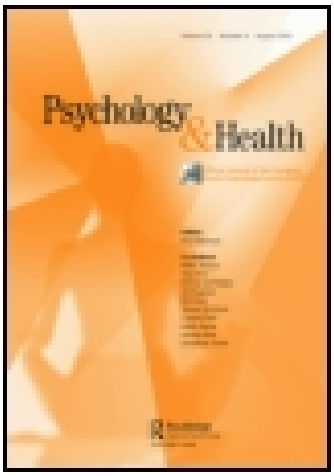

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CAUSAL ATTRIBUTIONS IN PREMENSTRUAL SYNDROME

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The relationship between causal attributions and symptoms was investigated with self-report inventories in patients with premenstrual syndrome (n=38) and controls (n=26) during the premenstrual as well as the intermenstrual phase of the cycle. Patients with prospectively confirmed premenstrual exacerbations of physical and psychological symptoms more frequently attributed their complaints during premenstruum to the cycle than was the case during the intermenstrual period. Controls showed no differences in types of explanations for complaints in either phase of the cycle. It appeared that patients used not only the menstrual cycle, but also psychological distress and physical exertion, more often then controls as an explanation for complaints during both phases of the cycle. Implications of the finding that patients used medical as well as non-medical explanations for complaints during the cycle are discussed with regard to treatment strategies for PMS.

KEY WORDS: Premenstrual syndrome, symptoms, causal attributions, treatment.

INTRODUCTION

In the past decade, the role of cognitive processes in the perception and evaluation of bodily sensations has been emphasized (Pennebaker, 1982; Leventhal, 1988, 1992). Within the field of social psychology, the process of perceiving and evaluating external and internal stimuli is known as 'attribution theory' (Jones *et al.*, 1972). One line of research examines the causes people construct to explain bodily sensations, and several studies indicate that patients construct causes for their symptoms (Mumma and McCorkle, 1982; Lowery and Jacobson, 1985). Given the ambiguity of most bodily sensations, it is evident that many plausible interpretations can be generated. Illness cognition appears to be an active process in patients, with important consequences for coping strategies with symptoms and illness (Leventhal, 1992). Therefore, knowledge of a patient's causal attributions for symptoms is important in understanding and treating the symptoms.

There appears to be a wide range of types, severity and timing of symptoms reported during the premenstrual period. Epidemiological studies on the incidence of premenstrual symptoms report rates from 5–97% (O'Brien, 1987). A majority of women experience only slight or minimal fluctuations in somatic and psychological complaints during the cycle (Gannon, 1985). Fewer than 10 % experience severe symptoms (Johnson, 1987),

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justifying the diagnosis of premenstrual syndrome (PMS). This means that not all women with cyclical fluctuations in symptoms should be considered as suffering from PMS. Biological, psychological and social factors have been suggested to explain the etiology and course of PMS. The obvious link with the menstrual cycle suggests that disturbances in the neuro-endocrinological changes underlying the cycle may be relevant. However, biological research has provided no support for the hypothesis that PMS is related only to neuro-endocrinological dysfunction (Lurie and Borenstein, 1990; Veeninga and Westernberg, 1992). Psychological theories concerning PMS include cognitive, affective and social variables as possible factors influencing premenstrual symptomatology.

Opinions of women as well as men with regard to the premenstrual period are often influenced by social beliefs and stereotypes (Parlee, 1974; Brooks-Gun and Ruble, 1980; Golub, 1981). In Western societies, premenstruum and the onset of menstruation are considered as periods with a variety of unpleasant physical and psychological symptoms. Ruble (1977) found that symptom reporting associated with the menstrual cycle was affected by the stage of the cycle at which a woman perceived herself to be, and that it was relatively independent of a woman's actual stage in the cycle. There is also evidence that women tend to attribute negative emotions that happen to occur premenstrually to medical factors (Koeske and Koeske, 1975; Bains and Slade, 1988). Furthermore, stereotypical beliefs and negative expectations about menstruation appeared to be related to distress experienced during premenstruum (Brooks-Gun and Ruble, 1980; Woods, Dery and Most, 1982; AuBuchon and Calhoun 1985; Olasov and Jackson, 1987). However, little is known about explanatory models patients with PMS have for symptoms perceived during their cycle. A search of the literature by Medline PsycScan [1992] revealed that no studies have been performed to investigate the relationship in patients with PMS between symptoms perceived during the cycle and causal attributions for these symptoms. Knowledge of a patient's illness cognition may lead to a better understanding of coping behaviour with symptoms (Leventhal, 1992). Moreover, the effectiveness of treatment depends upon consensus of opinion between patient and therapist with respect to explanation of symptoms (Higginbotham, West and Forsyth, 1988).

