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Review Article

Female sexual dysfunction: a review

Asmita Kaundal[1]*, Prachi Renjhen[2]

[1]Department of Obstetrics and Gynecology, AIIMS, Bilaspur, H.P., India
[2]Department of Obstetrics and Gynecology, Baba Saheb Ambedkar Medical College and Hospital, New Delhi, India

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***Correspondence:**
Dr. Asmita Kaundal,
E-mail: drasmita_kaundal@yahoo.com

ABSTRACT

Sexual health is an important aspect of human life and to maintain a healthy and happy sexual life a positive integration of physical, social as well and psychological domains is very important. Any alteration in any of these domains can lead to sexual dysfunction which can significantly affect the quality of life of a couple. Many couples live with the problem and suffer silently due to shyness, stigmas, and social norms related to the issue. Many times even the treating medical professionals also do not screen for the sexual issues due to inadequate knowledge and training related to sexual dysfunction further increasing the burden of the disorder which remain undiagnosed. Sexual dysfunction can affect both men and women. Since the sexual cycle is complex in women both diagnosing and treating the female sexual dysfunction can often be challenging. Routine screening, meticulous workup and multidisciplinary approach is usually required to diagnose and mange sexual disorders.

Keywords: Female sexual dysfunction, Hypoactive sexual desire disorder, Genitopelvic pain disorder, Dyspareunia

INTRODUCTION

Sexual health is an integration of physical, emotional, intellectual and social aspects of human life. A positive integration of all these domains is essential to enhance ones personality and live a happy and healthy life.[1] Any abnormality in the sexual function can significantly affects quality of life of the couple.[2] Any kind of physical, emotional or psychological issue can be associated with sexual dysfunction and vice versa.[3] Dysfunction related to sexual life are more commonly seen in women than in men.[4] A recent study shows that around 22.8% women suffers from one or more sexual difficulty, however only 3.8% of these women meet all the three criteria of FSD mentioned by DSM-V.[5] According to another study globally around 41% of women in reproductive age are suffering from sexual dysfunctions.[6]

NORMAL SEXUAL CYCLE IN WOMEN

Various models of sexual response in women has been described in the past. Most recent model is the one described by Bassoon which is a non-linear model in contrast to the earlier described models by Master and Johnson, Kaplan.[7,8] It is important to note that in women sexual cycle is complex and various stages may overlap with each other. Sexual cycle in a woman is divided into four stages desire, arousal, orgasm and refractory/resolution period. Desire consists of three components: sexual derive, sexual motivation and sexual wish. There could be number of reasons a women would agree or disagree to involve in a sexual activity other than spontaneous desire or sexual stimuli.[9,10] Her wish to be close to her partner (emotional intimacy), to respect and fulfill her partners desire and wishes, to increase her own well-being and self-image, appreciation by partner and sometime just to avoid or reduce the guilt of infrequent sex could be some of the reasons.[11,12] So either the spontaneous desire can lead to arousal or an appropriate stimuli of appropriate nature and duration can lead to responsive desire provided she could stay focused to the stimuli.[13] This model is also termed as incentive-based sex response cycle.[10] Continued sexual desire or positive sexual stimulation leads to arousal and excitement which leads to

vasocongestion manifested by increased vaginal lubrication, tumescence of clitoris and change of labial color. There is increase in heart rate, respiratory rate and raised muscle tension.[14] There is further increase in heart rate and respiratory rate and simultaneous contractions of many groups of muscles specially the uterus and lower third of the vagina leading to orgasm. Orgasm is followed by the period of resolution.

PHYSIOLOGY

Key areas to control the sexual desire in women are prefrontal cortex, locus coeruleus, medial preoptic area, paraventricular nucleus, ventral tegmental area and nucleus accumbens. Limbic system and preoptic areas of the anterior-medial hypothalamus plays a role in sexual desire production. Normal sexual function is under the control of certain hormones in the body. Dopamine, melanocortin, oxytocin, vasopressin and norepinephrine acts as excitatory hormones whereas opioids (mu receptors), serotonin (2A receptors), endocannabinoids are inhibitory in nature.[15] Estrogen and testosterone are other two very important hormones related to normal sexual function.

