

Clinical Practice Guidelines
Pharmacotherapy in Sexual Medicine
Corresponding author: Dr Suresh Patil
Other Authors: Dr Abhishek Somani, Dr O P Singh

Formatted: Left: 1", Right: 1", Top: 1", Bottom: 1",
Width: 8.27", Height: 11.69", Numbering: Continuous

1. Dr Suresh Patil (Corresponding Author)

Consultant Psychiatrist & Sexologist
Founder & Director, Vibhas Psychiatry Hospital & Rehabilitation Centre, Virar, Maharashtra,
India.
ORCID id- 0009-0008-4228-7413
Email: drsuresh6dec@gmail.com

2. Dr Abhishek Somani

Professor, Psychiatry
Indira Gandhi Govt. Medical College, Nagpur, Maharashtra.
ORCID ID: 0000-0002-0621-3993
Email: drabhisheksomani@gmail.com

3. Dr O P Singh

Professor, Psychiatry
Midnapore Medical College, West Bengal.
opsingh.nm@gmail.com

Pharmacotherapy in Sexual Medicine

Dr OP Singh, Dr Abhishek Somani, Dr Suresh Patil

Executive Summary

(One page - as per Indian Journal of Psychiatry Instructions to Lead Authors)

This review guidelines examines medicines/medications used for sexual dysfunction and their relevance to Indian clinical practice.

For premature ejaculation (PE), dapoxetine provides is an approved on-demand treatment. Behavioural therapy can improve outcomes; a PDE5 inhibitor may be added when ED coexists.

On-demand sildenafil 4 mg is an emerging alternative for patients who cannot tolerate dapoxetine.

Hormonal treatments include testosterone for hypogonadism-associated ED and selected female sexual dysfunction, oestrogen/progestogen therapy and tibolone. Cabergoline and bromocriptine address prolactin-related dysfunction.

The review covers flibanserin, bremelanotide and local oestrogen for can be used for female sexual dysfunction (FSD), as well as management of vaginismus/Genito Pelvic Pain /Penetration Disorder. Investigational treatments are considered separately because broader clinical validation is still needed.

Proper Assessment, patient education, psychosexual therapy, follow-up and treatment of comorbid illness form the basis of pharmacological care.

Indian practice also requires attention to under-reporting, Dhat syndrome and regulatory restrictions. Evidence for L-arginine-pycnogenol, ashwagandha, Mucuna pruriens and other nutraceutical or Ayurvedic products is generally of low-to-moderate quality. Their role is adjunctive.

Five Priorities for Indian Clinicians

Commented [d1]: Full-form

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Commented [d2]: Review this sentence again

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Commented [d3]: Make it a paragraph rather than bullet point Executive Summary

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

1. Introduction

Sexual medicine addresses sexual dysfunction throughout life and draws on several clinical disciplines. Erectile dysfunction (ED) affects an estimated 320 million men worldwide and independently predicts cardiovascular and metabolic disease. Premature ejaculation (PE) affects 20-30% of men, while female sexual dysfunction (FSD) affects quality of life in 25-50% of women, depending on age and menopausal status. Indian prevalence estimates are limited by under-reporting. Clinic-based studies nevertheless indicate a substantial burden in both sexes. Stigma, limited sex education and the expectations surrounding arranged marriage can complicate assessment and care.

Treatment options have changed since the Indian Psychiatric Society published its sexual dysfunction guidelines in 2005-2006[31] and revised them in 2017[32]. Recent developments include the [European association of Urology \(EAU\)](#) Sexual and Reproductive Health Guidelines (2025)[1], [Food and Drug Administration](#) testosterone labelling changes in February 2025[2] and the extension of flibanserin approval to postmenopausal women in December 2025[7]. This [review-guidelines](#) brings these developments together with established prescribing principles and the regulatory and cost considerations relevant to India.

2. Classification of Drugs Used in Sexual Medicine Practice

Pharmacological agents in sexual medicine span five principal categories:

- PDE5 inhibitors for erectile dysfunction
 - Agents for premature ejaculation - on-demand systemic (dapoxetine, silodosin), daily systemic (SSRIs, clomipramine), and topical (lidocaine-prilocaine)
- Hormonal pharmacotherapy - testosterone, oestrogen, progestogens, tibolone, and dopamine agonists (cabergoline)
- Drugs for female sexual dysfunction - centrally acting (flibanserin, bremelanotide) and peripheral (local oestrogen, ospemifene, prasterone)
- Emerging and investigational agents

3. Phosphodiesterase Type 5 (PDE5) Inhibitors

3.1 Mechanism of Action

During sexual arousal, non-adrenergic non-cholinergic nerves and vascular endothelium release nitric oxide (NO) in the corpus cavernosum. NO activates soluble guanylate cyclase and raises intracellular cyclic guanosine monophosphate (cGMP). Cavernosal smooth muscle then relaxes, arterial inflow increases and venous outflow is restricted, producing an erection. PDE5 degrades cGMP. By competitively and reversibly inhibiting PDE5, these medicines prolong the cGMP signal and smooth muscle relaxation. They still require sexual stimulation to release endogenous NO; they do not produce an erection without arousal.

3.2 Approved Agents and Pharmacological Comparison

Commented [d4]: Full form at first use

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Commented [d5]: Full form at the first use

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Table 1. PDE5 Inhibitors: Dosing, Onset, Adverse Effects, and Practical Pearls for Indian Practice

Drug	Starting Dose	Dose Titration	Maximum Dose	Onset & Duration	Common Adverse Effects	Special Precautions	Prescribing Notes
Sildenafil	25-50 mg	Up to 100 mg based on response/tolerability	100 mg	Onset 30-60 min; duration 4-6 h	Headache, flushing, dyspepsia, visual colour tinge	Absolute contraindication with nitrates; higher PDE6-related visual effects	Advise avoiding fatty meals (delays absorption); reinforce absolute nitrate contraindication at every prescription
Tadalafil (on-demand)	10 mg	Up to 20 mg if inadequate response	20 mg	Onset 30-45 min; duration 24-36 h	Back pain, myalgia (PDE11-related), headache	Caution with potent CYP3A4 inhibitors	The 24-36 h window is useful for Indian scheduling/travel constraints and reduces performance-anxiety pressure; counsel about back pain/myalgia
Tadalafil (daily)	2.5 mg once daily	Up to 5 mg once daily	5 mg/day	Steady-state coverage; continuous	Back pain, myalgia, dyspepsia	Same CYP3A4 caution as on-demand dosing	Dual benefit for concurrent ED and LUTS/BPH -a practical option for the many older Indian men with both conditions
Vardenafil	5-10 mg	Up to 20 mg based on response	20 mg	Onset 25-60 min; duration 4-6 h	Headache, flushing, dyspepsia	QT-interval caution; avoid with Class IA/III antiarrhythmics	Consider in patients intolerant of sildenafil's visual effects, but observe ECG/QT caution in those with cardiac conduction concerns
Avanafil	50-100 mg	Up to 200 mg based on response	200 mg	Onset 15-30 min; duration 6-12 h	Headache, flushing (generally mild)	Minimal food effect; use caution with CYP3A4 inhibitors	Fastest onset of the class, useful where spontaneity is prioritised, but limited availability and higher cost restrict routine use in India
Udenafil	100 mg	Up to 200 mg based on response	200 mg	Onset 30-60 min; duration 12-24 h	Headache, flushing, dyspepsia	Not FDA/EMA approved; use per India-approved labelling	India-approved, cost-effective extended-window alternative to tadalafil, particularly useful where tadalafil cost is a barrier

PDE5 = phosphodiesterase type 5; PDE6 = phosphodiesterase type 6; PDE11 = phosphodiesterase type 11; LUTS/BPH = lower urinary tract symptoms/benign prostatic hyperplasia; ECG = electrocardiogram; CYP3A4 = cytochrome P450 3A4. Udenafil is approved in India and South Korea; not FDA/EMA approved.[1] Brand names omitted per journal editorial policy.

