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EDITORIAL

A Biopsychosocial Model of Hypersexual Disorder/Sexual Addiction

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INTRODUCTION

Since 1977, when Dr. George Engel authored, “The Need for A New Medical Model: A Challenge for Biomedicine,” (Engel, 1977) the biopsychosocial model has advanced our understanding of diseases and their treatments. Based on systems theory, the model assumes that each system will affect and be affected by other systems. The biological system stresses the importance of anatomical, structural, genetic and molecular underpinnings of diseases and their effects on individual’s biologic function. The psychological system emphasizes how development, motivation and personality contribute both to disease processes and how individuals live and cope with those illnesses. The social model examines how cultural, familial, environmental and spiritual factors play a role in the development and progression of illness (Campbell & Rohrbaugh, 2006).

Applying the biopsychosocial model to hypersexual disorder and sexual addiction offers several advantages. First, the model establishes a framework that allows for a comprehensive understanding of the individual as opposed to a focus on a particular theory or school of thought. Second, use of the model emphasizes that problematic sexual behaviors deserve the same consideration and treatment as any other disease process. Third, the biopsychosocial model improves patient care by challenging providers to think about comprehensive treatment plans that address multiple domains of illness.

The term hypersexual disorder will be used in this article since it is currently the favored terminology by the American Psychiatric Association (APA). The criteria for this disorder were outlined in a previous article. For the purposes of this article, hypersexual disorder encompasses sexual addiction and compulsive sexual behaviors, and it is this body of literature that will be featured. Due to the relatively small body of literature on this disorder, some information has been extrapolated from the research literature on sexual offending and has been noted in the text.

This article will use the biopsychosocial model as a framework for presenting what is currently known about hypersexual disorder from the scientific literature. The model does not favor one theory or school of thought over another. Nor is it meant to explain the etiological basis of hypersexual disorder (“association does not mean causation”). Instead, the application of this framework is an attempt at organizing evidence-based theories and models into a better understanding of the predisposing, precipitating, perpetuating and protective factors of the disorder.

This article is meant for students, clinicians, patients and educators in that it synthesizes what is currently known and hopefully will guide future research and treatment that continues to be needed. It is not meant to be comprehensive, but rather representative. The focus is on the current scientific evidence obtained through research. It is important to note that simply because current empirical evidence does not exist for an individual theory, this does not preclude the possibility or importance of that theory. However, it is equally important to continue critically challenging our thoughts and assumptions about hypersexual disorder by ensuring high standards of scientific inquiry and rigor.

Biological Determinants

Biological factors that contribute to hypersexual disorder include molecular, genetic, physical/organic conditions and substances. Molecular factors include neurotransmitter systems, neuronal pathways, hormones and other substrates that underlie a particular illness. Genetic factors include inheritance often evidenced by family history. Physical conditions include medical illness, neurological disorders, and other disease and non-disease states such as pregnancy. Substances include medications, as well as substances of abuse including prescription, over-the-counter and illicit drugs (Campbell & Rohrbaugh, 2006).

The preponderance of scientific evidence to support models of hypersexual behavior comes from biologic studies. This may be due to the fact that biologic processes lend themselves to empirical studies. While there is a growing concern of biologic reductionism in both understanding and treating sexual disorders, examining biologic determinants is critical to moving clinicians, patients and even politicians towards a disease model of this disorder. A focus on biology does not undermine the other “schools” of thought, but rather helps provide legitimacy. Concepts such as trauma and attachment represent dysregulations in processes and pathways that ultimately have their foundation in neurobiology. Although we are still in the infancy of the understanding of the brain, it is critical that research focuses on understanding the biologic determinants of the thoughts, feelings and behaviors observed. Biological studies can be subdivided into the categories discussed below.

MOLECULAR

There is currently no brain model for hypersexual disorder. Hence, the understanding of the molecular underpinnings have come predominantly from comparison studies of other addictive disorders, individuals with brain damage, neuroimaging, animal studies and response to biological therapies (Berlin, 2008).

