

Résumé

Les troubles de stress et l'appartenance sexuelle : les implications en matière de théorie et de recherche

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De nombreuses études épidémiologiques signalent des taux de prévalence plus élevés chez les femmes, comparativement aux hommes, en ce qui a trait aux troubles liés au stress, tels que le trouble de stress aigu, le syndrome de stress post-traumatique et des troubles de dépression graves. Les troubles liés au stress entravent la capacité de travailler et de mener une vie familiale normale et augmentent le risque de suicide. La présence d'une plus grande vulnérabilité chez les femmes est liée à de multiples facteurs. Les différences physiologiques comptent parmi les indices différentiels. La nature et la signification du traumatisme, l'accessibilité des ressources et le recours à des catégories de diagnostic restrictives comptent parmi les facteurs qui augmentent, de façon significative, le risque de problème de santé à la suite de circonstances stressantes ou d'un traumatisme. Il est essentiel de mieux comprendre l'impact individuel de chaque facteur et les interactions inter factorielles pour mieux cerner le développement de troubles liés au stress. L'élaboration d'une théorie exhaustive des facteurs dynamiques-statiques tenant compte des rapports sociaux entre les sexes, qui explore le rôle de facteurs clés identifiés dans les recherches qualitatives et quantitatives, est essentielle. L'auteure discute de la modélisation axée sur l'équation structurelle comme méthode d'évaluation de théories.

Mots clés : stress, stress post-traumatique, dépression, appartenance sexuelle, évaluation

Stress Disorders and Gender: Implications for Theory and Research

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Numerous epidemiological studies report increased prevalence rates for women as compared to men for stress-related disorders such as acute stress disorder, post-traumatic stress disorder, and major depressive disorder. Stress disorders disrupt work and home life and pose a high risk for suicide. Multiple factors contribute to the increased vulnerability in women. Physiological differences account for some of the differential. Other factors that make a significant contribution to the overall risk for health problems in response to stressors or trauma include the nature and meaning of the trauma, accessibility of resources, and restrictive diagnostic categories. Increasing our knowledge of the individual impact of each factor as well as the interactions among the factors is central to understanding the development of stress disorders. Comprehensive sex- and gender-sensitive middle-range theory, which explores the role of key factors identified in qualitative and quantitative research, is required. The authors discuss structural equation modelling as one method of theory testing.

Keywords: stress, posttraumatic stress, depression, gender, review

Women are more vulnerable than men to stress-related disorders. Acute stress disorder (ASD), posttraumatic stress disorder (PTSD), and major depressive disorder (MDD) may be considered stress-related disorders. These disorders have profound consequences. They can lead to long-term health-care demands and can have significant social and financial consequences. It is well recognized in the literature on stress that the incidence of PTSD after a trauma is higher among women than men (Breslau, Davis, Peterson, & Schultz, 1997; Zatrack et al., 2002). The literature on MDD also indicates increased risk for women, with females being three times more likely than males to develop MDD (Maciejewski, Prigerson, & Mazure, 2001). The implications of this risk are significant, particularly as women tend to experience more severe symptoms after a major trauma and to have poorer quality-of-life functional outcomes (Holbrook, Hoyt, Stein, & Sieber, 2001). Women with MDD or an anxiety disorder are at greater risk of suicidal ideation than men, independent of the severity of the disorder (Schaffer et al., 2000). Men tend to have significantly higher rates of completed suicide (SIEC, 1998), but an increased level of suicidal ideation may place women at higher risk for completed attempts.

There is limited understanding as to the factors that contribute to the differential vulnerability of men and women. A number of risk factors have been identified in both qualitative and quantitative research, but these factors have not been compared for their relative contribution by sex and gender.¹ Although a significant amount of research has been conducted on stress disorders, most of the early studies on PTSD involved male combat veterans with chronic PTSD, with the findings being generalized to other populations. Subsequent PTSD studies with other traumatized populations have not, in general, systematically explored gender differences, often due to small sample size or mixed trauma types. Since gender has not been considered in the development of etiological theories, some concepts or mechanisms may be missed or under-identified. The issue of sex and gender and its role in the development of stress disorders is therefore inadequately explored in the theoretical and clinical research literature.