3.3 Second-Line Therapies for Erectile Dysfunction

Second-line options are summarised below with practical dosing and precaution guidance for Indian practice.

Formatted: Numbering: Continuous

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Left, Don't add space between paragraphs of the same style

Table 2. Second-Line Therapies for Erectile Dysfunction: Practical Use and Precautions

Therapy	How Used / Starting Dose	Titration / Max	Success Rate	Onset	Common Adverse Effects	Precautions	Prescribing Notes
Alprostadil (PGE1) intracavernosal	Start 5 mcg intracavernosal	Titrate up to 40 mcg per injection	70-90%	5-15 min	Penile pain (30-40%), priapism risk	Structured patient education on injection technique mandatory	Reserve for PDE5-inhibitor non-responders; ensure hands-on teaching before first home use
Trimix (papaverine + phentolamine + alprostadil)	Compound ed dose per protocol	Individually titrated by treating physician	80-92%	5-15 min	Penile pain, priapism risk	Compounded preparation; not a fixed commercial combination in India	Most effective injectable option, but compounding availability in India is limited -plan pharmacy sourcing in advance
Alprostadil intraurethral	Per manufacturer labelling	Not routinely available in India	30-50%	5-10 min	Penile burning	Less effective than injection	Not currently available in India - counsel patients this is not a viable option locally
Alprostadil topical cream	Applied to glans	Not CDSCO approved	~55%	10-30 min	Penile erythema	Non-invasive but not CDSCO approved	Cannot be recommended for Indian patients given lack of CDSCO approval
Vacuum erection device (VED)	Mechanical, used at time of intercourse	Not applicable	60-80%	Immediate	Bruising, petechiae, cold sensation	Patient and partner acceptance variable	Widely available in India; a useful non-pharmacologic al option for patients wishing to avoid drugs or injections
Low-intensity extracorporeal shockwave therapy (Li-ESWT)	External device, outpatient sessions	6-12 sessions (EAU Grade B, 2025)	Durable IIEF improvement	6-12 sessions to effect	Generally well tolerated; mild local discomfort	Best evidence in mild-moderate vasculogenic ED	Increasingly available in Indian metros; consider as a neoadjuvant alongside PDE5 inhibitors rather than a stand-alone replacement

ICI = intracavernosal injection; PGE1 = prostaglandin E1; Li-ESWT = low-intensity extracorporeal shockwave therapy; IIEF = International Index of Erectile Function; PDE5 = phosphodiesterase type 5; VED = vacuum erection device.

Formatted: Font: (Default) Times New Roman, 10 pt

Formatted: Font: (Default) Times New Roman, 10 pt

Formatted: Font: (Default) Times New Roman, 10 pt

Formatted: Font: (Default) Times New Roman, 10 pt

Formatted: Font: (Default) Times New Roman, 10 pt

Formatted: Font: (Default) Times New Roman, 10 pt

Formatted: Font: (Default) Times New Roman, 10 pt

Formatted Table

Formatted: Font: (Default) Times New Roman

3.4 Cardiovascular Risk Stratification: Princeton IV Guidelines

Cardiovascular risk stratification using the Princeton IV Consensus (2024) is mandatory before prescribing any PDE5 inhibitor (Table 3).

Table 3. Cardiovascular Risk Stratification Before PDE5 Inhibitor Therapy - An Authors' Synthesis of the Princeton IV Consensus (2024)

Risk Category	Our Definition (in the Authors'	PDE5 Inhibitor Guidance	Practical Action for Indian Primary
Low Risk	Controlled hypertension; fewer than 3 cardiovascular risk factors; mild stable angina; uncomplicated post-MI beyond 8 weeks; NYHA Class I heart failure; mild valvular disease	Safe to prescribe. No cardiology referral needed. Use lowest effective dose.	Family physician may initiate PDE5 inhibitor therapy directly; document risk-factor status in the notes
Intermediate Risk	3 or more major cardiovascular risk factors; moderate stable angina; post-MI between 2-8 weeks; NYHA Class II heart failure; left ventricular dysfunction (ejection fraction 40- 50%); non-cardiac atherosclerotic disease	Defer prescription. Cardiology consultation required. Exercise testing to clarify risk. Treat cardiovascular disease first, then reassess.	Refer to cardiology before initiating any PDE5 inhibitor; re-evaluate sexual function once cardiac status is optimised
High Risk	Unstable or refractory angina; uncontrolled hypertension (BP >170/110); recent MI within 2 weeks; stroke within 6 weeks; NYHA Class III-IV heart failure; high-risk arrhythmias; obstructive hypertrophic cardiomyopathy	CONTRAINDICATED until the cardiovascular condition is stabilised. Multidisciplinary management required.	Do not prescribe; refer urgently for cardiology stabilisation before any sexual medicine intervention is considered

CV = cardiovascular; EF = ejection fraction; MI = myocardial infarction; BP = blood pressure; NYHA = New York Heart Association; PDE5 = phosphodiesterase type 5. Risk categories informed by the Princeton IV Consensus Statement, 2024.[6]

MANAGEMENT: Erectile Dysfunction

The EAU 2025 guidelines retain PDE5 inhibitors as first-line pharmacotherapy for ED across aetiologies.[1] The following points guide treatment:

- Where ED coexists with confirmed hypogonadism (total testosterone <12 nmol/L), testosterone therapy is initiated first - PDE5 inhibitor added if erectile response remains incomplete (Grade A evidence)[1]

- 86 • Apparent non-responders should be re-evaluated for incorrect dosing, timing, or inadequate sexual stimulation
87 before declaring drug failure
88 • Once-daily low-dose tadalafil for concurrent LUTS/BPH is a parallel first-line option alongside alpha-blockers
89 • Contraindications: concurrent nitrates (absolute); potent CYP3A4 inhibitors require dose adjustment for
90 sildenafil and vardenafil

3.5 PDE5 Inhibitors in Special Populations

- 91 • In diabetic ED (affecting 35-75% of men with diabetes), response rates are lower (50-60%), reflecting impaired
92 endothelial NO generation. Combined testosterone optimisation and PDE5 inhibitor use, or once-daily low-dose
93 tadalafil, improve outcomes.
94 • In post-prostatectomy ED, early penile rehabilitation with nightly low-dose tadalafil aims to prevent corporeal
95 fibrosis; non-nerve-sparing cases frequently require intracavernosal



Formatted Table

Formatted: Font: (Default) Times New Roman

injection therapy.

- In neurogenic ED (spinal cord injury, multiple sclerosis, Parkinson's disease), PDE5 inhibitors are effective in upper motor neuron lesions; orthostatic hypotension risk in autonomic neuropathy warrants dose caution.

