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Role of sleep deprivation in the causation of postpartum obsessive-compulsive disorder

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A B S T R A C T

First-onset or recurrence of obsessive-compulsive disorder (OCD) is common after childbirth. Postpartum OCD can occur alone or in combination with other psychiatric disorders such as mood and anxiety disorders. Putative etiological mechanisms involve consideration of genetic factors, alterations in the serotonin system secondary to changes in levels of gonadal hormones, rise in oxytocin, hypothalamic–pituitaryadrenal axis hyperactivity, and neuroinflammation. Sleep deprivation arising from a host of diverse factors is common after delivery in women with postpartum OCD. The author suggests that sleep deprivation may play a critical role in the etiology of postpartum OCD. Clinical and research implications of this hypothesis are discussed.

Introduction

Postpartum obsessive-compulsive disorder (OCD) is generally defined as first-onset, or recurrence of OCD in the postpartum period. Postpartum OCD is not a distinct diagnostic entity in the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) [1]; however, unlike some other disorders (such as major depressive disorder, bipolar I disorder, bipolar II disorder or brief psychotic disorder), OCD cannot be characterized with the peripartum onset specifier. The DSM-5 does acknowledge that onset and exacerbation of OCD and symptoms that interfere with the mother-infant relationship can occur in the postpartum period. This lack of designation as a subtype of OCD may have contributed to lack of recognition and underdiagnosis of postpartum OCD. The duration of the postpartum period for OCD onset or recurrence is unclear; however, women remain at risk of experiencing OCD symptoms for several months after childbirth [2,3]. Consequences of untreated postpartum OCD may include poor quality of life for the mother, impaired mother-infant bonding due to avoidance of the child or excessive involvement with the child, and poor social functioning [5].

Prevalence estimates for postpartum OCD vary depending on the population studied, definition of caseness, and screening or diagnostic instruments used. A meta-analysis found that 2.43% of women had OCD during the first 12 months after delivery [6], in contrast with a 12-month prevalence of 1.08% in the general population. A recent prospective study reported that 11% of women screened positive for OCD on the Yale-Brown Obsessive Compulsive Scale (Y-BOCS) [7] at two weeks postpartum [3]. Almost half (45%) of these women had ongoing OCD symptoms six months after delivery, and an additional 5.4% had developed new OCD symptoms. Most of the women in this study had mild OCD (a score of 8–15 on the Y-BOCS). In another study [2], 4% of women met the OCD criteria according to Structured Criteria Interview for DSM-IV (SCID-I) [8] at six weeks after delivery.

The clinical profile of postpartum OCD can be distinguished from OCD occurring outside of the postpartum period. Compared to non-postpartum OCD, postpartum OCD is more likely to be characterized by obsessions about contamination, aggression, and symmetry/exactness; and compulsions involving repetitive cleaning/washing, and checking. Postpartum OCD can occur alone; however, it is more likely to be accompanied by other psychiatric disorders including mood or anxiety disorders. In a small case series of women who had first-onset of OCD in the postpartum period, all seven women had at least one comorbid psychiatric disorder, with mood disorders being the most co-occurring disorder [5]. The co-occurrence of OCD and major depressive disorder has been associated with a poor prognosis, including persistence of obsessions and compulsions. In their prospective study, Miller and colleagues [3] found that at two weeks postpartum, 27.5% and 70.6% of women who screened positive for OCD also screened positive on anxiety and depression measures respectively. Thus psychiatric comorbidity appears to be a rule rather than exception in women with postpartum OCD.

Risk factors for postpartum OCD include primiparity [2], past history of OCD, history of premenstrual worsening of OCD [9,10], past history of depression including postpartum depression [10], concomitant anxiety and depression [3], obstetric complications [11], obsessive compulsive personality disorder, and avoidant personality

