Gender Differences in Panic Disorder

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According to National Comorbidity Survey data, panic disorder is 2.5 times more prevalent in women than in men. Do physiological changes for women during the perimenstrual and perimenopausal phase play a role in this disorder?

According to the DSM-IV, panic disorder is classified as an anxiety disorder consisting of repeated and unexpected panic attacks. Panic attacks are defined as discrete events characterized by the sudden onset of cardiorespiratory symptoms and physiological arousal, accompanied by catastrophic fears and the urge to flee. Typically, these symptoms include shortness of breath, tachycardia, nausea, sweating, and fears that the individual is losing control or going crazy. Such spontaneous panic attacks typically reach an apex of intensity within 10 minutes.

Data from large scale epidemiological surveys suggest that panic disorder is more common in women than in men (Joyce et al., 1989; Katerndahl and Realini, 1993; Reed and Witchen, 1998). The National Comorbidity Survey (NCS) examined the presence of psychiatric morbidity, including depression, panic disorder and general anxiety, in a large national sample (Kessler et al., 1994). Based on NCS data, Eaton et al. (1994) found that panic disorder is 2.5 times more prevalent among women than men. In addition, the gender difference appears to increase according to age. For example, the prevalence rate of panic disorder for women ages 15 to 24 was 2.5%, compared to 1.3% of same-age men. For older women and men, the overall rates drop, but the difference between genders appears to grow. Among women ages 35 to 44, the rate of panic disorder was 2.1%, compared to the 0.6% rate among same-age men.

In addition to higher prevalence rates, women may suffer more debilitating forms of panic disorder. Yonkers and colleagues (1998) conducted a longitudinal study of 412 women and men diagnosed with panic disorder with and without agoraphobia for five years. This study found that after remission, panic symptoms recurred at twice the rate for women than men. Still other studies have shown that females suffer a significantly greater frequency of panic attacks than men (Maier and Buller, 1988).

We examined gender differences of specific panic-related symptoms using empirical data drawn from the NCS (Sheikh et al., 2002). Specifically, the frequency of 18 panic symptoms was examined according to the gender of patients with panic disorder (n=274) and patients with panic attacks only, but without meeting criteria for panic disorder (n=335). Findings from this study suggested that heart pounding was the most frequently endorsed panic symptom for both genders and both diagnostic groups. However, in the panic disorder group, a significantly greater proportion of women than men endorsed shortness of breath (72% versus 50%), feeling faint (59% versus 45%) and feeling smothered (60% versus 43%). In the panic attack only group, women were more likely to complain of shortness of breath (65% versus 50%), choking or difficulty swallowing (37% versus 25%), and feeling smothered (50% versus 38%). Using logistical regression, three symptoms predicted female gender: shortness of breath, nausea and feeling smothered. Two symptoms predicted male gender: sweating and pain in the stomach (Table).

Overall, the results of our study indicated that some gender differences do exist at the symptom level for panic disorder and panic attacks. Specifically, a significantly greater proportion of females appear to suffer respiration-related symptoms (difficulty breathing, feeling faint and smothered). Several theories are described here that show how adaptive physiological monitors for breathing and modulation of pain, coupled with fluctuations in the sex hormone cycle, may lead to panic.

**Theoretical Explanations**

Premenstrual hormonal fluctuations may partially explain the increased incidence of panic disorder in women. Seeman (1997) suggested that progesterone metabolites have anxiolytic effects due to their agonistic effect on g-aminobutyric acid (GABA)/benzodiazepine receptors. However, Stein et al. (1989) were unable to demonstrate increased anxiety ratings in normally menstruating females with panic disorder across two menstrual cycles. Nevertheless, other studies point to greater panic...
response in females suffering from premenstrual dysphoric disorder, indicating that a possible concurrent dysregulation of the GABA/benzodiazepine receptor complex may underlie aspects of both the panic response and disorders related to the female reproductive cycle. Premenstrual hormonal fluctuations may also explain the increased frequency of respiratory-related symptoms in women with panic disorder (Klein, 1993). According to the suffocation false alarm theory, there is a suffocation alarm system that becomes unduly hypersensitive. Therefore, ordinary physiological fluctuations in blood carbon dioxide levels and brain lactate may be interpreted as impending asphyxiations. Such overreactions on the part of the suffocation alarm system initially release a sense of breathlessness or dyspnea, followed by hyperventilation, panic and the urge to flee. Another indication that female physiology may have a particular relationship to panic disorder came from challenge studies with CO₂ and lactate. Although panic responses to such challenges only occur in panic disorder, women with premenstrual syndrome show similar respiratory difficulties as patients with panic disorder (Harrison et al., 1989; Sandberg et al., 1993).