The purposes of this paper are to review the research literature related to sex and gender differences in stress disorders, and to discuss the implications of the existing knowledge for future theory and research related to stress disorders. Key areas to be explored are physiological differences, the nature of the index trauma, resources available to cope with the assault, and diagnostic challenges related to gender.

Physiological Differences

Physiological differences between men and women may account in part for the differential vulnerability to stress disorders. A review of all the sex and gender differences in physiological functioning that have been described in the literature is beyond the scope of this paper. However, a few are particularly noteworthy. These include gender-specific differences in neuroendocrine responses, central noradrenergic and cardiovascular responses to stress, gonadal steroids, and neurological function.

Neuroendocrine Responses

The hypothalamic-pituitary-adrenal (HPA) axis is one of the key systems in stress response. The HPA axis directly controls the release of cortisol, as well as playing a role in the release of epinephrine, norepinephrine, and vasopressin in response to stressors. In rat models, females have been found to have more rapid corticosterone secretion than males in response to stress, as well as increased responsiveness to adrenocorticotropin

¹ We use the phrase "sex and gender" in many cases, to reflect the distinction between the two in current terminology: sex refers to biological differences, while gender refers to social or cultural differences.

hormone (ACTH) (Young & Korszun, 1999), which could be the mechanism responsible for the increased arousal and startle responses seen in humans with PTSD. Individuals with PTSD have been found to have lower cortisol levels in response to dexamethasone challenges, likely as a result of denser and more hyperresponsive glucocorticoid receptors (Yehuda, 1997). These changes in the HPA axis are being seen in women who were sexually assaulted as children (Stein, Yehuda, Koverola, & Hanna, 1997). Childhood assault may therefore sensitize the HPA axis, increasing the intensity of subsequent body responses to stress and appraisal of threat. Girls have been reported to experience sexual abuse at least three times as frequently as boys (MacMillan et al., 1997). This may contribute to the prevalence of stress disorders in women. It is difficult, however, to establish casual links between childhood events and adult physiological changes within the HPA axis in response to subsequent trauma.

Noradrenergic and Cardiovascular Responses

Women's noradrenergic and cardiovascular systems have been found to be more hyperresponsive than men's, particularly under stress. Heart rate is one of the key signs of arousal measured in stress studies. Women have higher baseline heart rates, cardiac indexes, and pulse pressure than men (Nopoulos & Andreason, 1999). In addition, women are more reliant on heart rate to compensate for increased cardiac output demands, while men are more reliant on stroke volume. Estrogen affects women's baroreceptors, causing dilation and therefore increasing heart rate (McFetridge & Sherwood, 2000). The differences in cardiovascular responsiveness make it difficult to compare baseline measures of arousal in stress across genders. This is further complicated by differences in the effects of gonadal steroids.

Gonadal Steroids

Gonadal steroids can exert powerful influences within the central nervous system. They have been associated with alterations in the structure of neural tissue, affecting neurotransmitter and neuropeptide signalling, neuron excitability, and synaptic communication (Altemus & Arleo, 1999). Changes in gonadal hormone levels have been shown to affect mood. Specifically, increases in gonadal hormones have been associated with blunting of anxiety. This is in part due to the action of estrogen and progesterone on GABA_A receptors, which, similar to benzodiazepines, result in increased anaesthetic, hypnotic, and anxiolytic effects (Altemus & Arleo). Thus, fluctuations in gonadal hormones may contribute to differential susceptibility to stress disorders in women, depending on the phase of the menstrual cycle. Estradiol affects the HPA

axis through direct stimulation of the corticotropin-releasing hormone (CRH) gene promoter and the central noradrenergic (norepinephrine) system (Chrousos, Torpy, & Gold, 1998). Progesterone also affects the HPA axis, independently of estrogen (Young, Lopez, Murphy-Weinberg, Watson, & Akil, 2000). Levels of circulating cortisol are regulated by negative feedback control within the HPA axis. Estrogens are thought to affect the negative feedback system, resulting in delayed ACTH and glucocorticoid shut-off (Young et al.). The delay causes a steeper rise in cortisol before shutting off the release of further cortisol. In addition, estradiol is capable of downregulating glucocorticoid (cortisol) activity in the anterior pituitary, hypothalamus, and hippocampus. This can result in decreased effectiveness of the negative feedback system, potentially sustaining the stress response. Estrogen and progesterone both modulate serotonin by upregulating serotonin (5-HT₂) receptors and increase serotonin synthesis, positively affecting mood (Altemus & Arleo).