DEFINING FEMALE SEXUAL DYSFUNCTION

Inability of a women to engage in or satisfactorily enjoy the sexual activity is called as Female sexual dysfunction.[16] It is very important to differentiate a sexual dysfunction from temporary alteration in the sexual function as a result of logical response to certain difficult circumstances. To call it a dysfunction the symptom should cause significant distress and should be present for 75% of the times for at least six months duration.[17] Estradiol levels influence nerve transmission and have an effect on both central as well as peripheral nervous system. It helps to maintain the vaginal mucosal epithelium and muscles. Decreased levels may be associated with thinning of the vaginal wall mucosal epithelium and atrophy of the smooth muscles.[18] Estrogen even have vasodilatory and vaso-protective effects and hence affects the blood flow to the vagina, clitoris and urethra.[19] Testosterone levels are associated with sexual arousal, genital sensation, orgasm and over all feeling of wellbeing in woman.[20]

CLASSIFICATION OF FEMALE SEXUAL DYSFUNCTION

In the year 2013 American psychiatric association's diagnostic and statistical manual of mental disorders, fifth edition (DSM-V) reclassified sexual dysfunction in women into three major categories namely sexual interest/arousal disorders, orgasmic disorder and genito-pelvic pain/penetration disorder.[17]

The symptoms need to be present for minimum duration of 6 months for approximately 75% of times in woman and should cause significant dysfunction.

Female sexual interest/arousal disorder

At least three of the following symptoms should be present-A. Absence or reduction in the frequency or intensity of sexual interest, B. Absence or reduction in the frequency or intensity of sexual or erotic fantasies or thoughts, C. Absent or reduction in the frequency of initiation of sexual activity, D. Absence or reduction in the frequency or intensity of excitement or pleasure during sexual activity. The condition is either present all the time or around 75% of the sexual exposures. E. Absence or reduction in the interest or arousal in woman elicited by any internal or external stimuli and F. Absence or reduction in frequency or intensity of sensation (genital or non-genital) during a sexual encounter which is present around 75% of the times.

Female orgasmic disorder

Any of the following symptoms if present-1. Delay/infrequent/absent orgasm 2. Marked reduction in the intensity of orgasm

Genitopelvic pain/penetration disorder

Marked difficulties encountered by the women during one of the following-1. Marked difficulty in having vaginal intercourse/penetration. 2. Marked pain in the vulvo-vaginal area associated with vaginal penetration attempts. 3. Marked anxiety and fear associated with vaginal penetration attempts. 4. Marked tightening of the pelvic floor muscles during an attempt of vaginal penetration.

There are few other classifications where female sexual dysfunction can be classified as primary and secondary based on the timing of onset of the symptoms or generalized or situational depending upon context to which the symptom appears.[21]

Primary

When the woman has never met the realistic expectations and the sexual dysfunction is present since the onset of sexual activity.

Secondary

When woman gives history of previously having normal sexual function

Generalized

When the symptoms are present all the times and not limited to certain type of stimulation, situation or partner

Situational

When the woman complaints of symptoms related to certain type of stimulation, situation or partner.

Based on severity

Mild: Evidence of mild distress over the symptoms in criteria A.

Moderate: Evidence of moderate distress over the symptoms in criteria A.

Severe: Evidence of severe distress over the symptoms in criteria A.

ETIOLOGY

Female sexual dysfunction is multifactorial. Certain medical or surgical conditions, acute or chronic disease, psychological issues, sociocultural issues and certain drugs can affect the sexual function. Certain medical conditions like arthritis, coronary artery disease, diabetes mellitus, hypertension, renal failure, hypothyroidism, pituitary disorders. Various gynecological conditions like sexually transmitted infections, endometriosis, chronic pelvic pain, pelvic organ prolapse, urinary incontinence. Neuromuscular diseases such as epilepsy. Malignancies and cancer related treatment are seen to be associated with sexual dysfunction.[22-24] The etiology in place of causes can broadly be divided into vasculogenic, neurogenic, endocrine, musculogenic and psychogenic causes.

