

Sexual Function in Elderly Women: A Review of Current Literature

Dana R. Ambler, DO,¹ Eric J. Bieber, MD,² Michael P. Diamond, MD³

¹Division of Reproductive Endocrinology and Infertility, Department of Obstetrics and Gynecology, Geisinger Medical Center, Danville, PA; ²Chief Medical Officer, University Hospital Health System, Cleveland, OH;

³Division of Reproductive Endocrinology and Infertility, Department of Obstetrics and Gynecology, Wayne State University, Detroit, MI

Although sexuality remains an important component of emotional and physical intimacy that most men and women desire to experience throughout their lives, sexual dysfunction in women is a problem that is not well studied. The prevalence of sexual dysfunction among all women is estimated to be between 25% and 63%; the prevalence in postmenopausal women is even higher, with rates between 68% and 86.5%. Increasing recognition of this common problem and future research in this field may alter perceptions about sexuality, dismiss taboo and incorrect thoughts on sexual dysfunction, and spark better management for patients, allowing them to live more enjoyable lives.

[Rev Obstet Gynecol. 2012;5(1):16-27 doi: 10.3909/riog0156]

© 2012 MedReviews®, LLC.

KEY WORDS

Menopause • Sexuality • Female sexual dysfunction • Estrogen deprivation • Testosterone depletion

It is expected that the United States' older population, those persons age 65 and above, will grow substantially as the Baby Boom generation ages.¹ This predicted change in our demographics creates an even greater need for a thorough understanding of issues affecting the elderly. This need is especially acute for physicians who will increasingly encounter

patients trying to maintain a high quality of life as their bodies and life circumstances change, and as advances in nutrition, health maintenance, and technology allow many to extend the time midlife activities are maintained.

One quality-of-life issue affected by these changes, for both men and women, is sexuality. Although

studies agree that the majority of women consider sexuality a very important determinant of quality

higher education and income, not smoking, moderate alcohol use, and lower body mass index (BMI)

to late menopausal transition, the percentage of women with SPEQ scores of low sexual function increased from 42% to 88%. By the postmenopausal phase, there were significant declines in sexual responsiveness, frequency of sexual activities, libido, and the total score of sexual function combined with significant increases in dyspareunia and partner's problems in sexual performance.³

Although studies agree that the majority of women consider sexuality a very important determinant of quality of life, the literature on the subject of sexual function in elderly women is not extensive.

of life, the literature on the subject of sexual function in elderly women is not extensive.² In addition to being sparse, the existing literature employs varying approaches, encompasses differing foci, and illustrates contradictory results on sexual function in the elderly population.

were associated with a reporting of moderate sexual activity.²

The Global Study of Sexual Attitudes and Behaviors (GSSAB), which included 13,882 women aged 40 to 80 years, reported 26% to 48%

The most common sexual concerns of women of all ages include loss of sexual desire, problems

Background

Although sexuality remains an important component of emotional and physical intimacy that most men and women desire to experience throughout their lives, it is unfortunately a topic many health care professionals have difficulty raising with their patients. Thus, it is not surprising that sexual dysfunction is a problem that is not well studied or discussed. The prevalence of sexual dysfunction among all women is estimated to be between 25% and 63%;² the prevalence in postmenopausal women is even higher, with rates between 68% and 86.5%, depending on the setting in which the study was performed.² Analysis of data from the National Health and Social Life Survey, a probability study of sexual behavior in a demographically heterogeneous cohort of 3432 US adults, found that sexual dysfunction is more prevalent in women (43%) than in men (31%), prevalence varied among women of different racial groups, and that it was associated with both a history of traumatic sexual experiences and deteriorating social position.² Young age, being in a significant relationship versus no relationship,

of women had a lack of interest in sex, and 18% to 41% of women had difficulty reaching orgasm; these were the most common female sexual dysfunctions (FSD) across world regions. Furthermore, in this study, sexual dysfunction was demonstrated to significantly impact women's self-esteem and quality of life, and cause emotional distress, leading to relationship problems.² To date, few studies have been conducted regarding sexuality and sexual function in postmenopausal women. The prevalence of sexual dysfunction in postmenopausal women varies from 68% to 86.5%, depending on the setting in which the study was performed.²

Sexual dysfunction in the elderly population has often focused on the lack of estrogen as a main cause. The Short Personal Experiences Questionnaire (SPEQ) short form is a validated measure of sexual function based on the McCoy Female Sexuality Questionnaire.³ This form evaluates the menopausal patient in relation to sexual function, with a score less than 7 indicating low sexual function or sexual dysfunction. From early

with arousal, inability to achieve orgasm, painful intercourse, negative body image, and diminished sexual desirability and attractiveness.⁴ Although aging and functional decline may affect sexual function, when sexual dysfunction is diagnosed, physicians should rule out comorbid disease or deleterious side effects of medications contributing to those symptoms. Common disorders related to sexual dysfunction and increasing age include cardiovascular disease, diabetes, lower urinary tract symptoms, and depression. Treating those disorders or modifying lifestyle-related risk factors (eg, obesity) may help prevent or diminish sexual dysfunction in the elderly.¹ A limiting factor that will need to be overcome for women in this group is that, although sexuality is important for older adults, interest in discussing aspects of their sexual life with their physicians is variable.¹

The most common sexual concerns of women of all ages include loss of sexual desire, problems with arousal, inability to achieve orgasm, painful intercourse, negative body image, and diminished sexual desirability and attractiveness.

Biology of Sexual Function

The biologic processes involved in sexual responses and initiation are thought by many to center around

estrogen and testosterone as the key hormones for sexual function.