**Suffocation False Alarm**
The suffocation false alarm theory (Klein, 1993) explores the possible function of sex hormones and panic in an integrated suffocation monitoring system. A triggered suffocation alarm may initially elicit acute distressing breathlessness and provoke escape efforts. Also, chronic hyperventilation lowers PCO₂ and bicarbonate levels, thus lowering blood carbon dioxide levels from the suffocation alarm threshold. Klein (1993) viewed chronic hyperventilation as an adaptive strategy. Several experimental studies have induced initial hypercapnic states in panic-prone individuals through CO₂ inhalation and lactate infusion to demonstrate how respiration potentially mediates bodily symptoms in panic.

In one study, the physiological response to CO₂ in female patients with panic disorder differed significantly across multiple indicators, including at-rest breathing rate and end-tidal CO₂ (Papp et al., 1997). Female patients showed the greatest CO₂ sensitivity, illustrated by their highest respiratory rate. These findings suggest that female patients with panic disorder may have a hypersensitive suffocation alarm and may efficiently compensate for hypoxia and hypercapnia.

In order to explain these types of respiration-related gender differences, suffocation false alarm theory illustrates the potential relationship between increased panic during conditions such as premenstrual syndrome and late luteal phase dysphoric disorder (Klein, 1993). Specifically, this theory postulates that progesterone and estrogen stimulate chronic hyperventilation during the luteal phase of the reproductive cycle. Progesterone withdrawal in the premenstrual phase may yield a sharp increase in PCO₂ levels.

Similarly, as the estrogen levels fall during ovulation, hyperventilation occurs in response to the higher carbon dioxide levels in expiratory respiration (Klein, 1993). Thus, some females with a low suffocation threshold may be vulnerable to panic, particularly at times during the luteal phase of their menstrual cycle.

**Other Theories**
Separation anxiety disorder has been shown to be a precursor of panic disorder (Gittelman and Klein, 1984; Lipsitz et al., 1994). Separation-distress theory (Panksepp, 1998) posits that similar physiological mechanisms that mediate separation-distress (i.e., emotional pain, protest, despair, detachment) and audio-vocal responses (crying) may also direct motivations toward social affiliation. Indeed, closely aligned and overlapping neurochemical circuits may underlie separation anxiety and panic. That is, absence of primary attachment figures or contact comfort can lead to an emotionally distressful somatic response such as uttering anguished sounds accompanied by tears. Moreover, according to this theory, these distressing vocalizations may be internalized and experienced as panic.

Porges (1998) suggested that the ventral and dorsal vagal complex, two components of the mammalian autonomic nervous system, control and coordinate affective communication and emotional responses. For example, the ventral vagal complex controls vocalization, tears, ventilation via bronchi and facial muscles. According to polyvagal theory, an emotional response to separation activates withdrawal of vagal tone and increases heart rate and respiration. Withdrawal of vagal tone (i.e., parasympathetic activity) has also been put forth as an explanation for the somatic symptoms of panic attack (George et al., 1989). Both polyvagal theory and separation-distress describe how gender differences may affect the activation or inhibition of emotional responses to social engagement. For example, Panksepp's (1998) separation-distress theory also suggested that testosterone may lower males' emotional sensitivity to pain and reduce distressing vocalizations, thereby explaining some of the gender differences in the prevalence of panic.
Conclusion
Several studies indicate a higher female-to-male ratio in panic disorder. Various theoretical explanations for these differences point to possible physiological differences, including the possible influence of sex hormones on respiration.

References: References

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