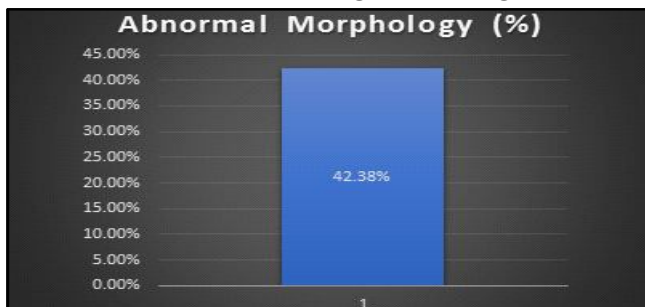
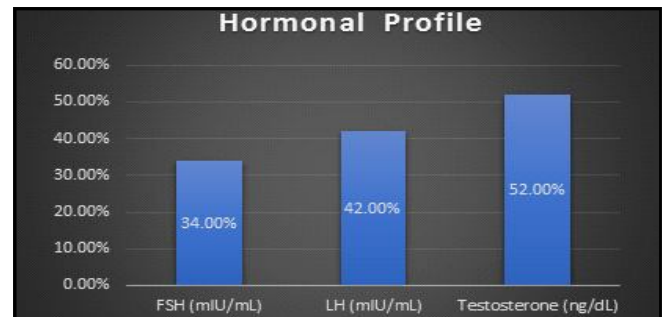
**Fig. 3:** Effect of Therapy on Abnormal Morphology (N = 47).**Fig. 4:** Effect of Therapy on Hormonal Profile (N = 47).

Table 3: Comparative Evaluation of Abnormal Morphology Before and After Therapy (N = 47).

Parameter	B.T. Mean	A.T. Mean	% Change	S.D.	S.E.	t	p-value
Abnormal Morphology (%)	18.73	10.79	↓42.38%	4.87	1.88	5.76	<0.001

significant ($p < 0.05$), suggesting restoration of hormonal balance. Additionally, parameters of sexual health, including desire, erection, ejaculation, and rigidity, demonstrated noticeable enhancement, with respective improvements of 47.48%, 39.04%, and 33.67%, and a 32.87% reduction in rigidity issues.

Discussion

The findings of the present study clearly demonstrate that *Jatamansi* exerts a favourable influence on male reproductive physiology, as evidenced by significant improvements in seminal characteristics and hormonal profile. Following intervention, semen volume, viscosity, and sperm concentration showed statistically significant enhancement, reflecting improved seminal plasma quality and augmented spermatogenic activity.

A notable enhancement in semen volume (35.64%; $p < 0.01$), semen viscosity (20.72%; $p < 0.01$), and sperm concentration (42.88%; $p < 0.01$) was observed, suggesting improved seminal quality and increased spermatogenic activity.

In addition, semen quality parameters showed marked improvement after the intervention. Total sperm motility increased by 57.40% ($p < 0.01$), with significant rises in rapid linear progressive motility (61.62%; $p < 0.05$) and slow linear progressive motility (18.07%; $p < 0.05$). Concurrently, non-progressive motility decreased by 20.11% ($p < 0.05$), and abnormal sperm morphology was significantly reduced by 42.38% ($p < 0.001$). The significant reduction in non-progressive motility and abnormal sperm morphology highlights *Jatamansi*'s potential to improve sperm structure, thereby possibly improving fertilization outcomes and embryo quality. These effects are consistent with earlier reports that *Jatamansi* possesses strong antioxidant properties that reduce oxidative stress, a major contributor to poor sperm morphology and motility.

Furthermore, *Jatamansi* produced significant modulation of the hormonal profile. Serum FSH levels decreased by 34% ($p < 0.01$), while LH and testosterone levels increased by 42% ($p < 0.01$) and 52% ($p < 0.001$), respectively. In parallel, significant modulation of

reproductive hormones was recorded. The reduction in serum FSH levels, along with a concomitant rise in LH and testosterone, indicates normalization of the hypothalamic–pituitary–gonadal axis and improved endocrine regulation of spermatogenesis. Elevated testosterone levels are particularly relevant, as this hormone plays a pivotal role in maintaining sperm production, maturation, and libido.

The results presented in the above Table demonstrate significant improvements in multiple parameters of male reproductive health following the administration of *Jatamansi* (*Nardostachys jatamansi*). This medicinal herb, traditionally used in Ayurvedic medicine for its neuroprotective and adaptogenic properties, appears to exert a broad-spectrum effect on male fertility.

Significant improvements in libido, erection quality, ejaculation control, and penile rigidity following *Jatamansi* administration suggest its beneficial effects on overall sexual function. These improvements may stem from enhanced androgen status and improved vascular response, aligning with *Jatamansi*'s known anxiolytic and tonic properties, which help reduce psychogenic causes of sexual dysfunction.

The pharmacological activity of *Jatamansi* is attributed to its *Rasapanchaka*—*Tikta-Kasaya Rasa*, *Madhura Anurasa*, *Sheeta Veerya*, *Katu Vipaka*, and *Snigdha-Laghu Guna*. These properties render it effective in pacifying Vata and Pitta doshas, directly influencing Shukravaha srotas.

Essential oils in *Jatamansi*, excreted through urine, possibly cause mild urethral stimulation that enhances libido. The increase in testosterone, LH, and the reduction in FSH suggests improved hypothalamic-pituitary-gonadal axis regulation.

The adaptogenic and nootropic effects contribute to its efficacy in reducing stress—a known factor in male infertility. Ayurvedically, it nourishes Rasa dhatu and supports the formation of subsequent dhatus, including Shukra, thereby promoting spermatogenesis.

No adverse effects were reported during the clinical trial, indicating good safety and tolerability.

Table 4: Comparative Evaluation of Hormonal Profile Before and After Therapy (N = 47).

Parameter	B.T. Mean	A.T. Mean	% Change	S.D.	S.E.	t	p-value
FSH(mIU/mL)	1.98	1.43	↓34.00%	0.46	0.52	0.14	<0.01
LH(mIU/mL)	2.74	3.21	↑42.00%	0.39	0.43	0.04	<0.01
Testosterone (ng/dL)	3.32	4.37	↑52.00%	0.65	0.45	2.75	<0.001

Conclusion

Jatamansi exhibits *Kashaya Tikta Rasa, Madhur anurasa, Katu vipaka, Sheeta virya, Snigdha guna*, which directly acts on *Shukravaha Srotas*. Owing to the similarity of Madhura Rasa and Sheeta Veerya with the intrinsic qualities of Shukra Dhatu, the drug is considered beneficial in *Shukrajanana Karma*. Classical references (Charaka Samhita) describing *Jatamansi* under *Shukrajanana Mahakashaya* support its role in reproductive health, which is further validated by the spermatogenic effect observed in the present study. The findings support the potential of *Jatamansi* as a holistic herbal intervention for improving male reproductive and sexual health. Its influence spans hormonal modulation, spermatogenesis, and sexual performance, likely mediated through antioxidant, endocrine, and adaptogenic mechanisms

Limitations and Future Directions

While these results are promising, it is important to consider potential limitations of the study, such as sample size, duration of treatment, and long-term effects. Future research should focus on investigating the drug's mechanism of action at the molecular and cellular levels along with conducting larger, randomized controlled trials to confirm these findings.

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