Sexuality and Schizophrenia: A Review

by Deanna L. Kelly and Robert R. Conley

Abstract

Sexual functioning has received little attention as an important aspect of patient care for those suffering from severe mental disorders such as schizophrenia. Yet, it has been implicated as one of the major factors contributing to noncompliance with antipsychotic medications and is documented by people with schizophrenia to be one of the areas of treatment with the most unmet needs. A stronger focus on sexuality and preventing sexual dysfunction in schizophrenia would likely be a major benefit for improving treatment. This review will describe possible mechanisms for sexual dysfunction, describe sexual disturbances that have been documented in the literature of people who have schizophrenia, and summarize and discuss assessment measures available. Moreover, a focus on second-generation antipsychotics (SGA) and their association with sexual functioning is described. Each SGA (clozapine, risperidone, olanzapine, quetiapine, ziprasidone, and aripiprazole) will be described for its prolactin effects, documented sexual disturbances associated with use, and product labeling regarding sexual function. Treatment options and psychosocial issues pertaining to sexuality also are presented.

Keywords: Schizophrenia, sexual dysfunction, antipsychotics, prolactin, amenorrhea.

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Sexuality is a natural component of human behavior, and the nature of sexual behavior in the normal population has been well addressed (Simons and Carey 2001). For those suffering from severe mental disorders such as schizophrenia, however, sexual functioning has received little attention or recognition as an important aspect of their care. Until recently, discussing sexual issues with schizophrenia patients was considered inappropriate because it was believed that they should not engage in sexual activity. In fact, in the early 1900s some researchers believed that sexual excesses could actually cause insanity (Von Krafft-Ebing 1904). As recently as the 1970s, psychiatrists believed that sexual activity could contribute to the development of schizophrenia in most patients with this illness (Pinderhughes et al. 1972). Although this belief is no longer held, little has been done to effectively address this important life issue in people with schizophrenia, and too little is known about the natural history of sexual functioning in people with schizophrenia.

Some studies have suggested that sexual functioning is both qualitatively and quantitatively different in people with schizophrenia compared with those without the illness. People with schizophrenia engage in less overall sexual activity of any type yet are more likely to experience autoerotic behavior (Rozan et al. 1971; Akhtar and Thomson 1980). These reports, however, are confounded by several issues. First, psychiatric staff members are reluctant to discuss sexual concerns with patients (Wolfe and Menninger 1973; Withersty 1976). This discomfort is compounded by the fear that people with schizophrenia cannot manage their sexuality and that discussing these issues might trigger inappropriate behavior (Sadow and Corman 1983). Psychiatrists have reported that discussing sexual issues may slow recovery (Pinderhughes et al. 1972). Second, almost all of the reports focusing on sexual functioning evaluated people only during treatment with conventional antipsychotics. Literature linking sexual dysfunction to conventional antipsychotic treatment emerged as early as 1968 (Shader and DiMascio 1968). Although the extent of sexual dysfunction among people with schizophrenia remains largely unknown, approximately 50 percent of patients have reported sexual dysfunction during treatment with conventional antipsychotics (Ghadirian et al. 1982; Sullivan and Lukoff 1990), and more recent studies have reported rates as high as 80 to 90 percent among both sexes (Macdonald et al. 2003).

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In the past decade researchers have advanced their understanding of the link between psychotropic medications and sexual dysfunction. Although most work focuses on people with depression, some attention has been paid to schizophrenia, notably since the introduction of SGA medications. Sexual dysfunction has been implicated as one of the major factors contributing to noncompliance with antipsychotic medications (Fleischhacker et al. 1994; Perkins 2002). A recent survey noted that people with schizophrenia identified "personal relationships" as one of the treatment areas with the most unmet needs (Burns et al. 2001). A better focus on preventing sexual dysfunction in schizophrenia would greatly improve treatment.