Conversely, decreases in gonadal hormones may affect stress responses. In the late luteal phase (immediately prior to menstruation) there is a rapid drop in estradiol and progesterone, which leads to reduced secretion of CRH from the hypothalamus and therefore less cortisol. The drop in CRH is also associated with a drop in serotonin. Both of these changes in the late luteal phase might contribute to the woman's decreased ability to cope and to the increased dysphoria and mood disorders seen at this time (Chrousos et al., 1998). Indeed, increased seizure activity, worsening of psychiatric symptoms, and increased rates of psychiatric hospitalization have all been linked to menstrual-phase differences. It is interesting to note that the increased prevalence rates of depression in women emerge around the time of puberty (Chrousos et al.; Nolen-Hoeksma, 1995).

Reciprocally, stress and violence can affect hormone levels, mainly through the effect of stress on the HPA axis. Women who have been victims of violence show lowered estradiol levels across age groups (Allsworth, Zierler, Krieger, & Harlow, 2001). In later years (age 41–45), these women also demonstrate slight increases in follicle-stimulating hormone.

Cardiovascular responses to stress may also be altered through the effects of gonadal hormones. In periods of emotional or physiological stress (e.g., hypovolemia), heart rate, stroke volume, and diastolic blood pressure are known to increase. In a study with women in a stress simulation, McFetridge and Sherwood (2000) found that during the follicular phase of the menstrual cycle, when estrogen and progesterone are lowest, the resting diastolic blood pressure and heart rate were highest. In addition, during this phase the women were more physiologically responsive to stress and its effects. Women in the late luteal phase of their menstrual

cycle demonstrated lower overall blood pressure and were less able to increase their diastolic pressure in response to stress. These findings may reflect differential ability to mount an effective cardiovascular or sympathetic response to stress related to the menstrual cycle.

Neurological Functional Differences

There are many gender differences in neurological function, some of which may affect risk for stress disorders. For instance, neuroimaging studies have demonstrated greater metabolism in the cingulate region of the brain in women compared to men (Nopoulos & Andreason, 1999). The cingulate region is a component of the limbic system, which plays a role in regulating emotions. Increased activation may interfere with higher centres in the brain, perhaps resulting in more basic behavioural patterns during stress, such as autonomic arousal and other defensive behaviours. In support of this mechanism, Nopoulos and Andreason describe limited studies that have shown more grey matter in the prefrontal cerebral cortex and temporal gyrus in women than in men, as well as greater cerebral blood flow. The prefrontal cerebral cortex and central gyrus are involved in episodic memory, critical thinking, speech, and modulation of the limbic system. Neuroimaging studies have shown that when patients with chronic PTSD are in periods of arousal, there is decreased blood flow to the prefrontal cerebral cortex and central gyrus, perhaps accounting for the clinical signs seen in arousal (Pittman, Shin, & Rauch, 2001; Van der Kolk, Burbridge, & Suzuki, 1997). The symptoms of stress disorder have been found to be more severe in women (Foa & Street, 2001), which may be a function of the flow alterations and anatomical differences.

Each of these physiological differences can be seen as contributing to women's greater vulnerability to stress disorders. Large gaps remain in our knowledge regarding the relative contribution of these differences to overall risk. There are few integrative studies that allow researchers to develop biological models of stress disorders. Any such model would be incomplete without the inclusion of psychosocial variables thought to have a profound effect on behavioural responses.

Index Trauma

A US study found that the incidence of exposure to traumatic events was actually higher for men than for women (Breslau, 2002). Despite this finding, women are recognized as developing stress disorders more frequently (Stein, Walker, & Forde, 2000). The nature of the trauma initiating the stress disorder (the index trauma) may help to explain the gender differences in vulnerability to stress disorders. Relevant considerations

include the type of trauma, previous assaults, issues of power and control, the identity of the assailant, and the degree of threat.

