Psychiatry Research 210 (2013) 564–569

Contents lists available at ScienceDirect

Psychiatry Research

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

The role of anxiety sensitivity in the experience of menstrual-related symptoms reported via daily diary

Yael I. Nillni [a,b,c,*], Kelly J. Rohan [a], Jennifer N. Mahon [a], Suzanne L. Pineles [b,c], Michael J. Zvolensky [d,e]

[a] University of Vermont, Burlington, VT, USA
[b] National Center for PTSD, Women's Health Sciences Division, VA Boston Healthcare System, Boston, MA, USA
[c] Boston University School of Medicine, Boston, MA, USA
[d] University of Houston, Houston, TX, USA
[e] MD Anderson Cancer Center, Houston, TX, USA

ARTICLE INFO

Article history:
Received 23 November 2012
Received in revised form
2 July 2013
Accepted 4 July 2013

Keywords:
Anxiety sensitivity
Menstrual symptoms
Menstrual cycle
Premenstrual symptoms

ABSTRACT

The current study examined the interactive effects of Anxiety Sensitivity (AS) and menstrual cycle phase in the experience of menstrual-related symptoms. Participants were 55 community women who completed prospective tracking of menstrual-related symptoms across at least one full menstrual cycle using the Daily Record of Severity of Problems (DRSP) and completed the Menstrual Distress Questionnaire (MDQ) once in their premenstrual and follicular cycle phases. Results revealed that women with higher levels of AS reported greater menstrual-related symptoms, regardless of cycle phase, as compared to women with lower levels of AS. These findings suggest that AS may be an important psychological factor involved in the experience of psychological and somatic symptoms across the menstrual cycle. Results are consistent with previous literature documenting the role of AS in menstrual-related symptoms as well as in other physical health conditions.

Published by Elsevier Ireland Ltd.

1. Introduction

The premenstrual phase of the menstrual cycle is associated with a variety of psychological (e.g., anxiety, sadness) and bodily (e.g., fatigue) symptoms (Freeman, 2003). Approximately 50–80% of women report that they experience at least some symptoms during the premenstrual phase (Halbreich et al., 2003). Premenstrual syndrome (PMS) is defined as a recurring pattern of symptoms that occur during the premenstrual phase and decline soon after the start of menses. Premenstrual Dysphoric Disorder (PMDD) is an extreme variant along the continuum of premenstrual symptoms, consisting of at least one psychological symptom (i.e., depressed mood, anxiety/tension, marked affective lability, or anger/irritability) and at least four other psychological or physical (e.g., fatigue) symptoms that cause significant impairment and occur during most menstrual cycles (APA, 2000). Epidemiological studies estimate that 3–8% of women meet DSM-IV-TR criteria for PMDD, whereas 13–19% of women report that they experience premenstrual symptoms associated with personal distress and impairment (Halbreich et al., 2003). Specifically, significant premenstrual symptoms have been linked with decreased productivity at work (Chawla et al., 2002) and relationship impairments that are comparable to impairments associated with depression and other physical health conditions (Dean and Borenstein, 2004). Notably, PMDD frequently co-occurs with other mood and anxiety disorders (Kim et al., 2004), suggesting that there may be shared etiological and/or maintenance factors. For example, neuroticism-related personality traits are greater among women with PMDD as compared to healthy controls and show a positive correlation with severity of premenstrual symptoms (Gingnell et al., 2010).

Anxiety sensitivity (AS), or the fear of the physiological symptoms of anxiety and its physical, psychological, and social consequences (McNally, 2002), is one potential factor that may make women more vulnerable to experience menstrual-related symptoms. AS has been conceptualized as a trait-like cognitive risk factor for a variety of psychological disorders (see Olatunji and Wolitzky-Taylor, 2009 for a review), implicating this construct as a transdiagnostic mechanism. Although AS is generally conceptualized as a trait level vulnerability factor arising from a combination of genetic factors and learning experiences (Olatunji and Wolitzky-Taylor, 2009), recent research has suggested that AS is malleable with treatment (Smits et al., 2008). Despite its role in many disorders, AS has been most strongly linked to the etiology and maintenance of anxiety disorders, particularly panic disorder and

* Correspondence to: National Center for PTSD, Women's Health Sciences Division, Veteran's Affairs Boston Healthcare System, 150 South Huntington Ave. (116B-3), Boston, MA 02130, USA. Tel.: +1 857 364 4637; fax: +1 857 364 4515.
E-mail addresses: yael.nillni2@va.gov, ynillni@gmail.com (Y.I. Nillni).