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disorder [2,12]. The etiology of postpartum OCD remains elusive but may include contributions from both psychological and biological factors. According to cognitive behavioural theory, obsessions and compulsions are experienced universally but women with OCD attach exaggerated importance to intrusive thoughts and misinterpret them catastrophically. In a recent study, prenatal obsessive compulsive-related beliefs predicted the postpartum development of obsessions and compulsions [13]. Limited data from drug studies have supported the involvement of the serotonin pathways [4]. There is also some evidence that oxytocin, which is elevated in late pregnancy and the postpartum period [14], may be involved in the pathogenesis of postpartum OCD. One study found that plasma levels of oxytocin were increased in OCD patients compared with healthy controls, and were negatively related to symptom severity [15]. Increased activity of the hypothalamic-pituitaryadrenal (HPA) axis has also been implicated. A recent positron emission tomography (PET) study demonstrated neuroinflammation within the cortico-striato-thalamo-cortical circuit of patients with OCD compared with healthy controls [16]. There are several reports of the association between sleep disturbance and OCD; however, surprisingly there are no reports of the relationship between sleep deprivation and postpartum OCD. Due to the lack of awareness of the association between sleep deprivation and OCD, clinicians may not elicit information about sleep changes when assessing women with postpartum OCD.

Hypothesis.

Sleep deprivation is an important trigger for first-onset of postpartum OCD in women predisposed to the disorder as a result of genetic and/or hormonal factors. Postpartum sleep loss may also increase the risk of recurrence or worsening of previous OCD symptoms.

Supporting evidence

Sleep disturbance in OCD

Sleep disturbance is common in patients with OCD; however, it is rarely recognized or evaluated as a potential symptom of OCD [17]. This lack of awareness may partly be due to the fact that insomnia is not part of the DSM-5 diagnostic criteria for OCD. Moreover, patients may not emphasize the impact of poor sleep on their OCD symptoms. In a recent study, 70% of patients with OCD and comorbid psychiatric disorders had sleep difficulties suggestive of primary insomnia [18]. Certain symptoms of OCD itself may contribute to insomnia. For example, the persistent intrusive thoughts and associated marked distress or anxiety may make it difficult for patients to fall or stay asleep [19]. One study found that insomnia was significantly associated with obsessions but not compulsions [20]. Co-occurring psychiatric illnesses such as mood or anxiety disorders may also contribute to the sleep loss [21]. Complaints of severe insomnia are present in 25.2%–45.6% of individuals with mood disorders and in 24.9%–45.5% of individuals with anxiety disorders [22].

Sleep studies have found reduced total sleep time and sleep efficiency in patients with OCD. Similar to findings in major depressive disorder, some studies have also reported reduced sleep latency while others have not [23]. The frequent comorbidity of OCD and depression is a challenge for researchers to tease out the differential effects of sleep on these two disorders. Studies of OCD without comorbid depression have also reported conflicting results. For example, in a controlled study, patients with OCD had impaired sleep continuity but there were no changes that are usually indicative of depression such as changes in slow wave sleep (SWS) or rapid eye movement (REM) timing or amount [24].

Studies on the effect of circadian rhythms in OCD have reported delayed sleep onset and offset as well as a higher prevalence of delayed sleep phase disorder (DSPD) [23,25,26]. A prospective study found that 42% of patients with severe treatment-resistant OCD had DSPD. Patients with DSPD were significantly more likely to be male, younger and with more severe OCD than those with a normal sleep phase [27]. It is unclear whether women with DSPD are at a greater risk of developing postpartum OCD than women without DSPD.

To sum, sleep disturbance is common in patients with OCD. Parsing out the relative contributions of OCD and depression to sleep changes can be difficult; however, it is clear that sleep disturbance is intrinsic to OCD [28].

Sleep deprivation and postpartum OCD

Recent studies have demonstrated that lack of sleep may trigger a broad range of postpartum psychiatric disorders including mania, postpartum psychosis and postpartum depression in women who are susceptible to developing these disorders. In a recent study of 870 parous women, Lewis and colleagues found that women with a history of sleep loss triggering episodes of mania were twice as likely to have developed an episode of postpartum psychosis [29]. Compared to men, women may be more vulnerable to develop episodes of hypomania or mania following sleep loss [29]. Sleep loss during pregnancy is also a risk factor for occurrence of depressive symptoms after delivery [30–32].

