

**AYURVEDIC MANAGEMENT OF OLIGOASTHENOZOOSPERMIA –
A SINGLE CASE STUDY****Dr. Yashwanth Kumar S. J.*¹, Dr. Janaki Y. S.²**

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ABSTRACT

Background: Oligoasthenozoospermia (OA) syndrome, characterized by reduced sperm count below 16 million/ml and reduced motility below 39%, is one of the major causes of infertility. In Ayurveda, it can be correlated with shukradushti, where vitiation of vata and pitta doshas occurs, leading to impaired quality and function of shukra dhatu. Ayurvedic management involving shodana, shamana and rasayana therapies may improve semen quality and reproductive potential. **Aims:** To evaluate the efficacy of virechana karma, uttarabasti and kustadi rasayana yoga in the management of oligoasthenozoospermia syndrome. **Materials and Methods:** A prospective, open-label, single-arm interventional case study was conducted on a 37-year-old married male presenting with primary infertility of seven years, associated with oligoasthenozoospermia confirmed by semen analysis. The

intervention protocol consisted of Deepana pachana with trikatu choorna, snehapana with dadimadi ghrita, virechana using nimbamrutadi eranda taila, followed by uttarabasti with shatavari ghrita. subsequently, shamana therapy comprising kushtadi rasayana yoga, kapikachhu ghanavati, was administered for 18 days. The total study duration was 36 days with a one-week follow-up. The semen parameters before and after treatment were compared. **Results:** Marked improvement was observed in semen quality and quantity following intervention. Semen volume increased from 1.5 ml to 2.0ml, sperm concentration improved

from 14 million/ ml to 100 million/ml total motility increased from 25% to 70%. sperm morphology remained normal throughout the study. The subject also reported subjective improvement in general wellbeing and sexual health. **Conclusion:** The combination of virechana karma, uttarabasti and shamana rasayana demonstrated significant improvement in semen parameters in the case of oligoasthenozoospermia. The integrated ayurvedic approach may offer a promising therapeutic option for male infertility associated with shukra dushti. Larger controlled clinical studies are needed to validate these findings.

KEYWORDS: Oligoasthenozoospermia, male infertility, shukra dushti, virechana, Uttara basti, kustadi rasyana yoga.

INTRODUCTION

In the current generation, male infertility is considered a major problem due to lifestyle changes and economic status. Male infertility is a male factor that contributes to the failure of conception after at least one year of regular unprotected sexual intercourse. Oligoasthenozoospermia^[1] (OA) is a condition characterised by a low sperm concentration typically less than 16 million per millilitre, and reduced sperm motility, with progressive and non progressive motile sperms under 40% (progressive less than 32%) globally; approximately one in six people of reproductive age experience infertility at some stage in their lives, according to WHO, male and female factors 26.3%, and male factors alone in 18.7%^[2] of cases. Approximately 45% of men with infertility are affected with oligoasthenozoospermia.

In contemporary management of male infertility includes hormonal therapy and reproductive technologies (ART), such as intrauterine insemination (IUI) and in vitro fertilization (IVF) although these interventions have improved pregnancy outcomes, they do not address the underlying causes of Impaired fertility in all cases and often assist conception rather than restoring physiological reproductive functions therefore, there is increasing interest in therapeutic approaches that enhance semen quality and reproductive health, thereby facilitating natural conception.

In Ayurveda, oligoasthenozoospermia can be correlated with Vatapittaja Shukra Dushti^[3], one of the Ashtavidha Shukra Dushti described in the classical texts. The vitiation of Vata and Pitta Doshas leads to impairment in both the qualitative and quantitative attributes of Shukra Dhatu, resulting in reduced sperm count and diminished motility. This clinical entity

closely resembles oligoasthenozoospermia described in contemporary andrology with respect to its etiopathogenesis and clinical manifestations.

Vajikarana Tantra, one of the eight specialized branches of Ashtanga Ayurveda, is dedicated to the promotion of male reproductive health and fertility. It emphasizes the restoration of normal reproductive function through a holistic therapeutic approach comprising Virechana, Basti, Uttarabasti, and Rasayana formulations. These interventions facilitate Dosha Shamana, Srotoshodhana, and Shukra Dhatu Poshana, thereby improving the quality and quantity of semen and enhancing the potential for natural conception.

