The challenges of infertility for women extend beyond those surrounding conception and birth. Overall quality of life can be significantly affected by the psychosocial impact of infertility’s diagnosis and treatment course. One quality-of-life measure of clinical and research interest is female sexual dysfunction (FSD), which is also one of the least addressed issues in the clinician-patient encounter today. FSD is defined as the persistent or recurrent difficulty encountered in 1 or more of the following factors that causes a woman personal distress: sexual desire, sexual arousal, orgasm, or pain during sex (TABLE 1).¹

Preexisting FSD may be a causal factor in infertility by contributing to limited or absent sexual activity. However, in the case of new-onset FSD associated with infertility, it is not always evident whether the diagnosis or treatment of has the greatest influence. Indeed, prior research demonstrates that both can significantly affect the emotional well-being of a woman and her partner.²

This review explores the complex and overlapping nature of infertility and FSD, providing clinicians with the foundation to adequately address the needs of their patients from a biopsychosocial perspective (FIGURE).

**FSD as the cause of infertility**

Preexisting sexual dysfunction is an underreported cause of infertility. In fact, couples may seek infertility treatment rather than address the fact that they are not sexually active. Therefore, a fertility specialist may be the first to discover a patient’s problem with sexual function.

Disorders of desire, arousal, orgasm, or pain can be a causal factor of infertility because sexual activity may be limited or avoided, especially around the time of ovulation. Vaginismus and dyspareunia are 2 sexual disorders that are frequently implicated as a direct cause of infertility.

Vaginismus, or hypercontractility of the pelvic floor muscles, can cause significant discomfort during sexual intercourse. Many women with this disorder will avoid vaginal penetration and seek other methods of conception. The etiology of vaginismus includes both physical and nonphysical factors that are associated with the anticipation of pain during sexual intercourse.

Dyspareunia, or the pain caused by attempted or actual vaginal penetration, has multiple etiologies. Many of the etiologies are associated with development of infertility, including endometriosis and uterine pathology.
Infertility as the cause of FSD

In women, sexual stimuli alone do not necessarily lead to sexual arousal because psychological factors may prevent their processing, according to the female sexual response cycle proposed by Dr Rosemary Basson. It is important to address life stressors, such as those related to medical illness and relationships, when evaluating a woman with sexual dysfunction. Studies have shown that infertility has a significantly greater effect on a woman’s sense of sexual identity than do other sources of stress. Women may also experience emotional states that are known causative factors of sexual dysfunction, such as depression, anxiety, and lowered self-esteem. Marital distress may arise following the diagnosis of infertility, and women who have had multiple, unsuccessful treatment attempts are known to be at an even greater risk of psychological distress.

The act of timed sexual intercourse during fertility treatment can bring about sexual dysfunction by eliminating the spontaneity of the act. The focus of sex becomes solely one of conception rather than of pleasure. Over time, the psychological pressure to conceive stemming from “sex on demand” can lead to decreased satisfaction with intercourse and the subsequent potential for the loss of a couple’s intimacy. Partner sexual dysfunction is a recognized risk factor for the development of situational sexual dysfunction in both men and women. Therefore, male partners of an infertile couple may also develop sexual dysfunction following the diagnosis. Depression, erectile dysfunction (ED), and relationship distress are common and can occur as a direct result of a female partner’s sexual dysfunction. In addition, women may suffer from this trend if their male partner has sexual difficulties such as ED or premature ejaculation.

Medical disorders, infertility, and FSD

There are several medical disorders associated with female infertility that also play a role in the development of sexual dysfunction.

Polycystic ovary syndrome

Polycystic ovary syndrome (PCOS) is the most common cause of anovulation in the infertile population. There is a frequent misconception that women with PCOS will experience increased sexual desire from the resulting hyperandrogenism. On the other hand, PCOS women may experience decreased sexual desire due to the hyperandrogenism that is associated with the condition. Additionally, polycystic ovaries can cause inflammation, which may also lead to decreased sexual desire.
contrary, PCOS has been shown to reduce quality of life, increase risk of depression, and decrease overall sexual satisfaction and feelings of sexual self-worth. This may be due to the changes in appearance (eg, acne, hirsutism, weight gain) associated with elevated androgen levels, but more research is necessary.11

Endometriosis
Endometriosis occurs more frequently among infertile women. Several mechanisms have been proposed to describe the relationship between endometriosis and infertility: abnormal peritoneal environment; alterations in tubal and endometrial function; and mechanical obstruction due to intra-abdominal adhesions.12 Endometriosis is also one of the most common causes of chronic pelvic pain and deep dyspareunia in women, due to the presence of inflammation in the pelvis, adnexal masses, or adhesions. This type of pain during vaginal penetration can limit sexual activity and potentially lead to sexual avoidance. This lack of sexual activity has been shown to lower self-esteem and negatively affect partner relationships.13 Surgical excision of endometriosis has the potential to improve not only the deep dyspareunia but also the quality of a woman’s sex life.14

Premature ovarian failure
Women with premature ovarian failure (POF) experience cessation of ovarian function and decreased sex hormone production. Compared to healthy control subjects, POF patients report more complaints of anxiety, psychological distress, and depression. They may experience decreased sexual arousal or vaginal lubrication and increased pain during intercourse. Women with POF report having fewer sexual fantasies and masturbating less frequently.15

