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Knowledge of and Agreement with Chronic Pain Diagnosis: Relation to Affective Distress, Pain Beliefs and Coping, Pain Intensity, and Disability

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Many authors report that a high percentage of patients with chronic pain have no or insufficient underlying physical pathology to explain their pain. Even when patients do have an identified diagnosis, many patients profess to have little understanding of the source of their pain or fear that they may suffer from more severe pathology. This may be particularly true for patients with chronic musculoskeletal pain given the lack of "objective" findings for soft tissue pain complaints. In the present study, we examined whether chronic neck and back pain patients were able to identify the physiologic source of their pain, and based on their responses patients were placed in one of three groups: (1) patients who did not know the cause of their pain; (2) patients who did know the cause and agreed with their clinical diagnosis; and (3) patients who identified a cause for their pain that was different from their clinical diagnosis. The sample was comprised primarily of individuals with musculoskeletal pain problems (70%) referred to an outpatient chronic pain rehabilitation program. Each patient completed a pretreatment test battery, and group differences were examined on responses to the McGill Pain Questionnaire, Survey of Pain Attitudes, Brief Symptom Inventory, Coping Strategies Questionnaire, and Pain Disability Index. Upon initial evaluation, 47.2% (n = 85) of patients indicated that they did not know what was causing their pain. Of patients who articulated a cause for their pain, 20% (n = 36) attributed it to factors that did not agree with their diagnosis. Only 32.8% (n = 59) of persons in the entire sample were able to accurately identify the cause of their pain. Patients who disagreed with their clinical diagnosis were more likely to be diagnosed with musculoskeletal pain and reported the highest levels of pain ($F(2,169) = 3.41$, $p < .05$) as well as the greatest levels of affective distress ($F(2,169) = 3.54$, $p < .05$). Patients who were unsure of or disagreed with their diagnosis tended to report a greater belief in pain being a signal of harm ($F(2,169) = 11.5$, $p < .001$) and described themselves as more disabled ($F(2,169) = 8.43$, $p < .001$). In addition, both the "unsure" and "disagree" groups tended to use maladaptive pain strategies more frequently, and persons unsure of their

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diagnosis had the lowest levels of perceived control over pain. A hierarchical regression analysis examining a cognitive/behavioral model of pain disability indicated that lack of knowledge of pain etiology, a belief that pain is a signal of harm, catastrophizing and affective distress all significantly predicted increased disability, while pain intensity did not. The data suggests that lack of knowledge about the origin of pain is associated with maladaptive cognitions in relation to pain (i.e., fear of harming oneself and catastrophizing) and increased emotional distress which in turn are related to heightened disability due to pain. These data argue that educating patients regarding their diagnosis and the origin of their pain, thereby dispelling dysfunctional pain beliefs, may be an important component of pain treatment, particularly among patients with chronic musculoskeletal pain.

KEY WORDS: chronic pain; pain beliefs; musculoskeletal pain; disability; affective distress.

INTRODUCTION

Health beliefs are an important determinant of illness and illness behavior (1–4) and a growing body of evidence supports their contribution to the study of chronic pain and its attendant disability (5). DeGood (6) was an early observer of the importance of shaping appropriate beliefs about pain treatment as a means for reducing patient resistance and enhancing therapeutic outcome. Patients undergoing chronic pain rehabilitation who report the belief that they can function with pain (7–9) or who endorse a conservative, management approach to their pain disorder (10) exhibit more functional gains and higher treatment satisfaction than patients with less adaptive pain cognitions. In fact, pain beliefs may be more important than biomedical factors such as physiologic impairment in accounting for the success of pain intervention (11). Interest in the relationship between patient beliefs about pain and treatment outcome are particularly important given the lack of association between pain severity and functional disability among chronic pain patients (8,12–14).

The evidence that pain beliefs contribute to pain treatment outcome is consistent with growing interest in a cognitive-behavioral model of pain disability and the effect of cognitive factors on pain severity, pain coping and pain disability (5,15,16). An important area of inquiry regarding pain beliefs that has received little attention concerns pain patients' knowledge of their diagnosis and their understanding of the physiologic source for their pain. Research attests to the importance a patient places on understanding the cause of illness-related symptoms (17–19) and this is similarly true for chronic pain (20–22). Research to date suggests that physician education regarding the etiology of pain is related to increased patient satisfaction (23,24), and one study reported that accuracy of patients' understanding for the basis of their pain significantly predicted return to work while orthopedic evaluation of the severity of the condition, number of "nonorganic" examination signs, and scales 1 and 3 of the MMPI did not (25).