Pathophysiology of Sexual Dysfunction

The relationship between sexuality and schizophrenia is complex. Although the etiology of schizophrenia remains unknown, the age of onset closely parallels that of the reproductive period (Hafner et al. 1993). For example, during this time secretion of luteinizing hormone increases by more than 30-fold in boys and 100-fold in girls (Veldhuis 1996). Estrogen levels in females with schizophrenia have been shown to be lower than normal controls at the onset of psychosis (Oades and Schepker 1994). Lower levels of total gonadotropins and testosterone have been reported in unmedicated male schizophrenia patients relative to controls (Gil-Ad et al. 1981; Van Cauter et al. 1991). In susceptible individuals, the failure to establish and maintain equilibrium of neuroexcitatory reproductive hormones may be pertinent to the precipitation of schizophrenia (Riecher-Rossler and Hafner 1993; Stevens 2002). Many reports from epidemiological, clinical, and basic research have shown that estrogens exert protective effects in schizophrenia (Riecher-Rosserler 2002). Furthermore, low estrogen levels have been correlated with sexual dysfunction. Therefore, although it is important to examine the relationship between medication and sexual disturbances in schizophrenia patients, these patients may have underlying hormonal disturbances that preexist or contribute to sexual disturbances that occur.

Lack of sexual activity may result directly or indirectly from having low social confidence, few personal relationships, a loss of impulse control, and deficit symptoms such as lack of interest and anhedonia. Some studies have found that even before the onset of illness, a lack of interest in forming sexual relationships is more common in males with schizophrenia than in healthy males (Rowlands 1995). Most studies, however, have reported that conventional antipsychotic medications cause most of the problems with libido, arousal, and orgasm in people with schizophrenia (Sullivan and Lukoff 1990).

Several mechanisms can cause sexual dysfunction during antipsychotic therapy. Nonspecific effects such as sedation and weight gain can lead to diminished sexual interest. Extrapyramidal side effects and tardive dyskinesia may also reduce mobility for sexual functioning (Yassa and Lal 1985). Serotonin has been shown to either facilitate or inhibit sexual behavior depending on the receptor stimulated (Meston and Gorzalka 1992). Cholinergic antagonism and alpha-adrenergic blockade have been implicated in orgasmic dysfunction and ejaculatory disturbances (Pollack and Rosenbaum 1992; Tamminga et al. 1997). Calcium channel blockade may also contribute to sexual dysfunction (Pollack and Rosenbaum 1992).

In addition, elevated prolactin levels may also contribute to sexual dysfunction. Hyperprolactinemia is known to cause hypogonadism and decrease testosterone levels (Wilson 1993). Prolactin appears to have a direct effect on sexual activity; normalization of prolactin levels with bromocriptine has been shown to restore sexual functioning before testosterone levels increase (Barnes and Harvey 1993). In normal patients, Faiman (1993) stated that 80 percent of men with serum prolactin levels > 50 ng/mL complained of impaired libido and impotence. Prolactin elevations from antipsychotic treatment primarily occur by dopamine blockade at the pituitary level (Rubin 1987). Ghadirian et al. (1982) and Burke et al. (1994) found that elevated serum prolactin correlated with more severe sexual dysfunction in men. Other studies have had variable results for correlational analyses, but most generally report higher rates of sexual dysfunction and menstrual disturbances in people with high prolactin levels (Kleinberg et al. 1999; Kelly et al. 2001).

Types of Sexual Dysfunction

The psychiatric literature contains some reports describing sexual disturbances in schizophrenia but few well-designed studies. Furthermore, only a few of these reports describe sexual function or dysfunction in women. The definition and measurement of sexual dysfunction in the existing literature has been inconsistent; however, a few general classifications do appear (Sullivan and Lukoff 1990). In men taking traditional antipsychotics, the most commonly reported sexual side effects (30%–60%) are erection and ejaculation disturbances (Segraves 1989), including difficulty achieving and maintaining erection as well as delayed or inhibited, retrograde, and spontaneous ejaculation. Diminished libido and decreased orgasm quality are also commonly reported in men. Priapism, a sustained painful erection that can result in permanent impotence, has also been reported (Moloney et al. 1975;

Keitner and Selub 1983). Women report decreased libido and orgasmic dysfunction including difficulty achieving orgasm, changes in the quality of orgasm, and anorgasmia (Degen 1982; Shen and Park 1982). Among women receiving conventional antipsychotic treatment, 50 to 90 percent experience menstrual irregularities (Ghadarian et al. 1982). Women may also experience dyspareunia secondary to vaginal atrophy and dryness. Galactorrhea in both sexes and gynecomastia in males are also known to occur and may be more pronounced in younger patients (Degen 1982; Gupta et al. 2001).