The aim of the present study was (1) to compare patients with PMS with controls on the reporting of symptoms and attributions of causality for these symptoms in the premenstrual as well as the intermenstrual period of the cycle, and (2) to examine the relationship between premenstrual symptoms and attributions of causality for these symptoms.

METHOD

Patients

Women with histories of premenstrual symptoms between the ages of 18 and 45 with ovulatory cycles and regular menses (not less than 27 or more than 31 days), not undergoing treatment for menstrual problems, and not on prescription drugs, were recruited from the central region of the Netherlands by a local newspaper advertisement seeking participants for a research and drug treatment project on premenstrual symptoms. Payment was offered for cooperation. Initial selection took place about nine

months before this study[1]. Premenstrual fluctuations in complaints were prospectively confirmed with a Dutch adaptation of the Menstrual Distress Questionnaire (MDQ; Moos, 1985; Van der Ploeg, 1986) on the 4th, 12th, 22nd and 26th days of the menstrual cycle for two consecutive cycles. A detailed description of the selection procedure and PMS criteria is reported elsewhere (Veeninga and Westenberg, 1992). Three hundred and eighty-four subjects were selected from the women who responded to the newspaper advertisement. Two hundred and four women completed the questionnaires and 88 met criteria for premenstrual symptoms.

The present study was part of a research project investigating different aspects of PMS (psychological, psychiatric, biological), and a pharmacological treatment study. It was decided that 38 patients could take part in the investigation. Therefore, a random sample of 38 out of 88 patients was enrolled to participate in the study. Ovulation detection was performed by sonography on the 12th and the 22nd day of two cycles. All 38 patients had ovulatory cycles.

Controls

Controls included twenty-six women without histories of physical and/or psychological complaints during the premenstrual period. They were hospital staff members whose participation in the study was requested through an advertisement in a hospital newsletter asking for controls in a research project on premenstrual symptoms. They were being paid for their cooperation. Women between the ages of 18 and 45 with ovulatory cycles and regular menses (not less than 27 or more than 31 days), not undergoing treatment for menstrual problems, and not on prescription drugs were asked to participate in the control group. The absence of premenstrual fluctuations in complaints was prospectively confirmed with a Dutch adaptation of the Menstrual Distress Questionnaire (MDQ; Moos, 1985; Van der Ploeg, 1986) on the 4th, 12th, 22nd and 26th days of the menstrual cycle for two consecutive cycles. None of the controls fulfilled criteria for PMS (Veeninga and Westenberg, 1992). Ovulation detection was performed by sonography on the 12th and the 22nd day of two cycles. All controls had ovulatory cycles.

Measures and procedure

Symptoms were assessed using the Dutch adaptation of the MDQ (Moos, 1985; Van der Ploeg, 1986) and the Dutch version of the Symptom Checklist-90 (SCL-90; Derogatis 1977; Arrindell and Ettema, 1986). Causal attributions were assessed using the Attribution Inventory (Kraaimaat and Van Schevikhoven, 1988). Women were asked to rate their complaints and causal attributions on the questionnaires on the 12th and 26th days of two consecutive menstrual cycles. The 26th day was considered as representative of the premenstrual period and the 12th day as representative of the intermenstrual period. The scores on the 12th and the 26th day of the first cycle were averaged with the scores on the corresponding days of the second cycle.

