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Gender Differences in Coping With Musculoskeletal Pain

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Gender differences in coping with musculoskeletal pain were cross-sectionally investigated, using questionnaires (Coping Strategies Questionnaire), in 446 Swedish patients (mean age 46 years, 72% women) seeking care for their ailments. Compared to male patients, women reported more disability, a larger consumption of analgesics, more work strain, higher levels of posttraumatic stress reactions, a lower self-esteem, and higher scores for the Coping Strategies Questionnaire indexes: diverting attention, praying/hoping, catastrophizing, increased behavioural activity, and pain behaviours. All gender differences in coping were ruled out in multivariate analyses, except for the association between the interaction term Gender × Posttraumatic Stress Reactions and Catastrophizing. Among women, catastrophizing was positively associated with posttraumatic stress reactions, perceived disability, and the number of previous treatments for pain. No such associations were found among men. Women's poorer capacity to cope with musculoskeletal pain is related to higher level of emotional distress, greater disability, and a history of treatments for pain.

Key words: Women, musculoskeletal pain, coping, work strain, posttraumatic stress

Gender differences in the experience of pain are receiving increasing attention (e.g., Unruh, 1996). Women are over-represented in certain pain conditions, for example, headache, abdominal pain and facial pain (Rasmussen & Olesen, 1992; Von Korff, Dworkin, LeResche, et al., 1988); osteoarthritis, rheumatoid arthritis, and

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fibromyalgia (Cathey, Wolfe, Kleinheksel, & Hawley, 1986; Verbrugge, Lepkowski, & Konkol, 1991; Wolfe, 1989), and musculoskeletal pain, particularly in the neck, shoulder, upper limbs, and hips (e.g., Andersson, Ejlertsson, Leden, & Rosenberg, 1993; Havsvold & Johnsen, 1993). This is also the case in Sweden, where approximately 75% of patients seeking care for long-standing musculoskeletal pain are women (Lagerlöf, 1993; Statistics Sweden, 1999).

Furthermore, in patient samples with pain, women seem to report a more negative clinical picture than do men. They tend to report pain of a greater intensity (Andersson et al., 1993) and frequency (Havsvold Johnsen, 1993), tend to consume more health care for pain (e.g., Taylor & Curran, 1985), and are on sick-leave or in early retirement due to such conditions more often than men (e.g., Lagerlöf, 1993). Finally, female patients report higher levels of anxiety and depression than men (Hyyppä, 1987; Jensen, Nygren, Gamberale, Goldie, & Westerholm, 1994; Magni, Calderion, Rigatti-Luchini, & Merksey, 1990), a difference that is also seen in the general population (Craighead & Vajk, 1998; McLean & Woody, 1998).

Coping strategies are known to influence patients' perceptions of their pain conditions (e.g., Rosenstiel & Keefe, 1983). Pain coping strategies refer to the thoughts and actions patients adopt to manage pain and its effects (e.g., Jensen, Turner, Romano, & Karoly, 1991; Katz, Ritvo, Irvine, & Jackson, 1996). Coping with pain can be classified into cognitive, including pain management techniques (e.g., distraction), and behavioural strategies, referring to actions for managing pain (e.g., taking pain medication; Fernandez, 1986). Further, they can reflect active or passive styles (e.g., Snow-Turek, Norris, & Tan, 1996). Active coping (e.g., problem solving), involves conscious attempts to relieve or control pain or to function in spite of it. Passive coping (e.g., praying/hoping) generally entails withdrawal or giving up and relinquishing control of the pain to something or someone else. Helplessness and catastrophizing thoughts also characterize the passive coping style (Nicholas et al., 1992). Catastrophizing refers to negative self-statements about pain (Kröner-Herwig et al., 1996; Rosenstiel & Keefe, 1983) and has been linked to medically incongruent back-pain, depression, severe pain, functional impairment, and unfavorable treatment outcomes (Jensen et al., 1991; Keefe, Brown, Wallstone, & Caldwell, 1989; Reesor & Craig, 1988; Sullivan & D'Eon, 1990). One possible reason for women's poorer adaptation to musculoskeletal disorders may be related to gender differences in the use of coping strategies for pain. This topic is largely unexplored, but one Swedish study (Jensen et al., 1994) showed that female patients reported higher levels on the Coping Strategies Questionnaire subscale catastrophizing than did men, after relevant confounders had been taken into consideration.

