THE ROLE OF CATASTROPHIZING IN THE PAIN AND DEPRESSION OF WOMEN WITH FIBROMYALGIA SYNDROME

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Objective. Although 2 recent studies have found associations between catastrophizing and poor medical outcomes in patients with fibromyalgia syndrome (FMS), neither assessed these findings in comparison with a similar group of patients with chronic pain. Our study examined the complex relationships between depression, catastrophizing, and the multidimensional aspects of pain in women with FMS and compared these relationships with those in women with rheumatoid arthritis (RA).

Methods. Sixty-four FMS patients and 30 RA patients completed the Coping Strategies Questionnaire (CSQ), the Beck Depression Inventory II (BDI-II), and the McGill Pain Questionnaire.

Results. Compared with subjects with RA, FMS subjects scored significantly higher on the catastrophizing subscale of the CSQ. FMS patients also earned higher scores on overall depression and on the cognitive subscale of the BDI-II. Furthermore, the relationship between catastrophizing and depression was significant in the FMS group only. Regression analyses revealed that in FMS, catastrophizing as a measure of coping predicted patients’ perception of pain better than demographic variables such as age, duration of illness, and education.

Conclusion. Cognitive factors, such as catastrophizing and depressive self-statements, have a more pronounced role in the self-reported pain of patients with FMS than in patients with RA. Clinically, this indicates that treating pain and depression in FMS by adding cognitive therapy and coping skills components to a comprehensive treatment program may improve the outcomes obtained with pharmacologic interventions.

Effective treatment of fibromyalgia syndrome (FMS) poses a challenge for rheumatologists. There is no consensus on the optimal treatment due, in part, to the limited effectiveness of pharmacologic agents in this population (1). In addition, the well-documented psychological distress and behavioral sequelae present in many FMS patients often further challenge physicians. By better understanding the psychological processes of FMS patients, rheumatologists might be able to offer them more effective care.

Extensive evidence suggests that psychiatric distress occurs at significantly higher rates in FMS patients compared with other chronic pain patients (2–5). Co-morbid major depression has been diagnosed in 26–80% of FMS patients (6–8), while anxiety has been detected in 51–63% of subjects studied (7,9). Of note, psychiatric diagnoses often antedate clinical features of the syndrome (7,10). In addition, FMS patients report more general life stress (11), more distressing life events (2), including mounting evidence of traumatic events in childhood (12–14), and higher levels of stress-related illness (15). Furthermore, personality variables associated with psychological vulnerability appear to be common in FMS, including low self-esteem (16), pessimism (17), helplessness (18), dependence and passivity (19), and denial of current life problems while attributing psychosocial dysfunction solely to physical illness (20).

A behavioral manifestation of psychological distress is the tendency to exhibit abnormal illness behavior (20). In FMS, abnormal illness behavior includes reporting obscure symptoms and engaging in excessive help-seeking (21,22), using denial as a defense mechanism (21), and demanding medical intervention only to denigrate the treatment offered (20). Based on these com-
mon behavioral observations and the high incidence of psychiatric comorbidity, many experts in the field speculate that FMS is a physiologic disorder mediated by psychological factors (11,23–27). Winfield (26) concluded that convergent psychological and neurobiologic data suggest that the pain and fatigue of FMS may be explained by a chronic, stress-related blunting of the stress response axes. Specifically, blunting of the sympathetic nervous system and the hypothalamic–pituitary–adrenal axis may result in alterations of pain regulatory mechanisms.

Previous investigations have suggested that the detrimental impact of stress may depend more on one’s cognitive appraisal of a situation (28) and on the perceived efficacy of one’s coping responses (29) than on the stressor itself. Thus, actual life events are less significant than one’s perception and interpretation of them. Psychologically distressed people have the tendency to commit cognitive errors and view reality in a manner that is self-deprecating (30). A common cognitive error that leads to faulty assumptions and misinterpretations is catastrophizing (30), which is characterized by pessimistic beliefs about oneself, others, and the future, in which one assumes that the worst possible outcome will occur. For example, if the physician were to recommend that the FMS patient engage in regular exercise, the patient might respond, “If I exercise today, I will be laid up in bed for the next five days.” Catastrophizing is a correlate of psychological vulnerability, in which people feel helpless and hopeless about their ability to impact internal and external events successfully. There is clearly a relationship between catastrophizing and poor medical outcomes in other patient populations, including those with irritable bowel syndrome (31), postoperative pain (32,33), soft tissue injury (34), chronic back pain (35), phantom limb pain (36), knee replacement surgery (37), dental hygiene treatment (38), and rheumatoid arthritis (RA) (39).

