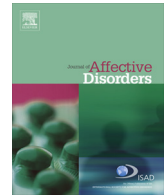




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Preliminary communication

Effect of dysfunctional attitudes and postpartum state on vulnerability to depressed mood

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ABSTRACT

Background: Postpartum depression (PPD) is the most common complication of childbearing with a 13% prevalence. Vulnerability to depressed mood has an important role in the onset of major depressive episodes (MDE), but has not been investigated in postpartum. The aim is to assess whether day-5 postpartum blues and severity of dysfunctional attitudes predicts vulnerability to depressed mood.

Methods: About 45 healthy women were recruited: group 1 ($n=12$) was day-5 postpartum during the typical peak of postpartum blues. Group 2 ($n=11$) was within 18 months postpartum and reported a vulnerability to cry (and had elevated dysfunctional attitudes but no MDE). Group 3 ($n=11$) was within 18 months postpartum and no vulnerability to cry. Group 4 ($n=11$) was not recently postpartum. Vulnerability to depressed mood was measured by the change in the visual analog scale from the sad mood induction procedure (MIP).

Results: Univariate analysis of covariance demonstrated that day-5 postpartum blues and level of dysfunctional attitudes were highly predictive of change in sad mood (postpartum blues: $F(1,41)=12.9$, $p < 0.005$, dysfunctional attitudes scale score: $F(1,41)=11.49$, $p < 0.005$).

Limitations: Although the effects were robust, sample sizes were 11–12 within each group.

Conclusion: Two factors (day-5 postpartum and severity of dysfunctional attitudes) predicted vulnerability to sad mood. Since the severity of postpartum blues predicts PPD, MIP on day-5 postpartum represents a quantitative measure that can be applied to screen novel, early interventions for preventing PPD. Interventions to prevent PPD through increasing resilience against mood induction should target postpartum women with greater severity of dysfunctional attitudes.

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1. Introduction

Postpartum depression (PPD) is the most common complication of childbearing with a prevalence rate of approximately 13% (O'Hara and Swain, 1996) and an optimal approach for widespread prevention has not been established. It is generally accepted that vulnerability to sad mood is an important factor in the onset of major depressive episodes (MDE), but vulnerability to sad mood has not been explored in postpartum. In this study vulnerability to sad mood is examined in relation to several factors: dysfunctional

attitudes, state of postpartum blues (day 5 postpartum) and general postpartum state (within 18 months postpartum).

The relationship of vulnerability to sad mood with dysfunctional attitudes was chosen because a cornerstone of the cognitive model of depression is that dysfunctional attitudes interact with negative life events to create depressed mood and more pessimistic dysfunctional attitudes are associated with greater risk for MDE (Alloy et al., 2006; Otto et al., 2007). While it might be assumed that greater severity of dysfunctional attitudes would be associated with greater vulnerability to depressed mood, this specific relationship has not been studied during the postpartum period. Investigations of mood induction in relation to dysfunctional attitudes have typically focused upon inducing sad mood in subjects such as in remitted and recovered depressed individuals and measuring changes in dysfunctional attitudes afterwards rather

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than vice versa (Jarrett et al., 2012; Miranda and Persons, 1988; Segal et al., 2006).

Vulnerability to sad mood is implicated in early postpartum specifically at day 5, but also thereafter. The rationale for day 5 is that it is the peak point of postpartum blues, a time of healthy range sadness reported in as many as 75% of women (O'Hara et al., 1991a, 1991b). A laboratory based method to assess the severity of postpartum blues has not been previously applied, instead, a common approach to measure postpartum blues is the Edinburgh Postnatal Depression Scale (EPDS) (Cox et al., 1987), which is less precisely oriented towards the day of assessment, and is less state dependent, inquiring about recent insomnia, fatigue, poor appetite, crying, anxiety and emotional lability. In addition, as demonstrated by endorsement on the crying question of the EPDS, approximately 20% of women have crying spells in their first 18 months of postpartum without experiencing a full MDE (Evans et al., 2001).

The objective of this study was to determine whether higher dysfunctional attitude scale severity, the presence of day 5 postpartum blues, or being within 18 months postpartum will be associated with greater sadness after sad mood induction. Given the importance of dysfunctional attitudes in the cognitive theory of depression (Alloy et al., 2006; Otto et al., 2007), given that day 5 postpartum is associated with postpartum blues (O'Hara et al., 1991a), and that MDE occurs with a high prevalence in postpartum (O'Hara and Swain, 1996), it is hypothesized that these three factors will be associated with greater vulnerability to negative mood induction.