Lack of patient knowledge regarding the nature of their pain disorder may be particularly common among individuals with chronic back pain (CBP) given the belief that many of these patients have no identifiable organic cause for their pain

symptoms (26–31). Not surprisingly, CBP patients without neurological impairment are often viewed as having pain that is exclusively or primarily psychogenic in origin (32–34), and often these patients are given nonspecific diagnoses or labels such as "chronic intractable benign pain syndrome" (35), "nonspecific low back pain" (26,36) and, in the case of industrial back pain, "activity intolerant" (27). This nonspecific view of chronic back pain has been criticized for its failure to acknowledge the large number of back pain patients who suffer musculoskeletal disorders such as myofascial pain syndromes (37–40) and somatic/articular dysfunctions of the spine and pelvic/sacral structures (41–44). These authors propose that musculoskeletal pain is frequently underdiagnosed and that consequently many clinicians fail to adequately educate patients regarding these disorders (45–47). Consistent with these views, many patients given nonspecific diagnoses display evidence of musculoskeletal dysfunctions (48,49), and patients with myofascial pain have been reported to be less accurate in identifying their diagnosis or the source of their pain, less satisfied with their medical care, and more likely to believe that there is something "more seriously wrong" with them (50). These data are important as an unclear etiology for a person's pain symptoms may reduce the perceived genuineness of the complaint (51).

Poor understanding of one's pain symptoms may also lead to the acquisition of maladaptive attitudes and behavior in relation to pain. As Turk (52) has noted, patients who interpret their pain as a sign of underlying tissue damage will be less likely to engage in behaviors that increase pain such as therapeutic exercise or functional activities. Jensen *et al.* (53) reported that beliefs that one is disabled and that pain is a signal of harm were positively associated with physical disability among a heterogeneous sample of chronic pain patients. There is growing evidence that fear/avoidance of pain may be an important predictor of disability in chronic pain (54–58) and may help to explain the psychological disturbance that develops among some chronic pain patients (59). Vlaeyen *et al.* (60) proposed that dysfunctional cognitive factors such as catastrophizing may mediate the relationship between pain and fear/avoidance behavior. In partial support of this hypothesis Flor and Turk (61) used regression analysis to demonstrate that cognitive factors such as pain catastrophizing significantly predicted pain and disability for patients with chronic back pain and rheumatoid arthritis, while disease related variables contributed only marginally.

The purpose of the present investigation was to examine the relationship between knowledge of the etiology of pain and pain attitudes and beliefs, pain coping, psychological distress, and self-reported disability among persons with chronic pain. The majority of the sample had musculoskeletal pain, and almost half of the subjects had work-related injuries which caused their pain. We also examined the influence of knowledge of etiology of pain, cognitive and affective variables, and pain intensity on pain disability using hierarchical regression. Specifically, we examined the impact of catastrophizing, the belief that pain is a signal of harm, and affective distress after accounting for knowledge of diagnosis as these variables have been shown to be related to disability in the studies mentioned above. We hypothesized that patients who were unsure of the etiology of their pain or disagreed with their diagnosis would be more likely to have maladaptive beliefs about pain and higher

levels of affective distress, which in turn would lead to greater disability. We also examined the impact of self-reported pain in the model.

METHODS

Subjects

Subjects were 180 consecutive persons with chronic pain (defined as a duration of three months or greater) referred for evaluation and appropriateness for admission into the Pain Management Program operated by the Department of Physical Medicine and Rehabilitation at the University of Michigan Medical Center. The treatment program is multidisciplinary and consists of psychological intervention and physical and occupational therapies. Patients are instructed in a comprehensive exercise program, receive manipulative therapies, are encouraged to correct postural habits, are taught adaptive techniques to accomplish activities of daily living, and are encouraged to gradually resume various functional activities. Psychological interventions include relaxation training, biofeedback, cognitive-behavioral strategies for pain control, and psychotherapy for problems of disturbed mood and maladaptive coping. Vocational assessment and rehabilitation often follows the completion of the program where appropriate.

