Effects of the Menstrual Cycle on Measures of Personality in Women With Premenstrual Syndrome: A Preliminary Study

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Background: Previous studies suggest that women with premenstrual syndrome (PMS) differ from those without PMS in measures of personality. The purpose of this study was to measure the effect of menstrual cycle phase on personality variables in women with and without PMS.

Method: The Personality Diagnostic Questionnaire-Revised (PDQ-R) was administered in both the follicular and luteal phases to women with PMS (according to National Institute of Mental Health PMS Workshop Diagnostic Guidelines) (N = 40). An asymptomatic control group (N = 20) as well as a symptomatic group of women with DSM-IV–diagnosed recurrent, non–menstrual-cycle-related brief depression (N = 20) also completed the questionnaire in both phases.

Results: Only women with PMS demonstrated a significant increase in total PDQ-R score (reflecting overall personality disorder) from the follicular to the luteal phase ($p < .01$). Women with PMS had significantly higher total PDQ-R scores than the asymptomatic controls during both the follicular ($p < .05$) and luteal ($p < .01$) phases, whereas there was no significant difference between women with PMS and symptomatic controls during either phase. Subscale scores fit similar patterns, as did the number of women in each group meeting a cutoff score indicative of the presence of personality dysfunction.

Conclusion: In this preliminary study, women with PMS were unique in demonstrating a menstrual cycle phase effect on PDQ-R score, while their scores in both phases were closer to symptomatic controls than asymptomatic controls. These findings suggest that personality disorder in women with PMS may have both state- and trait-related components.

(J Clin Psychiatry 2001;62:337–342)

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The term *premenstrual syndrome* (PMS) defines a condition in which symptom appearance is confined to the luteal phase of the menstrual cycle with a relative absence of symptoms during the follicular phase. Despite the occurrence of PMS symptoms only during the luteal phase, some studies have reported that PMS is associated with specific personality traits or disorders[1–3] and, therefore, potentially represents a more chronic "trait-linked" condition. The results of previous studies examining measures of personality in PMS are mixed and are difficult to interpret due to several methodological confounds, including the lack of prospective confirmation of a PMS diagnosis and the absence of asymptomatic women to control for potential menstrual cycle phase effects on personality measures.[4,5] Finally, no previous study has controlled for the possible impact of a recurrent mood disorder on measures of personality, thereby confounding attempts to draw specific inferences about the relationship between PMS and personality.

We evaluated personality by employing the Personality Diagnostic Questionnaire-Revised (PDQ-R)[6] in both the luteal and follicular phases in women with PMS, women without PMS, and women with brief episodes of recurrent depression not confined to the luteal phase of the menstrual cycle.

METHOD

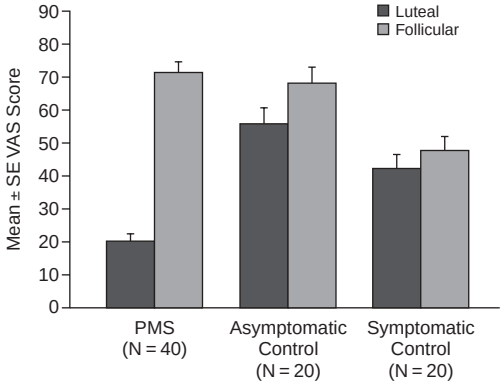
Subject Selection

The subjects of this study were 40 women with prospectively confirmed PMS (National Institute of Mental Health PMS Workshop Diagnostic Guidelines[7]) who came to the clinic in response to advertisements in local newspapers and a hospital newsletter or were referred by their personal physicians. All subjects reported menstrual cycles of regular length, varying between subjects and ranging from 21 to 33 days. Subjects were medication-free, and none had any medical illness currently (both at intake and at time of testing) or within the previous year or any psychiatric illness within the previous 2 years, as determined by the administration of the Schedule for Affective Disorders and Schizophrenia-Lifetime Version (SADS-L).[8] All women confirmed prospectively the timing and severity of their

mood-related symptoms by completing daily visual analog scale (VAS) self-ratings, as described elsewhere.[9] All women in the PMS group had mean negative mood symptoms (depression, anxiety, and irritability) that increased by at least 30% relative to the range of the scale employed by the subject in the 7 days before menses as compared with the 7 days afterward for at least 2 of the 3 cycles after the initial screening interview.