The principle aim of this investigation was, therefore, to examine gender differences in coping with pain in a sample of patients seeking care for musculoskeletal disorders. Women were expected to report higher levels of catastrophizing, also

when relevant confounders were statistically controlled. A second aim was to identify psychosocial (e.g., work strain) and clinical predictors (e.g., pain intensity) of coping strategies for pain separately for men and women.

METHODS

Patients

Patients ages 18 to 64 years seeking care to alleviate musculoskeletal pain from general practitioners (GPs) or physiotherapists (PHTs) were approached and asked to participate in this study. Out of 780 consecutive patients approached, 586 (75%) agreed to participate (for details, see Grossi, Soares, Ängeslevä, Perski, 1999). Analyses of variance and χ^2 tests revealed no significant differences between the participants and nonparticipants with respect to age, gender, ethnic background, or complaints. To make the sample homogeneous in terms of ethnic background, 205 patients of non-Swedish origin were excluded from the analyses. These patients have been described in greater detail in other publications (Soares & Grossi, in 1999a, in 1999b). Thus, a total of 446 Swedish patients were studied.

The mean age of the sample was 46±11 years and the majority of the participants (72%) were women. Seventy-one percent were married, 26% had a high educational level, (university) and 65% had white-collar occupations. The most common complaint was back pain (32%), followed by neck/shoulder pain (17%) and complex pain, that is, pain at multiple sites (12%). Fibromyalgia, myalgia, lower limb pain, hip pain, traumatic injury, pain due to tension, herniated disk, and "other" together accounted for 25% of the diagnoses. A considerable proportion of patients (14%) had not been given any clear diagnosis.

Assessment

The patients' diagnoses were established by GPs in accordance with the Swedish version of the International Classification of Diseases, Ninth Revision (Socialstyrelsen, 1987). To avoid interfering with the GPs' work, no reliability checks were performed on the diagnoses. The degree of reliability of the diagnoses is therefore unknown.

Measures

The patients completed a questionnaire designed to assess demographics (i.e. age, gender, marital status, occupation, work hours per day, employment status, number of children in the household) and ethnic background (i.e. whether the patient was of an ethnical origin other than Swedish).

Independent Variables

Clinical characteristics were assessed with the Pain Questionnaire (Arnér, 1984; Carlsson, 1984), which is currently used as a diagnostic tool at the Pain Management Clinic (Karolinska Hospital, Stockholm). It contains questions about pain duration, pain intensity (visual analogue scale scored from 0 to 10), pain complexity (one or several types of pain), pain frequency, previous somatic treatments and their effects, use of medication and other morbidity than pain. There is also a disability index that consists of 15 items (yes–no answers) covering various aspects of disability due to pain, such as downtime, mobility, and social life. High scores correspond to high disability. Cronbach's alpha for the disability index was .84.

Work strain. This instrument (Karasek & Theorell, 1990) contains 11 items (scored from 1 to 4) concerning work demands and control. Indexes for work demands and control were calculated. By dividing demands with control a measure of work strain was obtained for each patient. In previous research these indexes have been shown to have high reliability, as expressed by Cronbach alphas of .75 for demands and .76 for control (Theorell, Michélsen, & Nordemar, 1993). Patients who were not working at the time of data collection were instructed to rate their last employment with respect to work strain.

Burnout. This instrument consists of 22 items (scored from 1 to 7) that measure different facets of the burnout syndrome, as expressed by the subscales of burnout, tension, listlessness, and cognitive difficulties (Melamed, Kushnir, & Shirom, 1992). Lisspers and Setterlind (1999) validated the questionnaire in a cross-sectional investigation among 268 Swedes in low and middle white-collar occupations. They found significant positive associations between Melamed and coworkers' overall burnout index and the overall index for the Pines Burnout Measure (Pines, Aronson, & Kafry, 1981), $r = .738$, $p < .01$; the emotional exhaustion subscale of the Maslach Burnout Inventory (Maslach & Jackson, 1981), $r = .737$, $p < .01$; and the burnout subscale of the Stress Profile (Setterlind & Larsson, 1994), $r = .749$, $p < .01$. For purposes of data reduction, an overall burnout index was calculated for each patient. High scores correspond to high burnout levels. Alpha coefficient for this index was .78.