Vasculogenic

Atherosclerotic changes or any traumatic injury to iliohypogastric/pudendal arterial bed because of pelvic fractures, blunt or sharp trauma, chronic perineal pressure or injury due to any surgical procedure can lead to reduced blood supply to the genitalia. This arterial insufficiency can manifest as decreased vaginal and clitoral engorgement. Atherosclerotic lesion of aortoiliac artery also causes vaginal wall and clitoral muscle fibrosis due to reduced blood supply leading to vaginal dryness and dyspareunia. The changes caused due to the atherosclerotic changes can even interfere with the relaxation and dilatation of the clitoral and vaginal muscles.[25]

Neurogenic

Spinal cord injury, disease of peripheral and central nervous system (Diabetes), upper motor neuron lesion affecting the sacral spinal segments and multiple sclerosis may leads to sexual dysfunction. Women with spinal cord injuries have more difficulty in being aroused and achieving orgasm.[26] Certain headaches like tension type headaches and migraine are also associated with poor quality of sexual life and sexual dysfunction.[27]

Endocrine

Hormonal imbalance can also be associated with sexual dysfunction as sexuality in woman is exquisitely hormone dependent across all the phase of her life.[28] Decreased levels of estrogen (menopause, turner's syndrome, premature ovarian failure and hypothalamic pituitary disease) can be associated with loss of desire, difficulty or delayed arousal, vaginal dryness and dyspareunia.[29-41] Testosterone levels are also associated with libio, sexual desire and arousal. Low levels of testosterone are seen to be associated with low female sexual satisfaction index.[42-51] Prolactin is considered to be the peripheral biomarkers of sexual and reproductive function. Raised prolactin level is associated with reduced desire and arousal as it has inhibitory effect on the dopaminergic pathway.[52-60] Dysfunction in hypothalamic thyroid axis can lead to raised or reduced TSH levels. Both hypothyroidism and hyperthyroidism can be association with sexual dysfunction.[61-66] Hypercortisolism and hypoandrogenism mainly affects sexual desire as well as the arousal disorders.[67,68]

Musculogenic

Pelvic floor muscles play important role in sexual function. Levator ani muscle, bulbocavernosus and ischiocavernosus muscles involuntary contract during orgasm. Motor response during orgasm is modulated by levator ani muscle. Hypotonia of the pelvic floor muscles can reduce sensations in vagina and clitoris while hypertonicity of these muscles can lead to genitopelvic pain disorders like vaginismus and dysparuenia.

Psychogenic

In the absence of any organic cause for sexual dysfunction psychological causes like childhood abuse, previous negative experience, relationship issues with the partner like conflicts, lack of intimacy and distancing, self-image and body image disorders, partner's sexual function, life stressor, depression and anxiety disorders can significantly be related to sexual dysfunction.

OTHERS CAUSES

Medications/drugs

Certain drugs used for medical and psychiatric conditions can have adverse effect on sexual function. These include amphetamines and related anorectic drugs, anti-histaminics, anticholinergics, antihypertensives and cardiovascular medications like clonidine, beta blockers, digoxin, spironolactone and anti-lipids, hormonal preparations like antiandrogens, GnRH agonists, contraceptive and tamoxifen, monoamine oxidase inhibitors, psychotropic drugs like barbiturates, benzodiazepines, lithium, selective serotonin reuptake inhibitors, and tricyclic antidepressants, chemotherapeutic agents, phenytoin, aromatase inhibitors.[69]

Socio-cultural

Social and cultural factors like upbringing, social norms related to sexual issues, personal expectations, life events like retirement, bereavement, financial insecurities and

religious beliefs and influences also have an important role to play in the sexuality related issues.[70,71] Low educational level, poverty, unemployment, environment with limited opportunities are some of the other factors which could be related to sexual issues.[72]