Type of Trauma

Men's index trauma is more often combat exposure or having witnessed a trauma (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). In contrast, women are more frequent victims of sexual assault and other types of physical assault (Breslau, Davis, Andreski, Peterson, & Schultz, 1997; Kessler et al.; Maciejewski et al., 2001). Physical assault has been associated with a higher incidence of stress disorders in women than in men (Sorenson, Siegel, Golding, & Stein, 1991). Sexual assault is associated with an even higher incidence of stress disorders, with as many as 50% of female victims developing PTSD (Breslau, 2001). Women have been found to experience more severe and longer-lasting symptoms than men after an assault, particularly a sexual assault (Zoellner, Goodwin, & Foa, 2000). The increased frequency of physical and sexual assault in women may be a key factor in the gender differences.

Prior Assault

A history of prior assault is a consistent risk factor for stress disorder, especially if the prior assault occurred during childhood (Breslau, 2002). Furthermore, prior assault may affect the frequency of victimization. Women with a history of childhood assault have been found to be prone to revictimization and sexually inappropriate behaviours (Coid et al., 2001), especially if *sexually* assaulted in childhood (Field et al., 2001; Zlotnick, Zimmerman, Wolfsdorf, & Mattia, 2001). In contrast, although abused male children may be at risk for revictimization, they are also at increased risk of becoming offenders (Heyman & Slep, 2002; Salter et al., 2003). It has been estimated that 15–38% of women are victims of childhood sexual abuse, 13–20% of women experience adult rape, and at least 20% of women are repetitively assaulted (“battered”) in domestic situations (Butterfield, Panzer, & Forneris, 1999). High rates of abuse and repetitive violence play a role in women's vulnerability to developing stress-related disorders and to having relationships with those who abuse power, which in turn increases their risk of further violence.

Exposure to repetitive violence brings the risk of developing complex PTSD. Complex PTSD differs from classic PTSD in terms of severity and complexity of symptoms, relational difficulties, and degree of dissociation. Complex PTSD is more closely associated with the effects of childhood abuse, repeated interpersonal trauma, or prolonged control such as in a prisoner-of-war situation (Herman, 1992). Even women outside of these extreme situations have been described as experiencing a

form of captivity if they have to limit their activities due to fear or societal expectations, thus increasing their sense of powerlessness on a daily basis (Root, 1996).

Power and Control Issues

Interpersonal violence has been associated with the exertion of power and control by the perpetrator over the victim (Jewkes, 2002; Rosenbaum & Leisring, 2003), often resulting in the victim experiencing helplessness, shame, and low self-esteem. Victims of extreme childhood abuse are at risk for later substance abuse, a high-risk lifestyle, and poverty and homelessness (Morrell-Bellai, Goering, & Boydell, 2000). A social environment that includes poverty, alcohol use, and violence increases a woman's risk of sustaining interpersonal violence (Jewkes). Powerlessness is closely associated with stress disorders resulting from childhood abuse (Coid et al., 2001). Studies focusing on locus of control report consistent gender differentials and highlight the role of power differentials in relation to female victims. Women more often view themselves as having no control over what happens to them, while men more often view themselves as in control (Maes, Delmeire, Mylle, & Altamura, 2001).

It should be pointed out that powerlessness in response to sexual trauma is not unique to women. Although there have been few studies with non-institutionalized victims of male rape, it has been shown that male victims also experience feelings of shame, humiliation, and powerlessness (Hodge & Canter, 1998; Vearnals & Campbell, 2001). Male rape is often intended as a form of control and humiliation, similar to sexual assault of women, and is frequently perpetrated by heterosexual men (Hodge & Canter; King, Coxell, & Mezey, 2000). Unfortunately, very few men report their assault or present for treatment, so it is difficult to compare results. It has been suggested, however, that the effects of sexual assault are not gender-specific and that there are similar mechanisms at work between the genders in victims' self-appraisal of the assault in terms of its significance.

Psychological Significance

The psychological significance of the assault is complicated by the nature of the assailant. Most assaults against women, whether physical or sexual, are committed by a male intimate such as a parent or other relative, husband, or boyfriend (Root, 1996). In contrast, most assaults against men are committed by strangers (Hodge & Canter, 1998). An analysis of psychological symptom measures found that, among women who had been assaulted, sexual distress was more common if the assailant was an inti-

mate, whereas fear and anxiety were more common if the assailant was a stranger (Ullman & Siegel, 1993). These emotions affect arousal and self-appraisal of the significance of the event and therefore affect stress responses (Lazarus, 2000). Furthermore, women who live with the assailant face the risk of repetitive trauma.