Aims and Objectives: To evaluate the efficacy of virechana karma, uttarabasti and kustadi rasayana yoga in the management of oligoasthenozoospermia syndrome.

METHODOLOGY- A 37-year-old married male presenting with primary infertility of seven years, associated with oligoasthenozoospermia confirmed by semen analysis. The intervention protocol consisted of Deepana pachana with trikatu choorna^[4], snehapana with dadimadi ghrita^[5], virechana using nimbamrutadi eranda taila, followed by uttarabasti with shatavari ghrita. Subsequently, shamana therapy comprising kushtadi rasayana yoga, kapikachhu ghanavati, was administered for 18 days. The total study duration was 36 days with a one-week follow-up. The semen parameters before and after intervention were compared.

CASE PRESENTATION

For the clinical study, a 37-year-old married male presenting with primary infertility of seven years, associated with oligoasthenozoospermia confirmed by semen analysis. Attending Kayachikitsa OPD of Taranath Govt Ayurveda Medical Collage and Hospital, Ballari. Was enrolled irrespective of caste and socio economic status.

The patitent works as bus driver, he had satistfactory sexual act and after 2 years he felt tiredness, weakness after sexual act (2-3times a week) then gradually he lost his libido.

Past medical history – no any co morbidities

Time line events

Table no. 1: Showing the timeline of the events.

Phase	Treatment	Medicine/Procedure	Duration	Dates
1	Deepana–Pachana	Trikatu choorna 3 gms TID with luke warm water (Before Food)	3 days	8/02/2026-10/02/2026
2	Snehapana	Dadimadi Ghrita ⁵ (50 mL, 75 mL, 100 mL, 125mL, 150 mL)	5 days	11/02/2026-15/02/2026
3	Vishrama Kala	Sarvanga Abhyanga with murchitha tila Taila ⁶ followed by Bashpa Sweda	3 days	16/02/2026-18/02/2026
4	Virechana	Nimbamrutadi eranda taila 50ml with 50ml of warm water on an empty stomach (12Vegas)	1 day	19/02/2026
5	Samsarjana Krama	Post-Virechana dietary regimen	3 days	20/02/2026-22/02/2026
6	Yapana Basti ^[7] (as purvakarma for uttarabasti)	Madhu 30 g + Saindhava Lavana 10 g + Sukumara Ghrita 50 mL + Shatapushpa Kalka 25 g + Mustadi Ksheerapaka 300 mL + Mamsa Rasa 100 mL	3 days	23/02/2026-25/02/2026
	Uttara basti	Shatavari ghrita ^[8]	3 days	23/02/2026-25/02/2026
7	Shamana rasayana yoga	Kushtadi rasayana yoga ^[9] 500mg capsules 1 TID (B/F), Sukoshna ksheera as anupana. Kapikacchu ghana vati, 250mg, 2 TID(AF)with sukosna ksheera as anupana from	18 Days	26/02/2026-16/03/2026

Clinical Examination**Asta vidha pareeksha**

The Prakriti (~somatic constitution) of the patient was Vata- Pittaja, Nadi (~pulse) was 81bpm, regular, Mutra (~urine) was Prakruta (~normal), with normal frequency. Mala (~excreta)- hardstool, Jiwha (~tongue) were Nirama (~devoid of toxic by-product generated due to improper or incomplete digestion), Shabda (~sound) was Spashta (~clear), Sparsha (~tactile examination) was Anushnasheeta (~not too hot and cold), Drik (~eye sight) was Prakrita (~normal), and Akriti (~body stature) was Madhyama (~moderate).

Systemic examination

Respiratory system: Bilateral Air entry clear

Cardiovascular system: S1, S2 heard, No Murmur

Central Nervous System: Conscious and well Oriented to time, place and person

- Muscle tone: Normal
- Deep tendon reflexes: Normal
- Muscle power: Grade 5/5

- Genital examination –
- **Scrotum** –B/L Normal size and no any swelling, lesions varicocele
- **Testes** – B/L size consistency palpable
- **Epididymis:** Soft and Palpable
- **Spermatic Cord - nature** - Normal and right and left

Consistency – soft – right and left

- **Vas deference-** Palpable - Right spermatic cord/ and Left spermatic cord
- **Cremasteric reflex:** - Present

Laboratory Investigations

Table No. 2: Showing the laboratory investigations before treatment.