The Dutch adaptation of the *Menstrual Distress Questionnaire (MDQ)* is a self-report questionnaire, constructed for the measurement of complaints related to the

[1] We gratefully acknowledge the contribution of Henk M. Van der Ploeg in the selection of patients.

menstrual cycle. The list comprises 46 items obtained from interviews with actively menstruating women and from research reports on premenstrual symptoms. The questionnaire has 8 subscales reflecting pain, water retention, autonomic reactions, negative affect, impaired concentration, behavior change, arousal and control. MDQ items are measured on a visual analogue scale ranging from 'not at all' to 'extremely'. Results of the scoring were converted into a 10-point scale. In the present study the total score was used, as well as 3 of the 8 subscales reflecting pain, water retention and negative affect. These scales are considered to reflect premenstrual complaints (Moos, 1985).

The *Symptom Checklist-90 (SCL-90)* is a widely and well-validated self-report inventory for measuring the severity of psychopathology in psychiatric outpatients. The questionnaire comprises 90 items, each measured on a five-point scale of distress ranging from 'not at all' (1) to 'extremely' (5) distressed. The questionnaire has subscales reflecting agoraphobia, anxiety, somatic complaints, depression, distrust and interpersonal sensitivity, insufficiency, hostility, and sleep disturbances. Only the total score and the subscales of anxiety and depression were considered relevant in assessing premenstrual symptomatology.

Patients were also screened for psychiatric morbidity according to DSM-III-R axis I criteria using the *Anxiety Disorders Interview Schedule-Revised* (ADIS-R; DiNardo, O'Brien, Barlow, Waddell and Blanchard, 1983). Results will be published separately (Veeninga, De Ruiter and Kraaimaat, in press).

The *Attribution Inventory* was used in previous research (Kraaimaat and Van Schevikhoven, 1988) and comprises twenty items asking for different attributions to complaints. Subjects were asked to indicate the applicability of the attributions to complaints (reported on the MDQ and SCL-90) by means of a 4-point scale (1 = not at all, 2 = a little, 3 = quite a bit, 4 = very much so). Subsequently, the 20 items were classified a priori in the following 8 categories of attributions: menstrual cycle (one item: menstrual cycle), psychological distress (three items: psychological problems, emotional distress, unhappy childhood), physical exertion (three items: wrong posture, physical exertion, overactive or agitated life style), age (one item: age), somatic causes (three items: hereditary factors, physical illness, accident), harmful substances (five items: medication, stimulants, nutrition, pollution, allergy), weather conditions (one item: weather) and metaphysical influences (three items: misery and suffering in the world, punishment imposed by God, extra-terrestrial influences). Scale scores were calculated by summing up items per category. To facilitate comparison among scales of the self-report inventories, the total score on each scale was divided by the number of items per scale.

RESULTS

The means age of the patient group was 35.2 (sd=7.2) and 35.1 (sd=6.2) in the control group. The groups did not differ significantly in age (t-test, t=.06, n.s.), educational level (Chi^2 = 1.15, df=4, n.s.), and marital status (Chi^2 =2.93, df=1, n.s.).

Symptoms profiles for the groups as measured with the MDQ and the SCL-90

Mean and standard deviations of the scores on the MDQ and SCL-90 symptom scales are presented in Table 1.

Table 1 Means and standard deviations (in parentheses) of the MDQ and the SCL-90 scores on the 12th and 26th days of the cycle for patients and controls