Degree of Threat

The degree of threat associated with the assault is another key risk factor in stress disorders. The degree of threat may differ by gender because of the types of traumas experienced and power differential issues. In the United States, “women are more frequently killed by intimates than through all other types of violence combined” (Root, 1996, p. 363). Although similar proportions of men and women experience domestic violence in North America, for women the consequences are more often fatal or life-threatening. Incidents of domestic violence frequently include sexual assault (Hines & Malley-Morrison, 2001) and are often witnessed by children, potentially increasing the woman’s fear and the significance of the trauma for her. The threat to life increases with each subsequent assault (Campbell, 2002; Thompson, Saltzman, & Johnson, 2001). Stress disorders are more strongly associated with threat to life than with the presence or severity of physical injury, particularly in sexual assault situations (Ullman, Karabatsos, & Koss, 1999). Men may also experience threat, but it is reasonable to speculate that the power and size differentials between men and women increase the perceived threat to women.

Because of the limited data available on male victims of domestic violence and sexual assault, it is difficult to compare the effects of the nature of the trauma. The data that are available suggest that there may be common mechanisms and psychological sequelae underlying the development of stress disorders (Hines & Malley-Morrison, 2001). The greater prevalence of both sexual assault and poverty in women, however, may explain women’s greater vulnerability. Gender-specific differences in the resources available for coping with the effects of an assault must be considered as well.

Coping Resources

There may be gender differences in the resources available to deal with the sequelae of an assault. Specifically, differences have been noted in coping mechanisms, symptoms, the use of ineffective coping strategies such as avoidance or substance abuse, education and socio-economic status, and level of partner and social support.

Coping Mechanisms

Society still often expects women to be the primary caregiver and homemaker, even if they are working outside the home. This expectation may affect their coping resources, including the energy, time, and strategies they use to meet their own needs as well as their ability to reach out to other women. Marital status can affect coping resources in different ways. Although married women may have a wider support system than single women, they often have to support their spouse's coping efforts after a sexual assault (Ruch & Leon, 1983). Coping strategies may be influenced by the woman's history. In addition to the risk of later revictimization, childhood sexual assault has been associated with altered coping resources (Coid et al., 2001; Field et al., 2001; Van der Kolk et al., 1997).

Symptom Responses to Stress

Women and men have been found to differ in the frequency and severity of symptoms following a stressor. Fullerton et al. (2001) found that after a motor-vehicle collision women were almost five times likelier than men to have avoidance and numbing symptoms, especially avoidance of thoughts and situations, to lose interest in significant activities, and to have a sense of foreshortened future; they were almost four times likelier to have significant arousal symptoms, including difficulty sleeping, difficulty concentrating, and an exaggerated startle response. The presence of peritraumatic dissociation, either at the time of the trauma or in the emergency department, has been linked to a significantly higher incidence of PTSD (Fullerton et al.). The link between PTSD and dissociation is stronger for women than for men even when the incidence of dissociation is similar (Griffin, Resick, & Mechanic, 1997; Shalev et al., 1998).

Education and Socio-economic Status

Education level and socio-economic status have been associated with risk for violence and stress disorders (Brewin, Andrews, & Valentien, 2000). Historically, education levels and pay scales are lower for women than for men. Both education level and income can affect knowledge, understanding, coping resources, resiliency, and ultimately the socio-economic resources available to deal with the effects of trauma. The lower one's status, the greater one's risk (which is exacerbated by both gender and race) of being objectified or rendered invisible (Root, 1996) — that is, the risk of being open to abuse without the perpetrator feeling remorse. Women have lower status than men in many countries, with male dominance even being dictated in some cultures. Marital conflict regarding

role expectations can lead to fear, frustration, and potential violence in any culture. This risk of violence can be heightened in immigrant families as they adjust to new role expectations and experience psychosocial stressors in the absence of their usual support systems (Ritsner, Ponizovsky, Nechamkin, & Modai, 2001). Although there have been improvements over time, in 1995 women in Canada still earned barely half the net salary of men (Government of Canada, 1996). Their lower salary places more women than men below the poverty line, increases their risk of violence, and decreases the coping resources available to them.