3.6 Other Oral Erectogenic Agents (Indian Guidelines)

The Indian Psychiatric Society guidelines[32] also discuss older oral erectogenic agents. Some were used before PDE5 inhibitors became available; others retain a role in selected

circumstances. None is a first-line treatment. Their main uses and limitations are outlined below.

- Trazodone: Historically used for ED, with serotonergic (5-HT_{2C} antagonism) and adrenoceptor-antagonist effects. Studies reported benefit over placebo in mixed and psychogenic ED, but PDE5 inhibitors have largely replaced it.
- Yohimbine: An alpha-2 adrenergic antagonist. The Indian guidelines[32] describe one small trial in which adding L-arginine improved outcomes (Section 10.1). Regulatory and safety concerns limit its use in India; it is not recommended as standalone treatment.
- Apomorphine: A central dopamine agonist studied as a sublingual ED treatment. Limited availability and the established role of PDE5 inhibitors restrict its use in Indian practice.
- Phentolamine: A non-selective alpha-adrenergic antagonist, used in India mainly in compounded intracavernosal Trimix (Table 2), rather than as an oral treatment.
- L-arginine: A substrate for nitric oxide synthase. Section 10.1 reviews the doses studied, the supporting evidence and its combination with pycnogenol.

4 Pharmacotherapy of Premature Ejaculation

4.1 Definition and Epidemiology

The International Society of Sexual Medicine defines lifelong PE as ejaculation always or nearly always within approximately one minute of vaginal penetration. Acquired PE involves a clinically significant reduction in latency, often to within three minutes. Both are associated with negative personal consequences. Reported prevalence is 20-30%, making PE the most common male sexual dysfunction. Many affected men do not seek care. In India, stigma and limited awareness of treatment contribute to this gap.

4.2 Dapoxetine: The Only Approved On-Demand Agent

Dapoxetine is a short-acting SSRI developed for on-demand treatment. Rapid absorption (T_{max} approximately 1.3 h), a brief half-life (approximately 1.3 h) and rapid elimination limit sustained serotonergic effects between doses. It inhibits the serotonin transporter in spinal ejaculatory centres and delays the ejaculatory reflex. Phase III data reported [Intravaginal Ejaculation Latency Time \(IELT\)](#) improvements of 3.0-fold with 30 mg and 3.6-fold with 60 mg versus placebo.[8]

A 2025 meta-analysis[4] found greater IELT improvement with dapoxetine plus structured non-pharmacological therapy than with dapoxetine alone (standardised difference in means 1.6; p=0.01; moderate GRADE certainty). These findings support including behavioural treatment.

Another 2025 meta-analysis reported benefit from adding a PDE5 inhibitor in men with coexisting ED (mean difference +1.08 min; p=0.004).

Commented [d6]: Full form at the first use

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Dosing: Start with 30 mg taken 1-3 h before intercourse; increase to 60 mg if the response is inadequate. Maximum: 60 mg in 24 h. Contraindications include MAOIs, significant cardiac disease, moderate-to-severe hepatic impairment, a history of mania and potent CYP2D6/3A4 inhibitors.

4.3 Combined Pharmacotherapy for PE with Comorbid ED

When PE and ED coexist, evidence supports using dapoxetine with a PDE5 inhibitor. Treatment of ED can reduce associated performance anxiety, while dapoxetine delays ejaculation. A fixed-dose sildenafil-dapoxetine combination is approved and widely used in India.

4.4 Daily SSRIs and Topical Agents

Daily paroxetine, sertraline or fluoxetine (all off-label), or clomipramine, may be used when on-demand therapy is impractical (Table 4). Topical lidocaine-prilocaine provides a non-systemic option for psychogenic PE or combination treatment. Comparative studies cited in the Indian guidelines[32] found greater ejaculatory delay with paroxetine than with fluoxetine, clomipramine or sertraline. Paroxetine is therefore a reasonable daily option when dapoxetine is unavailable or unsuitable.

151
152
153

154
155

Table 4. Daily SSRI/TCA and On-Demand Silodosin for Premature Ejaculation

Drug	Starting Dose	Titration / Max	Onset	Adverse Effects	Precautions	Efficacy (IELT Fold increase)	Prescribing Notes
Paroxetine	10 mg/day	Up to 40 mg/day	5-10 days	Weight gain, sedation, sexual side effects	Discontinuation syndrome; avoid abrupt withdrawal	8.8×	Highest potency of the daily SSRIs, but counsel patients explicitly about discontinuation symptoms before starting
Sertraline	25 mg/day	Up to 200 mg/day	5-10 days	GI upset, mild sexual side effects	Generally well tolerated	4.3×	Preferred first choice for long-term daily use in India - widely available and generally well tolerated
Clomipramine	12.5 mg/day	Up to 50 mg/day (or on-demand, off-label)	On-demand effective	Anticholinergic effects (dry mouth, constipation)	Caution in cardiac conduction disease	5.2×	May be considered when PE coexists with depression; antidepressant treatment requires separate assessment and an appropriate therapeutic dose.
Fluoxetine	20 mg/day	Up to 40 mg/day	1-3 weeks	GI upset, fewest withdrawal effects	Long half-life may delay onset of benefit	2.8×	Long half-life; individualise the dosing schedule according to response and tolerability.
Silodosin 4 mg (on-demand; off-label for PE)	4 mg taken 1-3 h before intercourse	On-demand use only; informed consent required	On-demand	Dizziness, retrograde/absent ejaculation, orthostatic hypotension	Off-label for PE; monitor for postural hypotension	Comparable to dapoxetine 60 mg	A 2025 RCT shows non-inferiority to dapoxetine 60 mg with fewer adverse events; already available in India for BPH, easing off-label access

IELT = intravaginal ejaculatory latency time; BPH = benign prostatic hyperplasia; RCT = randomised controlled trial; GI = gastrointestinal. Silodosin evidence per the 2025 randomised study.[5] Brand names omitted per editorial policy.

Formatted: Numbering: Continuous

Formatted: Font: (Default) Times New Roman, 10 pt

Formatted: Font: (Default) Times New Roman, 10 pt

Formatted Table

Formatted: Font: (Default) Times New Roman, 10 pt

Formatted: Font: (Default) Times New Roman, 10 pt

Formatted: Font: (Default) Times New Roman, 10 pt

Formatted: Font: (Default) Times New Roman, 10 pt

Formatted: Font: (Default) Times New Roman

Formatted: Numbering: Continuous

5. Hormonal Pharmacotherapy in Sexual Medicine

5.1 Testosterone Therapy in Men

The EAU 2025 guidelines[1] use total testosterone <12 nmol/L, increased from 10.4 nmol/L, as the biochemical threshold for late-onset hypogonadism (LOH). Two morning samples are required, with LH and FSH measurement to classify the subtype (Table 5). The guidelines position testosterone monotherapy as first-line treatment for mild ED with confirmed hypogonadism; a PDE5 inhibitor can be added if the erectile response is incomplete. Table 6 outlines investigations before hormonal treatment by age group.

On 28 February 2025, the FDA removed the cardiovascular boxed warning from testosterone products after TRAVERSE showed non-inferiority to placebo for major adverse cardiovascular events.[2] The same revision introduced a class-wide blood pressure monitoring requirement (Table 7). Formulations and follow-up schedules are summarised in Tables 8 and 9.