Two recent studies of patients with FMS found catastrophizing to be related to increased pain and depression (40) and higher levels of disability (41). A third study failed to find a significant relationship between coping and disability in FMS after controlling for depression (8). However, its authors may have inadvertently reduced the relationship between coping and disability due to the shared variance between depression and coping factors (41). None of these studies assessed the complex relationships between catastrophizing, depression, and pain in FMS patients in comparison with a similar group of chronic pain patients. Thus, whether catastrophizing plays an unusually powerful role in the pain and depression of FMS patients remains unknown.

Based on these previous findings suggesting that FMS patients manifest higher levels of psychological distress than other chronic pain populations, our principal hypothesis was that catastrophizing plays a more important role in the pain and depression of women with FMS than in those with a similar chronic pain condition, i.e., RA. This would be consistent with a psychological vulnerability model and emphasize the importance of psychological assessment and treatment in conjunction with standard medical care, because both catastrophizing and psychological vulnerability are potentially modifiable factors. Thus, our study had 4 objectives: 1) to assess the pain coping strategies of women with FMS and compare these strategies with those reported by women with RA; 2) to assess the extent to which catastrophizing predicts pain scores in women with FMS; 3) to compare levels of depression between groups, including a more in-depth investigation into the cognitive components of depression; and 4) to examine and compare the relationships between catastrophizing, pain, and depression in women with FMS and women with RA.

PATIENTS AND METHODS

Participants and procedure. In accordance with the Institutional Review Boards of the University of Medicine and Dentistry of New Jersey–Robert Wood Johnson Medical School (UMDNJ-RWJMS) and United States International University in San Diego, California, informed consent was obtained from all participants. The sample consisted of 94 women between the ages of 25 and 60 years with a diagnosis of either FMS (n = 64) or RA (n = 30) by a board-certified rheumatologist using the diagnostic criteria established by the American College of Rheumatology (9,42). Because women account for >85% of FMS patients (9,43) and for a disproportionate number of RA patients, only women were included as subjects. Excluded from participating were women who were diagnosed with a coexisting psychotic disorder, organic brain syndrome, life-threatening medical illness, or communicative disorder, lacked fluency in English, or were considered illiterate.

Most of the participants (n = 82) were present or former patients of one of the authors (LHS). All new patients presenting at the UMDNJ-RWJMS rheumatology clinic who met the study criteria were verbally invited to participate. In addition, 240 letters inviting participation were mailed to the homes of active and former UMDNJ-RWJMS patients identified by computer. Although 98 potential participants responded to the verbal or written invitations, 16 were unable to complete the assessment for various reasons, such as lack of transportation.

The remainder of the participants were referred to the study by other participants (n = 5), recruited at local support
The adjective checklist of the MPQ, a self-report measure consisting of 20 groups of single-word pain descriptors, was used to assess the multiple dimensions of pain (46). Each word group contributes to a score for 1 of the 3 dimensions of pain hypothesized by the gate control theory: sensory, evaluative, and affective (47). Subjects are instructed to select 1 word from each group that best describes their experience and to leave out any word group that is not suitable. For the purposes of this study, self-reported pain is referred to as the total pain score and defined as the sum of the scores for all 3 dimensions, plus the score from the miscellaneous category. Reliability studies of the MPQ have demonstrated good test–retest reliability (46), while content and construct validity have been confirmed in 4 well-designed studies (48).