Uterine fibroids
Submucosal fibroids can interfere with embryo implantation, thereby contributing to infertility. However, there are conflicting data regarding the relationship between fibroids and dyspareunia. A 2003 population-based study from Italy demonstrated that women with uterine fibroids were more likely to report moderate or severe dyspareunia compared with women without fibroids.16 A follow-up study in 2006 showed, however, that the presence of fibroids did not correlate with an increased incidence of deep dyspareunia. Because of the high coexistence of endometriosis and fibroids in the infertile population, it is unclear whether the pain reported by patients with fibroids is solely due to the enlarged uterus. Nonetheless, for individual patients, a fundal fibroid can be the cause of discomfort during intercourse; fibroids in other locations are less likely to be the source of pain.17

Fertility medications: Effects on sexual function
Several medications used for the treatment of infertility are known contributors to FSD due to side effects. However, these side effects are typically short lived and resolve following cessation of therapy. These medications have been associated with sexual pain and can affect any phase of the sexual response cycle in women, including sexual desire, arousal, and orgasm.

GnRH analogues
The gonadotropin-releasing hormone (GnRH) analogues, such as leuprolide acetate or ganirelix, are frequently used during in vitro fertilization (IVF) cycles to suppress ovulation. Side effects may include decreased libido and dyspareunia secondary to vaginal dryness.
Oral contraceptives
Oral contraceptives (OCs) taken prior to the onset of an IVF cycle may contribute to vaginal irritation, decreased lubrication, and pain with penetration secondary to decreased serum estradiol and free testosterone levels. Although the existing data on the relationship between OC use and sexual dysfunction are limited, a case control study from 2002 demonstrated the increased relative risk of vulvar vestibulitis and dyspareunia in women with a history of OC use compared to never users. The connection between OCs and low libido, however, is difficult to make because published reports may be contradictory.

Ovulation induction agents
Clomiphene citrate (CC), commonly used for ovulation induction, may affect any aspect of the female sexual response cycle due to its side effects, including breast tenderness, abdominal pain, hot flashes, nausea, and mood swings. Metformin, often used for ovulation induction in insulin-resistant women with PCOS, has a side effect profile that includes diarrhea, nausea/vomiting, abdominal discomfort, indigestion, and flatulence, which may have a similar negative impact on sexual response. In addition, the high levels of estrogens seen during ovarian stimulation with exogenous gonadotropins have been shown to worsen symptoms of endometriosis, including sexual pain.

Addressing sexual function in the context of infertility
Despite the high prevalence of FSD in the United States, it continues to be one of the least addressed issues in the clinician-patient encounter (SIDEBAR). Physicians avoid the issue of sexual function for a number of reasons, including: lack of sexual health education in medical school and residency; lack of FDA-approved treatment options; discomfort with the topic; and time constraints on clinical visits. Meanwhile, in the infertility office setting, women may not disclose a sexual complaint either out of embarrassment or because they are focused solely on pregnancy.

Psychosocial interventions should be part of the evaluation and treatment paradigm for women dealing with infertility (TABLE 2). A simple way for a clinician to inquire about sexual function difficulties in the clinic setting is to begin with the following dialogue: “It is common for both women and men to have difficulties with sex while they are also coping with infertility. Is there anything that has been concerning you about your sex life that you would like to discuss today?”

Some approaches to treating FSD include cognitive therapy, medications, pelvic floor physical therapy, and lifestyle changes. Clinicians who treat infertility should maintain a referral base of physicans, behavioral therapists, and pelvic

TABLE 2
“ALLOW” Algorithm for Managing Sexual Dysfunction: A Sample Management Plan

| A: | Ask the patient if she has any concerns regarding her sexual function |
| L: | Legitimize to the patient why you are asking her about sexual function |
| L: | Limitations: Know your limitations for the evaluation and treatment of FSD and refer to other practitioners, if necessary |
| O: | Open up the visit to further discussion and evaluation of the sexual function complaint |
| W: | Work together with the patient on a treatment plan |

Example: “It is common for both women and men to have difficulties with sex while they are also coping with infertility. Is there anything that has been concerning you about your sex life that you would like to discuss today?”

Useful Referral Web Sites
Sex Therapists
American Association of Sexuality Educators, Counselors and Therapists (AASECT): www.aasect.org
Society for Sex Therapy and Research (SSTAR): www.sstarnet.org
Pelvic Floor Physical Therapists:
American Physical Therapy Association (APTA): www.apta.org

floor physical therapists familiar with the evaluation and treatment of sexual dysfunction. If necessary, counseling for the individual woman or couple should begin prior to or during the evaluation and treatment of infertility.22

Conclusion
Infertility can be a time of significant personal and interpersonal stress for women. Details of sexual function and frequency should be discussed at the initial infertility evaluation to rule out preexisting sexual dysfunction. Sexual dysfunction that is discovered during an infertility evaluation should be addressed independent of fertility concerns. When appropriate, treatment for sexual dysfunction may preclude the use of expensive and unnecessary treatments for infertility. If left untreated, FSD may become a chronic problem that can affect self-esteem and interpersonal relationships. Although there are no FDA-approved medications for FSD, patients and practitioners should be aware that effective interventions are available. Because FSD has a known negative impact on a woman’s quality of life, further research is necessary to provide optimal management for patients suffering from both FSD and infertility. ■

REFERENCES

KEY POINT
Sexual dysfunction discovered during infertility evaluation should be addressed independent of fertility concerns.