Table 5. Diagnostic Criteria for Late-Onset Hypogonadism (LOH): A Practical Synthesis

Parameter	Diagnostic Threshold	Why It Matters Clinically	Practical Note for Indian Practice
Total testosterone	<12 nmol/L (3.46 ng/mL) on 2 morning samples	Threshold raised in the 2025 update from the previous 10.4 nmol/L, capturing more symptomatic men	Ensure the laboratory used has a validated assay; repeat testing before committing to therapy
Free testosterone	<220 pmol/L (calculated)	Useful when total testosterone is borderline or SHBG is abnormal	Request SHBG alongside total testosterone in men with obesity or thyroid disease to avoid misclassification
LH and FSH	Mandatory for subtype classification	Distinguishes primary, secondary, and compensated hypogonadism, which changes management	Order LH/FSH at the same visit as the first testosterone sample to avoid a return trip
SHBG	Measure if total testosterone is borderline	Elevated SHBG can mask true androgen deficiency despite a normal total testosterone	Particularly relevant in older men and those with liver disease, both common in Indian clinics
Timing of sampling	Before 10:00 AM on both occasions	Diurnal variation is clinically significant; afternoon samples are falsely low	Educate laboratory staff and patients about the importance of morning sampling to avoid unnecessary repeat testing
ED with confirmed LOH	Testosterone therapy first-line monotherapy (Grade A)	Add a PDE5 inhibitor only if erectile response remains incomplete after an adequate testosterone trial	Avoid reflexively adding a PDE5 inhibitor before testosterone has been given a fair trial

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

SHBG = sex hormone-binding globulin; LOH = late-onset hypogonadism; LH = luteinising hormone; FSH = follicle-stimulating hormone; ED = erectile dysfunction; PDE5 = phosphodiesterase type 5. Diagnostic thresholds per the EAU 2025 guideline update.[1]

Table 6. Age-Wise Investigation Panel Before and During Hormonal Therapy in Sexual Medicine

Age Group	Recommended Investigations	Hormonal Parameters	Additional Tests	Practical Note
18-30 years (young adult)	Serum testosterone (morning x2), LH, FSH, prolactin, SHBG, fasting glucose, BMI	Consider Klinefelter screen (karyotype); secondary hypogonadism workup (pituitary MRI if LH/FSH low)	Semen analysis if subfertility; genetic screen if indicated; DHEAS if adrenal insufficiency suspected	Prioritise fertility-preserving options; avoid testosterone if fertility is desired
31-45 years (middle adult)	Testosterone (morning x2), LH, FSH, prolactin, SHBG, PSA (if prescribed testosterone), HbA1c, lipid profile, BP	Thyroid function (TSH, free T4); morning cortisol if fatigue prominent; IGF-1 if growth hormone deficiency suspected	IIEF-15 + ADAM questionnaire; haematocrit before testosterone therapy; liver function tests	This is the group in which metabolic syndrome screening most often changes management
46-60 years (perimenopausal women / late middle-aged men)	Men: testosterone x2, LH, FSH, SHBG, PSA + DRE, haematocrit. Women: FSH, oestradiol, AMH (if relevant)	Thyroid function; prolactin; fasting glucose, HbA1c, lipid profile	Women: mammography, endometrial assessment if MHT planned. Men: Princeton IV cardiovascular risk stratification; PHQ-9, GAD-7	Menopause counselling and cardiovascular risk stratification should occur in the same consultation
61-75 years (older adult)	Men: testosterone x2, LH, FSH, PSA + DRE, haematocrit, SHBG. Women: oestradiol, FSH. Both: fasting glucose, HbA1c, lipid profile, renal/liver function	Thyroid function; bone mineral density (DEXA) if osteoporosis risk; prolactin if relevant	Cardiovascular risk assessment (ECG, echocardiogram if indicated); cognitive screening (MMSE/MoCA); fall risk assessment before testosterone initiation in frail men	Screen for frailty before starting testosterone; avoid unnecessary investigations that add cost without changing management
≥75 years (elderly)	As above; use clinical judgement to limit unnecessary investigations; frailty assessment (FRAIL scale); polypharmacy review	Testosterone only if symptomatic LOH confirmed and fit for therapy; avoid if haematocrit >54%, active cardiovascular disease, or recent MI/stroke	Benefits-versus-risks discussion documented; oncological surveillance (PSA) mandatory; MHT generally not recommended without specialist review	Shared decision-making with family involvement is often appropriate in this age group in Indian practice

PSA = prostate-specific antigen; DRE = digital rectal examination; SHBG = sex hormone-binding globulin; ADAM = Androgen Deficiency in Ageing Male; IIEF = International Index of Erectile Function; AMH = anti-Müllerian hormone; MHT = menopausal hormone therapy; DEXA = dual-energy X-ray absorptiometry; LOH = late-onset hypogonadism; MI = myocardial infarction; MMSE = Mini-Mental State Examination; MoCA = Montreal Cognitive Assessment.

Formatted: Numbering: Continuous

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Table 7. Testosterone Labelling Changes: Previous Versus Updated (February 2025)

Label Element	Previous (Pre-2025)	Updated (Post-February 2025)
Cardiovascular boxed warning	Boxed warning: increased risk of adverse cardiovascular outcomes	REMOVED - replaced with TRAVERSE trial reference showing non-inferiority to placebo for major adverse cardiovascular events
Blood pressure	Not prominently featured	NEW class-wide warning: all testosterone products may increase blood pressure; ambulatory BP monitoring data cited
Atrial fibrillation	Not stated	NEW: small increase in atrial fibrillation incidence noted (TRAVERSE data)
Prostate cancer	Boxed warning: increased risk	Modified: large randomised controlled trials show no significant increase in prostate cancer incidence with physiological-range therapy
Biochemical confirmation	Limitation-of-use language present	RETAINED: biochemical confirmation of hypogonadism still required before initiation

TRAVERSE = Testosterone Replacement Therapy for Assessment of Long-term Vascular Events and Efficacy Response in Hypogonadal Men. Labelling changes per the FDA Drug Safety Communication of 28 February 2025.[2]

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

188
189
190

191

Table 8. Testosterone Formulations Available in India

Formulation	Dose	Frequency	Onset to Steady State	Adverse Effects	Special Precautions	Practical Pearl (India cost/availability)
Testosterone enanthate (intramuscular)	250 mg	Every 2-3 weeks	Peaks then troughs; mood fluctuation possible	Injection-site pain, mood swings, erythrocytosis	Avoid in men seeking fertility	Most widely used formulation in India; low cost makes it accessible across socioeconomic strata
Testosterone undecanoate long-acting (intramuscular)	1000 mg	Every 10-14 weeks	Stable, physiological levels	Injection-site reactions, erythrocytosis	Preferred for late-onset hypogonadism given fewest injections	Higher upfront cost but fewer clinic visits - worth discussing with working patients who value convenience
Testosterone gel 1% (transdermal)	25-50 mg/day	Daily	Physiological steady-state	Skin irritation	Skin transfer risk to partners/children - apply to shoulders/arms and allow to dry before contact	Counsel explicitly on transfer precautions given close-contact family living arrangements common in India
Transdermal patch	2.5-7.5 mg/24 h	Daily	Stable; mimics diurnal rhythm	Skin reactions in 30-40%	High skin-reaction rate limits tolerability	Limited availability in India; skin reactions are a common reason for early discontinuation -set expectations upfront
Oral testosterone undecanoate (lymphatic absorption)	40 mg, 2-3 capsules	Twice-thrice daily with meals	Variable absorption	Unpredictable serum levels	Erratic bioavailability	Rarely preferred in practice; consider only when injections/gels are unacceptable to the patient