An asymptomatic control group (N = 20) was recruited in a fashion similar to that used for the women with PMS, had no present or past history of psychiatric illness, and showed no menstrual cycle–related fluctuation in mood on daily ratings. A second, symptomatic group (N = 20) was employed to control for the effects of the presence of a recurrent mood disturbance on measures of personality. The symptomatic controls presented with recurrent mood and behavioral symptoms that occurred on a monthly basis, lasted for less than 2 weeks, and were associated with functional impairment. These symptoms were not confined to the luteal phase of the menstrual cycle (confirmed by daily VAS ratings as above) and, therefore, these women did not meet criteria for PMS. However, the women in the symptomatic control group met DSM-IV[10] criteria for recurrent brief depression. Asymptomatic and symptomatic controls also were medication- and illness-free as described above.

Figure 1. Visual Analog Scale (VAS) Symptom Ratings for Depression During the Luteal and Follicular Phases of the Menstrual Cycle in Women With Premenstrual Syndrome (PMS), Asymptomatic Controls, and Symptomatic Controls[a]



[a]The VAS ranges from 100 (most happy ever) to 1 (most sad ever).

Procedure

Each subject was asked to complete the PDQ-R twice during the menstrual cycle, once premenstrually (between days 23 and 28) and once postmenstrually (between days 5 and 10). The PDQ-R is a self-administered instrument with 152 true/false questions yielding a separate score for each of the 11 DSM-III-R personality disorders and an overall score. There is a threshold score for each individual disorder, and an overall score of 50 or more indicates the likely presence of 1 or more personality disorders. A score above 20 indicates the possibility of personality disorder. The PDQ-R thus provides 2 measures: a value quantifying the degree to which a person manifests symptoms of a specific personality disturbance and a cutoff point above which there is a suggestion of the existence of a clinically significant DSM-III-R personality disorder.

Additionally, VAS self-ratings of anxiety, depression, and irritability were obtained from women with PMS to confirm that they were symptomatic at the time that they completed the PDQ-R. The VAS scores from the days the PDQ-R was administered were divided by the range employed by the subject in the ratings for that month to standardize ratings (i.e., to control for individual differences in the use of the scale).

Statistical Analysis

The total PDQ-R scores as well as the individual subscale scores were analyzed as follows: Follicular scores were compared with luteal scores by analysis of variance with repeated measures (ANOVA-R), with menstrual cycle phase as the within-subjects factor and diagnostic group (PMS vs. asymptomatic control vs. symptomatic control) as the between-subjects factor. Post hoc Bonferroni t tests were performed when indicated by significant ANOVA. Yates corrected chi-square was used to compare the frequency of PDQ-R scores above the threshold for total or individual personality disorders between subject groups and across menstrual cycle phases. The Fisher exact test (2-tailed) was used when cells contained fewer than 5 subjects. The order of menstrual cycle phase during which the PDQ-R was administered was not counterbalanced; however, similar numbers of subjects first completed the PDQ-R during the premenstrual phase (N = 39) and during the postmenstrual phase (N = 41). Additionally, the effect of order of PDQ-R administration on total PDQ-R scale scores was examined by repeating the initial ANOVA with the addition of order of test administration as a between-group variable (i.e., premenstrual or postmenstrual testing performed first). Finally, correlations between the standardized VAS mood rating score and the PDQ-R total score were performed by Pearson correlation coefficients. Values in the text are expressed as mean ± standard deviation, unless noted otherwise.

RESULTS

Subjects

The ages of the women with PMS ranged from 24 to 45 years (36 ± 6 years) and did not differ significantly from the ages of the asymptomatic (33 ± 6 years) or symptomatic (35 ± 8 years) controls (ANOVA, $F = 1.098$; $df = 2,77$; $p = NS$). Women with PMS, but not the controls, demonstrated menstrual cycle phase–related cyclic-

Table 1. Personality Diagnostic Questionnaire-Revised (PDQ-R) Scores During the Luteal and Follicular Phases in Women With Premenstrual Syndrome (PMS) and in Asymptomatic and Symptomatic Controls[a]