2. Methods

2.1. Participants and study design

This study was approved by the Research Ethics Board for Human Subjects at the Centre for Addiction and Mental Health, University of Toronto, Toronto, Canada. Written informed consents were obtained from all subjects after a thorough explanation of the study details and each subject was free to withdraw anytime during the study. All experiments on human subjects were conducted in accordance with the Declaration of Helsinki (1997).

Women aged 18–45 were recruited through advertisement. They were eligible to participate if they were healthy, medication-free, and not taking any investigational products. Exclusion criteria were the following: currently pregnant (as screened with urine pregnancy test), use of any investigational medicinal product or herbal medication within the previous 8 weeks, diagnosed with any axis 1 and/or axis 2 disorders based on structured clinical interview (SCID) for DSM-IV, substance abuse (screened with urine drug test). In addition, to reduce variability in mood attributable to cigarette withdrawal, subjects who reported cigarette smoking in the past 5 years were excluded from the study.

In order to assess effects of postpartum blues, dysfunctional attitudes and general postpartum state (i.e. within 18 months postpartum), four groups of subjects were recruited for this study: group 1 was women at day 5 postpartum. Group 2 was women within 18 months of giving birth that reported crying spells but did not have symptoms of a MDE. Since a priori the levels of dysfunctional attitudes were unknown in the subjects sampled, it was anticipated that self-report of crying spells would be more likely to sample women with higher levels of dysfunctional attitudes. Group 3 was women within 18 months of giving birth without having any crying spells and group 4 was not recently postpartum (i.e. more than 4 years since giving birth).

The protocol involved two visits. The first was a screening visit for eligibility and the second was the experiment day. During the

second visit, subjects first completed the Stein's Blue scale, and then underwent a neutral MIP, followed by the administration of the Visual Analog Scale (VAS), the Dysfunctional Attitude Scale (DAS), the Profile of Mood State (POMS) and the VAS. After a break they underwent the sad MIP and the questionnaires were repeated in the same order again. Following a second break, neutral MIP was administered again to remove any effects of sad MIP. This was followed by administering the VAS and the Beck Depression Inventory Scale (BDI).

2.2. Measures

The outcome measures used in this study were the following: (1) 40-item version of dysfunctional attitude scale (DAS). Forms A and B of the DAS were administered in a counterbalanced design on the second visit to additionally assess stability of the DAS. Dysfunctional Attitude Scale was administered before and after the sad MIP (DAS 1 and DAS 2). DAS form A was also administered at screening (DAS 0); (2) the 10-point scale visual analog scale (VAS) with eight items consistent with how subjects feel in the moment. The items included depressed, happy, restless, sad, anxious, angry, drowsy and alert (Kendell et al., 1981). Change scores were measured during the sad MIP. (3) 65 adjective version of profile of mood state (POMS). Six factors are derived that include tension, depression, anger, fatigue, vigor and confusion (McNair et al., 1971). Change scores were measured during the sad MIP. (4) Additional measure included the Stein's blue scale for symptoms of postpartum blues, which consists of 13 symptoms evaluated at the moment (depression, crying, anxiety, tension, restlessness, exhaustion, dreaming, appetite, headache, irritability, poor concentration, forgetfulness and confusion) and the 10-item Edinburgh postnatal depression scale (EPDS) (Cox et al., 1987) to detect symptoms of PPD over the past 7 days.

2.3. Mood induction

Two forms of mood induction were applied: neutral and sad mood induction. To induce sad and neutral mood states the Velten (Velten, 1968) MIP was used in combination with the approach of Clark (1985). The Velten method is the most widely used technique for studying affective influences upon behavior and it has demonstrated effectiveness in altering subjective emotional states (Frost and Green, 1982). Velten MIP is a series of 60 self-referent statements. Negative statements reflected pessimism, dissatisfaction, and lethargy; for example "life is a heavy burden". Neutral statements example are such as "an orange is a citrus fruit". Subjects were asked to read each statement, printed individually, first to themselves and then aloud, and to 'feel and experience each statement as it would apply to you personally'. In addition, to facilitate the MIP, participants were also presented with a piece of music (while reading the statements), from work by Clark (1985). For sad MIP, subjects listened to Prokofiev's "Russia under the Mongolian Yoke" and for neutral MIP, they listened to Mozart's "Piano Concerto No. 21 in C Major".

2.4. Statistical analyses

First, the stability of the DAS on the main experiment day was assessed across the mood conditions for the four groups applying repeated measures of analysis of variance (ANOVA). DAS pre-mood induction (DAS 1) and DAS post-mood induction (DAS 2) were dependent variables, and group and DAS order were between subject factors.

The main analysis was a univariate analysis of covariance (ANCOVA) with a change in depressed mood measured with the VAS as the dependent variable, and predictor variables of DAS

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