General Health Questionnaire (GHQ–12). The GHQ–12 (Goldberg, 1972, 1985; Goldberg & Williams, 1988) was used to measure minor psychiatric morbidity. It contains 12 items about symptoms of anxiety and depression. Scores of 0 to 2 correspond to an absence of psychiatric morbidity (well-being) and scores

3 to 12 correspond to increasing levels of psychiatric morbidity (low well-being). The Swedish version of the GHQ–12 has a good internal consistency, as expressed by Cronbach alphas ranging from .86 to .90 (Brenner, Petterson, Levi, & Arnetz, 1988).

Posttraumatic Symptom Scale (PTSS–10). The PTSS–10 (Holen, 1990) was used to assess symptoms of posttraumatic stress. This instrument was developed to cover *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 1980) criteria for posttraumatic stress disorder, such as nightmares, sleep difficulties, impaired memory, irritability, tendency to withdraw (Holen, 1990). The respondent is instructed to rate the presence or absence of such symptoms in a yes-or-no form. The PTSS–10 contains 10 items; scores 0 to 2 correspond to no stress reactions, and scores of 3 to 10 correspond to increasing levels of stress reaction. The alpha coefficient in this study was .81.

Rosenberg' Self-Esteem Scale. Rosenberg's Self-Esteem Scale (Rosenberg, 1965) was used to investigate the patients' feelings about themselves in such regards as self-confidence and intrinsic value. It contains 10 items and the total score ranges from 10 to 40. For the purpose of this study, the higher the score, the higher the level of self-esteem. Cronbach alpha for this sample was .84 .

Dependent Variables

Coping strategies for pain were measured with the Coping Strategies Questionnaire (Rosenstiel & Keefe, 1983). This instrument contains 44 items (scored from 0 to 6) about eight strategies for coping with pain: reinterpret pain sensations, coping self-statements, ignore sensations, diverting attention, praying/hoping, catastrophizing, increased behavioural activities, and pain behaviours. The perceived effectiveness of the coping efforts was rated with two items: control over pain and ability to decrease pain (self-efficacy beliefs). To present a detailed description of the gender differences in the use of various coping strategies, male and female patients were compared with regard to individual subscales rather than composite measures. The Swedish version of the Coping Strategies Questionnaire has been shown to have a satisfactory internal consistency, that is, Cronbach alphas ranging from .70 to .80 (Jensen & Linton, 1993).

Procedure

The study design was cross-sectional. The research was conducted at health care and physiotherapy centres serving a catchment area of about 250,000 people, situ-

ated in the southwestern part of Stockholm. The participation of the GPs and the PHTs in the study was based on informed consent. The patients were identified when visiting the GPs and the PHTs during a period of 15 consecutive days. At this time, patients were examined by GPs and PHTs in accordance with the Swedish International Classification of Diseases, Ninth Revision (Socialstyrelsen, 1987), provided with the questionnaire, and informed about the study. They were also instructed to return the questionnaire by mail after completing it at home. All patients were volunteers and gave their consent. Confidentiality was guaranteed. The study was approved by the local Ethical Committee.

Statistical Analyses

In a first set of analyses, factorial analyses of variance and chi-square tests (χ^2) were used to assess differences between male and female patients in terms of sociodemographic variables, demands and control at work, emotional distress, pain parameters, and coping strategies. Gender differences in pain duration, demands–control ratio, and the Coping Strategies Questionnaire subscale of reinterpret, pain sensations were analyzed by means of nonparametric tests (Mann–Whitney *U* test), due to excessive skewness in these variables. Thereafter, the associations between gender and coping strategies were analyzed with multivariate linear regressions controlling for variables that were unequally distributed between the sexes, that is, occupation, marital status, working hours, work strain, posttraumatic stress reactions, pain complexity, perceived disability, use of medication, and mean number of previous treatments. In addition, the interaction terms Gender × Pain Complexity, Gender × Number of Treatments, Gender × Analgesics, Gender × Perceived Disability, Gender × Work Strain, and Gender × Posttraumatic Stress Reactions were calculated and treated as independent variables.

Finally, multivariate linear regression analyses were computed separately for men and women to examine the association between the same set of independent variables, with the exception of the interaction terms and coping. Statistical significance was set at an alpha level of .05. Single data were lost for a number of instruments, as indicated by the *n* values and the degrees of freedom. The loss of data was possibly due to the fact that patients completed the questionnaire at home and did not feel compelled to answer each question.