	PMS Group (N = 40)		Asymptomatic Controls (N = 20)		Symptomatic Controls (N = 20)		ANOVA-R					
							Diagnosis (df = 2,77)		Phase (df = 1,77)		Diagnosis-by-Phase (df = 2,77)	
PDQ-R Measure	Mean	SD	Mean	SD	Mean	SD	F	p	F	p	F	p
Total												
Luteal	39.5	18.9**,##	15.6	12.1	33.1	21.8	9.7	< .001	7.8	< .01	5.9	< .01
Follicular	29.1	15.2‡	15.8	13.6	30.9	17.9						
Schizoid												
Luteal	3.0	1.9**,##	1.0	1.1	1.8	1.4	7.0	< .01	2.7	NS	5.6	< .01
Follicular	2.1	1.7	1.2	1.3	1.8	1.6						
Schizotypal												
Luteal	2.7	2.5**,##	0.8	1.0	2.6	2.4	4.7	< .05	7.5	< .01	3.2	< .05
Follicular	1.5	1.8	0.7	1.0	2.1	2.5						
Paranoid												
Luteal	4.1	2.2##	2.8	1.9	3.6	2.0	2.0	NS	8.0	< .01	1.8	NS
Follicular	3.2	2.0	2.4	2.2	3.4	1.9						
Avoidant												
Luteal	3.4	2.1**,##	1.0	0.9	2.4	1.9	9.4	< .001	3.8	NS	6.1	< .01
Follicular	2.2	1.8	1.0	1.1	2.5	1.9						
Dependent												
Luteal	3.1	2.1*,#	1.3	1.3	2.9	2.5	4.1	< .05	0.9	NS	3.1	NS
Follicular	2.4	2.3	1.5	1.4	3.0	2.2						
Obsessive-compulsive												
Luteal	3.9	1.7**,##	2.0	1.7	3.1	2.3	6.7	< .01	10.0	< .01	2.7	NS
Follicular	3.0	1.6	1.7	1.5	2.9	1.9						
Passive-aggressive												
Luteal	3.2	2.1**,##	0.7	1.3	2.4	2.1	9.4	< .001	8.2	< .01	5.8	< .01
Follicular	2.0	1.8	0.7	1.2	2.2	1.9						
Self-defeating												
Luteal	2.9	1.9**,#	0.9	1.4	2.9	2.4	7.7	< .01	3.7	NS	2.5	NS
Follicular	2.1	1.4	1.0	1.5	2.5	2.1						
Histrionic												
Luteal	3.2	1.8**	1.5	1.5	2.6	2.0	4.8	< .05	0.3	NS	1.4	NS
Follicular	2.8	1.7	1.7	1.8	2.5	1.6						
Borderline												
Luteal	4.3	2.2**	1.3	1.6	3.7	2.1	11.9	< .001	0.0	NS	4.2	< .05
Follicular	3.6	2.1‡	1.7	2.2	4.0	2.2						
Antisocial												
Luteal	1.2	1.9	0.6	0.6	1.0	1.4	0.7	NS	1.0	NS	1.4	NS
Follicular	0.9	1.2	0.7	0.7	0.9	1.0						
Narcissistic												
Luteal	3.2	1.7**,##	1.9	1.7	2.6	1.8	2.9	.06	6.0	< .05	3.6	< .05
Follicular	2.3	1.4	1.6	1.8	2.6	1.6						

[a]Post hoc comparisons: PMS vs. asymptomatic—luteal phase: *p < .05, **p < .01; follicular phase: ‡p < .05. PMS vs. symptomatic—all comparisons in both phases: p = NS. Luteal vs. follicular—PMS: #p < .05, ##p < .01; asymptomatic: all comparisons, p = NS; symptomatic: all comparisons, p = NS. Abbreviation: ANOVA-R = analysis of variance with repeated measures.

ity in VAS symptoms (Figure 1). In the women with PMS, VAS scores ranged from 1 (most sad ever) to 100 (most happy ever) during the luteal and follicular phases. The range of the denominator employed to standardize mood rating scores was 45 to 100 (79.0 ± 16.6).

PDQ-R Scale Scores

ANOVA-R identified significant effects of diagnosis and diagnosis-by-phase interactions in the total PDQ-R score and in several subscale scores (Table 1).

Total score. Women with PMS demonstrated a significant increase in total score from the follicular to the luteal phase, whereas total score in asymptomatic and symptomatic controls did not differ significantly across menstrual cycle phases. Women with PMS scored significantly higher than the asymptomatic controls during both the follicular and luteal phases. In contrast, there was no significant difference between women with PMS and the symptomatic controls during either menstrual cycle phase, although the PMS subjects scored nonsignificantly higher than symptomatic controls during the luteal phase and nonsignificantly lower during the follicular phase. Finally, symptomatic control scores were significantly higher than those of asymptomatic controls during both the follicular and luteal phases.