Semen analysis

Semen parameters	Before treatment
Semen volume	1.5ml
Sperm count/ml	14 million/ml
Sperm motility(rlp+slp)	25%
Sperm motility (progressive motility)	25%
Sperm motility (sluggish motility)	35%
Morphology	Normal

Samprapti ghataka

Dosha- Vata pitta pradhana tridosha

Dushya-Rasa, shukra

Srotas- Rasavaha and shukravaha

Srotodusti-Sanga and vimargagama

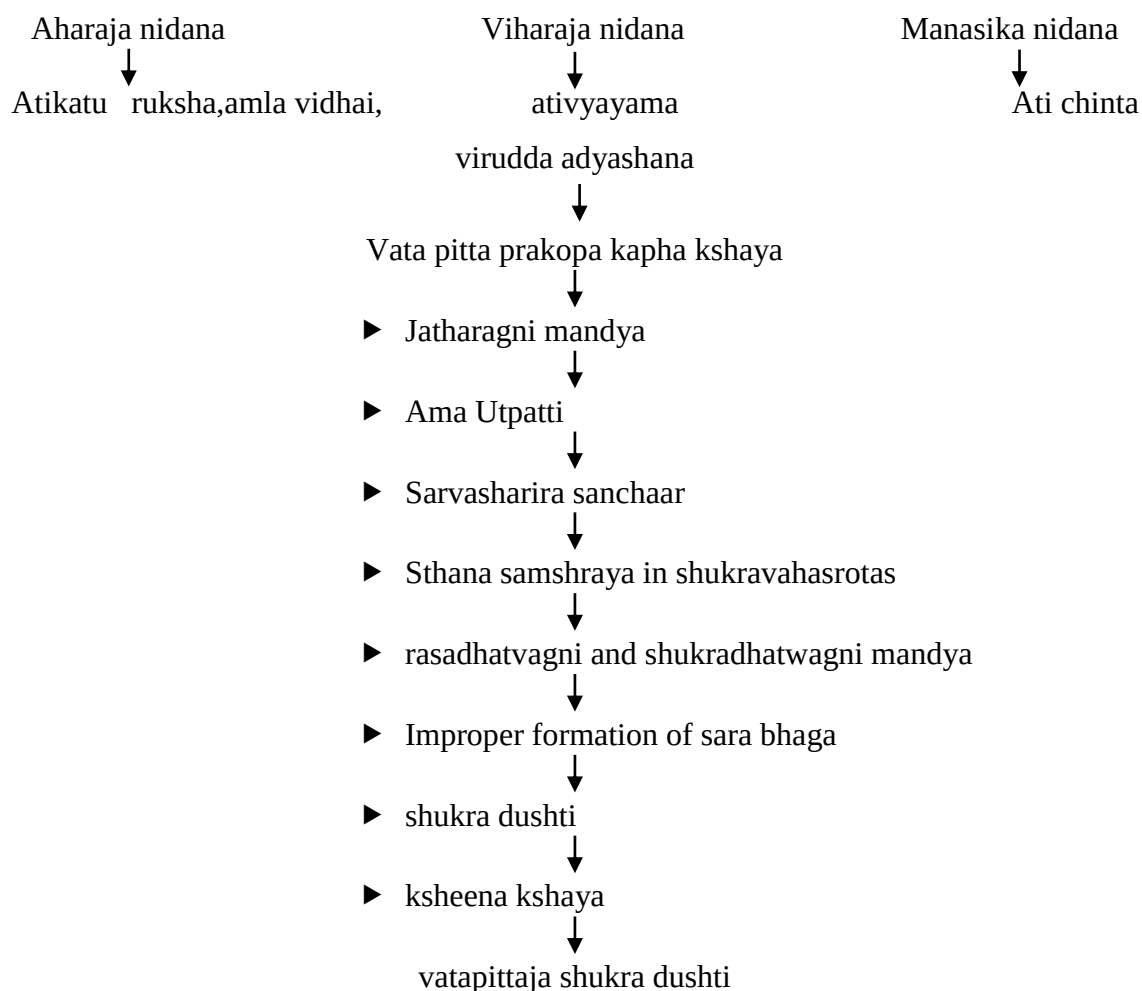
Udbhava sthana-Ama-pakwashaya

Sanchara sthana-Sarvashareera

Vyaktha sthana- vrshana

Rogamarga- abhyantara

Adhyasadyata- krichra sadhya

Samprapti**Intervention****Table no. 3: Showing the treatment protocol 36 days.**

Chikitsa	Shamanaushadhi	duration
Deepana pachana	Trikatu choorna 3 gms TID with luke warm water (Before Food)	3 days
snehapana	Dadimadi Ghrita (50 mL, 75 mL, 100 mL, 125mL, 150 mL)	For 5 days
Vishrama kala Sarvanga abhyanga Bashpa sweda	Sarvanga Abhyanga with murchitha tila Taila ⁴ followed by Bashpa Sweda	For 3 days
Virechana	Nimbamrutadi eranda taila 50ml with 50ml of warm water on an empty stomach (12Vegas)	For 1 day
Samsarjan karma	Post-Virechana dietary regimen	For 3 days
Basti (as poorvakarma for uttara basti in morning in empty stomach)	Madhu 30 g + Saindhava Lavana 10 g + Sukumara Ghrita 50 mL + Shatapushpa Kalka 25 g + Mustadi Ksheerapaka 300 mL + Mamsa Rasa 100 mL	3 days
uttarabasti	Shatavari ghrita	3 days

Chikitsa	Shamanaushadhi	Duration
Shamana aushadhi	Kushtadi rasayana yoga 500mg capsules 1 TID (B/F), Sukoshna ksheera as anupana. Kapikacchu ghana vati, 250mg, 2 TID(AF)with sukosna ksheera as anupana from	For 18 days
Total duration		36 days

OBSERVATION AND RESULTS

Table No. 4 showing results of objective parameters before and after intervention.