Estrogen Deprivation

Estrogen plays an essential role in female sexuality. One role of estrogen is to promote pelvic tissue resiliency for comfortable intercourse. When estrogen is not produced at a level sufficient to maintain premenopausal levels, vaginal dryness may occur. Furthermore, inspection of the vaginal tissues in postmenopausal or otherwise estrogen-deficient women reveals the mucosa to be dry and thin.⁵ In menopausal women, the vaginal mucosa becomes attenuated, loses its rugae, and appears pale and almost transparent because of decreased vascularity. A reduction in the amount of pubic hair and loss of subcutaneous fat and elastic tissue causes the labia majora and minora to appear wrinkled. Additionally, chronic estrogen deprivation causes the labia to become less sensitive to tactile stimulation.⁶ This loss of sensation results in less engorgement and swelling, and, consequently, the labia are less likely to separate in response to sexual stimulation, ultimately leading to dyspareunia.⁶

Discomfort during intercourse is a common problem of postmenopausal women. Heightened anxiety can cause dyspareunia by decreasing blood flow to the vaginal area. Pelvic atrophy, bony pelvis, decreased vaginal lubrication, greater irritation, tissue friability, and anxiety may result in pain or abdominal discomfort with both insertion and deep penetration.⁶ Loss of sexual interest can result by simple conditioning, via significant discomfort during intercourse.⁵

Changes in libido may result if arousal becomes more difficult because of the longer time needed for lubrication or anticipation of discomfort during coitus.^{5,6} Also,

bladder and bowel problems, the presence of purulent discharge from a vaginal infection, breast atrophy, and vasomotor instability can be disconcerting to both the patient and her sex partner and have an inhibiting effect on libido.^{5,6} The bladder often becomes thin, atrophic, and friable with diminished estrogen. There is a lack of elasticity and tone of these tissues. Such changes can lead to urinary incontinence, urinary frequency, dysuria, and cystitis after intercourse. These problems account for substantial morbidity among postmenopausal women.⁶

Menopause occurs because the ovaries gradually cease to respond to the stimulation from the gonadotropin-releasing hormones (GnRH)—follicle-stimulating hormone (FSH) and luteinizing hormone (LH)—released by the anterior pituitary gland.⁷ Eventually, these follicles cease to develop and mature, contributing to the decline in cyclically released estrogen and progesterone. In response, the levels of gonadotropins rise between 5- and 10-fold.⁷ The reduced availability of estrogen, as discussed previously, causes a spectrum of menopausal symptoms. Vasomotor symptoms are among the most distressing of all menopausal symptoms and can disrupt all aspects of a women's life,¹ primarily causing

decreased libido.⁶ A further incremental decline in most aspects of sexual function occurs as women pass through the menopausal transition, which is thought to be primarily associated with decreasing estradiol levels.³

Testosterone Depletion

Hormone-related libido changes in menopause may be attributed more

to falling testosterone levels than to reduced estrogen concentrations.^{1,6} Before menopause, the ovaries and adrenal glands produce about 50% of circulating testosterone with the remaining 50% from the peripheral conversion of precursors derived from the ovary and the adrenal gland.¹ After menopause, peripheral conversion of androstenedione becomes the major source of circulating testosterone, although there are varying degrees of ongoing ovarian production.⁸ The mean circulating level of testosterone declines gradually with increasing age, rather than showing a precipitous fall at the menopause transition; therefore, levels in women aged 40 years are approximately half of women in their early 20s.⁸ Most circulating testosterone produced is bound to sex hormone-binding globulin (SHBG) and albumin, leaving only 1% to 2% free and physiologically active. When SHBG production increases the level of free testosterone decreases; this is commonly seen in aging women. Dehydroepiandrosterone (DHEA) and DHEA-sulfate levels fall linearly with age, which further contributes to the decline in testosterone.⁸

Testosterone production is significant because it appears to play a role in maintaining women's sexual health. In women who undergo

Testosterone production is significant because it appears to play a role in maintaining women's sexual health.

bilateral oophorectomy before natural menopause, serum testosterone and estradiol concentrations decrease by approximately 50% and 80%, respectively.⁹ Despite estrogen replacement therapy, many surgically postmenopausal women have shown a decrease in sexual desire, sexual activity, and pleasure as well as a decreased sense of well-being.⁹ In a study of women with surgically

induced menopause, high doses of testosterone, given by intramuscular injection alone or in combination with estrogen, increased sexual desire, fantasies, and arousal more than placebo or estrogen alone.¹⁰ In another study, therapy with testosterone and estradiol implants increased sexual activity, satisfaction, pleasure, and the frequency of orgasm more than estradiol alone.¹¹ Shifren and colleagues conducted the first randomized, double-blind, placebo-controlled trial of a transdermal testosterone patch. Treatment with transdermal testosterone combined with an oral conjugated equine estrogen improved sexual function and psychologic well-being substantially more than placebo treatment.⁹ Therefore, it can be concluded that the decreased testosterone levels seen in menopausal and elderly patients are associated with a loss of sexual desire and sexual pleasure, feelings of diminished physical well-being, and persistent fatigue.¹² This decrease has caused some to speculate that the addition of testosterone may help elderly women with sexual dysfunction.

Sexual Dysfunction

The traditional linear cycle of female sexual response was first constructed by Masters and Johnson. It is composed of four phases: excitement or arousal, plateau, orgasm, and resolution.¹³ The cycle illustrates an orderly sequence of physiologic responses, beginning with sexual excitement and culminating in orgasm and resolution, and each stage has associated genital and extragenital responses.¹⁴

Kaplan proposed an alternate model in 1979 and introduced the concept of desire into normal sexual responses. In this model, desire leads to arousal then to plateau, which is followed by orgasm

and resolution. This model was intended to reflect sexual response for men and women; however, researchers recognized that some women did not experience all four phases of the cycle. As such, this model has been criticized because it does not reflect a woman's actual experience.¹⁴

In Basson's circular sexual response cycle model, a woman's sexual response consists of overlapping phases of variable order.¹³ Sexual desire may not be present initially. The woman assesses her subjective arousal by how sexually exciting she finds the stimulus and by concurrent emotions and cognitions generated by the arousal. This modulation of her subjective arousal appears to be more consistent than the variable modulation by feedback from the genital vasocongestion. Sexual satisfaction may occur without orgasms. Alternatively, orgasms may be experienced before the maximum arousal, and further orgasms may occur at peak arousal and during its very gradual resolution. Thus, for women, orgasm and arousal are not particularly distinct entities.¹³