Subscale scores. Significant diagnosis-by-phase interaction effects were observed for the following PDQ-R subscale scores: schizotypal, passive-aggressive, schizoid, avoidant, borderline, and narcissistic. Women with PMS scored significantly higher than asymptomatic con-

Table 2. Percentages of Women With Premenstrual Syndrome (PMS) and of Symptomatic and Asymptomatic Controls Scoring Above Personality Diagnostic Questionnaire-Revised (PDQ-R) Cutoff Scores[a] During the Luteal and Follicular Phases[b]

PDQ-R Measure	PMS Group (N = 40)		Asymptomatic Controls (N = 20)		Symptomatic Controls (N = 20)	
	Luteal	Follicular	Luteal	Follicular	Luteal	Follicular
Total (≥ 50)	33*	13	5	5	15	20
Total (> 20)	85**	70‡‡	20	25	65	60
Schizoid	45**,#	20	5	5	10	5
Schizotypal	25*	8	0	0	20	15
Paranoid	65*	48	30	20	45	55
Avoidant	28*	15	0	0	15	15
Dependent	25	20‡	5	0	30	25
Obsessive-compulsive	40*,#	18	10	5	25	20
Passive-aggressive	33*,#	10	5	5	25	25
Self-defeating	20	5	5	5	25	25
Histrionic	45**	33	5	10	30	20
Narcissistic	20	8	0	5	15	5
Borderline	53**	33	10	15	35	40
Antisocial	5	3	0	0	5	5

[a]A score of 50 or above indicates the likely presence of 1 or more personality disorders; a score above 20 indicates the possibility of personality disorder.
[b]Post hoc comparisions: PMS vs. asymptomatic—luteal phase: *p < .05, **p < .01; follicular phase: ‡p < .05; ‡‡p < .01.
Luteal vs. follicular—PMS: #p < .05; asymptomatic: all comparisons, p = NS; symptomatic: all comparisons, p = NS.

trols during the luteal phase on these 6 subscales and also during the follicular phase on the borderline subscale. No significant differences between women with PMS and symptomatic controls were observed in any subscale score in either phase. Finally, only in the women with PMS were subscale scores in the luteal phase significantly higher than those in the follicular phase.

Significant diagnosis effects but no diagnosis-by-phase interaction effects were observed for the dependent, self-defeating, histrionic, and obsessive-compulsive subscale scores. On post hoc testing, these effects reflected significantly higher scores (averaged across menstrual cycle phase) in women with PMS compared with the asymptomatic controls but not with the symptomatic controls. Significant phase but not diagnosis-by-phase interaction effects were observed for the paranoid and obsessive-compulsive subscale scores, reflecting an overall luteal phase increase in these scores in all women, with the largest increase accounted for by the women with PMS and less marked increases in the asymptomatic and symptomatic controls. Finally, ANOVA-R identified no significant main or interactive effects for the antisocial subscale scores.

Yates corrected chi-square analysis showed a significant difference during the luteal phase in the percentage of women with PMS (33% [N = 13]) compared with asymptomatic controls (5% [N = 1]) who surpassed the cutoff score (50 or greater) indicating the presence of a personality disorder, and in those who scored above 20 (85% [N = 34] vs. 20% [N = 4]), indicating a possibility of some personality dysfunction (Table 2). Differences between the percentage of women with PMS and the percentage of asymptomatic controls meeting the cutoff score during the luteal phase also were significant for the schizoid, schizotypal, paranoid, avoidant, obsessive-compulsive, passive-aggressive, histrionic, and borderline subscales. Follicular phase differences between women with PMS and the asymptomatic controls were noted only for the 20-point total score cutoff and the cutoff for the dependent subscale. Women with PMS showed significant phase-related differences for the schizoid, obsessive-compulsive, and passive-aggressive subscales, with a greater number of patients meeting the cutoff score in the luteal phase for these and for all other subscales and for the total PDQ-R score. All phase comparisons were nonsignificant for asymptomatic and symptomatic controls.

No significant main effects of the order of PDQ-R administration or interaction effects between menstrual cycle phase or diagnosis and order of testing were observed.

In the women with PMS, luteal phase mood ratings correlated significantly with luteal phase total PDQ-R scores ($r = 0.4$, $p = .03$). In the asymptomatic and symptomatic controls, there were no significant correlations between luteal phase mood ratings and luteal phase total PDQ-R scores. Similarly, there were no significant correlations between follicular phase mood ratings and follicular phase total PDQ-R scores in any group.

DISCUSSION

Only women with PMS exhibited a menstrual cycle phase effect in this study. Scores of these women were significantly higher in the luteal phase than in the follicular phase for the total PDQ-R and for some subscales, while symptomatic and asymptomatic control scores showed no significant differences between phases for the total PDQ-R or any subscale. A general effect of menstrual cycle phase on scores can be ruled out because of the lack of difference across menstrual cycle phases for the control groups.