Pain diagnoses were determined from the patient's medical evaluation. The most frequent etiology of pain was musculoskeletal (70%). Musculoskeletal pain was diagnosed based on the presence of trigger points which, when palpated, gave rise to referred pain (myofascial pain); restricted range of motion; and/or somatic dysfunction (vertebral, pelvic, or sacral malalignment) identifiable in the area of the patient's complaint of pain. In addition, as a result of radiographic and clinical testing, the pain was not attributable to neurological disturbance, degenerative disease, rheumatological disorder, or spondylolisthesis. Sixteen patients (8.9%) had radiculopathies, eight (4.4%) patients were diagnosed with osteoarthritis, six persons (3.3%) had fibromyalgia, and five (2.8%) had spondylolisthesis. No other diagnosis accounted for more than 2.5% of patients in the sample. The most frequent location of pain according to the International Association for the Study of Pain classification system (73) was low back (39.4%), followed by cervical pain (20%) and pain in three or more sites (18.3%). The sample was comprised of 59 males and 121 females, with a mean age of 40.2 years (SD = 10.8) and mean duration of pain of 45.7 months (SD = 56.4). Persons in the study were predominantly Caucasian (91.7%), while 5.3% were African-Americans, 2.3% were Hispanic, and one person was Native American. Thirty persons (16.7%) reported that they completed eighth grade but did not complete high school, 20.0% completed high school, 39.4% reported taking some courses in college or technical school, 8.9% reported that they completed college, and 15% had completed a graduate or professional program. Seventy-three patients (40.6%) indicated that their pain was due to a work-related injury, and 16 persons (8.9%) reported that their pain was work-related but not caused by a specific traumatic event.

Instruments

Pain. As part of their clinical evaluation, subjects completed the McGill Pain Questionnaire (MPQ) (63). The MPQ is designed to measure subjective pain experience in a quantitative form. The MPQ consists of twenty groups of single word pain descriptors with the words in each group increasing in rank order intensity. The sum of the rank values for each descriptor based on its position in the word set results in a score termed the Pain Rating Index (PRI). There are also three major subscales of the MPQ that assess the sensory, affective and evaluative dimensions of pain experience. The Total PRI was used in the present study as the measure of self-reported pain intensity. Repeat administration of the MPQ has revealed a 70.3% rate of consistency in the PRI score (63).

Affective Distress. Patients completed the Brief Symptom Inventory (BSI), a 53-item short form of the Symptom Checklist-90-Revised (64). According to the authors, the BSI is a self-report inventory which is designed to reflect the psychological symptom patterns of psychiatric and medical patients, as well as nonpatient populations. Subjects rate each item on a five-point scale of distress, ranging from "not at all" (0) to "extremely" (4). The BSI contains nine symptom dimensions: (1) Somatization (SOM); (2) Obsessive-Compulsive (O-C); (3) Interpersonal Sensitivity (INT); (4) Depression (DEP); (5) Anxiety (ANX); (6) Hostility (HOS); (7) Phobic Anxiety (PHOB); (8) Paranoid Ideation (PAR); and (9) Psychoticism (PSY). A global measure of distress, the General Severity Index (GSI), is calculated by adding the scores and dividing by the total number of items. The authors report that the individual subscales have internal consistency coefficients ranging from .71 to .85, and test–retest reliability coefficients ranging from .68 to .91 after a 2-week interval. The authors also report the measure has good convergent, discriminant, and predictive validity (64).

Patients were also administered the Beck Depression Inventory (BDI) (65), which consists of 21 groups of items that assess both the cognitive/affective and neurovegetative symptoms of depression. Alpha coefficients for the BDI in psychiatric and nonpsychiatric populations range from .73 to .95 (66).