FSD is a multicausal and multidimensional problem combining biologic, psychologic, and interpersonal determinants. It has a major impact on quality of life and interpersonal relationships. Despite the widespread interest in research and treatment of male sexual dysfunction, less attention has been paid to the sexual problems of women.¹⁵

FSD is also related to a partner's function: when erectile failure of a male partner is improved, a woman's desire, sexual arousal, orgasm, and satisfaction improve.¹ Female partners of men treated with sildenafil citrate experience high levels of treatment satisfaction, but one in five were concerned about adverse

events. Depression is frequently associated with greater than 70% of patients with FSD and the FSD may worsen when these patients are treated with medications such as selective serotonin reuptake inhibitors (SSRIs). Selection of medications should take into account sexual dysfunction and patient desire to improve sexual activity.¹

According to the *Diagnostic and Statistical Manual of Mental Disorders* (fourth edition), sexual dysfunctions are defined as "disturbances in sexual desire and in the psychophysiological changes that characterize the sexual response cycle and cause marked distress and interpersonal difficulty."¹⁵ The report of the International Consensus Development Conference on Female Sexual Dysfunction classified sexual dysfunction in women into sexual desire disorders. These disorders are subclassified as hypoactive sexual desire disorder (HSDD), sexual aversion, female sexual arousal disorder, female orgasmic disorder, and sexual pain disorder, encompassing dyspareunia and vaginismus.^{15,16} Most studies do not segregate the elderly population from all patients with sexual dysfunction.

HSDD, with a prevalence of 22%, is the persistent or recurrent absence of sexual fantasies or thoughts and desire for or receptivity to sexual activity that causes personal distress.¹⁵ HSDD may be a primary, lifelong condition in which the patient has never felt much sexual desire or interest, or it may occur secondarily when the patient formerly had sexual desire, but no longer has interest (aka, acquired HSDD).¹⁷ HSDD can also be generalized (general lack of sexual desire) or situational (still has sexual desire, but lacks sexual desire for her current partner¹⁷). In a study by Hartmann and colleagues,¹⁸ 79% of patients suffered from secondary and generalized HSDD. When a woman describing

lack of libido has really never had much interest in sexual activity, treatment is less likely to be successful. The cause is not considered to be hormonal because libido was lacking in these women even when estrogen and testosterone were at premenopausal levels.⁵ Little is known about why some women have a much lower sex drive than others. Some postulated theories are early abuse, relationship difficulties, or psychologic factors such as depression.⁵ Lack of interest can be affected by medications, family situations, work-related issues, and psychologic factors.¹

Sexual aversion disorder is the persistent or recurrent phobic aversion to and avoidance of sexual contact with a sexual partner that causes personal distress. Sexual arousal disorder is the persistent or recurrent inability to attain or maintain sufficient sexual excitement that causes personal distress, which may be expressed as a lack of subjective excitement, lack of genital lubrication, or some other somatic response.

Orgasmic disorder is the persistent or recurrent difficulty, delay in, or absence of attaining orgasm following sufficient sexual stimulation and arousal that also causes personal distress. Psychologic issues, antidepressants, alcohol use, and drugs have all been responsible in causing anorgasmia.¹⁵

Sexual pain disorders, such as dyspareunia, are described as recurrent or persistent genital pain associated with sexual intercourse. The most common causes are infection, surgery, medications, endometriosis, and interstitial cystitis. Vaginismus is the recurrent or persistent involuntary spasm of the musculature of the outer third of the vagina that interferes with vaginal penetration that causes personal distress. Noncoital sexual pain disorder is recurrent

or persistent genital pain induced by noncoital sexual stimulation.¹⁵ Recognition of the type of sexual pain disorder provides the opportunity for targeted therapy, leading to diminished symptoms or complete elimination of the disorder.

Sexual Dysfunction and Age

Multiple factors determine female sexuality and libido. These include the health of the individual, her physical and social environment, education, past experiences, cultural background, and her relationship with her partner. Sex and sexuality after the age of 60 years may be affected by both individual physical changes of aging as well as the physical changes of aging in her partner.¹⁹ Therefore, with age comes a decrease in sexual activity. Aged women may be more concerned about problems related to intimacy,¹⁶ dyspareunia, decreased arousal and response, decreased frequency of sex, and loss of sexual desire.^{2,20} The incidence of sexual dysfunction in postmenopausal women is well over 80%. A recent survey of 833 menopausal women, aged 45 to 60 years, revealed that 38% of them expressed concern about changes in sexual function to their physicians.⁶

Initial studies report a decline in sexual activity in women as they age that is associated with a decline in subjective and objective health ratings, with an added incremental decline associated with the menopausal transition.²¹ One study confirmed that sexual activity in women and men decreases with age, and is highly dependent on marital status.²⁰

The Melbourne Women's Midlife Health Project is a prospective, observational study of a community-based sample of Australian women aged 45 to 55 years. There

are eight assessments using a self-reported questionnaire based on the McCoy Female Sexuality Questionnaire and blood samples for hormone levels.²¹ From early to late menopausal transition, the percentage of women with scores indicating sexual dysfunction rose from 42% to 88%. By the postmenopausal phase there was a significant decline in sexual arousal, interest in, and frequency of sexual activities.²¹ The most important factors influencing a woman's sexual function were prior levels of sexual function, losing or gaining a sexual partner, feelings toward a partner, estradiol levels,²² race, lower education level, and psychosocial stress.²³ These data suggest a fairly dramatic decline in female sexual functioning with the natural menopausal transition.²¹ More recently, the same investigator reported a prevalence of sexual dysfunction among 40- to 80-year-old women as high as 43% worldwide.²³