Beck Depression Inventory II (BDI-II). Similar to its predecessor, the BDI-IA, the BDI-II is a 21-item self-report measure that assesses the cognitive, affective, and neurovegetative symptoms of depression (49). To make the BDI-II more consistent with the depression criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, items dealing with weight loss, changes in body image, and somatic preoccupation have been replaced. These modifications make the BDI-II less sensitive to medical factors, resulting in a more appropriate measure for a chronic pain population. The cognitive subscale of the BDI-II consists of the following 8 items: pessimism, past failure, guilty feelings, punishment feelings, self-dislike, self-criticalness, suicidal thoughts and wishes, and feelings of worthlessness (50). Satisfactory reliability and validity evidence for the BDI-II and the cognitive subscale has been reviewed elsewhere (49–51).

Demographics questionnaire. Designed specifically for this study and pilot tested prior to its use, the demographics questionnaire includes items related to age, education, duration of illness, and psychiatric and medical comorbidity. In addition, data about exercise habits, treatment history, marital status, and socioeconomic and employment status are requested.

Statistical analysis. The distributions of key variables were assessed and data transformations implemented to normalize 3 of the distributions (total depression, catastrophizing, and the affective dimension of pain). Descriptive statistics were calculated for all variables in both groups. Group equivalence and mean score differences on pain scores, catastrophizing, and both depression scores (total and the cognitive subscale) were assessed with t-tests.

Next, correlations were calculated for each group between the CSQ subscales, the depression scores, the sensory, affective, and evaluative aspects of pain, and total pain score. Hypothesized differences between groups were examined by converting correlations to Z scores and subjecting these to appropriate comparisons.

Separate univariate regression analyses were conducted for the FMS group. The analyses examined the association between the predictor variables (e.g., catastrophizing, depression, and patient history variables) and the dependent variables (e.g., the 3 dimensions of pain and the total pain score). The patient history variables included 1) age in years, 2) duration of illness in months, and 3) years of education. The
R² values from these analyses were then analyzed for differences in magnitude. Alpha for all statistical tests was set at 0.05. Power analysis conducted for the correlation/regression coefficients yielded a Glass effect size of 0.33 at 80% power with an α of 0.05 for 1-tailed tests. For t-tests with a 70/30 unbalanced group, the Glass effect size was 0.6 with a critical effect size of 0.27. These analyses suggested that there was adequate power to detect medium effect sizes.

RESULTS

Analysis of coping strategies. The data in Table 1 show that although both groups reported similar levels of pain, women with FMS were significantly more prone to catastrophizing their pain than were women with RA (t [df 92] = 2.41, P < 0.02). Post hoc analyses compared scores between groups on the remaining coping subscales using a series of 2-tailed t-tests with an α level set at 0.007 after applying a Bonferroni correction to adjust for multiple comparisons. The data in Table 2 show that no significant differences between groups existed for the other 7 coping strategy subscales. Furthermore, within-group correlation analyses, depicted in Table 3, revealed that in FMS patients, catastrophizing related significantly to all 3 dimensions of pain: sensory, affective, and evaluative. In contrast, data presented in Table 3 for RA subjects indicated that catastrophizing related to the affective and evaluative, but not the sensory, dimensions of pain.

Results in Table 3 suggest that there were other differences in the ways in which the 2 groups coped with pain. Similar to the findings reported by Burckhardt et al (40), FMS patients who catastrophized were also likely to use praying and hoping as a coping strategy, but this was not true of the RA subjects. In FMS, praying and hoping related to higher scores on every measure of pain: total pain, sensory, affective, and evaluative. Yet, praying and hoping in RA patients related only to the affective aspect of pain. For the RA patients, reinterpreting pain sensations related to the total pain score and the sensory aspect of pain. In contrast, no significant relationship between reinterpreting pain sensations and any other measure of pain existed for patients with FMS.