Assessment of Sexual Function

Most people do not spontaneously report sexual dysfunction to their clinicians because of the personal nature of sexual behavior. Clinical trials that rely on spontaneous reporting show very low rates of sexual dysfunction, whereas very high rates are noted when patients are directly questioned. The gender of the patient may also influence spontaneous reporting of sexual dysfunction, because men may report more frequently than women. Although clinicians are often hesitant to address sexual issues (Clayton 2001), patients report being eager and receptive to discuss these issues when their clinician raises them (Wasow 1980). Because of the high prevalence of sexual dysfunction in schizophrenia, its relationship to noncompliance, and peoples' willingness to discuss it, sexual functioning should be appropriately discussed and assessed in both clinical and research settings.

Because no single instrument or method to assess or measure sexual functioning in schizophrenia has been routinely used, interpreting published data and discerning the effects of different antipsychotics on sexual functioning are often difficult. Table 1 lists published studies, relating specifically to sexual function, which have used rating instruments. At least 14 different rating instruments have been used in the 15 published studies. Furthermore,

Table 1. Published studies assessing sexual function in patients with schizophrenia

Instrument/Assessment Method Used	Questions (*n*)	Study
Self-Rating Questionnaire	6 for men 6 for women	Ghadirian et al. 1982
Semi-Structured Interview and Questionnaire	Not listed	Friedman and Harrison 1984
Sexual Evaluation Scales (Analogue Scales)	16 men 14 women	Othmer and Othmer 1987
Sexual Functioning Questionnaire	15 for men only	Burke et al. 1994; Wirshing et al. 2002
Modified Sexual Functioning Questionnaire	22 for men 26 for women	Smith et al. 2002
Schiavi Modified Sexual Function Questionnaire	18 for men only	Aizenberg et al. 1995; Aizenberg et al. 2001
Sexuality Questionnaire	Not listed	Kockott and Pfeiffer 1996
Sexual items from UKU Side Effect Rating Scale	7 for men 8 for women	Hummer et al. 1999; Bobes et al. 2003
Heterosexual Development of Women Sex Attitude Test Sexual Function of Women	12 for women 22 items 10 for women	Raboch 1984
Untitled Semistructured Inventory	23-Item version for men and women	Teusch 1995
Sexual Behavior Questionnaire	11 for men 10 for women	Macdonald et al. 2003
Dickson-Glazer Sexual Functioning Scale	32 for men 40 for women	Kim et al. 2002

questions specific to women have been included on only a few rating scales, and overall few questions covered sexual functioning. A computerized self-report questionnaire has been developed specifically for schizophrenia (Dickson-Glazer Sexual Functioning Inventory of Patients on Antipsychotic Medications [DGSF]; Dickson et al. 2001), but to our knowledge, only one published study using this inventory is available (Kim et al. 2002). This instrument is quite long, with 40 items for women. Although questions remain regarding the validity of self-report measures of sexual function in schizophrenia (McConaghy 1999), this inventory is an advance in the assessment of sexual dysfunction in patients with schizophrenia.

Greater strides in assessing sexual functioning have occurred in the depression literature. Several scales have been used and validated in this patient population. Clayton (2001) describes important criteria to consider when selecting appropriate rating scales for sexual function in patients with depression (table 2), which are likely applicable to patients with schizophrenia as well. Four rating scales that meet the criteria listed are in routine use for depressed patients: the Arizona Sexual Experience Scale (ASEX; Gelenberg et al. 1998; McGahuey et al. 2000), the Changes in Sexual Functioning Questionnaire (CSFQ; Clayton et al. 1995, 1997), the Derogatis Interview for Sexual Functioning (DISF; Derogatis 1997), and the Rush Sexual Inventory (RSI; Zajecka et al. 1997, 2000). The ASEX consists of only five questions, the DISF is well validated but is not designed to measure change over time, and the RSI has not been validated and uses mostly yes-or-no questions. Therefore, the CSFQ may be the most appropriate scale to use with schizophrenia patients. In fact, we have reported that even patients with treatment-resistant schizophrenia can be questioned using this scale (Kelly et al. 2003).

Table 2. Criteria for instruments assessing sexual function in psychiatric patients

1.	Gender specific
2.	Address phase-specific function
3.	Brief
4.	Perceived as nonintrusive by the patient
5.	Have the ability to separate illness from medication effects
6.	Monitor changes over time
7.	Assess premorbid and lifelong function compared with current state of functioning

Note.—Adapted from Clayton 2001.