In another study, six domains of sexual function were studied in 3167 women in the baseline cohort of the Study of Women's Health Across the Nation (SWAN). Participants were aged 42 to 52 years, pre- or early perimenopausal, and not using hormonal therapies. Early perimenopausal women reported greater pain with intercourse than premenopausal women, but the two groups did not differ in frequency of sexual intercourse, desire, arousal, or physical or emotional satisfaction. Variables having the greatest association across all outcomes of sexual function were relationship factors, the perceived importance of sex, attitudes toward aging, and vaginal dryness.²⁴ In 2009, the SWAN cohort analyzed 3302 women with self-reported ratings of importance of sex; frequency of sexual desire, arousal, masturbation, sexual intercourse, and pain during intercourse; and

degree of emotional satisfaction and physical pleasure. The results were similar, illustrating that pain during sexual intercourse increased and sexual desire decreased over the menopausal transition. Masturbation increased during the early transition, but then declined in postmenopausal women. The menopausal transition was not independently associated with reports of the importance of sex, sexual arousal, frequency of sexual intercourse, emotional satisfaction with partner, or physical pleasure.²⁵

The results from SWAN highlight the importance of including social, health, and relationship

and problems with age and health status.²⁶ This was the largest and most comprehensive survey on the sexual function of the aging and is consistent with past studies that have investigated the topic. All agree that elderly women engage in, or wish to engage in, sexual activity.²⁶ However, due to the lack of an agreed-upon standard defining sexual behavior, differing methodologies (including both longitudinal and cross-sectional surveys), and the use of different populations, the estimated percentage of elderly women engaging in sexual behavior ranges greatly from 10% to 60%.^{2,27} The lack of standard

the current thought that age decreases the potential for sexual satisfaction.²⁹

SWAN reported substantial ethnic differences in sexual domains in women of all ages. After controlling for a wide range of variables, black women reported a higher frequency of sexual intercourse than white women; Hispanic women reported lower physical pleasure and arousal; Chinese and Japanese women reported more pain and less desire and arousal than white women, although the only significant difference was for arousal.^{24,25} Therefore, relationship variables, attitudes toward sex and aging, vaginal dryness, and cultural backgrounds have a greater impact on most aspects of sexual function than the transition to early perimenopause.

The results from SWAN highlight the importance of including social, health, and relationship factors in the context of menopause and sexual functioning.

factors in the context of menopause and sexual functioning. These factors and, in particular, feelings toward one's partner or starting a new relationship, have also been identified by others as highly important. Therapies to prevent menopausal transition-associated vaginal pain may help slow or prevent subsequent declines in sexual desire. The strong associations of psychologic status, physical health, and social factors with sexual function underscore the clinical imperative to explore and address these factors when discussing women's concerns regarding sexual dysfunction. The very strong association of the importance of sex with all domains of sexual function suggests that asking women about the importance of sex may be the cornerstone in the management of sexual concerns of aging women.

A study of Sexuality and Health among older adults in the United States sampled 3005 US adults, 1550 women and 1455 men, aged 57 to 85 years, and described the association of sexual activity, behaviors,

definitions and methodologies also contributes to conflicting results in regard to interest and satisfaction. Some studies cite a decrease in sexual behavior and interest with age,^{19,26} whereas others find no decrease.²⁸ Additionally, there is disagreement as to whether there is a decrease in women's satisfaction with their sexual behavior with increasing age,¹⁹ or whether there is no relationship between sexual satisfaction and aging.^{21,22}

Sexual satisfaction among postmenopausal women has been inadequately described. Cross-sectional data were collected from the Women's Health Initiative (WHI) observational cohort and used to describe the prevalence and correlates of low sexual satisfaction in postmenopausal women. All members of the WHI observational study, aged 50 to 79 years—excluding women who did not respond to the sexual satisfaction question or reported no partnered sexual activity in the past year—were included. Overall, 77% reported sexual satisfaction with their partner, dispelling

Organic Causes of Sexual Dysfunction

Many common general medical disorders negatively impact sexual function, causing decreased interest in sex (Table 1). Negative effects on desire, arousal, orgasm, ejaculation, and freedom from pain during sex can occur. Chronic disease also interferes indirectly with sexual function by altering relationships and self-image and causing fatigue, pain, disfigurement, and dependency.³⁰

Risk factors other than age are strongly associated with FSD. In terms of specific conditions, cardiovascular disease, diabetes, lower urinary tract problems, breast cancer, hysterectomy, oophorectomy, endocrinopathies, bariatric surgery, osteoarthritis, clinical depression, smoking, and natural menopause have all been consistently found to show significant associations with female sexual dysfunction.¹ Diseases such as osteoarthritis affect mobility and

TABLE 1**Risk Factors for the Development of Sexual Dysfunction****Potential Contributors to Decreased Sexual Function**

Age
 Menopause
 Urinary incontinence
 Pelvic floor disorders (eg, childbirth, uterine prolapse)
 Surgery (eg, hysterectomy, oophorectomy, gastric bypass)
 Diabetes
 Cardiovascular disease
 Neurologic or vascular dysfunction
 Obesity
 Hyperlipidemia
 Hypertension
 Osteoarthritis
 Multiple sclerosis
 Renal failure
 Liver failure
 Pulmonary disease
 Endometriosis
 Uterine fibroids
 Cancer (eg, breast)
 Hyperprolactinemia
 Hypothyroidism
 Substance abuse (tobacco, alcohol)
 Psychosocial issues
 Depression
 Anxiety

tolerance to physical activity, reducing sexual desire. Body image and perceived attractiveness are modified by aging and disease with a concomitant reduced desire for sexual relationships.¹ Depression has been associated with low sexual desire in 50% to 60% of untreated patients.³¹

Cardiovascular disease is a leading cause of morbidity in the elderly and is frequently associated with sexual dysfunction. Advanced age in itself constitutes a risk factor for vascular dysfunction even when other known risk factors are absent. Intact neurologic and vascular systems are necessary for normal arousal in women.¹ Further

research is needed to determine the exact correlation between cardiovascular disease and sexual dysfunction in women.