In the FMS group, catastrophizing related negatively to ignoring pain sensations, which was also consistent with the findings of Burckhardt et al (40). Catastrophizing also related negatively to the use of coping self-statements and perceived ability to decrease pain (r [df 62] = −0.45, P < 0.0001) and control pain (r [df 62] = −0.44, P < 0.0001). Contrary to the findings of others (37,40), the perceived ability to control pain was not related significantly to the total pain score in either group. Furthermore, only in FMS subjects was the ability to decrease pain associated with lower levels of pain (r [df 62] = 0.32, P = 0.01). Although none of the coping strategies related to lower total pain scores in either group, ignoring painful sensations related negatively to the evaluative aspect of pain in FMS patients.

Univariate regression analyses. In women with FMS, catastrophizing appeared to be as good as depression at predicting self-reported pain. Data in Table 4 show that both catastrophizing and depression were significant predictors of pain, explaining 27% and 30% of the variance, respectively. Furthermore, for patients with FMS, catastrophizing was a better predictor of pain than the demographic variables of subject age (t [df 61] = 2.60, P < 0.05), duration of illness (t [df 61] = 3.04, P < 0.05), and years of education (t [df 61] = 1.87, P < 0.05).

Analyses of depression. FMS subjects reported significantly more depression than RA subjects (t [df 92] = 2.47, P < 0.02) and scored higher on the cognitive subscale of the BDI-II (t [df 92] = −2.55, P < 0.01). In addition, the correlation between depression and catastrophizing was significant in the FMS group (r [df 62] = 0.710, P < 0.0001), whereas the correlation in the RA group was not (r [df 28] = 0.238, P = 0.21). This

Table 2. Comparisons between fibromyalgia syndrome and rheumatoid arthritis groups on other Coping Strategies Questionnaire subscales*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Fibromyalgia syndrome (n = 64)</th>
<th>Rheumatoid arthritis (n = 30)</th>
<th>t-test</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coping self-statements</td>
<td>22.37 ± 7.51</td>
<td>23.37 ± 8.94</td>
<td>0.561</td>
<td>0.576</td>
</tr>
<tr>
<td>Diverting attention</td>
<td>11.64 ± 7.66</td>
<td>12.50 ± 8.97</td>
<td>0.480</td>
<td>0.633</td>
</tr>
<tr>
<td>Reinterpreting pain</td>
<td>6.25 ± 6.57</td>
<td>5.70 ± 5.88</td>
<td>−0.391</td>
<td>0.697</td>
</tr>
<tr>
<td>Ignoring pain sensations</td>
<td>15.03 ± 8.34</td>
<td>16.67 ± 7.76</td>
<td>0.906</td>
<td>0.367</td>
</tr>
<tr>
<td>Praying or hoping</td>
<td>14.34 ± 8.39</td>
<td>16.10 ± 9.35</td>
<td>0.912</td>
<td>0.364</td>
</tr>
<tr>
<td>Increasing activities</td>
<td>13.56 ± 6.04</td>
<td>12.27 ± 6.62</td>
<td>−0.940</td>
<td>0.350</td>
</tr>
<tr>
<td>Pain behaviors</td>
<td>18.27 ± 6.08</td>
<td>20.07 ± 8.00</td>
<td>1.207</td>
<td>0.230</td>
</tr>
</tbody>
</table>

* Except where otherwise indicated, values are the mean ± SD.
relationship was significantly different between the 2 groups \( (Z = 2.78, P < 0.05) \).

**DISCUSSION**

Catastrophizing appears to play a more important role in the pain and depression of women with FMS than in women with RA, a similar chronic pain condition. Women with FMS are more prone to catastrophizing their pain than are women with RA. In addition, catastrophizing predicts pain scores in FMS patients better than demographic variables that typically show strong relationships: duration of illness, years of education, and subject age. In comparing the scores of FMS and RA patients on the 7 remaining coping subscales of the CSQ, catastrophizing was shown to be the only significantly different coping strategy. Thus, FMS and RA groups report equivalent levels of pain and rely on similar coping strategies, but the FMS group is more prone to the negativistic thinking associated with catastrophizing. With a tendency to endorse items such as, “It’s terrible and I feel it’s never going to get better” and “I feel like I can’t go on,” FMS subjects are more likely to experience their pain with a sense of hopelessness and helplessness. Thus, our results suggest that coping and pain have different patterns of relationships in FMS and RA patients.