Second-Generation Antipsychotics

Other than case reports, only a handful of articles discuss sexual functioning with the use of second-generation antipsychotics. Most clinical trials do not systematically rate sexual function. They rely instead on spontaneous reporting of sexual side effects using COSTART terminology, which can underestimate the number of true occurrences (Tran 1997). One recent study (Bobes 2003) comparing risperidone, olanzapine, quetiapine, and haloperidol is the largest study to date to measure sexual dysfunction and reproductive side effects. This study reported rates of sexual dysfunction between 35 and 43 percent for risperidone, olanzapine, and haloperidol. Rates of sexual dysfunction on quetiapine were 18 percent. Also, reproductive side effects were similar for haloperidol and olanzapine (6%–7%), lower for quetiapine (3%), and higher for risperidone (12%; Bobes et al. 2003). A summary of the literature pertaining to sexual function associated with SGAs follows. Each paragraph lists the prolactin-elevating potential of each SGA; current literature, including studies and case reports focusing on sexual function; and the risk for sexual dysfunction as noted in the prescribing information for the medications.

Clozapine. Clozapine has a low propensity to block dopamine in the tuberoinfundibular pathway and has a negligible effect on plasma prolactin levels (Turrone et al. 2002). Sexual function during clozapine treatment has been comparatively better than during treatment with conventional antipsychotics. One study involving 100 patients with schizophrenia found less sexual dysfunction with clozapine treatment than with conventional antipsychotics (Peacock et al. 1994). A more recent study reported better orgasmic function, enjoyment, and satisfaction with clozapine compared with traditional antipsychotics (Aizenberg et al. 2001). Another study found similar rates of sexual side effects in clozapine- and haloperidol-treated patients but noted that high plasma clozapine levels correlated with sexual dysfunction during clozapine treatment (Hummer et al. 1999). A recent retrospective chart review reported a significantly lower proportion of sexual dysfunction with clozapine compared with haloperidol and risperidone (Mullen et al. 2001). This relatively low incidence of sexual problems may be due to its prolactin-sparing effects. Case reports of priapism and impotence with clozapine have been reported and are likely related to alpha-adrenergic and muscarinic blockade rather than being related to hyperprolactinemia (Compton and Miller 2001). The prescribing instructions state that 1 percent of patients may experience abnormal ejaculation (Novartis Pharmaceuticals 2002). To our

knowledge no case reports in the adult literature describe amenorrhea, galactorrhea, or gynecomastia occurring during clozapine treatment, and these adverse effects are not listed as adverse effects in the prescribing information for clozapine (Novartis Pharmaceuticals 2002).

Risperidone. Of all the SGAs, risperidone has the highest propensity to elevate plasma prolactin levels (Kleinberg et al. 1999). Mean prolactin levels at doses of 3 mg are about 27 ng/mL, significantly higher than those of olanzapine or clozapine (Turrone et al. 2002). Although no studies measuring sexual dysfunction with risperidone or the drug's relationship to rating instruments using prolactin have yet been published, data on prolactin levels and sexual side effects were evaluated from the pivotal trials for risperidone. The incidence of adverse sexual events in men was correlated with risperidone dose, but this effect was not observed in women. The incidence of sexual dysfunction at doses of less than 6 mg/day was not significantly different than placebo (Kleinberg et al. 1999). In a fairly large trial evaluating quality of life with risperidone treatment, approximately 4 percent of patients spontaneously reported sexual disturbances and 2 percent of women experienced amenorrhea (Bobes et al. 1999). Studies that actively question patients have produced higher rates of sexual dysfunction; menstrual changes were reported in 24 percent of patients treated with risperidone compared with 20 percent for olanzapine (Conley and Mahmoud 2001). A recent retrospective chart review reported a significantly higher proportion of sexual dysfunction with risperidone compared with haloperidol and clozapine (Mullen et al. 2001), and other studies have found higher rates of both sexual dysfunction and reproductive side effects with risperidone compared with olanzapine, quetiapine, and haloperidol (Bobes et al. 2003). In addition, several case reports describe sexual dysfunction during risperidone treatment. In male patients, the reports describe gynecomastia (Shiwach and Carmody 1998; Benazzi 1999; Mabini et al. 2000), galactorrhea (Mabini et al. 2000), ejaculatory difficulties (Shiwach and Carmody 1998; Raja 1999; Kaneda 2001), and priapism (Emes and Millson 1994; Nicholson and McCurley 1997) occurring with risperidone treatment. The most commonly reported adverse effect for women is menstrual irregularity, occurring at doses as low as 1 mg/day. Amenorrhea and galactorrhea have also been reported with fairly low doses of risperidone (Dickson et al. 1995; Kim et al. 1999). The prescribing information states that in premarketing trials menorrhagia, orgasmic dysfunction, and vaginal dryness occurred at a rate of 0.1 percent, and amenorrhea, gynecomastia, galactorrhea occurred in < 0.1 percent of patients (Janssen Pharmaceutica 2000). As evident in the above reports, the actual incidence of sexual dysfunction was underestimated in the pivotal trials.