Measure	*Day*	*Patients n=38*	*Controls n=26*	*Mann-Whitney-U test*	*Friedman test*	
				Pt. vs contr.	*Pt. 12–26*	*Contr. 12–26*
		Mean(S.D.)	*Mean (S.D.)*	*z*	*Chi*	*Chi*
MDQ						
pain	12	1.85 (.78)	1.22 (. 24)	–4.16***		
					23.68***	.93
pain	26	3.16 (1.56)	1.27 (.45)	–6.06***		
water ret.	12	1.46 (.57)	1.08 (.11)	–3.52***		
					34.11***	2.37
water ret.	26	3.47 (1.53)	1.24 (.34)	–6.43***		
neg. affect	12	1.38 (.57)	1.01 (.03)	–5.14***		
					25.29***	1.33
neg. affect	26	2.26 (1.46)	1.11 (.29)	–6.08***		
total score	12	1.44 (.46)	1.07 (.08)	–4.75***		
					28.66***	.15
total score	26	2.53 (1.05)	1.14 (.22)	–6.53***		
SCL–90						
anxiety	12	1.21 (.22)	1.02 (.03)	–5.14***		
					4.45***	.15
anxiety	26	1.44 (.46)	1.02 (.06)	–5.57***		
depression	12	1.26 (.32)	1.03 (.05)	–4.76***		
					8.53**	.04
depression	26	1.55 (.59)	1.04 (.08)	–5.89***		
total score	12	1.24 (.22)	1.03 (.03)	–5.55***		
					15.16***	.15
total score	26	1.45 (.44)	1.04 (.07)	–6.08***		

*p<.05; **p<.01; ***p<.001

Variances between the intermenstrual and the premenstrual day, as well as between groups, were found to differ, so that nonparametric tests were used to analyse differences between the days of the cycle and the groups. Differences between the premenstrual and the intermenstrual day were tested by Friedman tests for each group separately. In the patient group, significant differences were found between the 12th and the 26th days of the cycle on all symptom scales of the MDQ and the SCL-90. No differences were found in the control group between these days.

Mann-Whitney-U tests revealed that patients differed significantly from controls on all symptom scales of the MDQ and SCL-90 not only on the 26th day of the cycle, but also on the 12th day.

Thus, patients reported substantially more symptoms in the premenstrual period compared to the intermenstrual period. Furthermore, patients reported more symptoms than controls not only in the premenstrual period, but also in the intermenstrual period.

Attributions of causality

The mean scores on the attribution scales are presented separately for patients and controls in Table 2 for the 12th and the 26th days. Except for the attribution 'menstrual cycle', means of the other attributions in patients as well as control are all below 1.50, whereas the scale ranges from 1 (not at all) to 4 (very much so). This indicates that the symptoms were mostly not attributed to any cause at all. In the control group, this finding is in line with the very low scores on the symptom scales on the 12th as well as the 26th day. Somewhat remarkable are the rather low mean scores on the attribution scales in patients, since they reported substantially more symptoms on both days of the cycle.

Table 2 Means and standard deviations (in parentheses) of the scales of the attribution inventory on the 12th and the 26th days of the cycle

Attribution scale	*Patients n=38*		*Controls n=26*	
	day 12	*day 26*	*day 12*	*day 26*
Menstrual cycle	1.64	2.35	1.18	1.38
	(.72)	(.98)	(.41)	(.67)
Psychological distress	1.20	1.31	1.04	1.04
	(.31)	(.42)	(.12)	(.12)
Physical exertion	1.10	1.12	1.06	1.09
	(.16)	(.18)	(.15)	(.18)
Age	1.17	1.35	1.06	1.09
	(.36)	(.66)	(.22)	(.29)
Somatic causes	1.12	1.18	1.11	1.11
	(.27)	(.37)	(.21)	(.24)
Harmful substances	1.10	1.12	1.06	1.09
	(.16)	(.18)	(.15)	(.18)
Weather conditions	1.40	1.40	1.17	1.20
	(.50)	(.53)	(.40)	(.45)
Metaphysical influences	1.06	1.06	1.03	1.04
	(.12)	(.12)	(.08)	(.10)

Note: Results of the statistical analyses are given in the section on the results.

Differences in causal attributions between the intermenstrual and the premenstrual period were separately analysed for the two groups with Friedman tests. The only difference was found in the patient group: they attributed their symptoms more often to the menstrual cycle on the 26th day than on the 12th day of the cycle ($Chi^2 = 13.33$, df=1, $p<.001$).