The ABC model of impulse control has been hypothesized as a possible model for hypersexual behaviors (Stein, 2008), but has not been validated in a clinical sample. In this model, the **A**mygdala leads to affective dysregulation, **B**ehavioral reward is controlled by the nucleus accumbens and ventral striatal circuits, and **C**ognitive control is impaired in the prefrontal cortex. The comparison to hypersexual disorder is the observed phenomenon of a high rate of affective disorders triggered by stress, preoccupation and reward from engaging in sexual behavior, and continued behavior despite negative consequences.

There are several studies that offer support to this model. Functional MRI scans have demonstrated that men show greater activation in the amygdala activation when shown stimulating materials than do women (Hamman, Herman, & Nolan, 2004). Enhanced dopaminergic neurotransmission (concentrated in the nucleus accumbens) has been associated with sexual excitation (Kafka, 2010). Damage to the orbitofrontal region of the prefrontal cortex has been seen in cases of pedophilia (Burns & Swerdlow, 2003). There is also evidence of prefrontal cortical damage in sexual addicts with a history of sexual trauma (Ullman, 2007).

The "monamine hypothesis" of paraphilias is also applicable to hypersexual disorder (Kafka, 2010). This model, which has been validated with laboratory animal studies, looks at how the monamine transmitters serotonin, norepinephrine, and dopamine interact with sex hormones such as testosterone to modulate sexual appetite and copulatory behavior in mammals. Increases in dopamine and decreases in serotonin lead to increased sexual behavior and decreased inhibition in primates (Kafka, 2010). In humans, the high rate of co-morbid mood disorders such as unipolar and bipolar disorders, anxiety, impulse control disorders and attention deficit hyperactivity disorder (ADHD) which also have their underpinnings in dysregulation of the monamine systems may demonstrate a connection between abnormalities in neurotransmission and hypersexual disorder (Kafka, 2010). This model is further substantiated by the demonstrated efficacy of serotonin selective reuptake inhibitors (SSRI's) in decreasing libido (Kafka, 1991).

Positron Emission Tomography (PET) scanning has demonstrated, in a small sample, a connection between sexual arousal and internally produced opiates (Frost, Mayberg, & Berlin, 1986). Further exploration of this connection might help explain the addictive biologic underpinnings of hypersexual

disorder as well as explain why medications such as naltrexone (an opiate antagonist) have efficacy in treating the disorder.

Finally, the hormone testosterone has been implicated in the intensity of sexual expression (Whaelen, 1976) as well as potentially sexual makeup (Rahman, 2005). The exact role of testosterone in hypersexuality is currently not known. However, agents that lower testosterone have been found to be effective in the treatment of intense urges in paraphilias (Bradford & Pawalak, 1993) and hence, may have applicability in hypersexual disorder (Codispoti, 2008).

GENETIC

Family, adoption and twin studies along with more advanced statistical and molecular techniques are the standard for determining heritability of a disorder (Kendler, 2005). Currently, there are no such studies for hypersexual disorder, although it has been postulated that the disease does run in families (Carnes, 1991). There is evidence to suggest that other sexual disorders, such as the paraphilias, do run in families (Gaffney, Lurie, & Berlin, 1984). There is also evidence, from uncontrolled studies, that individuals with hypersexual disorder tend to have family histories with high rates of other addictive behaviors such as substance abuse (Carnes, 1991; Schneider & Schneider, 1996). One researcher has preliminary evidence that polymorphisms in the D4 receptor gene (DRD4) may contribute to sexual drive (Ben Zion et al., 2006), but this finding is non-specific.