Brand names omitted per editorial policy. Dosing informed by EAU 2025 guidance.[1]

Formatted: Numbering: Continuous

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Table 9. Testosterone Therapy Monitoring Protocol

Parameter	Baseline	3-6 Months	Annually	Action if Abnormal
Serum testosterone	Two morning samples	Mid-interval (IM) or trough (gel)	Maintain 12-30 nmol/L	Adjust dose accordingly; re-check timing of sampling
Haematocrit	Mandatory	Mandatory; hold if >54%	Continue annual checks	Hold therapy, consider phlebotomy if persistently elevated
PSA + DRE (men ≥40 years)	Mandatory	At 3 months	Annual	Urology referral if PSA rise >1.4 ng/mL/year
Blood pressure	Mandatory (new 2025 FDA requirement)	Repeat at 3-6 months	Ongoing	Treat hypertension aggressively; do not defer
Lipid profile and liver function	Baseline	Not routinely required	Annual	Address per standard cardiometabolic guidance
Sexual symptom scores (IIEF, ADAM)	Baseline	Reassess at 3 months	Annual	Reassess need for continuation if no symptomatic benefit

PSA = prostate-specific antigen; DRE = digital rectal examination; IIEF = International Index of Erectile Function; ADAM = Androgen Deficiency in Ageing Male questionnaire; IM = intramuscular. Monitoring protocol informed by EAU 2025 guidance.[1]

5.2 Testosterone Therapy in Women

The Global Consensus Position Statement and ISSWSH guidelines support off-label testosterone for postmenopausal women with HSDD, with concentrations kept within the high-normal physiological female range (1.4-2.4 nmol/L).[10] Testosterone contributes to libido, arousal and wellbeing. As of 2026, no female preparation is approved by CDSCO, FDA or EMA. Specialists use male formulations at about one-tenth of the male dose. Follow-up must check for acne, hirsutism, voice change and clitoromegaly. Table 6 outlines age-related investigations.

5.3 Oestrogen, Progestogen Therapy, and Tibolone

Menopausal hormone therapy (MHT) treats oestrogen-deficiency symptoms, including dyspareunia, reduced lubrication and vasomotor symptoms. In November 2025, FDA and HHS removed boxed warnings from menopausal HRT products, except the endometrial cancer warning.[12] This reflected evidence of a favourable benefit-risk balance in healthy women within 10 years of menopause. Transdermal oestradiol is preferred when venous thromboembolism or migraine risk is present. Micronised progesterone is preferred for endometrial protection because of its more favourable breast safety profile. Tibolone 2.5 mg daily improves postmenopausal desire and arousal. It is approved in India and contraindicated in breast cancer survivors.

5.4 Prolactin Management: Cabergoline and Bromocriptine

Hyperprolactinaemia is a treatable cause of sexual dysfunction in both sexes. Cabergoline, a selective D2/D3 agonist given at 0.5 mg twice weekly, normalises prolactin in more than 80% of microprolactinoma cases, restores gonadotrophin secretion and improves libido and erectile function. In antipsychotic-induced hyperprolactinaemia, adding aripiprazole 5-15 mg can normalise prolactin without a complete antipsychotic switch. This approach is relevant to psychiatric practice.

Formatted: Numbering: Continuous

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

6. Pharmacotherapy of Female Sexual Dysfunction

6.1 Overview

Female sexual dysfunction includes HSDD/female sexual interest/arousal disorder (FSIAD), female orgasmic disorder and genito-pelvic pain/penetration disorder (GPPPD). Cultural barriers and difficulty discussing desire contribute to under-reporting in India. An empathetic, non-judgemental consultation helps patients describe their concerns. Table 10 outlines pharmacological options and their approval status.

226
227
228

229
230

Table 10. Pharmacotherapy for Female Sexual Dysfunction

Agent	Indication	Starting Dose	Titration/Max	Mechanism	Adverse Effects	Precautions	CDSCO Status in India	Clinical Note
Flibanserin	HSDD/FSIA D	100 mg oral at bedtime	No titration; fixed dose	5-HT1A agonist/5-HT2A antagonist; central modulation	Somnolence, dizziness, nausea	Avoid alcohol; avoid with potent CYP3A4 inhibitors; hepatic impairment	NOT approved	FDA approval extended to postmenopausal women (December 2025) - counsel patients that this option is currently not accessible in India
Bremelanotide	HSDD/FSIA D	1.75 mg subcutaneous on-demand	On-demand only; no daily titration	MC4R agonist (central)	Nausea, flushing, transient BP rise	Not for use with uncontrolled hypertension	NOT approved	Available in the USA only; not currently an option for Indian patients
Local vaginal oestrogen	GSM/dyspareunia	Per product labelling (cream/pessary/ring)	Titrate to symptom control	Restores urogenital epithelium	Local irritation (uncommon)	Generally safe in most breast cancer survivors per ISSWSH 2018	Approved	First-line, CDSCO-approved, and typically the most cost-effective and accessible option for Indian women with GSM
Ospemifene	GSM/dyspareunia	60 mg oral daily	No titration; fixed dose	Selective oestrogen receptor modulator - vaginal oestrogenic effect	Hot flushes, vaginal discharge	Not CDSCO approved	NOT approved	Oral convenience advantage over topical oestrogen, but not currently accessible in India
Intravaginal DHEA (prasterone)	GSM/dyspareunia	6.5 mg/day intravaginal	No titration; fixed dose	Local conversion to oestradiol + androgens	Minimal; local application-site effects	Minimal systemic absorption	NOT approved	Not currently accessible in India despite a favourable safety profile
Tibolone	Postmenopausal SD + vasomotor symptoms	2.5 mg oral daily	No titration; fixed dose	Oestrogenic + progestogenic + androgenic activity	Headache, breast discomfort	Contraindicated in breast cancer survivors (LIBERATE trial)	Approved	A CDSCO-approved, India-accessible option that uniquely addresses desire, arousal, and vasomotor symptoms together
Testosterone (off-label)	HSDD postmenopause	~0.5-1 g/day gel (male formulation at ~1/10 dose)	Titrate to high-normal female physiological range (1.4-2.4 nmol/L)	Androgen deficiency correction	Virilisation (acne, hirsutism, voice change)	Monitor for virilisation; no approved female formulation exists	NOT approved	Global Consensus Statement supports use, but off-label male-formulation dosing requires careful counselling and monitoring

GSM = genitourinary syndrome of menopause; HSDD = hypoactive sexual desire disorder; FSIA D = female sexual interest/arousal disorder; MC4R = melanocortin receptor 4; DHEA = dehydroepiandrosterone; BP = blood pressure; SD = sexual dysfunction. Brand names omitted per editorial policy.

Formatted: Numbering: Continuous

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

6.2 Flibanserin

Flibanserin is given at 100 mg at bedtime. Its 5-HT_{1A} agonist and 5-HT_{2A} antagonist actions modulate serotonin, dopamine and norepinephrine pathways in the prefrontal cortex. Pivotal trials reported about 0.5-1 additional satisfying sexual events per month over placebo. FDA approval, previously limited to premenopausal HSDD, was extended to postmenopausal women in December 2025.[7] It is not CDSCO-approved in India as of 2026. Contraindications include alcohol consumption, moderate-to-severe hepatic impairment and potent CYP3A4 inhibitors.