RESULTS

Sociodemographic Variables

As illustrated in Table 1, men were significantly more often blue-collar workers, were more often employed full-time, and spent more weekly hours in paid work.

TABLE 1
Gender Differences in Demographic Characteristics and Types of Complaints Among Patients With Musculoskeletal Disorders

	Men[a]	*Women*[b]	*Test of Significance*
Age			
Mean±SD	45±12 years	46±11 years	ns
Marital Status			
Single	28 (23%)	47 (14%)	ns
Married/cohabit	87 (70%)	231 (72%)	ns
Divorced	9 (7%)	38 (12%)	ns
Widow/er	0	6 (2%)	ns
Education			
Mandatory	33 (27%)	84 (26%)	ns
High school	56 (45%)	120 (37%)	ns
University	28 (23%)	88 (28%)	ns
Other	6 (5%)	30 (9%)	ns
Occupation			
Blue-collar	52 (45%)	86 (28%)	$\chi^2(1)= 9.59$, $p < .01$
Low white-collar	21 (18%)	115 (37%)	$\chi^2(1)= 13.44$, $p < .001$
Intermediate/high white-collar	37 (32%)	101 (33%)	ns
Own business	5 (5%)	5 (2%)	ns
Working time			
Full-time	77 (63%)	144 (45%)	$\chi^2(1)= 10.68$, $p < .01$
Part-time	7 (6%)	68 (21%)	$\chi^2(1)= 14.04$, $p < .001$
Not working	40 (31%)	110 (34%)	ns
Working hours/week			
Mean±SD	41±11	36±11	$F(1, 431)=20.55$, $p < .0001$
Complaints			
Back pain	44 (35%)	98 (30%)	ns
Neck/shoulder pain	19 (15%)	59 (18%)	ns
Complex pain	13 (11%)	39 (12%)	ns
Fibromyalgia	0	5 (2%)	Not performed
Myalgia	2 (2%)	11 (4%)	Not performed
Lower-limb pain	5 (4%)	11 (4%)	Not performed
Hip pain	3 (2%)	10 (3%)	Not performed
Traumatic injury	4 (3%)	9 (3%)	Not performed
Strain injury	1 (1%)	3 (1%)	Not performed
Tension pain	0	8 (2%)	Not performed
Herniated disk	5 (4%)	3 (1%)	Not performed
Other	10 (8%)	20 (6%)	ns
No clear diagnoses	18 (15%)	46 (14%)	ns

[a]$n = 124$. [b]$n = 322$.

Women were more often in low-status white-collar occupations and more often employed part-time. There were no other gender differences in sociodemographic variables.

Complaints

Analyses performed on complaints recorded by the GPs and PHTs (Table 1) revealed no gender differences in terms of back pain, neck/shoulder pain, complex pain, other or unclear complaints. Comparisons between the sexes regarding other complaints were not performed due to the small sample size in each category.

Pain Parameters

On the Visual Analog Scale (Table 2), women did not rate their pain as significantly more intense than did men. However, they reported higher scores for perceived disability due to pain and a higher consumption of analgesics. Analyses performed on other pain parameters indicated that female patients experienced their pain as more complex, that is, had different types of pain and had undergone more somatic treatments, such as transentaneous nerve stimulation (TNS) and acupuncture. There were no significant gender differences in pain duration or in the use of sedatives.

Work Strain

Analyses with factorial analyses of variance (Table 2) revealed that women reported lower levels of control in the work setting, but comparable levels of demands. A Mann–Whitney *U* test also revealed higher scores for the demand–control ratio work strain among women.

Emotional Distress

Compared to male patients, women reported significantly higher scores for posttraumatic stress reactions and lower self-esteem (Table 2). There were no reliable gender differences in terms of anxiety and depression or symptoms of burnout.

Coping

As shown in Table 3, the assumption that women would report higher scores for catastrophizing was supported by the data. Furthermore, female patients reported higher scores for diverting attention, praying and hoping, increased behavioural activity, and pain behaviours. There were no significant gender differences in the use of the strategies coping self-statements, ignore sensations, and reinterpret pain sensations, or in the ability to decrease or control pain.