Objective parameters	Before treatment 08/02/2025	After virechana 17/03/2025
Semen volume	1.5ml	2ml
Sperm count/ml	14 million/ml	100 million/ml
Sperm motility (RLP+SLP)	25%	70%
Sperm motility (progressive motility)	25%	50%
Sperm motility (sluggish motility)	35%	20%
Morphology	Normal	Normal

OBSERVATION AND RESULTS

Table No. 5 showing results of objective parameters before and after intervention.

Subjective Parameter	Before Treatment	After Treatment
Dourbalya (0-3)	3	2
Mukshasoshsa (0-3)	2	1
Pandutha (0-3)	2	1
Shrama (0-3)	3	1
Sadana (0-3)	2	1
Sexual desire (0-3)	2	0
Orgasm (0-3)	3	0
Ejaculation (0-3)	0	0

DISCUSSION

In this case study the patient suffering from OA Syndrome

Virechana:- In shukra dusti/shukra ksheena avasta; Due to etiological factors of Vata and Pitta doshas which make shukra dusti. By adopting does normalcy to body Shukra dushti a clinical condition occurring due to vata and pitta dusthi to address that prime treatment taken as virechana and Uttarabasti because to remove aggravated doshas from shukra dhatu level shodhana plays an prime role, virechana being easiest rout and has beejam bhavati karmuka(has ability to promote progeny) and uttarabasti a specialized procedure having direct action on shukravah shrotas it is shukradoshahara and gharbhaprapitikara in which medicine is administered through the urthral route, it aids to deliver medicine directly to urinary and genital tracts.

Role of intervention

Virechana – Vata pitta hara, adhinabhighata dosha hara, (vyana vayu), vatanulomana.

Uttarabasti - Adhistana based chikitsa -shukradoshahara and gharbhapraptikara helps in localized absorption of nutrients, it surpasses first phase metabolism acts fast and provides immediate effect.