Olanzapine. Olanzapine causes transient elevations in plasma prolactin levels. During treatment in adults, prolactin levels remain slightly elevated in about one-third of patients (Tran 1997). Prolactin elevation appears to be a dose-related phenomenon (Crawford et al. 1997). Mean prolactin levels during treatment with 10 to 30 mg/day of olanzapine are approximately 17 ng/mL, which is higher than that of normal, drug-free patients and clozapine-treated patients (Markianos et al. 2001). This same study found prolactin levels in patients treated with haloperidol to be about twice those of patients treated with olanzapine. At least seven case reports discussed cases of priapism occurring with olanzapine, which may be due to the alpha adrenergic and muscarinic blockade of this medication (Compton and Miller 2001). The prescribing information suggests that the incidence of priapism may be 0.1 percent, but this may be underreported (Eli Lilly and Company 2001). Muscarinic blockade is possibly dose related (Richelson and Souder 2000), and one case of priapism has occurred during olanzapine overdose (Matthews and Dimsdale 2001). Therefore, very high doses may be associated with a greater risk of priapism. Impotence associated with haloperidol use has been improved by switching to olanzapine treatment (Tsai and Hong 2000), and switching from risperidone to olanzapine has improved libido and menstruation (Gazzola and Opler 1998; Dickson and Glazer 1999; Kim et al. 2002). Comparative data from one large clinical trial using routine doses of olanzapine and risperidone, however, found rates of sexual dysfunction to be approximately 30 percent in males in both medication groups (Conley and Mahmoud 2001). And in a recent large comparative study with risperidone, quetiapine, and haloperidol (n = 636), olanzapine was associated with sexual dysfunction and reproductive side effects in 35 percent and 6 percent of the subjects, respectively (Bobes et al. 2003).

Quetiapine. Quetiapine has negligible effects on the elevation of prolactin. In all of the large trials of quetiapine, prolactin levels were reported to decrease from baseline to endpoint during quetiapine treatment and no differences were noted between quetiapine and placebo (Borison et al.1996; Arvanitis and Miller 1997; Small et al. 1997; King et al. 1998). In more than 2,000 patients treated with quetiapine, menstrual changes occurred in less than 1 percent of patients treated (Goldstein and Cantillon 1997). No cases of sexual dysfunction have appeared in the literature to date. One case of priapism occurring with a quetiapine overdose has been reported and was postulated to be secondary to alpha 1 antagonism (Pais and Ayvazian

2001). Impotence, abnormal ejaculation, and amenorrhea were reported in pivotal trials to occur in less than 0.1 percent of patients (AstraZeneca Pharmaceuticals 2001). In a recent comparative trial, quetiapine had the lowest risk of sexual dysfunction (18%) compared with risperidone, olanzapine, and haloperidol (35%–43%). Of these medications, quetiapine may also have the lowest propensity for reproductive side effects (< 3%) (Bobes et al. 2003).

Ziprasidone. Little information about either plasma prolactin levels or sexual functioning with ziprasidone is available, although slight elevations in prolactin levels may occur. In a double-blind study, prolactin levels at the end of 52 weeks were approximately 19 ng/mL and 60 ng/mL for ziprasidone and risperidone treatment, respectively (Ananth et al. 1998). In premarketing trials, impotence, abnormal ejaculation, amenorrhea, galactorrhea, and anorgasmia occurred infrequently (< 0.1%), and one case of priapism was reported (Pfizer 2001). A few case reports of priapism have also been reported (Reeves and Mack 2002; Reeves and Kimble 2003).