Disability. To assess disability due to pain, patients were asked to complete the Pain Disability Index (PDI) (67). The PDI is a seven-item self-report inventory that assesses the degree to which pain interferes with functioning in the following areas: (1) family/home responsibilities; (2) recreation; (3) social activity; (4) occupation; (5) sexual behavior; (6) self-care; and (7) life-support activity. Based on two reported factor analyses of the items (67,68), two subscale scores were obtained: a voluntary activities subscale (VOL), obtained by summing the first five items, and an obligatory (OBL) activities subscale, obtained by summing items six and seven. Alpha reliabilities for these two subscales are .85 and .70, respectively (67). A total disability score was also derived by summing the responses to the all of the items. Tait *et al.* (67) reported that the test–retest reliability for the total score after 2 months was significant but low (r = .44), which they indicated may have been related to several factors, such as a small sample size. A subsequent study (69) found higher reliability coefficients for the total score (.91) and the VOL and OBL factors (.87 and .73, respectively).

Pain Attitudes/Beliefs. Subjects were administered the Survey of Pain Attitudes (SOPA) (53,70). The SOPA is a 57-item item measure which assesses beliefs regarding: (1) Control (CON; perceived control over one's pain); (2) Disability (DIS; belief that one cannot function because of pain; (3) Harm (HARM; belief that pain is a signal of damage and that exercise and activity therefore should be limited); (4) Emotion (EMO; perception that pain is affected by one's emotional state); (5) Medication (MED; belief that medications are appropriate for treating chronic pain; (6) Solicitude (SOL; belief that a person should receive aid from family members when in pain; (7) Medical Cure (CURE; belief that a medical cure exists for one's pain). Patients are asked to respond with regard to how much they agree with each statement ranging from 0 "very untrue" to 4 "very true." Thus, higher scores represent greater agreement with the beliefs presented above. Alpha coefficients for each of the SOPA subscales range from .71 to .81, and test–retest reliability from .63 to .68 (53).

Pain Coping. The Coping Strategies Questionnaire (CSQ) developed by Rosenstiel and Keefe (71) was used to measure patient's use of pain coping strategies. The scale consists of seven subscales, including six cognitive strategies (diverting attention (DA), reinterpreting pain sensations (RPS), ignoring pain sensations (IPS), coping self-statements (CSS), praying or hoping (PH), and catastrophizing (CAT)), and one behavioral strategy (increasing activity level (IA)). Subjects use a 7-point scale to rate how often they use each strategy to cope with pain. Patients also make two ratings of overall effectiveness of coping strategies (how much control they have over pain (CON) and how much they are able to decrease pain (DEC)). Reliability coefficients for each of the subscales range from .71 to .85 (71).

Pain Questionnaire. Finally, patients also completed a questionnaire that solicits information regarding their pain duration, compensation and litigation status, and other sociodemographic information. In the questionnaire, patients were asked to reply in written form to the statement "what do you think is the cause of your pain?"

Procedure

Each subject was referred to the program by a physiatrist specializing in spinal disorders including musculoskeletal dysfunctions. Clinical evaluation including appropriate diagnostic testing and clinical assessment was completed prior to referral to the program. Thus, each subject was referred following their medical work-up and after a diagnostic impression had been determined.

Prior to evaluation for program admission, subjects were mailed the questionnaire battery and were asked to complete it before their clinic appointment. This information was then collected during their clinic visit, and the questionnaires were checked for accuracy and thoroughness of completion. Subjects were coded as receiving compensation if they indicated at the time of the evaluation they were receiving Workers' Compensation, income from no-fault insurance, Social Security Disability, Supplemental Security Income, sick leave disability benefits, or long-term medical disability. Patients were characterized as being involved in litigation if they

Table I. Pain and Demographic Information by Group

Variable	Group			*p*-value
	Agree (n = 59)	Disagree (n = 36)	Unsure (n = 85)	
Mean age (years)	41.3(11.7)	41.6(9.2)	38.8(10.7)	ns
Mean duration of pain (months)[b]	64.1(67.5)	43.9(54.8)	33.8(44.6)	<.01
Sex				ns
Male	16	10	33	
Female	43	26	52	
Litigation[a,b]				<.05
Yes	16	20	38	
No	43	16	47	
Compensation				ns
Yes	28	23	54	
No	31	13	31	
Percent musculoskeletal pain[a]	57.6	86.1	71.8	<.01

[a]Disagree differs from Agree.
[b]Unsure differs from Agree.

indicated at the time of evaluation that they were involved in a third-party suit, suit for Workers' Compensation, suit against a no-fault insurance carrier, or a suit to increase their current benefits.