Screening

Since female sexual health is surrounded by a lot of social norms, taboos and stigma woman often do not present with a direct symptom related to sexual dysfunction. Most of the times and in many of the communities since women sexual health is not given priority even by the woman herself and hence the medical advice for sexual symptoms is not generally sought. Even the health care providers are not routinely screening women for sexual problems the disease remain undiagnosed at most of the instances. Therefore, it is important that all the health care providers should routinely include simple questions regarding sexual health. If any symptom related to sexual dysfunction is present further enquiry and detailed workup is needed. World health organization and united state surgeon encourage to address the sexual problems during the annual visit of the patients. A simple questionnaire including three questions can be used for the initial screening of the women.[73] 1. Are you sexually active? 2. Is there any problem? 3. Do you experience pain during intercourse? Screening should be done at every visit as it takes time for a woman to develop trust and it may take several visits for a woman to open up regarding her sexual complaints.

Evaluation

Once it is established that the problem exists the symptom can be categorized as per DSM-V categories. There are several validated self-assessment questionnaire like Female sexual function index (FSFI), female sexual distress scale (FSDS) which can be used to reach a diagnosis.[74,75] A detailed history describing the nature, site and duration of the symptoms, associated medical or surgical history, obstetrics and gynecological history, use of tampons, drug history, treatment received if any for the symptom, addictions, childhood abuse or previous negative experiences and relationship issues should be discussed to get a lead about the underlying cause. A through physical examination followed by systemic and gynecological examination should be done. Gynecological examination would include inspection for the distribution of pubic hair, signs of senile muscular atrophy, sign of infection, cracks, fissures, pelvic organ prolapse. On internal examination care should be taken to evaluate pelvic floor muscles, uterus, bladder, urethra, anus and adnexa. Special attention should be made to look for the evidence of endometriosis, tenderness, adnexal mass, levator ani muscle myalgia. A neurological examination with emphasis on evaluation of sensory and motor function of the lower extremities, evaluation of the pelvic floor muscle tone, anal sphincter resting tone, voluntary contractions and perineal sensation is also needed.

INVESTIGATIONS

To evaluate general well-being of the woman (complete blood count, liver function test, kidney function test, blood sugars and HbA1c, Hormonal profile including thyroid function test, prolactin, FSH, LH, estradiol and testosterone levels) should be done.[76] If needed ESR, toxin levels (lead, mercury), Pap smear, cervical smear, ultrasound should be obtained. Specific investigations as per initial evaluation should be requested.

MANAGEMENT

Treating a sexual dysfunction is often challenging and requires a multidisciplinary approach to address physical, psychological and socio-cultural issues associated with the disorder. Treating an obvious underlying etiology may be helpful in managing the problem. Since most of the times sexual dysfunctions are long-lasting and has psychological impact, psychosexual counselling may play an important role. With PLISSIT (permission, limited information, specific suggestion, intensive therapy) it is possible to asses and treat around 60-70% of women with sexual concerns and requires brief time and can be started on first/second visit itself.[77] Cognitive behavior therapy has an important role in sexual dysfunction related to the sociocultural, interpersonal and the psychological disorders.

General principle of management includes: Identifying and treatment of the underlying cause, if any, patient information and education about the basic anatomy and physiology related to sexual function, lifestyle modifications, non-pharmacological therapies: physiotherapy, vaginal dilators, psychotherapy, and pharmacological management

Lifestyle modification is one of the first line management which should be offered to the patients either alone or in combination with non-pharmacological or pharmacological treatment. Weight management is important for those suffering from body image disorders or eating disorders.

Sexual interest /arousal disorders

Affects 5.4-13.6% of women worldwide. Treat the underlying cause if any. Psychotherapy and antidepressants for those who have associated anxiety. Transdermal testosterones for shorth term use with monitoring of androgen levels every 2-3 months.[78]

Female orgasmic disorder

Affects 3.4-5.8% of the women. Psychotherapy and couple counselling for those with primary orgasmic disorder. Secondary orgasmic disorders resolve with the treatment of the cause. Sex education and directed masturbation techniques may help in cases of the lifelong anorgasmia.[78-81]

Genito-pelvic pain disorder

Treatment of any local or gynecological cause if present. Vaginismus can be treated with combined systemic desensitization (cognitive and behavior psychotherapy) when woman is taught deep muscle relaxation techniques along with vaginal dilators. The goal is to desensitize the women to her fear of vaginal penetration and have sense of control over her muscles. If the therapy fails the next option is pelvic floor muscle physiotherapy.