One of our most salient findings is that no particular coping strategy is associated with lower pain scores in either diagnostic group. At the same time, the maladaptive coping characterized by catastrophizing predicts higher levels of pain in both groups. Interestingly, the magnitude of this relationship is not signifi-

<table>
<thead>
<tr>
<th>Predictor variable</th>
<th>( R^2 )</th>
<th>B</th>
<th>SEB</th>
<th>( P )</th>
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<tbody>
<tr>
<td>Catastrophizing subscale</td>
<td>0.27</td>
<td>5.35</td>
<td>1.12</td>
<td>0.0001</td>
</tr>
<tr>
<td>Total depression</td>
<td>0.30</td>
<td>6.04</td>
<td>1.16</td>
<td>0.0001</td>
</tr>
<tr>
<td>Age in years</td>
<td>0.02</td>
<td>0.28</td>
<td>0.25</td>
<td>0.266</td>
</tr>
<tr>
<td>Duration of illness</td>
<td>0.01</td>
<td>-2.91</td>
<td>0.04</td>
<td>0.449</td>
</tr>
<tr>
<td>Years of education</td>
<td>0.08</td>
<td>-1.77</td>
<td>0.76</td>
<td>0.022</td>
</tr>
</tbody>
</table>

Table 3. Intercorrelations among coping and pain variables for patients with fibromyalgia syndrome and patients with rheumatoid arthritis*

Table 4. Univariate regressions predicting total pain scores in fibromyalgia syndrome patients

* See Table 1 for definitions.
† \( P < 0.01 \).
‡ \( P < 0.05 \).
cantly different between the groups. In contrast, the relationship between catastrophizing and depression is significantly stronger for FMS patients than for RA patients. Taken together, these findings reveal that catastrophizing is associated strongly with pain in both FMS and RA, and that catastrophizing has a higher correlation with depression in patients with FMS.

A number of factors might account for the tendency of FMS patients to catastrophize more than RA patients. First, the duration of illness in our FMS patients was half that of the RA patients. Although little research has been conducted in this area, perhaps catastrophizing occurs earlier in the process of accepting a chronic illness. Second, unlike their RA counterparts, FMS patients may feel discouraged by the medical community’s poor understanding of their condition and the resultant ambivalence, and in some cases, the overt hostility of health care professionals. FMS patients often report feeling summarily dismissed by their primary care physicians and may arrive in rheumatology clinics with a desperate need to be heard and understood. This need and the lack of objective evidence render adamant vocalization the only option for effective communication. Third, unlike RA, there are no exciting new treatment options for FMS on the horizon, only symptomatic treatment that is too often ineffective. The lack of prospects for relief could serve to increase the feelings of hopelessness and helplessness associated with catastrophizing. Fourth, it is possible that higher rates of depression and associated negative cognitions in FMS patients are responsible for a catastrophic coping style. Finally, negativistic thought processes and poor coping skills could be an intrinsic part of the psychopathogenesis of FMS, but not pivotal to RA.

Almost 44% of the FMS group was categorized as moderately to severely depressed, a significantly higher rate of depression than that found in the RA group (19.9%). These findings are consistent with those of others who have assessed depression in FMS (7,8,19,20). Interestingly, the present FMS patients scored higher on the cognitive subscale of the BDI-II, suggesting a greater presence of depressive self-statements such as, “I feel I am a total failure as a person” or “I blame myself for everything bad that happens.” Overall, FMS patients are more likely to endorse items associated with feelings of worthlessness, failure, self-dislike, guilt, and suicidality. Of considerable concern, 34% of the FMS patients and 13% of the RA patients reported having suicidal ideation within 2 weeks prior to assessment. Appropriate followup care was provided for these subjects; note that they may not have received professional intervention otherwise, because often their depression is not diagnosed or treated. Only 15.6% of the FMS patients and none of the RA patients reported ever receiving a diagnosis of depression.