Earlier studies[1] suggested that PMS reflected the presence of a more enduring process consistent with underlying neuroticism or disturbances in personality; however, as described previously,[2] abnormal personality measures also may reflect personality scale items that are sensitive to PMS symptoms and therefore merely demonstrate the presence of these symptoms. In contrast to the characterization of PMS as a chronic mood disorder, PMS has also been described as a state-dependent condition associated with state-dependent changes in several measures,[11] including perceptions of life events,[12] body image,[13] and locus of control.[14] It is possible, then, that some of the personality phenomena putatively involved in PMS could be

state- rather than trait-dependent, and thus limited to the symptomatic luteal phase. In this case, PDQ-R performance appears to be a largely state- rather than trait-dependent phenomenon, with almost all of the differences between women with PMS and controls occurring during the luteal phase.

These findings are consistent with those of studies[15–17] that found menstrual cycle phase effects in women with PMS who were administered the Minnesota Multiphasic Personality Inventory. Studies that found no menstrual cycle effect on personality dysfunction in women with PMS when administered the PDQ-R,[4] the Eysenck Personality Questionnaire,[18] or the Millon Clinical Multiaxial Inventory[19] had methodological limitations that might explain the discrepancies with our findings. First, of the women studied by Eckerd et al.,[4] only 10 were administered the PDQ-R in both the follicular and luteal phases, and it is not clear how many of these 10 women had a diagnosis of PMS and how many were controls. Mira et al.[18] did not confirm the presence of PMS prospectively. Parry et al.[19] found group effects similar to our data, with a significant difference between women with PMS and controls in measures of passive-aggressive and borderline personality traits. However, no phase-by-group effects were observed. Given the high variance in scores and the small sample sizes (N = 15 for each group), it is possible that a lack of significant phase-by-group interactions reflected a type II error.

The PDQ-R scale is not a substitute for a structured diagnostic interview; however, results similar to ours were obtained by Pearlstein et al.[5] employing the Structured Clinical Interview for DSM-III-R (SCID) in women with PMS. In their study of 78 women with prospectively confirmed late luteal phase dysphoric disorder (LLPDD), Pearlstein et al. found that 10% of the women had Axis II personality disorders when administered the SCID for DSM-III-R Personality Disorders during the follicular phase,[5] a result similar to the number of women with PMS in our study who scored above the 50-point cutoff for total score during that phase (12.5% [N = 5]). Both studies showed the prominence of avoidant, paranoid, and obsessive-compulsive Axis II disorders in women with PMS, although our study also indicated the appearance of additional personality disorders (see Table 2). Further, our data would suggest that, had Pearlstein and colleagues interviewed women in the luteal phase, they might have found higher rates of personality disturbance.

On the subscales for which a diagnosis effect but no diagnosis-by-phase interaction effect was observed (dependent, histrionic, obsessive-compulsive, self-defeating), PMS patients had scores comparable not only to symptomatic controls but also to patients with bipolar illness who were studied by O'Connell et al.[20] The subjects in the O'Connell study were not symptomatic at the time they were tested, so personality traits may be epiphenomenal to the condition of recurrent mood disorder. These similarities suggest that a chronic recurrent mood disorder may alter measures of personality even when the patient is asymptomatic. Alternatively, our data also are consistent with the possibility that underlying personality traits may confer susceptibility to the development of recurrent mood disorders.

Rather than demonstrating enduring personality disorder as defined in the DSM-III-R, high PDQ-R scores in several subscales (schizotypal, paranoid, passive-aggressive) in women with PMS occurred only during the luteal phase. PMS symptoms of mood lability, irritability, and social isolation may account for the increased subscale scores, erroneously suggesting disturbances in personality. In women with PMS, inferences about personality may be misleading if measures are applied only during the luteal phase.

Our data show that measures of personality dysfunction in women with PMS are increased relative to those in asymptomatic women but are predominantly menstrual cycle phase related. We suggest that these increased measures may accompany the nonspecific condition of chronic or recurrent mood disorder, consistent with the absence of an increase relative to symptomatic controls. Rather than demonstrating the presence of a personality disorder that predisposes to PMS, our data suggest that a chronic, recurrent mood disorder, albeit phasic, may result in symptomatic residua during the otherwise asymptomatic phase of the menstrual cycle. Our data, consistent with earlier reports, further suggest that even trait characteristics like personality are fluid and display state-dependent variation, hence emphasizing the importance of identifying menstrual cycle phase and the presence of symptoms when studying women with PMS.

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