Psychiatry Research 206 (2013) 206–212

Contents lists available at SciVerse ScienceDirect

Psychiatry Research

journal homepage: www.elsevier.com/locate/psychres

Affective information processing in pregnancy and postpartum with and without major depression

Jackie K. Gollan [a,*], Denada Hoxha [a], Sarah Getch [b], Lindsey Sankin [a], Ruth Michon [c]

[a] Department of Psychiatry and Behavioral Sciences, Feinberg School of Medicine, Northwestern University, Chicago, IL, United States
[b] Northwestern Memorial Hospital, Chicago, IL, United States
[c] Northwestern Memorial Faculty Foundation, Chicago, IL, United States

ARTICLE INFO

Article history:
Received 11 May 2012
Received in revised form
4 October 2012
Accepted 12 November 2012

Keywords:
Major depression
Pregnancy
Postpartum
Affective disorders
Emotion
Processing

ABSTRACT

Adults with clinical depression exhibit systematic errors in their recognition and interpretation of affective stimuli. This study investigated the extent to which depression and phases of pregnancy and postpartum influence affective processing of positive and negative information, and the extent to which affective information processing in pregnancy predicts depressive symptoms in postpartum. Data were collected from 80 unmedicated women, diagnosed with major depressive disorder (MDD) or with no psychiatric disorder and between ages 18 and 44 years, during 32–36 weeks of pregnancy and during 6–8 weeks postpartum. All completed a Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) Axis I review, symptom reports, and a computer task measuring affective information processing. Significant group differences were found in which postpartum women with major depression were less responsive to negative stimuli, with lower ratings of intensity and reactions to negative pictorial stimuli, compared with postpartum healthy women. Also, lower ratings of the intensity and reactions to negative stimuli during pregnancy among depressed women predicted postpartum depression severity, even after controlling for depressive severity and affect ratings in pregnancy. Blunted affective reactivity to negative stimuli is a characteristic of depression that was observed among depressed women during pregnancy and postpartum in our study.

1. Introduction

Major depression during pregnancy and postpartum is a major public health concern invoking increased maternal morbidity and mortality (Lindahl et al., 2005; Grace et al., 2003). Even when pregnancy and postpartum progress normatively, the perinatal phase are emotional experiences for many women. Functionally, women are continually prompted to interpret and react to the environment with responses that ensure the well-being of themselves and their infants. Systematic biases in emotional reactions reflected by greater or less responsiveness to emotional information are likely to have important effects on maternal affective experience. Additionally, systematic biases in emotional reactions impact mother–infant interactions, quality of attachment, and child(rens) own affective experiences (Tronick and Beeghly, 2011).

Data suggest that major depression alters an individual's ability to accurately recognize the valence, described as positivity or negativity, and affective arousal to emotional scenarios. Research indicates systematic biases in evaluative judgments of emotional information with nonpregnant adults who view discrete emotional facial expressions. Adults with major depression show more errors with visual search tasks (Hammar et al., 2003), exhibit reduced accuracy in identifying positive emotions (Surguladze et al., 2004), and need a higher intensity of positive valence in faces to detect happiness (Joormann et al., 2006) compared with healthy adults. Also, depressed adults show an increased likelihood of interpreting neutral faces as sad relative to non-depressed controls (Csukly et al., 2009; Gollan et al., 2008; Leppänen et al., 2004). Finally, depressed adults perceive heightened sadness in sad faces (Bouhuys et al., 1999; Hale et al., 1997), exhibit a preference for mood-congruent stimuli (sad faces) (Sterzer et al., 2011), and show deficits in emotion recognition (Surguladze et al., 2004). Collectively, numerous studies show that (see Demenescu et al., 2010 for review) adults with major depression exhibit difficulties in cognitive processing of emotional information conveyed by heightened reactivity to negative facial expressions and relatively lower reactivity to positive facial expressions. Characterizing the extent to which perinatal

* Correspondence to: Northwestern University, Feinberg School of Medicine, Department of Psychiatry and Behavioral Sciences, 446 East Ontario Street, Suite 7-204, Chicago, IL 60611, United States. Tel.: +1 312 695 6121; fax: +1 312 965 5010.
E-mail address: j-gollan@northwestern.edu (J.K. Gollan).

0165-1781/$ - see front matter © 2012 Elsevier Ireland Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.psychres.2012.11.030

depression is associated with systematic biases in responses to affective stimuli has yet to generate the same level of research attention.

Research shows that depressed women show altered cognitive processing in early pregnancy (Pearson et al., 2010). Yet, to the authors' knowledge, there are no studies that have examined affective reactivity among depressed females in later stages of pregnancy and also during the first few weeks of postpartum using emotional stimuli that represent social and nonsocial contexts.

Data indicate that women in pregnancy and postpartum have difficulty identifying emotional experience. Healthy pregnant women show increased affective arousal ratings in response to negative stimuli compared with nonpregnant healthy women (Siefritz et al., 2003). Data from brain scans show that healthy pregnant women in their second trimester have an increased activation to fear-related stimuli in the prefrontal cortex relative to other trimesters (Roos et al., 2011), though harm avoidance moderates increased activation, namely, in the left amygdala activation when viewing negative visual pictures of infants faces (Baeken et al., 2009). Likewise, healthy mothers in the early postpartum stage exhibit changes in their capacity to identify visual sensory stimuli from their surrounding environment (Strathearn et al., 2008). And, first time mothers appear to be less primed to respond to positive unfamiliar stimuli as they exhibited greater activation of dopaminergic brain regions, specifically the reward system, to their own happy infant faces versus unfamiliar positive infants compared with controls (Strathearn et al., 2008). Though these data suggest that women in pregnancy and in postpartum have altered reactions to positive and negative stimuli, most of the research has relied on facial expressions, rather than social and nonsocial scenarios. Several studies have used tasks that consist of stimuli unique to motherhood experiences, particularly pictorial stimuli of infant faces. Using a validated paradigm permits cross-comparison with other studies on affective arousal in response to the International Affective Pictures System Task (IAPS) stimuli (Lang et al., 1993).