If catastrophizing affects both pain and depression in FMS, it has important implications for treatment. The recognition that emotional processes influence the experience of chronic pain has led to calls for multidisciplinary approaches to treatment (1,23,24,52). Careful assessment of both mood and coping resources for FMS patients could identify those who might benefit from adding psychotherapeutic intervention to standard medical treatment.

For example, findings from several recent studies support the effectiveness of cognitive-behavior therapy (CBT) for patients with FMS (52–55). CBT teaches patients to recognize and reframe dysfunctional thoughts such as catastrophizing and to integrate more effective coping behaviors into daily life. Effective coping counteracts feelings of helplessness that have been found to have a relationship with symptom severity and functioning in patients with FMS (56). In addition, patients gain a sense of control over their illness when they learn to cope more effectively with their pain, learn to take responsibility for coping, and give themselves credit for successful coping efforts (57). Although there is presently no cure for FMS, there are behavioral strategies, such as exercise, that have been found to reduce the symptoms (1). By challenging patients’ faulty assumptions that they are helpless, improved self-efficacy for decreasing pain emerges. However, because many FMS patients attribute their poor functioning to their medical condition alone (20), care is needed in referring them to psychotherapy. We find it helpful to present psychotherapeutic care as an empirically supported component of the standard treatment protocol for FMS.

If referring patients to a formal CBT program is not an option, rheumatologists can address the psychological issues of FMS patients directly. Our data emphasize the importance of assessing and treating depression in FMS patients. An efficient instrument such as the BDI-II provides the opportunity to evaluate both the vegetative and cognitive symptoms of depression. Similarly, asking patients about their strategies for coping with pain can be revealing. Catastrophizers often cannot identify a strategy or will report that they “do not” cope with pain. If this is the case, note that they are present for the appointment and help them identify the steps
taken to arrive at your office. Our results suggest that encouraging patients to reinterpret pain sensations (e.g., think of pain as numbness or warmth) and use of coping self-statements such as, “I can overcome the pain,” help to counteract the effects of catastrophizing.

In addition, the assessment of anxiety and psychosocial stress is extremely important. More than 76% of our FMS patients reported that stress exacerbates pain. Such a finding supports the theoretical basis of our study: catastrophizing may produce an internal experience of chronic stress that activates physiologic mechanisms. These mechanisms may contribute to the pain transmission process (26) or even long-term physiologic changes that may render one more vulnerable to depression (58) and medical illness (59). Clinicians caring for patients who report high levels of stress should explore ways in which they cope with their stress, encourage adaptive behavior, and suggest additional options such as a healthier diet, exercise, journaling, and relaxation exercises.

While our findings and their implications for treatment are compelling, several limitations should be considered in interpreting the results. First, because of its correlational design, causal inferences are not warranted. Experimental designs are needed to establish the nature of the relationships reported herein. Future studies could extend the present findings by adding a CBT intervention that focuses on reframing catastrophic beliefs. Furthermore, time-series and within-subject designs similar to that used by Hazlett and Haynes (60) would be of value, especially if they include larger samples.

Second, our sample was not randomly selected. Regular clinic patients who were willing to volunteer for research studies may not have adequately represented the FMS population at large. Third, we relied exclusively on self-report measures. Even though there is evidence of good reliability and validity for all 3 instruments used, future studies can benefit from including additional assessment methods beyond mere self-report. Our interest was in the subjective perception of pain; however, future studies should measure the experience of pain both subjectively and objectively. Finally, the relatively small number of subjects in the RA comparison group limited the choice of statistical tests and their power.

Although this study extends current findings in the FMS literature by comparing FMS subjects to a similar chronic pain group on measures of catastrophizing, depression, and pain, intervention studies continue to be an important future direction. Based on our findings, it would be interesting to compare FMS patients, RA patients, and normal controls on coping strategy modification after completing psychotherapy adapted to focus specifically on catastrophizing. Another important direction for future research is model building. Explanatory models, such as the one proposed by Bradley (61), offer the theoretical foundation from which future researchers can systematically evaluate the reciprocal processes involved in the development, mediation, and perpetuation of FMS.

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