TABLE 2
Gender Differences in Clinical Characteristics, Work Strain, and Emotional Distress Among Patients with Musculoskeletal Disorders

	Men[a]	*Women*[b]	*Test of Significance*
Pain intensity (0–10)			
Mean±SD	7.14±1.94	7.43±2.01	ns
Disability (0–15)			
Mean±SD	4.46±3.28	5.35±3.78	$F(1, 444) = 5.34$, $p < .05$
Use of analgesics			
Regularly	14 (11%)	52 (16%)	χ^2 (2) = 7.65, $p < .0001$
Occasionally	49 (40%)	157 (49%)	
Never	61 (49%)	113 (35%)	
Use of sedatives			
Regularly	6 (5%)	10 (3%)	ns
Occasionally	7 (6%)	23 (7%)	
Never	111 (89%)	289 (90%)	
Pain duration (months)			
Median	11.5	12	ns
Range	0–431	0–468	
Pain complexity (types)			
One type	66 (53%)	119 (37%)	χ^2 (1) = 9.10, $p < .01$
Several types	58 (47%)	203 (63%)	
Number of previous treatments			
Mean±SD	1.50±1.20	1.98±1.38	$F(1, 444 = 11.34$, $p < .001$
Demands	2.72±.56	2.75±.63	ns
Control	3.22±.47	3.04±.48	$F(1, 413) = 12.23$, $p < .001$
Work strain			
Median	.84	.91	U = 5.13, $p < .001$
Range	.36–1.7	.25–2.42	
PTSS	2.49±2.44	3.46±2.65	$F(1, 444) = 12.44$, $p < .001$
Self-esteem	3.31±.55	3.13±.67	$F(1, 441) = 7.74$, $p < .01$
Burnout	3.04±1.21	3.09±1.23	ns
GHQ			
<3	84 (68%)	215 (67%)	ns
≥3	40 (32%)	107 (33%)	

Note. PTSS = Posttraumatic Symptoms Scale; GHQ = General Health Questionnaire.
[a]$n = 124$. [b]$n = 322$.

Multivariate Analyses

A set of multivariate regression was computed to analyze the associations between gender and coping strategies while controlling for variables that were unequally distributed between the sexes, that is, marital status, occupation, working hours, work strain, emotional distress, pain complexity, perceived disability, use of medication, and mean number of previous treatments. All categorical variables with

more than two categories were transformed into dummies. To avoid problems of multicollinearity, only one measure of emotional distress, posttraumatic stress reactions, was entered in the analyses. Furthermore, interaction terms were calculated between gender and work strain, posttraumatic stress reactions, number of previous treatments, pain complexity, use of analgesics, and perceived disability and used as independent variables. The results are shown in Table 4. The associations between gender and coping strategies were ruled out by the introduction of confounders. However, the interaction term Gender × Posttraumatic Stress Reactions was found to be positively associated with catastrophizing, indicating that women with high PTSS scores made more frequent use of catastrophizing.

Separate Multivariate Analyses

In the separate multivariate regression analyses, the same set of independent variables was employed, with the exception of the interaction terms between gender and other variables, in the statistical prediction of catastrophizing. Among women (Table 5), catastrophizing was positively associated with posttraumatic stress reactions, perceived disability, and the number of previous treatments. A virtually identical pattern of results was obtained in secondary analyses, in which posttraumatic stress reactions were substituted with scores for self-esteem, anxiety/depression, and burnout, respectively. The results thus indicate a more frequent use of catastrophizing among women with high levels of emotional distress, great disability, and a history of treatments for pain. Among male patients, no significant associations were observed between the independent variables and catastrophizing.

TABLE 3
Gender Differences in Coping (Coping Strategies Questionnaire) Among Patients With Musculoskeletal Disorders

	Men[a]	*Women*[b]	*Test of Significance*
Diverting attention	1.39±1.14	1.89±1.12	F (1, 444) = 17.81, $p < .0001$
Reinterpret pain sensations	.59±.73	.78±.89	ns
Coping self-statements	2.82±1.40	3.08±1.30	ns
Ignore sensations	2.08±1.31	2.24±1.26	ns
Praying & hoping	1.20±1.05	1.48±1.11	$F(1, 444) = 5.93$, $p < .05$
Catastrophizing	1.20±1.01	1.67±1.25	$F(1, 444) = 13.61$, $p < .001$
Increasing activities	1.78±1.25	2.61±1.27	$F(1, 444)=38.46$, $p < .0001$
Pain behaviors	2.13±1.08	2.62±1.05	$F(1, 444) = 19.57$, $p < .0001$
Control over pain	3.73±1.69	3.61±1.36	ns
Ability to decrease pain	2.84±1.40	2.97±1.16	ns

[a]$n = 124$. [b]$n = 322$.