The prevalence of sexual dysfunction is also high in women with diabetes.¹ Interest or motivation toward sexual interaction can be influenced by suboptimum glycemic control, reduced energy, altered self-image, and interpersonal difficulties that result in difficulties with dietary compliance or glucose monitoring.³⁰ Women with diabetes also have reduced vaginal engorgement during orgasm.³⁰ Clinical experience suggests that dyspareunia is linked to chronic candidiasis, a common infection

in uncontrolled patients with diabetes, that causes pain and triggers vulvar vestibulitis syndrome in susceptible women.³⁰ Evidence-based treatment of diabetes-associated sexual dysfunction in women should include attention to depression, interpersonal issues, and the psychologic aspects of living with diabetes because these are known to be correlated with sexual function.³⁰

Lower urinary tract symptoms are common in older women and frequently associated with FSD. They may represent specific age-related pathology, be it a manifestation of a systemic illness or a result of medications used for comorbid conditions. Sen and colleagues recently investigated the effects of different types of urinary incontinence on female sexual function using the Female Sexual Function Index Questionnaire (FSFI). They reported that mixed urinary incontinence, compared with stress urinary incontinence, had the most significant impact on sexual function.²⁷ Leakage of urine with intercourse or with orgasm has been shown to reduce sexual motivation.³¹

Urogynecological surgery, such as sling procedures or vaginal surgeries, do not seem to affect overall sexual satisfaction, based on several prospective and retrospective studies on sexual function after tension-free vaginal tape procedure and vaginal hysterectomy.^{6,27,31,32} An increasing number of articles have raised the issue of FSD in women who undergo urogynecological surgery,²⁷ but until now conflicting data have been reported.

Surgery can play a role in sexual function due to organic, emotional, and psychologic factors. Sexual life after surgery can be unchanged, worsened, or improved.²⁷ A questionnaire was given to 400 women to ascertain self-image, sexuality,

and sexual response before and after hysterectomy. Their responses suggested that neither self-image nor sexuality diminishes after hysterectomy. The type of hysterectomy that was performed also did not appear to affect the attitudes of the respondents.³³ Deterioration in sexual function is reported by 13% to 37% of women after simple or radical hysterectomy.²⁷ These symptoms usually include loss of desire, decreased frequency of sexual activity, painful intercourse, diminished sexual responsiveness, difficulty achieving orgasm, and decreased genital sensation.²⁷ This may be due to a disturbance in the innervation to the uterus and upper vagina after total hysterectomy.³² Other studies illustrated that preoperative sexual dysfunction was correlated with worsening mood and libido postoperatively, therefore stating that psychologic well-being was a causative factor.¹⁹ A systematic review of the older literature revealed that many studies addressing the important question of sexuality after hysterectomy were of limited quality or poorly designed.¹⁹ Newer, prospective studies have demonstrated improved sexual function after hysterectomy, especially after subtotal hysterectomy.¹⁹ Helström and colleagues interviewed 100 women before and after subtotal (supracervical) hysterectomy. Fifty percent of the women reported improvement in their sexuality after surgery and 21% reported deterioration³²; 29% of women reported no change. Coital frequency was increased, cyclicity of arousability was reduced, and frequency of desire, frequency of orgasm, and multiplicity of orgasm were unchanged.³² A study comparing subtotal and total hysterectomy reported better libido and more frequent sexual activity in the women who underwent subtotal hysterectomy.³² In addition, there

were more postoperative sequelae after total hysterectomy compared with subtotal hysterectomy, suggesting that the effect on the women's sexuality might result from the surgical technique.³² Further randomized studies are needed for definitive results; however, a majority of the research illustrates improved psychologic well-being and sexual function after hysterectomy for benign disease.

Obesity has been linked to impairments in health-related quality of life, including reduced physical functioning, psychosocial functioning, emotional well-being, and sexual dissatisfaction and/or sexual difficulties. Obesity is associated with lack of enjoyment of sexual activity, lack of sexual desire, difficulties with sexual performance, and avoidance of sexual encounters.³⁴ Gastric bypass surgery is one of the few treatment options proven to induce substantial weight loss, increase life expectancy, and improve numerous comorbidities of obesity, such as type II diabetes and hypertension. Consistent with these benefits, studies have shown that bariatric surgery in the morbidly obese can improve sexual dysfunction.³⁴

Hyperprolactinemia has been described as a potential factor in sexual dysfunction; however, women more commonly present with menstrual irregularities, infertility, and galactorrhea, rather than with sexual dysfunction. Excessive prolactin lowers free testosterone through its inhibitory effects on hypothalamic GnRH secretion and pituitary gonadotropin (FSH and LH) secretion. When hyperprolactinemia is associated with panhypopituitarism, a reduction in androgens, estrogens, glucocorticoids, and thyroxine can compound sexual dysfunction.³⁰ Hyperprolactinemic women without depression or other hormonal

disorders have reported lower scores for sexual desire, arousal, lubrication, orgasm, and satisfaction than have controls.³⁰

The incidence of sexual dysfunction in women with hypothyroidism is unknown. The prevalence of menstrual disturbances, ovulatory function, and fertility in women with hypothyroidism has been estimated at 25% to 70%.³⁰ Hypothyroidism is associated with fatigue, depression, and mood disorders that might contribute to sexual dysfunction in both sexes. Because the incidence of hypothyroidism peaks at the age of menopause and perimenopausal symptoms could overlap with symptoms of hypothyroidism, screening for hypothyroidism in women at this age is generally recommended.³⁰

Effect of Medications on Sexual Function

All organ systems have decreased homeostatic reserve with aging, which results in decreased clearance and enhanced toxicity of many drugs. Undesired effects of medications are for these reasons quite prevalent in the elderly. The odds of being polymedicated also increase with advanced age, and common medication interactions tend to occur more often in the elderly population. New symptoms such as decreased libido, lack of lubrication, inability to reach orgasm, and lack of interest in sexual encounters may also result. Patients may believe new symptoms are a result of aging and may not report these occurrences to their physician unless the practitioner gives them an opportunity by asking questions about their sexual health, for example, about sexual activity, frequency of sexual activity, or reasoning for no sexual activity.²

TABLE 2**Medications That Can Cause, Interfere With, or Worsen Sexual Dysfunction**