Aripiprazole. Serum prolactin levels during treatment trials with aripiprazole have been found to decrease from baseline across all dose ranges. Levels decreased by about 7 ng/mL during a 4-week trial (Kane et al. 2002) and were similar to placebo (< 15 ng/ml). This decrease is fairly consistent across trials (Casey et al. 2003). The lack of increased prolactin levels may be explained by aripiprazole's partial agonism of D2 dopamine receptors, in contrast to the D2 antagonism of other second-generation agents. Sexual dysfunction was infrequently reported in clinical trials (Bristol-Meyers Squibb Company 2002). More studies are needed to specifically address the issue of sexual side effects with aripiprazole.

Treatment of Sexual Dysfunction

Relationship counseling and addressing patient-specific concerns should be incorporated into the treatment plan of people with schizophrenia, and attempts to manage and assess sexual problems should be undertaken. The clinician should remember that not all sexual disturbances are related to antipsychotic medications. First, concomitant treatment, such as anticholinergic and antidepressant medications, may contribute to or cause sexual dysfunction. Second, concomitant disease states may also contribute to disturbances in sexual domains. Diabetes is one example in which libido, arousal, and enjoyment are known to be lower than in normal controls (Schiavi et al. 1995). Clozapine and olanzapine can cause significant weight gain and glucose dysregulation, therefore, clinicians should consider the possibility of new-onset type II diabetes in patients treated with these medications who develop sexual problems. Third, because sexual side effects are somewhat dose dependent, lowering the dose of an antipsychotic may be beneficial. Another option is to change the antipsychotic medication being used. Because rates of sexual dysfunction may be lower with SGAs than with traditional antipsychotics, SGAs should be considered in patients having sexual difficulties on traditional antipsychotics. In addition, SGAs may be very different in their propensity to cause sexual dysfunction, and each may cause different sexual problems in a particular individual.

Any pharmacological intervention added to help with sexual disturbances must be made within the context of the overall clinical picture. Conservative actions should be taken first, especially for patients who have been difficult to stabilize on antipsychotic medications and may be likely to have side effects or exacerbation of symptoms (Sullivan and Lukoff 1990). Furthermore, little data support adjunct treatment for sexual dysfunction associated with antipsychotics. In the past, some pharmacological interventions have successfully increased sexual functioning, but many have untoward side effects of their own. Bromocriptine at doses of 2.5 mg bid to tid has improved libido in patients with hyperprolactinemia (Cohn et al. 1985). However, this medication has many side effects such as nausea, hypotension, and exacerbation of symptoms and is not recommended. Bethanechol, a cholinergic agent, may improve impaired erectile functioning at doses of 10 to 20 mg tid (Pollack and Rosenbaum 1987) and cyproheptadine in doses of 4 mg qid has been used successfully in treating antidepressant-induced anorgasmia (Sovner 1984). Yohimbine and amantadine have also been used to treat impotence and anorgasmia (Reid et al. 1987; Balogh et al. 1992). Most of these reports predate the SGAs; more recent strategies have involved sildenafil or cabergoline. Two case reports regarding the efficacy of sildenafil in schizophrenia-spectrum patients indicate a positive effect on libido and erectile function (Benatov et al. 1999; Lare and Labate 2000). Several other case reports and open-label trials note improvements in libido, arousal, orgasm, and sexual satisfaction in both men and women with antidepressant-induced sexual dysfunction (Fava et al. 1998; Ashton and Bennett 1999; Nurnberg 1999*a*, 1999*b*). Cabergoline was also found effective without a worsening of psychosis in a few case reports (Tollin 2000; Cohen and Biederman 2001). A comparative study in hyperprolactinemic patients (Sabuncu et al. 2001) found that cabergoline led to a greater reduction of prolactin levels than bromocriptine while also being better tolerated (cabergoline had a 12% rate of side effects versus 53% for bromocriptine). Doses used are generally 1

mg/week. In addition, shakuyaku-kanzo-to, an herbal product, has also been reported as beneficial for the treatment of risperidone-induced amenorrhea (Yamada et al. 1999). Another report also found this commonly used Japanese and Chinese product useful for neuroleptic-induced hyperprolactinemia in males (Yamada et al. 1997).