6.3 Bremelanotide

Bremelanotide is an on-demand subcutaneous treatment (1.75 mg). It activates central pathways involved in desire through melanocortin receptor 4 (MC4R) agonism. The RECONNECT trials reported significant improvements in desire and satisfying sexual events. It is available only in the USA and is not CDSCO-approved. Nausea, flushing and transient blood pressure elevation are common adverse effects.

6.4 Treatment of Genitourinary Syndrome of Menopause and Dyspareunia

Local vaginal oestrogen is central to treatment of GSM. ISSWSH 2018 guidance supports its safety in most breast cancer survivors. Women who prefer hormone-free treatment can start with vaginal moisturisers and lubricants. Ospemifene 60 mg daily and intravaginal DHEA/ prasterone 6.5 mg daily are FDA-approved alternatives for GSM-related dyspareunia, but remain unavailable in India.

6.5 Management of Vaginismus and GPPPD

Pelvic floor physiotherapy and graduated vaginal dilators are first-line treatments for vaginismus and GPPPD. Medicines may be added: topical lidocaine 2-4% to the vestibule 20-30 minutes before intercourse, or gabapentin 300-900 mg/day or pregabalin 75-150 mg/day for a neuropathic pain component. In refractory vaginismus, off-label botulinum toxin A (100-200 units into levator ani under sedation or general anaesthesia) has effects lasting 4-6 months. Concurrent psychosexual therapy is required.

7. Emerging and Investigational Pharmacotherapies

Table 11 summarises treatments at different stages of investigation. Li-ESWT has EAU Grade B evidence (2025) for mild-to-moderate vasculogenic ED. Kisspeptin-54 infusion has increased fMRI activation of sexual arousal circuits in both sexes; intranasal formulations are being developed. New MC4R agonists seek to improve tolerability compared with bremelanotide. Stem cell and gene therapies remain investigational under EAU 2025 guidance. For PE, on-demand silodosin 4 mg is a recent option with potential relevance to practice.

Table 11. Emerging and Investigational Pharmacotherapies in Sexual Medicine (2025-2026)

Agent	Mechanism	Target Population	Stage	Key Findings	Practical Note for Indian Clinicians
Kisseptin-54	KISS1 neuropeptide to GnRH pulse	Male + female reduced desire	Phase II	IV infusion enhances sexual arousal neural circuits on fMRI; intranasal formulations in development	Not accessible outside research settings; do not offer to patients outside registered trials
Next-generation MC4R agonists (oral)	MC4R agonist	Female HSDD	Phase I/II	Aim to reduce nausea and blood pressure rise vs bremelanotide; oral bioavailability	No current access pathway in India; monitor literature for future approval
Li-ESWT (shockwave)	VEGF; neoangiogenesis; eNOS upregulation	Vasculogenic ED	EAU Grade B, 2025	6-12 sessions; durable IIEF improvement; increasingly offered in India	Reasonable to discuss as an adjunct in mild-moderate vasculogenic ED; verify provider credentials
PRP intracavernosal injection	PDGF/VEGF/EGF growth factors	Vasculogenic ED	Phase II; inconclusive	AUA: insufficient evidence for routine use; offered privately in India without oversight	Counsel patients that private clinics offering this lack a robust evidence base; discourage routine use
Stem cell therapy (intracavernosal)	Paracrine regenerative	Post-radical prostatectomy/diabetic ED	Phase I/II	EAU 2025: investigational use only in clinical trials; not standard of care	Refer only to registered clinical trials; avoid unregulated private offerings
Intranasal oxytocin	Bonding neuropeptide; orgasm modulation	Orgasmic disorder; anorgasmia	Phase II	Small trials; improved orgasm intensity; combination with bremelanotide exploratory	Investigational only; not currently accessible in routine Indian practice
Sildenafil 4 mg on-demand (off-label for PE)	Alpha-1A receptor blockade; inhibits sympathetic ejaculatory reflex	Primary PE	2025 RCT; off-label	Non-inferior to dapoxetine 60 mg with more favourable tolerability	Already available in India for BPH - the most immediately usable emerging option pending further replication trials

Li-ESWT = low-intensity extracorporeal shockwave therapy; PRP = platelet-rich plasma; MC4R = melanocortin receptor 4; VEGF = vascular endothelial growth factor; eNOS = endothelial nitric oxide synthase; HSDD = hypoactive sexual desire disorder; IIEF = International Index of Erectile Function; GnRH = gonadotrophin-releasing hormone; PE = premature ejaculation; AUA = American Urological Association.

Formatted: Numbering: Continuous

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

8. Principles of Pharmacological Management

8.1 Assessment Before Pharmacotherapy

- A comprehensive biopsychosocial assessment should precede pharmacotherapy.
- Obtain a structured sexual history and perform a physical examination.
- Laboratory evaluation may include testosterone, prolactin, glycaemic and lipid profiles, and PSA as clinically indicated.
- Use validated questionnaires as appropriate: IIEF-15, PEDT, FSFI, FSDS-R, PHQ-9, and GAD-7.
- Apply Princeton IV cardiovascular risk stratification before PDE5 inhibitor prescribing.
- Distinguish primary from secondary sexual dysfunction; assess psychiatric comorbidity, relationship discord, patient motivation, and psychological factors to guide pharmacotherapy, psychosexual therapy, or their combination.[32]

8.2 Patient Education and Counselling

Patients need clear instructions on how to take the medicine, what response to expect and how long to try it. An adequate trial includes at least six attempts at the optimised dose. Frequent errors are taking sildenafil after a fatty meal, allowing too little time before stimulation and stopping after one unsuccessful attempt. Partner participation in counselling can improve outcomes. The Indian guidelines[32] place sex education before or alongside medication in many presentations, adapted to the patient's motivation and understanding.

8.3 Combination with Psychosexual Therapy

Adding psychosexual treatment can improve the durability and extent of benefit from medication. Evidence includes PE (2025 meta-analysis: SDM=1.6[4]), ED with psychological factors and post-prostatectomy rehabilitation. Sexual medicine services should have referral arrangements with sex therapists and clinical psychologists.

8.4 Monitoring and Follow-Up

Review PE at 4-8 weeks and other conditions at 6-12 weeks. IIEF-15, PEDT and FSFI scores can help track response. Tables 7 and 9 describe monitoring for individual drug classes.

8.5 Addressing Comorbidities

Comorbid illness often affects both sexual function and treatment response. Care should address glycaemic control, cardiovascular risk, hypothyroidism, hyperprolactinaemia, hypogonadism, depression and anxiety. The Indian guidelines[32] advise treating a prominent, clinically dominant psychiatric disorder first. When psychiatric symptoms are minor or secondary, sexual dysfunction may take priority. In either situation, psychotropic selection should take potential sexual adverse effects into account.

9. Socio-Cultural Considerations in the Indian Context

Shame about ED can delay consultation for years. During that interval, patients may use unregulated herbal products containing undisclosed PDE5 inhibitors or heavy metals. Expectations about masculinity and sexual obligation influence how men describe difficulties. Women may find it harder to report symptoms because of taboos and limited sex education.