PHYSICAL ILLNESS

Hypersexual behavior has been seen in a variety of individuals who have suffered from traumatic brain injury (TBI) (Rao, Handal, & Vaishnavi, 2007). Studies of these individuals' brains have offered clues to localization of regions of the brain that may be responsible for such behaviors. For example, hypersexual behavior has been seen in individuals with thalamic strokes (Spinella, 2004). There are a variety of neurodevelopmental disorders that can lead to increased sexual behaviors such as Bipolar Disorder (APA, 2000), Alzheimer's disease (Dhikav, Anand, & Aggarwal, 2007), Kluver-Bucy syndrome (Stroke), and Kleine-Levin syndrome (Arnulf, Zeitzer, File, Farber, & Mignot, 2005). To date, the pathophysiological understanding of these disorders has not led to better understanding of the anatomical, physiological or neurochemical basis of hypersexual disorder.

SUBSTANCES

It is well known clinically that substances that increase dopaminergic activity (e.g., anti-parkinsonian agents) in the brain often are associated with

increases in sexual behavior (Klos, Bower, Josephs, Matsumoto, & Ahlskog, 2005). Further evidence for a biologic underpinning is the response that individuals suffering from this disorder have to biologic treatments. As mentioned above, serotonin reuptake inhibitors often lower sexual libido (Kafka, 1991). Naltrexone, an opiate antagonist used in alcohol dependence and other addictive disorders, has had some clinical application in reducing compulsive sexual behaviors (Grant & Kim, 2002). It should be noted that none of these treatments are specific to individuals with hypersexual disorder.

Psychological Determinants

Psychological determinants are a bit more complex to outline in terms of classification. This is partially due to the multiple schools of thought (e.g., psychodynamic, cognitive, behavioral, etc.) that have contributed to the understanding of mental conditions. A description of all of the psychological theories is beyond the scope of this article. Several of the leading theories have been published previously in this journal (Giugliano, 2003). Theories that have the most empirical evidence to support them include those outlined below.

THE DUAL CONTROL MODEL AND AFFECTIVE REGULATION

The dual control model was initially formulated by the Kinsey Institute (Bancroft, 1999) and has the most empirical evidence of any psychological theory to support it. While the model postulates a neurobiological component (yet to be fully identified) of sexual excitation and arousal, it has demonstrated in both heterosexual and homosexual populations that negative mood states such as depression and anxiety can be associated with increased promiscuity and masturbation (Bancroft, 1999). Such findings are important in that they have guided development of the proposed DSM-5 criteria to include that the behaviors must derive from a “response to dysphoric states” (Kafka, 2010). This theory also explains why for most people negative affective states lead to a decrease in sexual desire, whereas for the sexual addict a low mood state actually increases sexual excitability (Bancroft & Vukadinovic, 2004).

ATTACHMENT THEORY

Problems with attachment have been postulated as a predisposing factor for problematic sexual behavior. Based on Bowlby’s (Bowlby, 1973) and Ainsworth’s (Ainsworth, Blehar, Eaters, & Wall, 1978) works, it has been hypothesized that avoidant attachment patterns may lead to sexual encounters without emotion or affection (e.g., prostitutes and pornography). Disorganized attachment may lead to paraphilic behaviors (a desire for

intimacy, but intense fear of it), whereas preoccupied attachment may lead to an emotionally needy individual who craves validation from multiple partners.

The literature on attachment and ability to form adult romantic relationships is robust (Gentzler & Kerns, 2004; Hazan & Shaver, 1987; Simpson, 1990). There is growing empirical evidence to support this theory in hypersexual disorder. One study did find that subjects who reported weak parental attachment were more involved in unrestricted sexuality and more drug use than subject who reported stronger parental attachment (Walsh, 1995). Further, a study found that 65% of female juvenile sex offenders demonstrated social isolation and serious signs of inability to relate to others which differed from a control group of non-sexual violent offenders (Fehrenback & Monastersky, 1988). In a small sample of sex addicts, 95% were found to have an insecure attachment style (Leedes, 1999). This finding was later replicated in a larger study (Zapf, Greiner, & Carroll, 2008). Finally, Carnes (1983) found using the Family Adaptability and Cohesion Evaluation Scales (FACES) that 78% of individuals in an inpatient treatment program for sexual addiction reported coming from a "rigid" and "disengaged" family structure. This finding has been reproduced in a small sample of women (Opitz, Tsytsarev, & Froh, 2009) and physicians with sexual boundary violations (Samenow, Yabiku, Ghulyan, & Swiggart, 2010).