DISCUSSION

In the present case, the patient was suffering from OA syndrome, which was correlated with *Shukra Dushti/Shukra Ksheena Avastha*. According to Ayurveda, vitiation of *Vata* and *Pitta Doshas* can affect the quality and quantity of *Shukra Dhatu*, leading to disturbances in reproductive function. Therefore, the main aim of treatment was to restore *Dosha* balance and improve the normal functioning and nourishment of *Shukra Dhatu*.

Rationale for Virechana and Uttarabasti

Virechana was selected as the main *Shodhana* procedure because it helps in eliminating aggravated *Pitta Dosha* and restoring *Dosha Samya*. It also helps in maintaining the normal movement of *Vata* i.e Vatanulomana. Since *Shukra Dushti* is associated in adhonabhighata doshas, this therapy was considered as important treatment.

Uttarabasti was selected because it is a specialized therapy indicated for disorders involving the genitourinary and reproductive systems. The medicine is administered through the urethral route, allowing it to act locally on the reproductive tract. In classics, *Uttarabasti* is described as *Shukra Dosha Hara* and *Garbha Praptikara*. Hence, it was considered appropriate for addressing ksheena shukra.

The combination of *Virechana* and *Uttarabasti* was therefore intended to provide both systemic and localized management.

ROLE OF THE DRUGS

Dadimadi Ghrita

In *Shukra Dushti*, increased *Rukshata* due to *Vata* may contribute to depletion and poor nourishment of *Shukra Dhatu*. *Dadimadi Ghrita*, with its nourishing and *Snigdha* properties, was used to counteract this rukshata and ksheenata and support the proper nourishment of *Shukra Dhatu*.

Shatavari Ghrita

Shatavari is traditionally considered *Pitta Hara*, *Brimhana* and *Shukra Vardhaka*. Its *Snigdha* and *Madhura* properties help to counteract the *Rukshata* and *ushnata* associated with aggravated *Vata* and *pitta*. Therefore, *Shatavari Ghrita* was used to improve the nourishment of *Shukra Dhatu* and support reproductive function.

Shatavari is widely used as a rejuvenator and sexual tonic due to its properties such as *madhura- tikta rasa*, *madhura vipaka*, *sheeta veerya*, *sheeta*, *guru* and *snigdha guna* and is helpful in *shukra vridhhi* (spermatogenetic activities) and *shukra pravritti* (sperm ejaculation). In vivo studies have proved the ameliorating effect of *shatavari* root extract on the diabetes related sexual dysfunction in male Wistar rats. Similarly, improvement of penile erection and in vitro nitric acid-releasing activity of the extract of *Asparagus racemosus* Willd. was observed. One study assessing the effect of poly herbal formulation (*Withania somnifera* (L) Dunal, *Ocimum sanctum* L, *Asparagus racemosus* Willd and *Embllica officinalis* Gaertn.) has shown significant impact on adaptogenic, antistress and behavioural aspects contributing to better reproductive health in albino rats.⁶¹ Despite the preclinical evidence, the clinical trials for assessing the aphrodisiac potential of *shatavari* are scarce.^[10]

Kustadi Rasayana Yoga

Kustadi Rasayana Yoga, containing drugs such as *Kushta*, *Amalaki* and *Kokilaksha*, was included for its *shukra shodana*, *Rasayana* has supportive effects on tissue nourishment. The formulation was intended to improve the overall quality and functioning of *Shukra Dhatu*.

Kapikacchuvati

Kapikacchu (*Mucuna pruriens*) is an important *Vrushya* and *Shukra Vardhaka* drug. It is described as having *Madhura Rasa* and *Vrushya*.

Kapikacchu have L-Dopa which contains MAO inhibitor hormone which helps the brain to release Dopamine. When Dopamine is secreted in optimum levels, it increases Testosterone & GH. So, it is responsible for the elevated mood, increased libido and vitality. So it is said to be best *vajikarana dravya* in male infertility.