Several factors unique to the postpartum period such as physical pain related to childbirth, nocturnal child care, breastfeeding, worrying about the safety of the baby, and frequent checking of the newborn may adversely affect the sleep of new mothers [33]. Sleep loss is also a common symptom of major depressive disorder and anxiety disorders that commonly co-occur with postpartum OCD [23]. Sleep disturbance is particularly common among first-time mothers who are at a greater risk of having first-onset of OCD after childbirth. Studies have shown that poor sleep is associated with more severe OCD which in turn may worsen sleep [28].

Possible mechanisms

Neuroinflammation may be the mechanism by which sleep deprivation contributes to the onset or worsening of OCD [34,35]. Currently, there are no neuroimaging or immunological studies in women with postpartum OCD; however, Attwells and colleagues [16] found that translocator protein (a marker of neuroinflammation) distribution volume was increased (mean: 32%; range: 31%–36%) within the neurocircuitry of OCD. Women may be more susceptible to the effect of inflammation because illnesses with a purported inflammatory etiology such as depression, chronic pain and long-term fatigue are more common in women than men [36]. The confluence of factors such as pain, insomnia and increased level of stress may further increase the risk of inflammation after childbirth. Research has shown that postpartum sleep deprivation causes an increase in the levels of proinflammatory cytokines [40]. Both sleep deprivation and neuroinflammation have also been implicated in the etiology of postpartum depression; however, there are no such studies in postpartum OCD alone or in combination with postpartum depression.

Clinical and research implications

Confirmation of our hypothesis will likely add to the etiological understanding of postpartum OCD, and improve its clinical outcome with the discovery of more targeted and safer therapeutic interventions. Currently, there are no controlled studies to guide clinicians in the management of postpartum OCD. The extant literature is limited to anecdotal reports on the effectiveness of antidepressants, particularly selective serotonin reuptake inhibitors (SSRIs) [37], and cognitive behavioural therapy (CBT) with exposure response prevention (ERP) [38,39]. A recent study found that ERP delivered over four days was effective in reducing symptoms of OCD as well as insomnia [18]. Sleep disturbance in this study did not adversely influence the OCD treatment

outcome as patients with more sleep disturbance prior to initiation of psychotherapy had better outcomes after treatment. There is preliminary evidence that circadian rhythm sleep disorder might mediate response to treatment in patients with OCD [41]. Thus it is conceivable that management of sleep deprivation may also be effective in the amelioration of the core symptoms of OCD in the postpartum period. Misri and Milis [42] found that the addition of quetiapine (mean dose 112.5 mg daily) was effective in women who had failed to respond to an SSRI or a serotonin and norepinephrine reuptake inhibitor (SNRI). Interestingly, quetiapine addition was ineffective in patients with non-postpartum treatment-resistant OCD [43]. There are no studies of sedative/hypnotics, or quetiapine monotherapy in women with postpartum OCD; however, anecdotally we have observed effectiveness of quetiapine in a low dose (e.g. 25–50 mg daily) in the management of postpartum OCD in some women without comorbid mood or anxiety disorders (unpublished data). Temporally these patients had experienced sleep loss followed by onset of postpartum OCD. Within a week of initiation of quetiapine there was improvement in insomnia as well as symptoms of OCD. The rapid onset of action suggested that improvement in OCD symptoms was due to the sedative effect of quetiapine rather than its antidepressant or anti-OCD effects [44].

In light of studies on the association between sleep deprivation and neuroinflammation, researchers may be interested in investigating the effect of immunomodulatory drugs in the management of postpartum OCD. There is mounting evidence that a subgroup of patients with depression who may have immune dysregulation might benefit from the use of non-steroidal inflammatory drugs [35,45,46]. Researchers may also be interested in studying the prophylactic use of behavioural-educational interventions aimed at improving sleep in women considered at risk of developing postpartum OCD.

Conclusion

Sleep loss is common in patients with OCD, perhaps even more so in the postpartum period due to the convergence of various factors known to affect sleep in new mothers. Studies exploring the role of sleep deprivation have the potential to improve our understanding of the etiology of postpartum OCD as well as its clinical management.

Conflict of interest statement

Dr. Sharma has received grant support from, participated on scientific advisory boards for, or served on speakers' bureaus of Assurex, Genome Canada, Neurocrine Biosciences, Sage Therapeutics, Stanley Medical Research Institute, and Sunovion Pharmaceuticals.

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