TRAUMA

Most individuals who were traumatized in childhood grow up to be healthy, well-functioning adults (Rind & Tromovitch, 1997). However, it is well known that looking at a group of individuals suffering from hypersexual behaviors, a large percentage of those individuals report a history of psychological, physical, emotional and specifically sexual trauma (Schwartz, Mark, & Galperin, 1995). Hence, the role that trauma plays in hypersexual disorder cannot be ignored. To date, however, the relationship between trauma history and hypersexual behavior is predominantly observational, descriptive and theoretical. Concepts such as dissociation, depersonalization, "trauma bonding," love-map and re-enactment, while well described in the psychological literature, have not been well validated in large samples of individuals with hypersexual disorders.

COGNITIVE AND BEHAVIORAL

There is little empirical data to support cognitive and behavioral models of hypersexual disorder. However, the wealth of descriptive literature along with emerging literature on the efficacy of cognitive behavioral treatments makes this model worth mentioning. Carnes (1991) has described the core

beliefs that often lead to the sexual addictive cycle (“I am bad,” “No one will love me,” “My needs will never be met” and “Sex is my most important need.”). From a behavioral perspective, it is thought that sex addiction may follow a similar pattern as other addictions in terms of classical (association) and operant (reward) conditioning (Laws & Marshall, 1990).

Emerging studies have demonstrated limited applicability of CBT to hypersexual disorder. In a study of men enrolled in CBT based group therapy for problematic Internet-enabled sexual behaviors, the therapy was found to improve quality of life, reduce depression, but not significantly impact computer use (Orzack, Voluse, Wolf, & Hennen, 2006). CBT has shown to be an effective modality in reducing sexual offenses in certain groups of sexual offenders (Hanson, Gordon, & Harris, 2002; Losel & Schumucker, 2005) as well as an emerging strategy for Internet addiction (Young, 2007). Behavioral strategies such as relapse prevention techniques, covert sensitization and arousal reconditioning that have demonstrated efficacy in the offender population have also been adapted for hypersexual behavior (Southern, 2008).

Social Determinants

The social formulation identifies social, cultural and spiritual factors that contribute to the development of an illness. Social factors include family and upbringing, education, employment, access to health services, and the legal system. Spiritual and cultural factors expand upon these domains looking at not only religion, but how these factors explain an individual's identity, their environment, their relationship to others, and their relationship to healthcare providers (Campbell & Rohrbaugh, 2006).

To date, there has been relatively little research in this area. Hypothesis such as changes in parenting styles (absent parents leading to more needy children) as well as the early sexualization of children in the media may be contributing to hypersexual behaviors (Schwartz, 2008). However, empirical data supporting these claims are scarce. Social factors such as poverty and unemployment are emerging to be evidence-based risk factors associated with sexual appetite and acting out (Davis, 2009). Similar to psychological determinants, an exhaustive review of all possible sociocultural factors related to hypersexual disorder is beyond the scope of this paper. Hence, the focus will be on the following representative factors.

FUNDAMENTALISM

It has long been theorized that while religion and an enriched spiritual life may serve as a protective factor for psychological problems, religious fundamentalism may predispose the individual to problems (Edger, 2010;

Kwee, Dominguez, & Ferrell, 2007). This phenomenon has been observed extensively in the clergy (Davies, 2003). There has been only one study that examined a group of Hasidic Jews and found more sexual compulsion than in controls (Needell & Markowitz, 2004).