Atmagupta or *Kapikacchu beeja* is considered a viable source of protein, having anti-oxidant, *vatashamaka*, *shukrajanana* and *shukravardhana* properties, highlighting its aphrodisiac potential. It is a strong nutritive and neuroprotective drug helpful in conditions such as

premature ejaculation, sexual dysfunction and anxiety-related issues associated with sexual health. In vivo studies have shown their potent spermatogenetic effect due to the major component of L-DOPA and antioxidants in Wistar albino rats. *Mucuna pruriens* L. DC., due to L-DOPA, which has a proven stimulatory effect on spermatogenesis. The hypothalamo-pituitary-gonadal axis provides a potent hormonal balance with a decrease in stress, anxiety and related conditions as well. It is proven to be effective in the management of ageing-associated testicular damage in the aged rat testis. This is one of the herbs showing significant evidence on the sexual health of males.^[11]

OVERALL DISCUSSION

Overall, the treatment was planned to address the condition through both systemic and localized approaches. *Virechana* was used for *Shodhana*, correction of *Dosha* imbalance and *Vatanulomana*, whereas *Uttarabasti* was aimed at providing localized therapy to the reproductive and genitourinary tract. The oral formulations, including *Dadimadi Ghrita*, *Shatavari Ghrita*, *Kustadi Rasayana Yoga*, *Kapikacchu* and *Swarna Vasant Malati Rasa*, were selected mainly for their *Shukra Vardhaka*, *Vrushya*, *Rasayana* and nourishing properties. Thus, the overall treatment approach was aimed at correcting the underlying *Dosha* imbalance, improving *Shukra Dhātu* nourishment and supporting reproductive function.

CONCLUSION

In this case, the combined Ayurvedic treatment with *Virechana*, *Uttara Basti*, and *Shamana Rasayana* therapy showed encouraging improvement in semen parameters in a patient with oligoasthenozoospermia. Sperm count, motility, semen volume, and sexual wellbeing improved after treatment. The findings suggest that an integrated Ayurvedic approach may have a useful role in the management of Vata-Pittaja *Shukra Dushti* and male infertility. However, since this is a single-case study, larger and well-controlled studies are needed to confirm these results.

CHIRAYU DIAGNOSTIC Address: Patel Nagar , Beside TVS Service
Station Hosapete - 583201 Ph no:8618192808

Name: Mr. veeresh Date :08/02/2025
Age :31 years Gender : Male
Referred By : Dr.Chamaraj T MS, (OBG) FMS.

SEMEN EXMINATION REPORT

Service / Test	Result	Ref. Range
Sample Data		
Abstinence Period	03 days	
Collecting Time	10:50 am	
Analysis Time	11:50 am	
Physical Characters		
Volume	1.5ml	
Time of Liquefication	1 hour	
Viscosity	Normal	
Reaction	Alkaline	
Microscopic Exmination		
SPERMATOZOA COUNT :14Millions/ml		15 to 259 Millions/ml
Sperm Motility(%)		
(a) Active Progression	25%	
(b) Slow Progression	35%	
(c) Non-Progression Motility	15%	
(d) Immotile (Dead Sperms)	25%	
Morphology(%)		
Normal Heads	20%	
Macro Heads	15%	
Micro Heads	30%	
Headless 'Pinheads'	035%	
Double Heads	00%	
Other Element		
Pus Cells :	4-5	
Epithelial Cells :	1-3	
Red Blood Cells :	Absent	
Bacteria :	Absent	
Note : Sample collected from Lab		
IMPRESSION :Oligoasthenospermia		
*** End Of Report ***		
Signature _____		
Electronic Pathological Binocular Microscope , Makler Conting Chamber & Incubator		
T. gumbur-m on		

Figure No. 1: Showing the report before intervention.

SRI KANAKADURGA DIAGNOSTIC CENTRE Mob : 91486 93847
 1st Floor Savithramma Complex,
 Beside Mohan Lodge, Opp. Old KSRTC Bus Stand,
 Kolachalam Compound, BALLARI-583101, Karnataka.