0165-1781/$ - see front matter Published by Elsevier Ireland Ltd.
http://dx.doi.org/10.1016/j.psychres.2013.07.016

posttraumatic stress disorder (Feldner et al., 2008; Li and Zinbarg, 2007). The menstrual reactivity hypothesis proposes that women high in AS are hypervigilant to the physical sensations they experience during the menstrual cycle and, consequently, develop a negative expectation and attentional bias towards these bodily sensations that affects their symptom reports (Sigmon et al., 2004). A small body of literature has supported the role of AS in the experience of menstrual-related symptoms. For example, higher levels of menstrual distress have been found among women who score high on AS in comparison to women who score low or medium on AS (Sigmon et al., 1996, 2000a, 2000b). Specifically, women high on AS tend to report more severe symptoms on the Menstrual Distress Questionnaire (MDQ) as compared women low on AS when asked to report on either their current premenstrual (days −5 to −1) or intermenstrual (days 8–22) cycle phases (Sigmon et al., 2000a, 2000b). Of note, these studies did not find an interaction effect between AS and menstrual cycle phase, indicating that women high on AS reported more menstrual-related symptoms than women low on AS, regardless of current menstrual cycle phase (Sigmon et al., 1996, 2000a, 2000b).

These preliminary AS and menstrual distress studies conducted to date should be considered within the context of their limitations. First, past work has utilized a cross-sectional design whereby women were randomly assigned to complete measures in one specific cycle phase as opposed to completing measures across multiple cycle phases (Sigmon et al., 1996, 2000a, 2000b). Therefore, it is unclear how individual women may vary on menstrual symptom reports across different menstrual cycle phases. Second, previous studies compared the premenstrual phase to the intermenstrual phase (i.e., follicular, ovulatory, and early to midluteal phases combined). Combining cycle phases may neglect natural cycle variation in symptom reports as the follicular, ovulatory, and midluteal phases represent distinct hormonal fluctuations (Rubinow et al., 1988). Thus, the comparison of symptom reports in the intermenstrual phase to the premenstrual phase is difficult to interpret. Third, cycle phase of assessment was measured by day count only, which typically only holds 50% agreement with more precise measurement techniques (e.g., salivary assay of progesterone; Shirtcliff et al., 2001). Therefore, it is possible that women were not necessarily assessed in the cycle phase intended.

The aim of the current study was to address the key limitations of past work in the examination of the interactive effects of AS (treated as a continuous variable) and menstrual cycle phase on prospectively reported menstrual symptom severity across the follicular and premenstrual cycle phases. We employed a prospective design and assessed menstrual symptom severity using daily tracking (Daily Record of Severity of Problems; DRSP) throughout the study duration (≥ one full cycle), as well as the prospective version of the MDQ (Form T) to capture how the participant feels on the day of their visit, one day during the premenstrual phase and one day during the follicular phase. Cycle phase verification was completed with at-home ovulation detection kits and a progesterone salivary assay. It was hypothesized that women higher on AS would report more severe menstrual-related symptoms in their premenstrual phase as compared to their follicular phase, and in comparison to women lower on AS in either cycle phase.

2. Methods

2.1. Participants

Participants were 55 normally menstruating (i.e., average cycle length of 25–35 days that did not regularly vary in length month-to-month by ≥7 days) women (M_{age}=26.18 years, S.D.=8.9) recruited from the greater Burlington, Vermont area.[1] The current study utilizes data collected as part of a larger investigation examining panic reactivity across the menstrual cycle (Nillni et al., 2012). Exclusionary criteria were: (a) use of hormonal birth control methods (e.g., birth control pill, patch, implant, injection, or vaginal ring), (b) postmenopausal (e.g., ending of menstrual period) or perimenopausal (e.g., hot flashes) status, (c) pregnancy (based on self-report) or trying to become pregnant, (d) current generalized anxiety disorder, posttraumatic stress disorder, specific phobia, social phobia, and obsessive compulsive disorder, (e) current or past panic disorder with or without agoraphobia diagnosis, (f) current alcohol or substance dependence, (g) acute and serious suicidal intent, (h) psychosis, (i) cardiovascular disorders (e.g., myocardial infarction), (j) seizure disorder, (k) asthma or respiratory problems, and (l) current use of medications used to block or modulate anxiety and/or panic (e.g., Beta blocker, anxiolytics). Due to the aims of the larger investigation (i.e., to isolate the role of AS on panic reactivity), we excluded women with a current anxiety-related diagnosis.