Deep dyspareunia: if there are associated conditions like PID and endometriosis treatment of the cause will help the woman. If no cause is found adapting alternate position to avoid the thrust can be of help. Deep pelvic pains can also be associated with musculoskeletal disease and treating these conditions will help alleviating pain.[79]

Table 1: Management of FSD.[80-82]

Management of FSD		
Non-pharmacological		
Lifestyle modification	Weight management Smoking cessation Stop/reduce alcohol consumption Exercise Healthy life-style Spending quality time with the partner	-
Non pharmacological methods	Physiotherapy	Genito-pelvic pain disorders pelvic organ prolapse stress urinary incontinence
	Vaginal dilators	-Vaginismus -Vaginal stenosis
	Self-stimulation Clitoral vaccum /therapy Vibration devices	Orgasmic disorders
	Psychotherapy - Cognitive behavior therapy - Sex therapy - Psychosexual counselling	-To improve the maladaptive thoughts the negative behavior -To understand and manage emotional factors, relationships issues, past trauma/abuse
	Yoga Relaxation therapies Hypnotherapy	Stress management
Pharmacological	Vaginal lubricants and moisturizers	-Genital arousal disorders, management of dyspareunia in lubrication disorders in postmenopausal and breastfeeding women
Hormone therapy and drugs	Estrogen	-Topical estrogen in case of estrogen deficiency causing vulvovaginal atrophy (breastfeeding mothers, breast cancer women after discussion with oncologist)
	Intravaginal dehydroepiandrosterone (prasterone)	-Vulvovaginal Atrophy
	Ospemifine	-Dyspareunia secondary to vulvovaginal atrophy
	Tibolone	-Postmenopausal women can benefit from tibolone use
	Testosterone	-Androgen deficiency secondary to surgical menopause
	Vasodilators: Sildenafil, Prostaglandin, L-arginine, Phentolamine, Vasoactive intestinal peptide (VIP)	-Not FDA approved. Beneficial in FSD secondary in women on SSRIs or spinal cord injury
	Dopamine agonists: Bupropion, apomorphine, cabergoline	-Hypoactive desire disorder

Continued.

Management of FSD		
	Serotonin1a agonist/2a antagonist: Fibanserin Muscle relaxant: Tizanidine	-Hyperprolactinemia induced FSD -SSRI induced FSD -FDA approved for hypoactive desire disorder - Hypertonicity of pelvic floor muscles
Laser	Erbium laser Carbon Dioxide laser	-Vulvovaginal atropy (mostly in patient who are at risk for hormonal management such as breast cancer patients)
Surgery	Genital cosmetic surgery: (Labioplasty/ vaginoplasty/ perineoplasty) Laser rejuvenation Vestibulectomy Fenton's procedure or Plymouth procedure Genital reconstructive surgeries	-Body image disorders -Vulvodynia -Dyspareunia due to stenosis/narrowing/skin-splitting at posterior fourchette -Local or reginal flaps or surgeries to restore normal anatomy
	Trigger point injection (0.25% bupivacaine +2% lidocaine+40 mg triamcinolone) or Bupivacaine+hyaluronidase+depot-medrone	-Levator muscle spasm
	Botox injections inti puborectalis/pubococcygeus	Refractory Vaginismus

CONCLUSION

Female sexual dysfunction is prevalent worldwide but due to various taboos surrounding sexual issues it often remains underreported. It is important that every health care worker should screen women for sexual concerns and if symptoms is present a detailed enquiry should be made or referral to the specialist should be done. Management should be multidisciplinary and both physical and psychological issues should be addressed. Treatment session should also involve the partner to achieve the maximum benefit. Early diagnosis and timely referral are the key to reduce the morbidity associated with sexual dysfunction and improve the quality of life for the couple living with the problem.

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