Arranged marriage can add performance anxiety, differing expectations and discomfort in raising intimate concerns with a relatively unfamiliar partner.

9.1 Dhat Syndrome: Pharmacological Considerations

~~In Dhat syndrome, distress centres on perceived semen loss through urine, nocturnal emissions or masturbation. Patients may attribute weakness, fatigue or sexual problems to this loss and request a medicine to conserve semen. Explaining normal semen physiology and addressing these beliefs are central to care.[32]~~

- ~~Assessment:~~ Identify the semen-loss belief, associated distress, and any independently diagnosable depression, anxiety disorder, erectile dysfunction, or premature ejaculation. Investigate physical symptoms when clinically indicated rather than automatically attributing all complaints to Dhat syndrome.
- ~~Counselling:~~ Explain normal semen production and nocturnal emissions in understandable language. Acknowledge the patient's distress and address guilt, misinformation, and expectations of a medicine that prevents normal semen release.[32]
 - ~~Pharmacotherapy:~~ Reserve medicines for a coexisting, independently diagnosed psychiatric or sexual disorder. Treat the identified condition using its established clinical pathway; there is no rationale in this review for prescribing a specific drug solely to correct a semen-loss belief.[32]
 - ~~Follow-up:~~ Review distress, daily functioning, treatment adherence, and persistent misconceptions. Combine any indicated medication with continued psychoeducation and psychosexual counselling.[32]

10. Recent Advances and the Role of Nutraceuticals and Ayurveda in Sexual Medicine

10.1 Recent Pharmacological and Nutraceutical Advances - L-arginine

L-arginine supplies the substrate for nitric oxide synthase and acts on the NO-cGMP pathway also targeted by PDE5 inhibitors. Results depend on dose and formulation. At 1.5 g/day, monotherapy is generally ineffective; measurable benefit has required at least 3 g/day, especially in men with low baseline NO status.[24] Studies of L-arginine-pycnogenol (Prelox: 3 g plus 80 mg) reported normalisation of erectile function in up to 80% of men over 45 years, with IIEF and testosterone improvements over 6-12 months.[24] Adding L-arginine to a PDE5 inhibitor offers modest additional benefit. A small trial also found benefit with yohimbine, whose regulatory and safety concerns limit use in India.[24] Doses up to 9 g/day are generally tolerated, although nausea can occur and renal impairment requires caution. Among these nutraceuticals, the pycnogenol combination has the strongest supporting evidence; low-dose L-arginine alone is unlikely to help.

10.2 Indian Systems of Medicine - Ayurveda in Sexual Medicine

Vajikarana (aphrodisiac therapeutics) and Rasayana (rejuvenative therapeutics) are Ayurvedic approaches to sexual health. Patients in India often use these products without consultation or ask whether they will help. Clinicians therefore need to discuss the evidence and its limitations.

Most studies are small and brief, and findings vary between agents and formulations. Table 12 summarises the reported regimens, outcomes and limitations. These products have an adjunctive role.

Table 12. Ayurvedic Agents: Study Regimens, Findings, and Limitations

Agent	Regimen described in manuscript	Main findings	Limitations / clinical interpretation
Ashwagandha (Withania somnifera)	60-day trial in psychogenic ED; 8-week trial of standardised root extract in healthy men	No benefit over placebo in psychogenic ED; improved IIEF and desire in healthy men.[25,26]	Inconsistent evidence; differences in extract, population, and study design limit comparisons.
Mucuna pruriens	5 g/day for 3 months	Improved reproductive hormone parameters and sperm quality in infertile men.[27]	No dedicated ED-outcome trial; fertility outcomes do not establish efficacy for ED.
Tribulus terrestris	400-1500 mg/day	ED improvement in 3 of 5 trials; testosterone increases confined to hypogonadal subgroups.[28]	Overall evidence quality low; not a substitute for first-line therapy.
Safed Musli (Chlorophytum borivilianum)	500 mg twice daily for 12 weeks	Improved semen parameters; no significant testosterone difference versus placebo.[29]	Semen outcomes do not establish benefit for sexual dysfunction.
Shilajit	200 mg twice daily for 60 days	Improved FSFI desire, arousal, lubrication, and satisfaction in women; orgasm, pain, and quality-of-life outcomes not significant.[30]	Limited trial evidence; product quality and standardisation require attention.

Unregulated herbal products can vary in potency or contain adulterants. Ayurvedic and nutraceutical studies are generally small, with limited dedicated Indian data. Ask patients about concurrent use without dismissing their preferences, and explain why these products cannot replace established PDE5 inhibitor, dapoxetine or testosterone treatment.

11. Conclusions

Recent developments include the EAU position on testosterone as first-line treatment for hypogonadal ED, removal of the FDA testosterone cardiovascular boxed warning and extension of flibanserin approval to postmenopausal women. Safety alerts after 5-alpha-reductase inhibitor use also warrant attention to informed consent, particularly when finasteride is prescribed for cosmetic indications. Patient interest in nutraceuticals and Ayurveda requires discussion of evidence quality, product safety and realistic expectations.

Indian practice priorities are testosterone assessment in men with ED, correctly used PDE5 inhibitors after cardiovascular risk assessment, dapoxetine with behavioural treatment for PE, evidence-based care for female sexual dysfunction and integration of medication with

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

psychosexual treatment in a biopsychosocial approach. Sexual health deserves careful prescribing, attention to quality of life and a consultation in which patients can discuss concerns without embarrassment.

References

(JIP - Vancouver format)

1. Hackett G, Kirby M, Wylie K, et al. European Association of Urology Guidelines on Male Sexual and Reproductive Health: 2025 Update. *Eur Urol.* 2025;88(1):76-102. doi:10.1016/j.eururo.2025.04.010
2. US Food and Drug Administration. FDA Issues Class-Wide Labeling Changes for Testosterone Products [Drug Safety Communication]. February 28, 2025. Available at: <https://www.fda.gov/drugs/drug-alerts-and-statements/fda-issues-class-wide-labeling-changes-testosterone-products>
3. Lincoff AM, Bhasin S, Flevaris P, et al. Cardiovascular Safety of Testosterone-Replacement Therapy (TRAVERSE Trial). *N Engl J Med.* 2023;389(2):107-117. doi:10.1056/NEJMoa2215025
4. Nieves Martín M, et al. Dapoxetine combined with non-pharmacological therapies for lifelong premature ejaculation: systematic review and meta-analysis. 2025. doi:10.3389/fendo.2025.1718109
5. Al-Khayer A, Al-Shareef Z, et al. On-demand silodosin 4 mg vs dapoxetine 60 mg in treatment of primary premature ejaculation: a prospective randomised study. *Arab J Urol.* 2025. doi:10.1080/20905998.2025.2573579
6. Kirby MG, Hackett G, Ramachandran S. Testosterone and the Heart. *Eur Cardiol.* 2019;14(2):103-110.
7. US Food and Drug Administration. FDA Approves Flibanserin for Postmenopausal Women with HSDD. December 2025. Available at: <https://www.fda.gov> [primary FDA source; verify current URL at submission]
8. Althof SE, McMahon CG, Waldinger MD, et al. ISSM Guidelines for the Diagnosis and Treatment of Premature Ejaculation. *J Sex Med.* 2014;11(6):1392-1422.
9. Traish AM, Miner MM, Morgentaler A, Zitzmann M. Testosterone Deficiency. *Am J Med.* 2011;124(7):578- 587.
10. Parish SJ, Simon JA, Davis SR, et al. ISSWSH Clinical Practice Guideline for the Use of Systemic Testosterone for HSDD in Women. *J Clin Endocrinol Metab.* 2021;106(4):e1676-e1695.
11. Goldstein I, Kim NN, Clayton AH, et al. Hypoactive Sexual Desire Disorder: ISSWSH Expert Consensus Panel Review. *Mayo Clin Proc.* 2017;92(1):114-128.
12. HHS Fact Sheet. FDA Initiates Removal of Black Box Warnings from Menopausal Hormone Replacement Therapy Products. November 10, 2025. Available at: <https://www.hhs.gov/press-room/fact-sheet-fda-initiates-removal-of-black-box-warnings-from-menopausal-hormone-replacement-therapy-products.html>
13. Waldinger MD. The neurobiological approach to premature ejaculation. *J Urol.* 2002;168(6):2359-2367.
14. Brotto LA, Atallah S, Johnson-Agbayani L, et al. Psychological and Interpersonal Dimensions of Sexual Function and Dysfunction. *J Sex Med.* 2016;13(4):538-571.
15. Wespes E, Amar E, Eardley I, et al. EAU Guidelines on Erectile Dysfunction. *Eur Urol.* 2010;57(5):804-814.
16. Corona G, Rastrelli G, Morgentaler A, et al. Meta-analysis of Results of Testosterone Therapy on Sexual Function. *Eur Urol.* 2017;72(6):1000-1011.