2.2. Measures

2.2.1. Structured clinical interview for DSM-IV Axis I disorders-non patient version (SCID-NP)

The SCID-NP (First et al., 1994) is a structured diagnostic interview that was administered at the screening visit to assess the presence of current and past Axis I diagnoses and current suicidal ideation. Only the PI and one other clinical graduate student with SCID training and experience administered the SCID-NP. A random selection (10%) of SCIP-NP ratings were later verified by an independent rater (clinical graduate student with SCID training and experience), and there were no disagreements between raters.

2.2.2. Anxiety Sensitivity Index (ASI)

The ASI (Reiss and McNally, 1985; Reiss et al., 1986) is a 16-item, self-report assessment that measures fear of bodily sensations related to anxious arousal in general that was administered at the screening visit. Individuals rated statements (e.g., "It scares me when I feel shaky") on a 5-point Likert scale (0=very little to 4=very much), indicating the degree to which they worry about possible consequences of anxiety symptoms. Items were summed to calculate the total score, ranging 0–64. Prior research has demonstrated acceptable test–retest reliability (ranging from 0.71 to 0.75), validity (Reiss et al., 1986), and internal reliability (α=0.88; Peterson and Heilbronner, 1987). The ASI is well-represented as a single factor structure (Reiss et al., 1986). ASI was examined continuously and internal consistency of the total score in the current sample was good (α=0.78).

2.2.3. Daily Record of Severity of Problems (DRSP)

The DRSP (Endicott and Harrison, 1997; Endicott et al., 2006) is a 14-item daily questionnaire (11 symptom items and three impairment items) that measures severity of symptoms (e.g., "felt angry, irritable") on a 6-point Likert scale (1="Not at all" to 6="Extreme") across the menstrual cycle, including three impairment items. The DRSP has been shown to be a reliable and valid measure of premenstrual symptoms and impairment (Endicott et al., 2006). Participants completed this questionnaire daily throughout the study (≥one full menstrual cycle) and all items were summed to create a daily score.

2.2.4. Provisional Premenstrual Dysphoric Disorder (PMDD) assessment

A provisional PMDD assessment using DSM-IV PMDD criteria was conducted at the screening visit via a standardized interview. In accordance with DSM-IV criteria, daily data on the DRSP was utilized to confirm the provisional PMDD diagnosis. Although 2 months of daily data are required to confirm a diagnosis of PMDD, for some of the participants there was only 1 month of DRSP data available. Of the eight women identified with provisional PMDD at the screening visit, three (38%) were confirmed following examination of the daily data. Following the method described in Borenstein and colleagues (2007), a diagnosis of PMDD required: (1) five symptoms, including one emotional symptom (i.e., depressed, anxious, affect lability, and irritability), with a rating as >3 during the premenstrual phase (Day −5 to −1), (2) an average daily score of <3 in the follicular phase (Day 6–12), and (3) at least a 30% change from follicular to premenstrual phase. Individuals who met criteria for clinically relevant PMS within the entire sample despite whether they met a provisional PMDD diagnosis at the screening visit were also identified, following the method described in Borenstein et al. (2007). Specifically, clinically relevant PMS required: (1) one or more symptoms on the

[1] A total of 49 women attended both menstrual cycle phase visits and a total of nine women attended only one cycle phase visit. Of the women that attended only one cycle phase visit, three were excluded because cycle phase could not be confirmed. Of the women that attended both menstrual cycle phase visits, 11 premenstrual cycle phase visits were excluded because cycle phase was not confirmed. Thus, 55 women were retained in the study due to attending at least one lab visit and confirmation of at least one cycle phase. Of the 55 women enrolled in this study, a total of 49 completed the DRSP.