TABLE 4
Multivariate Regression Analyses (Standardized Betas) of the Associations Between Gender[a] and Coping Strategies for Pain, Controlling for Possible Confounders

	Diverting Attention	*Praying, Hoping*	*Catastrophizing*	*Increased Behavioral Activity*	*Pain Behaviors*
Gender	.057	–.034	.099	.148	–.044
Single	.192	.134	.012	.383*	.150
Married	.237	.143	–.009	.392*	.144
Divorced	.208	.138	–.070	.297*	.105
Blue-collar	.219	.258	.158	.290	.201
Low white-collar	.187	.222	.157	.176	.236
Intermediate/high white-collar	.145	.098	.165	.168	.134
Full-time employed	–.020	.035	.085	–.089	.017
Part-time employed	–.098	–.030	.075	–.100	.011
Working hours/week	–.133*	–.089	–.020	–.110	–.049
Pain complexity	–.129	–.130	.092	–.076	–.208
No. of previous treatments	–.253	.072	.049	.020	–.031
Use of analgesics	.118	.016	.019	.158	.433*
Perceived disability	.257	.254	.213	.423	.508
Work strain	.115	–.308	.028	.009	–.153
PTSS	.001	–.159	–.229	–.135	–.040
Gender × pain complexity	.185	.239	–.037	.158	.358
Gender × no. of treatments	.294	–.088	.064	.071	.217
Gender × analgesics	–.100	–.035	.002	–.065	–.195
Gender × perceived disability	–.058	–.165	.118	–.348	–.474
Gender × work strain	–.163	.222	.044	–.077	.170
Gender × PTSS	–.050	.253	.452*	.084	.145

Note. PTSS = Posttraumatic Symptoms Scale.
[a]Male = 1; female = 2.
*$p < .05$. **$p < .01$. ***$p < .001$.

TABLE 5
Multivariate Regression Analyses (Standardized Betas) of the Associations Among Sociodemographics, Pain Parameters, Work Strain, Emotional Distress, and Catastrophizing Among Male and Female Patients With Musculoskeletal Pain

	Catastrophizing Men	*Catastrophizing Women*
Single	.171	–.041
Married	–.036	.008
Divorced	–.001	–.078
Blue-collar	.102	.156
Low white-collar	.076	.170
Intermediate/high white-collar	.113	.176
Full-time employed	–.026	.124
Part-time employed	.192	.061
Working hours/week	–.004	–.029
Pain complexity	.105	.056
Number of previous treatments	.159	.115*
Use of analgesics	.056	.009
Perceived disability	.178	.361***
Work strain	.077	.081
PTSS	.037	.267***

Note. PTSS = Posttraumatic Symptoms Scale.
*$p < .05$. **$p < .01$. ***$p < .001$.

DISCUSSION

This cross-sectional study examined gender differences in coping with musculoskeletal pain. A second aim was to identify statistical predictors of men's and women's coping strategies for pain. Compared to male patients, women reported (a) a more negative clinical picture, including a greater disability; (b) less control in the work setting and thus more work strain; (c) higher levels of posttraumatic stress reactions and a lower self-esteem; (d) a broader spectrum of coping strategies for pain, including catastrophizing, but equal levels of self-efficacy beliefs. All gender differences in coping variables were ruled out when relevant confounders were taken into consideration, with the exception of the association between catastrophizing and the interaction term Gender × Posttraumatic Stress Reactions. In further analyses it was found that women's levels of catastrophizing were significantly related to higher levels of posttraumatic stress reactions, to a greater disability, and to a history of health care consumption. Such associations were not seen among men.

In line with our findings, Jensen et al. (1994) observed that female patients with long-standing musculoskeletal pain used catastrophizing more frequently than did male patients and proposed that this difference may account for women's generally poorer adaptation to pain. These results expand our knowledge by showing

that a greater use of catastrophizing is not related to female gender per se, but is contingent rather on female patients' lack of mental well-being, perceptions of disability, and a history of treatments for pain.