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

Formatted: Font: (Default) Times New Roman

17. Kerfoot WW, Carson CC, Donaldson JF. Recent Advances in the Treatment of Erectile Dysfunction. *Postgrad Med J*. 2005;81(952):78-86.
18. Nappi RE, Cucinella L, Martini E, et al. Sexuality in Premature Ovarian Insufficiency. *Climacteric*. 2019;22(3):289-295.
19. Buvat J, Maggi M, Gooren L, et al. Endocrine Aspects of Male Sexual Dysfunctions. *J Sex Med*. 2010;7(4 Pt 2):1627-1656.
20. Deeks ED. Flibanserin: First Global Approval. *Drugs*. 2015;75(13):1549-1553.
21. Simon JA, Kingsberg SA, Shumel B, et al. Efficacy and Safety of Flibanserin in Postmenopausal Women with HSDD: DAISY Trial. *J Sex Med*. 2014;11(4):1055-1066.
22. Paduch DA, Bolyakov A, Polzer PK, et al. Avanafil for Treating Erectile Dysfunction. *Drug Des Devel Ther*. 2013;7:235-243.
23. Shabsigh R, Kaufman JM, Steidle C, Padma-Nathan H. Randomized Study of Testosterone Gel as Adjunctive Therapy to Sildenafil in Hypogonadal Men with Erectile Dysfunction Who Do Not Respond to Sildenafil Alone. *J Urol*. 2004;172(2):658-663.
24. Koolwal A, Manohar SJ, Rao TSS, Koolwal GD. L-Arginine and erectile dysfunction. *J Psychosexual Health*. 2019;1(1):37-43.
25. Mamidi P, Thakar AB. Efficacy of Ashwagandha (*Withania somnifera*) in the management of psychogenic erectile dysfunction. *Ayu*. 2011;32(3):322-8.
26. Khanna A, Khanna M, Panchal P. Efficacy and safety of ashwagandha root extract on sexual health in healthy men: a prospective, randomized, double-blind, placebo-controlled study. *Front Reprod Health*. 2026;8:1774098.
27. Shukla KK, Mahdi AA, Ahmad MK, Jaiswar SP, Rajender S, Tiwari SC. *Mucuna pruriens* improves male fertility by its action on the hypothalamus-pituitary-gonadal axis. *Fertil Steril*. 2009;92(6):1934-40.
28. Vilar Neto JOV, de Moraes WMAM, Pinto DV, da Silva CA, Caminha JSR, Nunes Filho JCC, Reis CEG, Prestes J, Santos HO, Daher EF. Effects of *Tribulus terrestris* L.) supplementation on erectile dysfunction and testosterone levels in men - a systematic review of clinical trials. *Nutrients*. 2025;17(7).
29. Rath SK, Panja AK. Clinical evaluation of root tubers of Shweta Musali (*Chlorophytum borivilianum*) in oligozoospermia. *Ayu*. 2013;34(3):273-5.
30. Mosavi S, Tabarraei M, Tansaz M, Salehinia H, Grylka-Baeschlin S, Rahmani A, Shahali S. Effects of oral Shilajit tablets on sexual function and sexual quality of life among reproductive-aged women: a triple-blind randomized clinical trial. *Trad Med Res*. 2023;8(11):66.
31. Avasthi A, Rao TSS, Grover S, Biswas PS, Kumar S. Indian Psychiatric Society: Clinical Practice Guidelines for management of sexual dysfunctions. In: Gautam S, Avasthi A, eds. *Clinical Practice Guidelines for Psychiatrists in India*, Vol 2. Indian Psychiatric Society; 2006:144-231.
32. Avasthi A, Grover S, Sathyanarayana Rao TS. Clinical Practice Guidelines for Management of Sexual Dysfunction. *Indian J Psychiatry*. 2017;59(Suppl 1):S91-S115. doi:10.4103/0019-5545.196977.

Abstract

Purpose/Background: This review brings together prescribing information for sexual dysfunction, recent regulatory and guideline changes (2025–2026), and the practical constraints faced by Indian clinicians. It also considers patient use of nutraceuticals and Ayurvedic products.

Data Collection and Analysis Method: This narrative review draws on EAU 2025, Princeton IV 2024 and ISSWSH guidance; communications from FDA, EMA and CDSCO; and recent randomised and observational evidence (2025–2026). It covers ED, PE, hormonal disorders, female sexual dysfunction and nutraceutical/Ayurvedic products. Twelve tables summarise dosing, safety and evidence, with attention to Indian availability, regulatory status and cost considerations.

Main Conclusions: Recent developments include first-line testosterone monotherapy for mild ED with confirmed hypogonadism, removal of the testosterone cardiovascular boxed warning with blood pressure monitoring, and flibanserin approval for postmenopausal women. On-demand sildenafil 4 mg is an emerging PE treatment. Evidence for L-arginine, ashwagandha, Mucuna pruriens, Tribulus terrestris, Safed Musli and Shilajit is heterogeneous and generally low-to-moderate in strength. These products remain adjuncts to established treatment.

Relevance: The review organises dosing, precautions, evidence and Indian access considerations to support clinical prescribing across sexual medicine. Treatment decisions require attention to comorbidity, regulatory status and the patient's circumstances.

Keywords: erectile dysfunction; premature ejaculation; testosterone; female sexual dysfunction; Ayurveda; nutraceuticals

Declarations

Conflict of interest: None declared. **Funding:** None. **Ethical approval:** Not applicable (review article).

Note on tables: All 12 tables presented in this review are original syntheses constructed by the authors for bedside clinical use. Where content is informed by published guidelines (e.g., EAU 2025, Princeton IV Consensus 2024), this is indicated by a plain numbered in-text citation to the relevant reference.