Subjects were divided into one of three groups based on their written response to the question "what do you think is the cause of your pain?" This response was compared to their diagnosis based upon their prior medical evaluation. Persons were classified as being in the Unsure group (n = 85) if they responded to this question by writing "not sure," "?," "uncertain," "don't know," or similar response. Persons in the Agree group were classified as agreeing with their diagnosis (n = 59) if they indicated in medical or lay terms a response that corresponded with their diagnosis. For example, if a person was diagnosed with musculoskeletal pain and grouped as agreeing with their diagnosis, their responses included "muscle pain" or "damage to muscles" or "soft-tissue injury" or "problems with alignment of pelvis" or a similar response. Finally, persons in the Disagree group (n = 36) were assigned if they identified a cause for their pain which was inconsistent with their diagnosis. Most often, patients attributed their difficulties to findings not considered to be clinically significant (e.g., disk bulge), or attributed their pain to a neurological cause (e.g., pinched nerves) when none had been identified from their medical evaluation.

RESULTS

Demographic Analyses

Demographic and pain-related information on the groups is presented in Table I. The groups did not differ in terms of age, sex, or whether or not they were receiving compensation related to their pain. Based on a one-way ANOVA, a significant difference between the groups was observed in terms of duration of pain

Table II. Standardized Residual Means and Standard Deviations by Group for Psychological Distress Measures

Variable	Group			*F*-ratio
	Agree (n = 59)	Disagree (n = 36)	Unsure (n = 85)	
BDI	-.14(0.9)	.27(1.0)	-.01(1.0)	2.18
BSI SOM	-.20(0.9)	.16(1.2)	.07(1.0)	2.04
BSI O-C	-.08(1.0)	.18(1.1)	-.02(0.9)	0.87
BSI INT	-.12(0.8)	.24(1.1)	-.02(1.1)	1.58
BSI DEP	-.19(0.9)	.28(1.0)	.02(1.0)	2.84
BSI ANX[a]	-.16(0.9)	.36(1.1)	-.04(1.0)	3.47*
BSI HOS	-.20(0.7)	.14(1.0)	.08(1.1)	2.02
BSI PHOB	-.08(0.9)	.31(1.3)	-.07(0.9)	2.27
BSI PSY[a]	-.23(0.7)	.34(1.2)	.02(1.0)	4.27*
BSI PAR[a]	-.25(0.7)	.43(1.3)	-.01(1.0)	6.13**
BSI GSI[a]	-.21(0.8)	.32(1.2)	.01(1.0)	3.54*

[a]Disagree differs from Agree.
*$p < .05$.
**$p < .01$.

($F(2,177) = 5.3, p < .01$). A *post hoc* test using Tukey's honestly significant difference method indicated that the Unsure group had a significantly lower duration of pain compared to the Agree group. The percentage of patients in each group who were involved in litigation was also significantly different ($\chi^2(2) = 8.51, p < .05$). Follow-up chi-square tests indicated that the Agree group was less likely to be involved in litigation compared to both the Disagree ($\chi^2(1) = 7.64, p < .01$) and Unsure ($\chi^2(1) = 4.69, p < .05$) groups. Finally, the proportion of persons with musculoskeletal pain problems was significantly different across the groups ($\chi^2(2) = 9.31, p < .01$), as follow-up analyses revealed that patients who disagreed with their diagnosis were more likely to have musculoskeletal pain compared to persons who agreed with their diagnosis ($\chi^2(1) = 9.07, p < .01$). Persons who were unsure of their diagnosis also tended to have a higher frequency of musculoskeletal pain compared to the Agree group, although this difference statistically was only marginally significant ($\chi^2(1) = 3.08, p = .08$).

Since these analyses revealed that the groups significantly differed in terms of pain duration, litigation status and presence or absence of a musculoskeletal pain problem, these variables were used as covariates in the following statistical analyses. The dichotomous variables (litigation and musculoskeletal pain) were dummy coded.