Differences between the groups in causal attributions (between subjects' effects) were analysed by Mann-Whitney-U tests for both phases of the cycle separately. In comparison to controls, both on the 12th and the 26th days of the cycle, patients attributed their complaints more often to the menstrual cycle ($z= -3.02$, $p<.01$ and $z= -3.70$, $p<.001$, respectively), psychological distress ($z=-2.77$, $p<.01$ and $z= -3.28$, $p<.01$, respectively) and physical exertion ($z= -2.86$, $p<.01$ and $z= -2.39$, $p<.05$, respectively). On the 12th day, patients attributed their symptoms more often to weather conditions than controls ($z= -2.07$, $p<.05$).

Relationship between attributions and symptoms

The relationship between causal attributions and reported symptoms was investigated for those categories of the Attribution Inventory in which patients differed from

controls in both phases of the cycle. We investigated this relationship only in patients, because controls had few complaints and reported no significant differences in causal attributions in the premenstrual and intermenstrual periods. In Table 3, the product-moment correlation coefficients between the attributional categories of menstrual cycle, psychological distress and physical exertion of the Attribution Inventory and the scores on the subscales of the MDQ and the SCL-90 are presented for patients on the 12th and the 26th days of the cycle.

Table 3 Correlations between scores on the attribution inventory scales and scores on MDQ and SCL-90 symptom scales for patients on the 12th and the 26th days of the cycle

Attribution	*MDQ scales*			*SCL-90 scales*	
	pain	*water retention*	*negative affect*	*anxiety*	*depression*
Day 12					
Menstrual cycle	.01	.06	−.08	−.02	.01
Psychol. distress	.41*	.33*	.67**	.66*	.41*
Physical exertion	.58**	.52**	.52**	.41*	.58**
Day 26					
Menstrual cycle	.49**	.36*	.51**	.41*	.33
Psychol. distress	−.01	−.03	.28	.37*	.50**
Physical exertion	.44*	.32	.24	.31	.36*

Two-tailed; * $p<.05$, ** $p<.01$;

On the 12th day of the cycle significant relationships were found between scores on the MDQ and the SCL-90 scales, and scores on the categories psychological distress and physical exertion of the Attribution Inventory. No association was found between the symptom scores and the attribution category menstrual cycle on this day.

On the 26th day of the cycle, scores on the pain, water retention and negative affect scales of the MDQ, and the anxiety scale of the SCL-90 were correlated with the category menstrual cycle of the Attribution Inventory. SCL-90 anxiety and depression scores were associated with psychological distress, and MDQ pain and SCL-90 depression scores with physical exertion on the 26th day.

DISCUSSION

Patients with PMS showed fluctuations in typical premenstrual symptoms, as measured with the MDQ. These fluctuations concern not only somatic symptoms, but also psychological symptoms, as is most clearly indicated by premenstrual changes in anxiety, depression and psychological distress, as measured with the SCL-90. Controls reported no fluctuations in symptoms during the cycle.

Patients reported significantly more physical as well as psychological symptoms than controls, not only premenstrually, but also in the intermenstrual period. The finding of higher anxiety and depression scores in patients during the intermenstrual period could suggest that factors other than PMS contributed to the reported symptomatology. Our patients were also screened for psychiatric morbidity according to DSM-III-R axis I criteria. A large number of patients met criteria for anxiety disorders (Veeninga *et al.*, in press). This is in line with the high levels of psychological symptoms reported

intermenstrually. The finding of a strong relationship between PMS and anxiety disorders is corroborated by recent investigations (Facchinetti, Roman, Fava and Genazzani, 1992; Fava, Pedrazzi and Gauraldi, 1992). It could be possible that the high prevalence of anxiety disorders is influenced by cyclical hormonal changes: there is evidence that premenstrual women show an enhanced susceptibility to fear (Van der Molen, Merckelbach and Van den Hout, 1988).

Patients attributed their complaints during premenstruum more frequently to the cycle than was the case during the intermenstrual period. Controls showed no differences in types of explanations for complaints in either phase of the cycle. Some differences in attributional modes between patients and controls were found: patients not only used the menstrual cycle, but also psychological distress, physical exertion and weather conditions more often than controls as an explanation for complaints. Thus, patients attributed their complaints to somatic as well as to other causes.