Patient Name:- [REDACTED] Age:-37/M
 Labno:- [REDACTED] Date:-17/03/2025
 Referred By:-Dr Madhava Diggavi

Test Name	Result	Unit	Bio.Ref.Range
SEMEN ANALYSIS			
Physical Examination			
Colour	Greyish White		
Durations of Abstinence	4 days		2-5
Liquefaction	35		30-60
Viscosity	Normal		< 2cm thread after
Liquefaction			
Chemical Examination			
Reaction (ph)	7.0		7.2-7.8
Fructose	Present		
Volume	2 ml		
Microscopic Examination			
Total Sperm Concentration	>100 Million/ml		> 15
Percentage of Motility	70 %		> 50
Grade-A (Fast Progressive)	50 %		
Grade-B (Slow Progressive)	20 %		
Pus Cells	1-2 /HPF		
Epithelial Cells	1-2/ /HPF		

Lab Technologist

NOTE : Haematology & Bio Chemistry Investigations are done by Computerised fully

Figure No. 2: Showing the report before intervention.

BIBLIOGRAPHY

1. World Health Organization. (2021). *WHO laboratory manual for the examination and processing of human semen* (6th ed.). Geneva: WHO. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK279348/> ([ncbi.nlm.nih.gov](https://www.ncbi.nlm.nih.gov/books/NBK279348/) in Bing)
2. World Health Organization. *Infertility prevalence estimates, 1990–2021*. Geneva: WHO., 2023.
3. Acharya sushruta's Sushruta Samhita, nibandhasara sangraha comentry by acharya dalhan, and nyaya Chandrika by srigayadas edited by kevala krishna Thakral, 2019, Chaukamba Sanskrit sanstana sharirastana, 2nd chapter, verse 3, 20, 420.

4. Sharangadhara' s sharangadhara Samhita translated in English by prof. KR Shrikant murthy, Chaukhamba Oriental Varanasi 2022 Madhyama khanda chapter 6, verses 12-23.
5. Acharya Agnivesha, Caraka Samhita annotated by Caraka and redacted by Dridhabala with the Ayurveda Deepika commentary of Chakrapani datta, by Prof. Banwari Lal Gaur edited by Dr. Manoj Nesari and Prof. Vaidya V.V Prasad published by Rashtriya Ayurveda Vidyapeeth 2021 Siddi sthana chapter-12, verses- 15, 1031.
6. Govinda Dasji Bhaisajya Ratnavali, Bhisagratna commented upon by Vaidya Sri. Ambikadatta Sastri, English Translation by Dr. Kanjiv Lochan. 1. 2006 edition. Chaukhambha series Adhyaya 5, verses 1286-1287. 367.
7. Acharya Agnivesha, Caraka Samhita annotated by Caraka and redacted by Dridhabala with the Ayurveda Deepika commentary of Chakrapani datta, by Prof. Banwari Lal Gaur edited by Dr. Manoj Nesari and Prof. Vaidya V.V Prasad published by Rashtriya Ayurveda Vidyapeeth 2021 Siddi sthana chapter-12, verses- 15, 1031.
8. Agnivesha. Charaka Samhita with Ayurveda Deepika commentary of Chakrapani Datta. Yadavji Trikamji Acharya, editor. 4th ed. Varanasi: Chaukhamba Surbharati Prakashan; Chikitsa Sthana, Raktapitta Chikitsa, 4/95-96, 434.
9. Agnivesha, Charaka Samhita with Ayurveda Deepika commentary of Chakrapani Datta. Yadavji Trikamji Acharya, editor. 4th ed. Varanasi: Chaukhamba Surbharati Prakashan; Sutra Sthana, chapter 4, 12(20).
10. Banerjee P, Das A, Kumar P, Chakraborty S, Jalan K. An Updated Insight on the Chemistry, Ethnobotany, and Health Benefits of *Asparagus racemosus* (Shatavari): With a Special Emphasis on Shatavarin IV. J Am Nutr Assoc, Nov-Dec. 2025; 44(8): 681-692. doi: 10.1080/27697061.2025.2496945. Epub 2025 May 7. PMID: 40334116.
11. Khan MZI, Seppan P. Mucuna pruriens mitigates aging-related testicular dysfunction and sperm parameters by restoring cell adhesion molecules and junctional complexes. Biogerontology, Apr. 16, 2026; 27(3): 85. doi: 10.1007/s10522-026-10432-1. PMID: 41989640.