Antipsychotics (eg, olanzapine or risperidone)
 Antiepileptics (lamotrigine, gabapentin, and topiramate)
 Antihypertensives: β -blockers, ganglion blockers (reserpine/methyldopa), niacin, fibrates, clonidine, spironolactone
 Hormonal contraceptives
 Antidepressants (selective serotonin reuptake inhibitor, tricyclic antidepressant, monoamine oxidase inhibitor, lithium, benzodiazepine)
 Neuroleptic medications (eg, dopamine antagonists)
 Diuretics, thiazides
 Alcohol
 Illicit drug use: marijuana, cocaine, heroin, methadone
 Antiparkinsonians
 Anticholinergics
 Antihistamines
 Cimetidine
 Steroids

Medications that affect the nervous system will affect sexual function. SSRIs are commonly associated with sexual dysfunction in women, mainly decreased libido, whereas bupropion, mirtazapine, and nefazodone less frequently cause FSD. Tricyclic antidepressants have less negative effect on sexual desire, but may cause anticholinergic side effects resulting in lower urinary tract symptoms and associated sexual dysfunction. Sildenafil citrate has been successfully used when sexual dysfunction was caused by antidepressants, most commonly SSRIs.¹ Neuroleptic medications are dopamine antagonists and increase prolactin, resulting in testosterone antagonism and decreased libido.¹

Elderly patients are more sensitive to side effects of medications in part due to their underlying comorbidities. Medications that interfere with normal sexual functioning are necessary at least for

periods of time during the management of intercurrent illness or long term in the control of chronic disease. Whenever possible, medications that cause symptomatic sexual dysfunction should be replaced to improve sexual functioning. At other times, it is necessary to treat common side effects such as vaginal dryness or erectile dysfunction specifically while the offending medication is continued.¹ Medications that commonly are associated with sexual dysfunction are listed in Table 2.

Potential Treatment Options

Before initiating pharmacological therapy, the potential contribution of relationship difficulties or psychologic causes should be considered and treated, if appropriate. Most of these sexual disorders require intense psychologic counseling and education. Listening and clarifying serves as the

cornerstone of the sexual dysfunction evaluation.

The clinician should learn the nature of the problem(s), its severity, duration, degree of distress, and the patient's motivation for treatment. The clinician must take a medical history, including inquiries about diseases and/or medications that may result in sexual dysfunction. Questions about the patient's prior use of hormone therapy, her current sexual relationship, and her partner's health, sexual functioning, and reactions to the patient's sexual problem are also essential components of the history. Finally, the patient should be screened for the possibility of depression and/or an anxiety disorder. In the case of severe psychiatric issues, referral or consultation may be appropriate.²⁸ There are ongoing research studies to help better define the diagnostic approaches to assess sexual function, but they have not yet yielded definitive results.^{8,28,35} Such approaches may

yield improvements in the diagnostic capability for identification or treatment of sexual dysfunction in the future.

Estrogen preparations are currently the only US Food and Drug Administration (FDA)-approved medication for the treatment of sexual dysfunction. Small doses of estrogen vaginal cream can adequately improve lubrication and decrease pain with intercourse; however, estrogen response is quite individual.⁵ Drug efficacy may be affected by the route of estrogen administration. Clinical evidence has shown that 0.625 mg of conjugated estrogen or an equipotent dose of another estrogen product is sufficient for most women as hormone replacement therapy to improve sexual dysfunction symptoms.^{5,6,22} Estrogen vaginal creams may relieve genital symptoms of vaginal dryness and atrophy, dyspareunia, irritation, and pruritus. Vaginal dryness can also be managed with a combination of estrogen replacement therapy and a nonestrogenic, water-soluble lubricant. The lubricant can be applied to internal surfaces of the vagina and the vaginal introitus.⁶ Transdermal and intravaginal routes of estrogen administration for patients with sexual dysfunction have become the most common and successful treatment methodologies for these patients.

The WHI research has reported that estrogen replacement therapy has no effect on overall health-related quality of life. Postmenopausal women with intact uteri (16,608 women) were randomized to receive estrogen plus progestin therapy or placebo. This resulted in no significant effects on general health, vitality, mental health, depressive symptoms, or sexual satisfaction.³⁶ Further studies are necessary to better describe the cofactors associated with sexual satisfaction.

Testosterone has also been shown to improve sexual dysfunction. Testosterone enhances the central nervous system aspect of the sexual response, desire. However, a consistent relationship between women's testosterone levels and sexual desire, fantasies, activities, or satisfaction has never been clearly demonstrated.^{5,12} The pharmacokinetics of testosterone formulations for women are unclear, and the assays for the measurement of total and free testosterone concentrations in women lack accuracy and sensitivity.²⁰ Testosterone's major adverse effects include virilization (oily skin, acne, hirsutism, alopecia, deep voice), liver toxicity, polycythemia, and breast carcinoma.^{15,20} Long-term safety studies on breast cancer development and cardiovascular events are lacking.

Testosterone administration in early studies included oral, intramuscular injection, and subcutaneous implants, all of which resulted in increases in sexual desire in postmenopausal women.¹² Oral active testosterone preparations currently available in the United States are a fixed combination of methyl testosterone and esterified estradiol, but are not currently FDA approved for the treatment of sexual dysfunction.¹⁵

Postmenopausal volunteers (34 women) were randomized to treatment with either estradiol implants, 50 mg alone, or estradiol, 50 mg, plus testosterone, 50 mg, administered three times per month for 2 years. According to the Sabbatsberg Sexual Self-Rating Scale, all sexual parameters improved significantly in both groups.³⁵ Several randomized, controlled studies have demonstrated that the transdermal, 300- μ g testosterone patch is more advantageous over other routes of administration and improves sexual function over placebo.²⁰

Increased sexual desire and frequency of satisfying sexual activity were the main outcomes.²⁰ The testosterone patch is designed to give an appropriate free testosterone level and a relatively steady-state blood level.⁸ The addition of testosterone has resulted in a significantly greater improvement compared with estradiol alone for sexual activity, satisfaction, pleasure, orgasm, and relevancy. For example, testosterone seems to act synergistically with exogenous estrogen to diminish the impairment of sexual functioning, loss of energy, depression, and headaches that can occur in women who have undergone oophorectomy or in naturally menopausal women.¹⁷ Therefore, significantly greater improvement in sexuality was observed with combined therapy, verifying the therapeutic value of testosterone for diminished libido in postmenopausal women.³⁵