THE INTERNET

The proliferation of the Internet has allowed for an expansion in research on sexual behaviors. Because of its anonymity, accessibility and affordability (Cooper, 1997), individuals with sexual problems who may not have come to clinical attention are emerging. Theories on how the Internet contributes to hypersexual behaviors range from speculation (early exposure to sexual materials desensitizing children) to empirically validated. Although many children do receive unwanted exposure to sexually explicit materials and solicitations, most of these children do not develop sexual problems (Mitchell, Finkelhor, & Wolak, 2003). This trend is similar in adults, a large percentage of whom engage in online sexual behaviors yet only a small subgroup demonstrates problematic behaviors (Cooper, 2000). It is possible that the Internet fuels problems in those individuals who have predisposing risk factors (Southern, 2008), although there are some individuals for whom it presents as a primary problem.

Internet addiction, which may be related or unrelated to sex addiction, may share some features with hypersexual disorder such as similar personality characteristics (e.g., shyness/isolation) and cognitive distortions (Chack & Leung, 2004; Schwartz & Southern, 2000). In a study that specifically screened for online behaviors in individuals who scored high on the Kalichman Sexual Compulsive Scale (SCS), women and gay men were at higher risk than married men (Cooper, 2000). This finding is thought to be due to sociocultural disenfranchisement of these populations (see below).

HOMOPHOBIA

Hypersexual behaviors in lesbian, gay, bisexual and transgendered (LGBT) populations has a growing body of evidence. Studies have shown that higher levels of sexual compulsivity are associated with a greater number of sexual partners; unprotected anal intercourse; unprotected oral intercourse; history of sexually transmitted diseases; and providing money, drugs, or a place to stay in exchange for sex (Benotsch, Kalichman, & Kelly, 1999). These findings have been replicated. In a population of gay male escorts, sexual compulsivity was associated with higher frequency of engaging in HIV sexual risk behaviors. Lower self-confidence and higher sexual sensation seeking were found to be associated with sexual compulsivity, accounting for 36% of the total variance (Parsons, Bimbi, & Halkitis, 2001). Loneliness has also

been found to be an associated factor (Torres & Gore-Felton, 2007), although this may not be specific to LGBT populations (Yoder, Virden III, & Amin, 2005).

It has been theorized that cultural factors such as homophobia place gay men at greater risk for hypersexual behavior. This theory has been explored in a sample of 513 gay men, among whom data analysis indicated that higher levels of internalized homophobia were associated with greater frequency of sexual compulsivity (Dew & Chaney, 2005). Literature on lesbian and transgendered populations is sparse.

SEXISM

There is a growing body of literature that females with hypersexual disorder differ from men. It has been thought that whereas men generally objectify sex, women more often seek relationships and security (Turner, 2008). This difference has been explained by the theory that women internalize oppression from a predominantly male driven society and that the conscious and unconscious marginalization leads to more passive forms of sexual control (Kasl, 1989). There have been virtually no empirical studies that examine women sex addicts. There is limited research on female sex offenders. The lack of research in this area most likely stems from the relatively low numbers of females who come to clinical attention and perhaps a gender bias in the research studies.

Conclusion

This application of the biopsychosocial formulation to hypersexual disorder is not exhaustive. Because of the debate on the name of the disorder, a systematic literature search is virtually impossible. Due to the infancy of the field and lack of resources and investigators studying hypersexual behaviors, large meta-analyses that combine studies with small samples or exclude those with methodological limitations are not possible.

The goal of this article is to lay the foundation for shifting how clinicians, educators and patients approach hypersexual behavior. Too often, educational seminars and the media are riddled with one-sided perspectives that are not supported by the research literature. Rather than emphasizing one school of thought (e.g., "Most sexual addicts have been traumatized and have shame"), the biopsychosocial model challenges us to think about this disorder in a comprehensive and evidenced-based manner. As future research is conducted and more knowledge is obtained, we can only hope that the gaps in the framework will be filled-in for both a more comprehensive understanding of the disorder and emerging support for the treatments we use to help those afflicted with this problem.

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