Contrary to medical conceptions of PMS, patients used the cycle more often as an explanation for complaints than controls during the intermenstrual phase. In the gynaecologist's view, this period is considered to be unaffected by cycle-related symptoms. During premenstruum, physical as well as psychological symptoms were attributed to the menstrual cycle by patients with PMS. Moreover, pain was attributed to physical exertion, and depressive symptoms to psychological distress and physical exertion. Thus, patients' interpretations of complaints during the premenstrual period were not restricted to the cycle. The attribution of pain to physical exertion and depressive symptoms to psychological distress seems to be based on commonsense theories of symptoms.

It has been suggested that women who seek help for PMS misattribute symptoms to physiologic changes during the cycle (Choung, Colligan, Coulam and Bergstrahl, 1988; Hammerbäck, Bäckström and MacGibbon-Taylor, 1989).

Moreover, it has been found that women overestimate the prevalence of premenstrual symptoms in retrospective reports, as compared to prospective ratings of the same subjects (Endicott and Halbreich, 1982; Rubinow, Roy-Byrne, Hoban, Gold and Post, 1984). These findings could be interpreted as a tendency to somatization. Our finding of higher levels of somatic symptoms in patients in the premenstrual as well as in the intermenstrual period could corroborate this assumption. However, patients in our study appeared to attribute their complaints to medical as well as to non-medical causes, such as psychological distress and physical exertion, even in the premenstrual period. Moreover, no differences were found between patients and controls in the tendency to attribute complaints to somatic causes other than the menstrual cycle.

One may retain some reserve with respect to regarding the results of this study as representative of PMS sufferers. Patients were recruited by newspaper advertisements (seeking participants for a research and treatment project on PMS) and not selected from a general population sample or from women seeking clinical help for their complaints. Moreover, only women with regular ovulatory cycles were selected for participation and the control group was selected from health professionals only. Therefore, findings of this study should be interpreted with caution.

Also, some comments can be made with regard to the method of assessing attributions to complaints in this study. The Attribution Inventory is previously only used in research assessing attributions to complaints in headache sufferers, and not in patients suffering from premenstrual symptoms. However, the items of this inventory

were selected by means of a literature survey, collecting different attributions to different complaints.

The main finding of the present investigation that patients used medical as well as non-medical explanations for complaints has implications for some aspects of diagnosis and treatment in individual cases.

Explanatory models that patients construct for illness influence coping behavior, treatment outcome, compliance, and drop-out (Cameron, 1978; Follick, Zitter and Ahern, 1983; Leventhal, 1988, 1992). Moreover, it has been argued that the effectiveness of treatment depends upon consensus of opinion between patient and therapist with respect to explanation of symptoms (Higginbotham *et al.*, 1988). Although PMS is considered to be the result of multiple interacting biological, psychological and social factors (Clare, 1985; Keye and Trunnell, 1986; Lurie and Borenstein, 1990), most practitioners apply treatment that is based on either a biomedical or a psychological model of complaints. This approach has two disadvantages: firstly, a monocausal approach to PMS does not take into account the influence of other factors; and secondly, a treatment strategy based on a one single explanation of symptoms might not be consistent with a patient's view of her symptoms, consequently resulting in differences between the patient's and practitioner's expectations of treatment outcome. Effective treatment of PMS requires not only a careful assessment of all possible factors contributing to premenstrual symptomatology, but also negotiations between patient and therapist to obtain a maximum of agreement in explanatory models of complaints. Thus, in treating individual cases, the management of PMS requires careful monitoring of symptoms and causal attributions, in order to obtain insight into the patient's explanatory model of complaints.

Information about a patient's attributions of symptoms could also be important on another level. Patients not only seek explanations for bodily experiences, but the hypotheses they develop might, in turn, influence their perception of symptoms (Pennebaker, 1982). This implies that effective treatment may include a cognitive therapy of attributional retraining, when a woman has commonsense opinions of her symptoms that are not in line with a functional analysis of her symptoms.

Finally, it should be mentioned that the effectiveness of a cognitive approach, in addition to other treatment strategies in PMS, still has to be demonstrated by research.

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