Family and Social Support

The response of a partner to an assault can affect risk for stress disorders. When a woman is sexually assaulted, her partner may view the event as sex rather than as an assault (Burgess & Hazelwood, 2001). The distinction is critical. If her partner views it as sex, he may see the woman as “damaged goods” or as having encouraged the assailant. Higher levels of non-support have been found among partners of women who were sexually assaulted than among partners of women who were victims of other traumas (Davis, Taylor, & Bench, 1995). Even if the partner views the trauma as an assault, his response may be to seek revenge on the assailant rather than help the woman deal with her acute response to the event.

Once an assault has occurred, social networks can help reduce the risk of stress disorders (Brewin et al., 2000). Social networks influence the victim’s appraisal of the situation, such as whether or not he or she views it as overwhelming. Informal social support systems may have an even more positive influence on stress than professional help (Ullman, 1996). Men have been found to rely on their partner, while women tend to reach out to a network of friends. One small study of coping differences, however, found that these may be the product of subjects’ recall based on social stereotypes rather than true differences in coping mechanisms (Porter, Marco, Schwartz, & Neale, 2000). The nature of assaults commonly experienced by women, in any case, would tend to isolate them from their social networks, and such isolation would likely cause more stress for a woman than for a man (Maciejewski et al., 2001). A woman’s familiarity with her assailant, in domestic violence and many other sexual assault situations, may contribute to her reaction of shame, perhaps causing her to further avoid her social networks. Such avoidance combined with the aggressor’s attempts to isolate and control her would serve to effectively remove the woman from her social networks.

Women are often reluctant to disclose sexual assault of any type. Even in some North American cultures and societies, sexual assault is still viewed as the woman’s fault, particularly if she had been drinking

alcohol, using other recreational substances, or engaging in other risky behaviours prior to the incident. Each of these factors may affect how friends, police officers, and health-care professionals treat a woman at the time of disclosure (Popiel & Susskind, 1985). A woman's reluctance to report the incident due to concerns about social stigma may serve to further isolate her from support networks. Male victims of sexual abuse and assault are similarly reluctant to report the incident and have very limited access to social agencies or resources. Again, however, cross-gender comparison is hindered by the lack of data on the effects of resources. With either gender, failure to disclose may result in the use of ineffective coping mechanisms such as avoidance or substance abuse.

Ineffective Coping Mechanisms

Avoidance and delays in dealing with the assault are associated with increased risk of stress disorder (Dunmore, Clark, & Ehlers, 2001). Similarly, the use of alcohol and other substances may be increased as a means of coping, despite its ineffectiveness (Moncrieff & Farmer, 1998). There have been widespread warnings about the risk of "date rape" drugs such as flunitrazepam (Rohypnol) and gammahydroxybutyrate (GHB), yet these drugs are used infrequently (Ullman et al., 1999). Instead, it is alcohol which is the "date rape" drug. Alcohol is used by either the victim or the assailant in 30–70% of sexual assaults (Abbey, Zawacki, Buck, Clinton, & McAuslan, 2001). Alcohol use increases the risk of revictimization. It has been estimated that almost 100% of women with substance-abuse problems are victims of physical or sexual assault (Butterfield et al., 1999).

The effect of alcohol on coping among women who have been physically assaulted is unknown. In victims of motor-vehicle collisions, alcohol use has been found to have a protective effect against PTSD (Maes et al., 2001). It could be argued that alcohol use prior to a sexual or physical assault could have the opposite effect for women, due to social norms concerning women and the concepts of shame and blame. Shame has been associated with an increased risk of PTSD, such as numbing and dissociation, among combat veterans. Female victims are often blamed for the assault by members of their social circle, particularly if they consumed alcohol prior to the incident. This shame response could contribute to the risk for PTSD in a manner similar to that found among veterans (Mason et al., 2001).

Each of these physiological, trauma-related, and resource differences may contribute to the differential vulnerability of women to stress-related disorders. Another possible contribution to the vulnerability differential is the challenge posed by the tools used to identify stress disorders.

Diagnostic Challenges Related to Gender

There are concerns regarding the validity of the diagnostic categories as distinct entities, potential for gender bias, and risk of sampling bias with the use of the *Diagnostic Services Manual, 4th Edition* (DSM-IV), in which ASD, PTSD, and MDD are defined. The diagnostic criteria are designed to represent mutually exclusive concepts. If concepts are not unique and gender neutral, sample error and bias could result. This would, in turn, affect the variability of prevalence rates between men and women (Hartung & Widiger, 1998). Hartung and Widiger also point out that the use of diagnostic concepts can serve to distort the prevalence of a disorder in one sex or another, especially if symptoms are derived mainly from one gender. There is a risk that the use of different criteria for men and women will lead to artificial differences in prevalence and under- or over-diagnosing between groups. It could also limit comparison. Hartung and Widiger advocate for either improved, uniform gender-neutral criteria or gender-specific criteria that incorporate a measure of the level of dysfunction to allow comparison between genders.