Some women and men in the general population have benefited from hormone replacement such as dehydroepiandrosterone (DHEA) or testosterone for both androgen insufficiency and sexual dysfunction (Reiter et al. 2001; Munarriz et al. 2002). Some recent reports have found low DHEA and DHEA-S levels in patients with schizophrenia (Reiter et al. 2000; Harris et al. 2001) as well as lower serum levels of estradiol and progesterone in women (Baptista et al. 1999). Little has been published about hormone treatment in patients with schizophrenia; however, in men and women with other disorders, such as epilepsy, testosterone replacement and DHEA, respectively, have been used if sexual dysfunction occurs during treatment (Harden 2002). More research is needed, however, to confirm their efficacy and safety in patients with schizophrenia.

Psychosocial Issues of Sexuality

Second-generation antipsychotics are rapidly replacing traditional antipsychotics for the treatment of schizophrenia because they are less likely to cause adverse effects, offer higher rates of medication compliance, reduce the risk of relapse, and are cost effective (Conley and Kelly 2000). Although not systematically studied, SGAs are probably associated with less sexual dysfunction than traditional antipsychotics. As people change medications and begin to regain libido, sexual function, and fertility, many new treatment issues will arise. During treatment with traditional antipsychotics, female fertility was often impaired. Several cases of patients being switched to SGAs from traditional antipsychotics have resulted in unplanned pregnancies (Dickson and Hoggs 1998; Neumann and Frasch 2001; Tenyi et al. 2002). However, long-term effects of suppressed fertility are not known for patients who have been treated with conventional antipsychotics for many years. Impaired fertility may be a lifelong problem, and clinical care must change to address this issue. The effects of the new antipsychotics on male fertility are largely unknown (Dickson and Edwards 1997), and research is needed in this area. A recent study found that women with schizophrenia not wishing to become pregnant do not commonly use contraception (Miller 1997). Women with schizophrenia also have more abortions and are more often victims of violence during pregnancy than those without mental illness (Miller and Finnerty 1996).

As patients' symptoms improve, libido and the desire to engage in intimate relationships may increase. Schizophrenia patients often have poor judgment and report fairly frequent sexual activity with people known to be injection-drug users. In one study, sexual activity occurred frequently with people known to be infected with human immunodeficiency virus (HIV) and people who were homosexual or bisexual. Fifty percent of the people in this study were reported to be involved in sex-exchange behavior (sex bought or sold for money, drugs, or goods). Condom use was particularly low with less than 10 percent of patients using protective measures (Cournos et al. 1994). Others have reported that the risk for HIV is much higher in this population, and rates of infection have increased substantially in recent years (Gottesman and Groome 1997; Otto-Salaj and Stevenson 2001).

Both men and women have reported that one of the areas with the highest proportion of unmet needs is counseling about intimate relationships (Bengtsson-Tops and Hansson 1999). In addition, studies addressing the needs surrounding sexual issues have concluded that people with schizophrenia are prepared to discuss sexual issues (Lukoff et al. 1986; Buddeberg et al. 1988; McCann 2000). Furthermore, concern about sexual dysfunction may actually exacerbate psychiatric symptoms (Sullivan and Lukoff 1990). Therefore, family planning, education, and contraceptive counseling should be an integral part of a comprehensive treatment plan for patients with schizophrenia.

Conclusion

It is striking how little attention has been paid to the area of sexual functioning and schizophrenia. Convincing evidence exists that patients with schizophrenia are open to discussing sexual issues, and more than 75 percent of those with severe mental illness believe that discussing sexual issues may actually be beneficial for their outcomes (Lewis and Scott 1997). Proper sexual education and counseling must be integrated into the treatment planning of patients with schizophrenia. Given the high rate of sexual dysfunction among patients with schizophrenia and its negative relationship to compliance, it is troubling that more attention has not been paid to its assessment. Although this domain is difficult to measure objectively, researchers need to work at standardizing rating instruments. Researchers should also focus on discerning the effects of different treatments on sexual function. Although the past decade has seen some attempts to better address these issues in schizophrenia, much more attention to this topic is needed to improve treatment and outcomes for those who suffer from this devastating illness.

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