Other hormones, such as progestins, can be combined with estrogen replacement therapy to enhance the positive effects or to diminish the negative effects when dealing with sexual dysfunction.³⁷ However, such therapy is underused and very much under-researched. As a result, there is no consensus regarding dosages, routes, complications, and patient selection factors.⁶

Research Opportunities

There is a tremendous need for more research in this field. One reason for the lack of literature that explores female elderly sexuality is the relatively recent development of systematic studies of sex in medicine and science. Considered a taboo topic and a private matter regardless of age or sex for many years, the literature only recently started to branch out from studying the sexual behavior of the young—those considered most

sexual—to the elderly, a group long considered by many to be asexual. Recent advances in pharmacology have helped propel this research, most notably the advances made in treating erectile dysfunction in men with drugs like sildenafil citrate. Although the majority of literature concerned with issues of elder sexuality remains largely androcentric, fueled in part by the growing market for medications treating male sexual dysfunctions and the desire of practitioners to improve the quality of life of their elderly patients, research in the field of elderly female sexual function is improving. In addition to focusing on female sexuality and sexual dysfunction, the need for discussion and comparison of heterosexual and homosexual couples will need to be addressed.

Although research avenues continue to expand in the field of sexual function and the aging population, they remain small in number. Treatments to improve sexual function in women are being explored, however, an agreed-upon standard defining baseline sexual function is lacking. Developing a baseline of functionality is the first step in narrowing this range and ultimately developing the best treatments for patients with an actual dysfunction as well as the best educational resources for patients seeking to adapt to the changes occurring in their aging bodies.

Quantitative research asking women directly how they define sexual behavior would create new concepts with operational definitions meaningful to both the researchers and the women surveyed. Assessments of baseline and stimulated physiologic endpoints to assess sexual function, sexual dysfunction, and arousal would complement the current evaluations, which have focused on validating psychiatric tools and patient

diaries. Longitudinal population surveys ongoing at this time will likely improve our understanding of sexuality in the elderly.

Surgery and its contribution to sexual function should not be ignored. Further studies are needed to determine the appropriate role for supracervical hysterectomy and its impact on sexual function, as well as other surgical techniques.

The difference in populations in most of the past literature is due to the range of ages. Most studies have a small sample, or if they do have a large sample, most of the women surveyed are not elderly. The majority of these studies are also primarily based on a narrow subset of elderly American women, specifically those in white, well-educated, high socioeconomic, urban populations.² To define functionality for all elderly women, studies must take into consideration the variability of elderly women including minority women, those from rural populations, women of low socioeconomic status, and those without a high level of education. Broadening these studies to incorporate women from diverse ethnic and racial backgrounds will be important in determining those with sexual function.

Conclusions

Although the studies are few and differ in many ways, they all agree on one point: elderly women are not asexual. Researchers now have the task of defining a standard of functionality for this population. One of the challenges researchers will face in defining this standard is that accepted standards for premenopausal and even newly postmenopausal women are not necessarily applicable to elderly women. This is in part due to the physiologic differences between

these populations and the unique social challenges facing the elderly. Taking into consideration the age-specific challenges these women face, both physiologically and socially, in conjunction with considering their attitudes toward sex, and understanding their expectations concerning sex, will be necessary components for any attempt to define a standard of functionality.

Female sexual dysfunction affects 40% to 60% of women and correlates with age, education, and physical and emotional health.¹ Women may experience occasional or intermittent difficulties in relation with sexual activity, decreased desire, inability to reach orgasm, or pain during intercourse. When these symptoms become persistent or quite frequent, it can be considered as a sexual dysfunction and may have an underlying cause.

There is a decline in sexual function with age that may affect quality of life. Disease and functional decline account for decreased interest in sexual activity in the elderly. Sexuality is important for older adults, but interest in discussing aspects of sexual life is variable. Physicians should give their patients an opportunity to voice their concerns about their personal sexual function and offer them alternatives for evaluation and treatment if dysfunction is present.¹ Women's health providers need to be aware of their patients' continuing interest in sexual activity, screen for sexual dysfunction, and treat any dysfunction with care and sensitivity. It is important for physicians to provide the opportunity to discuss these topics with their elderly patient population.

Increasing recognition of this common problem, and future research in this field may alter perceptions about sexuality, dismiss taboo and incorrect thoughts on sexual dysfunction, and spark

better management for patients, allowing them to live more enjoyable lives. ■

The authors report no affiliation or financial arrangement with any of the companies mentioned in this article or with their competitors.