The study has several limitations, which need to be considered before a more detailed discussion of the results. Firstly, the cross-sectional design does not allow issues of causality to be ascertained. The results may, however, generate hypotheses to be tested in prospective studies. Secondly, the extent to which differential selection mechanisms related to health care seeking may explain the observed gender differences is unknown. The reversed pattern of associations, that is, a more negative clinical picture among men, would have been plausible because the data suggest that men are less prone to seek medical care for their musculoskeletal ailments. However, the analyses of the patients' clinical characteristics indicate that women not only suffer a greater dysfunction due to pain, but are also greater consumers of analgesics and other health care (e.g., TNS, acupuncture) than men. Women's greater health care consumption is also reflected by the greater percentage of women in the study sample. Similar observations have been made by others (e.g., Andersson et al., 1993; Jensen et al., 1994; Lagerlöf, 1993).

Thirdly, patient's self-reports could not be validated with objective measures, and the reliability and validity of the diagnoses given by the GPs and PHTs are unknown. However, physical diagnoses are often vague and seldom corroborated by objective findings (e.g., Boden, Davis, Dina, et al., 1990; Borenstein & Wiesel, 1989; Rothman, 1984; Von Korff et al., 1988). Because no structured interview was employed for diagnosing posttraumatic stress disorder, we cannot be certain about whether the posttraumatic stress reactions reported by the patients in the study sample truly reflect the sequelae of previous trauma or, rather, a general dimension of emotional distress.

The assumption that physical abuse, sexual abuse, or both may be prevalent in the sample is corroborated by findings showing that 38% of women and 10% of men with long-standing musculoskeletal pain reported having been exposed to some form of sexual abuse, mostly in adulthood (Linton, 1997; Linton, Lardén, & Gillow, 1996). A possible interpretation of the results is thus that women suffering from posttraumatic stress reactions, due to sexual or physical abuse, develop highly debilitating pain conditions, which are not readily ameliorated by such treatments as acupuncture, TNS, or physiotherapy. The failure to relieve symptoms in spite of repeated treatments may, in turn, not only increase levels of emotional distress but also lead to an increasing use of catastrophizing cognitions about pain.

All measures of emotional distress employed in the study are highly intercorrelated (Grossi et al., 1999) and share a common dimension of poor mental well-being. The regressions yielding practically identical results, independently of whether scores for the PTSS, self-esteem, GHQ, or burnout were included among the independent variables, supports the notion that it is a general dimension of

emotional distress, which is prevalent among women scoring high on catastrophizing. Longitudinal data (Keefe et al., 1989) show that catastrophizing predicts depression at 6 months' follow-up, independently of initial levels of depression, pain, and functional impairment. Also, reduction of catastrophizing is one of the key change mechanisms for positive adaptation to pain (Kendall, 1992; Newton & Barbaree, 1987; Turk & Rudy, 1992; Turner & Clancy, 1986). An alternative explanation to our results is thus that female patients with a propensity toward catastrophizing suffer a deeper impact from their pain conditions, are less responsive to treatment, and develop high levels of emotional distress.

Finally, it could be hypothesized that women's higher levels of emotional distress and catastrophizing are both determined by their generally worse clinical picture, which, in turn, may be related to gender differences in nociceptive mechanisms (Walker & Carmody, 1998); muscle fibre composition (Ng, Richardson, Kippers, & Parnianpour, 1998); biologic responses to pregnancy and childbearing (Biering-Sørensen, 1983a; Frymoyer et al., 1980; Kelsey, Greenberg, Hardy, & Johnson, 1975); responses to stress (Biering-Sørensen, 1983b); total workload (Lundberg, Märdberg, & Frankenhaeuser, 1994; Mårdberg, Lundberg, & Frankenhaeuser, 1991); or a combination of these. All these plausible causal mechanisms remain to be elucidated in future investigations.

In keeping with these data, clinicians need to make thorough assessments not only of their patients' physical status and past treatments, but also of their mental health and cognitions toward pain. Interventions among women who manifest great disability and have already undergone a number of somatic treatments should not solely be targeted at physical symptoms, but also at decreasing emotional distress and improving coping skills.

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