There is potential for overlap in the diagnostic criteria and in the concepts underlying the stress disorders. This may partially explain the comorbidity of stress disorders (Brunello et al., 2001). Comorbidity may also indicate a lack of clarity of concepts underlying these diagnoses. Women are more likely to have PTSD if they have pre-existing depression, but this is not true for men after controlling for type of trauma (Breslau et al., 1997). It is unclear if PTSD and depression are distinct, comorbid entities with overlapping symptoms or if there is a progression from one disorder to the other.

Another source of sampling bias is differential reporting of assaults. If women are underreporting assaults due to shame or fear, the gender difference in prevalence of stress disorders could be even greater. On the other hand, men are known to underreport. Furthermore, much of the research has involved women who present for examination or treatment. The differences between these women and those who do not report are relatively unknown. A survey of women in the community found that those who reported had more severe injuries or experienced greater threat (Thompson et al., 2001). It cannot be assumed, however, that stress disorders are not an issue for those who fail to report.

Clearly, the diagnostic criteria need to be further examined in terms of each gender as well as their interrelationships. One possibility would be to identify and validate distinct concepts underlying stress disorders, rather than collective scales or groups of symptoms. For instance, avoidance can be seen in ASD, PTSD, and MDD. Understanding the nuances

of avoidance and its parameters may allow us to determine whether different mechanisms or concepts apply for men and women.

Implications for Theory and Research

We currently lack a comprehensive theory to explain the development of stress disorders, to increase our understanding of these disorders, and to direct our prevention and intervention efforts. While many sex and gender differences are discussed in the literature, their relative contribution to the development of stress-related disorders in general is unknown. Also unknown are the reasons why some people develop PTSD, others develop depression, while still others develop combined disorders. Middle-range theories allow for examination of a specific phenomenon as well as for a closer linking of theory, research, and practice (Lenz, Suppe, Gift, Pugh, & Milligan, 1995). This level of theory could potentially allow us to more effectively explain, prevent, assess, predict, and treat stress disorders.

Theory Development

Middle-range theory requires clear identification of core concepts and linkages between concepts and measurable indicators (King, 1988). Most of the research on stress disorders and risk factors has used a DSM-IV diagnosis as the dependent variable. The underlying core concepts of these disorders have not been examined for their causal influences and relationships. Examples include avoidance, dissociation, and re-experiencing. A theory that examines these relationships could facilitate the development of strategies to attenuate the risk of developing stress disorders, as well as clarify whether comorbidity reflects parallel processes or a melding of concepts.

We propose a new, unifying model of stress development, one that combines the three major perspectives on stress: biological, environmental, and psychological (Cohen, Kessler, & Gordon, 1997). In this model the nature of the event, including past history and vulnerability issues, influence the psychological processing of the threat and the perceived significance of the event. The person then appraises the adequacy and availability of coping resources relative to the event. A negative appraisal is followed by a stress response that may be both physical and behavioural. There are many occasions when a woman will view an assault as highly threatening and significant and view her coping resources as inadequate. Severe, sustained, or repetitive stress has been shown to initiate a series of physiological responses that may affect behavioural responses and subsequent vulnerability to stress disorders. In addition, there are a number of physiological differences in the female and male stress

response, so that women may be predisposed to stress disorders. A model such as that proposed could form the basis for middle-range theory.

In developing a theory for stress disorders, one must consider whether or not it should be gender-specific. Im and Meleis (2001) suggest the need for “gender sensitive” theory in order to better represent the perspective of women. They describe gender-sensitive theory as based on principles of gender equity, affirmation of women as individuals, and the right of women to have control over their own bodies. In speaking of sensitivity, however, they refer only to women. Confining research and theories to one gender may contribute to inaccurate description of the disorder, provide limited definitions, and give disproportionate weight to how the disorder is expressed in that gender (Hartung & Widiger, 1998). Furthermore, it could result in gender stereotypes becoming even more imbedded and impair objectivity in diagnosis and measurement.