References

- Camacho ME, Reyes-Ortiz CA. Sexual dysfunction in the elderly: age or disease? *Int J Impot Res*. 2005;17(suppl 1):S52-S56.
- Addis IB, Van Den Eeden SK, Wassel-Fyr CL, et al. Sexual activity and function in middle-aged and older women. *Obstet Gynecol*. 2006;107:755-764.
- Dennerstein L, Leher P, Burger H, Guthrie J. Sexuality. *Am J Med*. 2005;118(suppl 12B):59-63.
- Derogatis LR, Burnett AL. The epidemiology of sexual dysfunctions. *J Sex Med*. 2008;5:289-300.
- Redmond GP. Hormones and sexual function. *Int J Fertil Womens Med*. 1999;44:193-197.
- Hofland SL, Powers J. Sexual dysfunction in the menopausal woman: hormonal causes and management issues. *Geriatr Nurs*. 1996;17:161-165.
- Gould D. The menopause: sexually-related problems. *Nurs Stand*. 1998;12:49-54; quiz 55-56.
- Davis SR, Tran J. Testosterone influences libido and well being in women. *Trends Endocrinol Metab*. 2001;12:33-37.
- Shifren JL, Braunstein GD, Simon JA, et al. Transdermal testosterone treatment in women with impaired sexual function after oophorectomy. *N Engl J Med*. 2000;343:682-688.
- Sherwin BB, Gelfand MM, Brender W. Androgen enhances sexual motivation in females: a prospective, crossover study of sex steroid administration in the surgical menopause. *Psychosom Med*. 1985;47:339-351.
- Davis SR, McCloud P, Strauss BJ, Burger H. Testosterone enhances estradiol's effects on postmenopausal bone density and sexuality. *Maturitas*. 1995;21:227-236.
- Kingsberg SA, Simon JA, Goldstein I. The current outlook for testosterone in the management of hypoactive sexual desire disorder in postmenopausal women. *J Sex Med*. 2008;5(suppl 4):182-193; quiz 193.
- Basson R, Brotto LA, Laan E, et al. Assessment and management of women's sexual dysfunctions: problematic desire and arousal. *J Sex Med*. 2005;2:291-300.
- Rosen RC, Barsey JL. Normal sexual response in women. *Obstet Gynecol Clin North Am*. 2006;33:515-526.
- Basson R, Berman J, Burnett A, et al. Report of the International Consensus Development Conference of Female Sexual Dysfunction: definitions and classifications. *J Urol*. 2000;163:888-893.
- Salonia A, Munarriz RM, Naspro R, et al. Women's sexual dysfunction: a pathophysiological review. *BJU Int*. 2004;93:1156-1164.
- Leiblum SR, Koochaki PE, Rodenberg CA, et al. Hypoactive sexual desire disorder in postmenopausal women: US results from the Women's International Study of Health and Sexuality (WISHeS). *Menopause*. 2006;13:46-56.
- Hartmann U, Heiser K, Rüffer-Hesse C, Kloth G. Female sexual desire disorders: subtypes, classification, personality factors and new directions for treatment. *World J Urol*. 2002;20:79-88.
- Laumann EO, Nicolosi A, Glasser DB, et al. GSSAB Investigators' Group. Sexual problems among women and men aged 40-80 y: prevalence and correlates identified in the Global Study of Sexual Attitudes and Behaviors. *Int J Impot Res*. 2005;17:39-57.
- Shah K, Montoya C, Persons RK. Clinical inquiries. Do testosterone injections increase libido for elderly hypogonadal patients? *J Fam Pract*. 2007;56:301-303.
- Dennerstein L, Alexander JL, Kotz K. The menopause and sexual functioning: a review of the population-based studies. *Annu Rev Sex Res*. 2003;14:64-82.
- Dennerstein L, Dudley EC, Hopper JL, Burger H. Sexuality, hormones and the menopausal transition. *Maturitas*. 1997;26:83-93.
- Dennerstein L, Smith AM, Morse CA, Burger HG. Sexuality and the menopause. *J Psychosom Obstet Gynaecol*. 1994;15:59-66.
- Avis NE, Zhao X, Johannes CB, et al. Correlates of sexual function among multi-ethnic middle-aged women: results from the Study of Women's Health Across the Nation (SWAN). *Menopause*. 2005;12:385-398.
- Avis NE, Brockwell S, Randolph JF, Jr, et al. Longitudinal changes in sexual functioning as women transition through menopause: results from the Study of Women's Health Across the Nation. *Menopause*. 2009;16:442-452.
- Lindau ST, Schumm LP, Laumann EO, et al. A study of sexuality and health among older adults in the United States. *N Engl J Med*. 2007;357:762-774.
- Dalpia O, Kerschbaumer A, Mitterberger M, et al. Female sexual dysfunction: a new urogynaecological research field. *BJU Int*. 2008;101:717-721.
- Sarrel PM. Sexual dysfunction: treat or refer. *Obstet Gynecol*. 2005;106:834-839.
- McCall-Hosenfeld JS, Jaramillo SA, Legault C, et al; Members of Women's Health Initiative-Observational Study. Correlates of sexual satisfaction among sexually active postmenopausal women in the Women's Health Initiative-Observational Study. *J Gen Intern Med*. 2008;23:2000-2009.
- Bhasin S, Enzlin P, Coviello A, Basson R. Sexual dysfunction in men and women with endocrine disorders. *Lancet*. 2007;369:597-611.
- Basson R, Schultz WW. Sexual sequelae of general medical disorders. *Lancet*. 2007;369:409-424.
- Helström L, Lundberg PO, Sörbom D, Backström T. Sexuality after hysterectomy: a factor analysis of women's sexual lives before and after subtotal hysterectomy. *Obstet Gynecol*. 1993;81:357-362.
- Roussis NP, Waltrous L, Kerr A, et al. Sexual response in the patient after hysterectomy: total abdominal versus supracervical versus vaginal procedure. *Amer J Obstet Gynecol*. 2004;190:1427-1428.
- Kolotkin RL, Binks M, Crosby RD, et al. Obesity and sexual quality of life. *Obesity (Silver Spring)*. 2006;14:472-479.
- Davis SR, McCloud P, Strauss BJ, Burger H. Testosterone enhances estradiol's effects on postmenopausal bone density and sexuality. *Maturitas*. 2008;61:17-26.
- Hays J, Ockene JK, Brunner RL, et al; Women's Health Initiative Investigators. Effects of estrogen plus progestin on health-related quality of life. *N Engl J Med*. 2003;348:1839-1854.
- Davis SR, Davison SL, Donath S, Bell RJ. Circulating androgen levels and self-reported sexual function in women. *JAMA*. 2005;294:91-96.

MAIN POINTS

- The prevalence of sexual dysfunction in postmenopausal women varies from 68% to 86.5%.
- The most common sexual concerns of elderly women include loss of sexual desire, problems with arousal, inability to achieve orgasm, painful intercourse, negative body image, and feelings of diminished sexual desirability and attractiveness.
- Sexual dysfunction occurs as women pass through the menopausal transition, a transition that is thought to be primarily associated with decreasing hormonal levels.
- Female sexual dysfunction is a multicausal and multidimensional problem combining biologic, psychologic, and interpersonal determinants.