Also, the field has yet to characterize the extent to which depression exerts systematic differences in affective information processing across the perinatal phases. Participants with postpartum depression and nonpartum depression showed worse recognition of happiness and fear expressions, and participants with postpartum depression (PPD) showed worse recognition of disgust and anger faces compared with depressed nonpartum women (Flanagan et al., 2011). Also, postpartum depressed mothers evaluated neutral baby faces as less neutral (Gil et al., 2010), and showed higher amygdala activity when viewing negative emotional faces (Moses-Kolko et al., 2010). Studies have also shown improved abilities to encode emotional faces in later than earlier stages of pregnancy and that symptoms of anxiety were greatly associated with these encoding abilities (Pearson et al., 2010). In our current study, we examined affective reactivity from later stages of pregnancy until 6 weeks postpartum.

Quantifying affective reactivity relies on two dimensions: valence, which specifies the dimensions of positivity or negativity evoked by affective stimuli; and, intensity, which characterizes the dimension of affective arousal in response to the stimuli (Lang et al., 1993; Yik et al., 1999). Valence and arousal ratings convey the extent to which individuals experience affective reactivity and may be motivated to approach or withdraw, as is consistent with models of emotion that associate valence with an activated motivational system and arousal with the intensity of the activation (Cacioppo and Gardner, 1999; Davidson and Irwin, 1999; Lang et al., 1993). Higher activation of arousal and valence when viewing negative pictorial stimuli is likely to prompt the motivation to withdraw or avoid the scenario. A mother who is less responsive to negative scenarios may delay avoidance behaviors, inadvertently increasing exposure her to negative scenarios.

This study enrolled two groups (Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) depressed versus no psychiatric disorder) in a prospective, longitudinal design with the first visit during 32–36 weeks of pregnancy and the second visit between 6 and 8 weeks postpartum. At each visit, we collected clinical data and evaluations of affective stimuli using a validated and standardized set of affectively-laden pictorial stimuli. To test the relative differences in affective evaluations, we controlled for maternal self-reported affective state, given data showing that valence ratings may have varying intensity depending on the negative affect state of the individual (Joormann et al., 2010; van Beek and Dubas, 2008). Then, we compared maternal ratings of valence and arousal of positive, neutral, and negative stimuli. This approach sought to: (a) measure affective information processing within two well-characterized groups of unmedicated adults, (b) identify group differences in affective information processing across dimensions of positive and negative affective stimuli in pregnant and postpartum women with and without DSM-IV defined major depression, and (c) evaluate the extent to which affective information processing in pregnancy, after controlling for affective state and depression in pregnancy, would uniquely predict severity of depressive symptoms at the postpartum. We hypothesized that (a) pregnant women with major depression would exhibit attenuated responses to affective stimuli compared to pregnant healthy women; and, (b) postpartum women with major depression would exhibit attenuated responses to affective stimuli compared to postpartum healthy women.

2. Methods

This study uses data collected from one study conducted between 2008 and 2010 at an academic medical center, that was designed to test and compare affective information processing among women with and without major depression in pregnancy and postpartum.

2.1. Participants and procedures

Eighty pregnant women, right handed, unmedicated and between ages 18 and 65 years, were self-referred responding to advertisements placed in prenatal clinics, community groups, and the Internet. All subjects enrolled between 32 and 36 weeks of pregnancy. To ensure reliable identification of major depression, participants were screened with DSM-IV structured clinical interview screen/modules and depression symptom rating scales, along with specific inclusion and exclusion criteria. To ensure reliable identification of depression, one group met Diagnostic and Statistical Manual of Mental Disorders criteria for Major Depressive Disorder (DSM-IV, 4th edition; American Psychiatric Association, 1994) as well as a score ≥ 10 on the Patient Health Questionnaire-9 (PHQ-9, Kroenke et al., 2001) and on the Quick Inventory of Depressive Symptoms Self-Report (QIDS-SR, Rush et al., 1996). The healthy controls did not meet DSM-IV criteria for Major Depressive Disorder and had scores ≤ 9 each on the PHQ-9 and QIDS-SR.

Exclusion criteria were designed to ensure that comorbid illness substances did not influence measurement of valence and arousal. These included (1) comorbid medical or psychiatric illness (i.e., bipolar I and II (lifetime, current), schizophrenia, delusional disorder, organic brain disorder, obsessive-compulsive disorder, specific phobia or philia of animals, Axis II borderline, schizotypal, antisocial; substance use or dependence); (2) imminent risk of suicide or homicide; (3) use of psychotropic medications in the last 2 weeks that might affect valence and arousal ratings; (4) exhibited insufficient understanding of the research procedures to voluntarily participate. In total, 80 participants completed the first visit in pregnancy, 78 completed the second visit postpartum follow-up, of which 75 completed the valence and arousal task. See the CONSORT chart (Fig. 1).

2.2. Procedure

Using IRB-approved methods, verbal consent was obtained for the phone interview, written consent upon arrival for the on-site evaluation. On-site participants completed a urine toxicology screen, questionnaires, and the computer task.