It is possible that understanding gender inequality will provide the key to understanding stress disorders. For example, it is often assumed that lack of power and control in interpersonal assault of any type is limited to females. Men who have been sexually assaulted, suffered childhood abuse, witnessed significant trauma and been unable to help, or been in combat can also have power and control issues. Male sexual assault is associated with humiliation and exertion of power (King et al., 2000). It may be that male and female sexual assault victims are at similar risk for stress disorders, in which case the assault or its effects, rather than gender, would explain the different prevalence rates. If research or theory is limited to one gender or the other, these core issues will not be identified.

In view of the potentially crucial role of sex and gender, it is imperative that gender sensitivity be extended to reflect the voice of both genders in theory development related to stress disorders. In order to achieve this broader form of sensitivity in a meaningful fashion, however, it will be necessary to describe and test the theory in one gender for the physiological, environmental, and psychological aspects that are thought to differ. Data and concepts gathered from multiple research studies, using qualitative and quantitative methods, would have to be incorporated into the model. Furthermore, the use of diagnostic labels would be secondary to investigating the relationships among underlying concepts. The exploration of gender sensitivity would have to be extended to the research methods and instruments used in testing the theory.

Research Methods

Theory testing is often the first step after theory development. One way to integrate theory development and testing is structural equation modelling (SEM) (Hayduk, 1987). SEM allows for exploration of causal rela-

tionships among core concepts in a theory. A putative theory in SEM is constructed from knowledge of relevant qualitative and quantitative research as well as experiential knowledge. Data are then collected to reflect the concepts in the model. Next, the fit between the model and the population is analyzed. SEM analysis allows for testing of hypothesized causal relationships among concepts. In methods such as SEM, homogeneous samples are an essential component of theory-testing strategies and causal inference (Hayduk & Avakame, 1993). Groups with similar index traumas would have to be used for analysis initially, to allow for this homogeneity.

It should be noted that the theory-testing instruments would have to be sufficiently gender sensitive to identify gender differences and reflect core concepts for both genders. Hartung and Widiger (1998) recommend validity testing to ensure that the instruments are capable of identifying disorders in both genders. They also suggest the use of item response theory analysis to identify gender biases. The researcher would have to ensure that the instrument reflects only the concept being examined — not the aggregates of concepts — in order to avoid confusion and overlap between concepts.

Once the theory is tested in one type of trauma and with one gender, it would have to be tested across other types of trauma to test its utility. Then it could be tested with the opposite gender across different types of trauma. When testing the theory for each gender separately using SEM, it is possible that some relationships will be supported for one gender and not the other or that common relationships will be found across genders. A comprehensive theory could then be developed, one that includes common core concepts and relationships. Development and testing of separate theories would facilitate comparison of prevalence, risk factors, and efficacy of treatment, as well as subjects' perspectives.

Conclusion

Women's high risk for stress disorders may be the result of many physiological, environmental, and psychological gender differences. Alternatively, it may be a function of the increased prevalence of physical and sexual assault among women, or a function of the feelings of powerlessness, shame, self-esteem, or vulnerability associated with physical and sexual assault. The available research has been limited in its ability to allow for causal inference, and has used diagnostic aggregate labels rather than underlying concepts relevant to stress disorders.

Stress disorders have a significant impact in terms of health consequences, health-care costs, and strain on the health-care system. It is imperative that we understand causation in this process, in order to

develop targeted strategies to reduce the risk of developing stress disorders. It is recommended that sexually assaulted women be studied first, because of the high incidence of and risk for stress disorders in this group. Prospective studies with female sexual assault victims without a prior history of sexual trauma would be particularly useful because of the ability to control for the difficulties inherent in attempting to retrospectively understand the contribution of childhood trauma over time. Development of a theory specifically addressing this vulnerable population might allow us to identify a wider array of core concepts and relationships. This limited theory may then provide a basis for theory testing across other types of trauma by age and by sex and gender. Until such testing is conducted, we will not be able to effectively compare the contribution of gender-specific differences (functional and physiological) with that of trauma-specific differences. In this manner, middle-range theory will emerge, which will reflect the complex relationships among concepts and be sufficiently broad to test in other populations.

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