Affective Distress

Data from the BSI and BDI are presented in Table II. ANCOVAs were performed to examine group differences on the BDI and BSI subscales, and *post hoc* tests were conducted on the standardized residuals to examine which groups significantly differed based on Tukey's honestly significant difference method. The groups did not significantly differ on the BDI, but the groups did significantly differ

Table III. Standardized Residual Means and Standard Deviations by Group for Pain Intensity, Pain Disability, Pain Attitudes, and Pain Coping Strategies

Variable	Group			*F*-ratio
	Agree (n = 59)	Disagree (n = 36)	Unsure (n = 85)	
McGill				
Total PRI[a]	-.23(0.9)	.28(1.0)	.04(1.0)	3.41*
PDI VOL[a,b]	-.36(1.1)	.19(0.9)	.17(0.9)	6.61**
PDI OBL[a,b]	-.34(0.9)	.24(0.9)	.14(1.0)	6.14**
PDI TOTAL[a,b]	-.40(1.1)	.23(0.9)	.18(0.9)	8.43***
SOPA CON[b]	.25(1.1)	.01(0.9)	-.17(0.9)	3.42*
SOPA DIS[b]	-.31(1.2)	.05(0.8)	.20(0.9)	5.13**
SOPA HARM[a,b]	-.46(0.9)	.16(1.0)	.25(0.9)	11.5***
SOPA EMO[a]	.28(1.1)	-.25(1.0)	-.09(0.9)	4.45*
SOPA MED	-.12(0.9)	.01(1.1)	.08(1.0)	0.78
SOPA SOL	-.08(0.9)	.07(1.0)	.03(1.0)	0.36
SOPA CURE	-.25(1.0)	.17(1.2)	.10(0.9)	3.17*
CSQ DA	-.19(1.0)	.04(1.1)	.11(1.0)	1.73
CSQ RPS	-.10(0.9)	.09(1.0)	.03(1.0)	0.54
CSQ CSS	.08(1.0)	-.01(1.1)	-.06(0.9)	0.37
CSQ IPS	.05(1.0)	-.12(1.0)	.01(0.9)	0.36
CSQ PH[a,b]	-.33(1.1)	.23(1.0)	.13(0.9)	5.84**
CSQ CAT[b]	-.37(1.0)	.08(1.0)	.22(1.0)	7.49**
CSQ IA	-.23(0.9)	.00(1.0)	.16(1.0)	2.96
CSQ CON[b]	.18(1.0)	.21(0.8)	-.22(1.1)	4.08*
CSQ DEC	.09(1.0)	.07(0.9)	-.09(1.0)	0.69

[a]Disagree differs from Agree.
[b]Unsure differs from Agree.
*$p < .05$.
**$p < .01$.
***$p < .001$.

on the BSI GSI based on ANCOVA ($F(2,174) = 3.54$, $p < .05$). *Post hoc* tests revealed that the Disagree group reported significantly greater psychological distress on this measure compared to the Agree group. Significant differences were also found on the ANX ($F(2,174) = 3.47$, $p < .05$), PSY ($F(2,174) = 4.27$, $p < .05$), and PAR ($F(2,174) = 6.13$, $p < .01$) subscales of the BSI. Again, on each subscale subjects in the Disagree group had significantly higher scores compared to persons in the Agree group.

Self-Reported Pain

To examine group differences in self-report of pain, ANCOVA was performed on the McGill Total PRI scores. The standardized residual means and standard deviations are presented in Table III. A significant group main effect was observed ($F(2,174) = 3.41$, $p < .05$). *Post hoc* analysis on the standardized residuals using Tukey's honestly significant difference indicated that persons who disagreed with their diagnosis reported significantly higher levels of pain based on the McGill Total PRI compared to persons who agreed with their diagnosis.

Disability

To examine group differences on the measures of disability MANCOVA was initially conducted with the VOL, OBL and Total scores from the PDI. This analysis revealed a significant group main effect ($F(6,346) = 2.09$, $p < .05$). Separate ANCOVAs were then conducted on each of the measures listed above, followed by *post hoc* tests on the standardized residuals (using Tukey's honestly significant difference as the criteria) to determine how groups significantly differed. The means and standard deviations for each group expressed in terms of the standardized residuals, the F-value for the main effect of group in the ANCOVAs, and the results of the *post hoc* tests are presented in Table III.

Significant group differences were observed on the PDI VOL ($F(2,174) = 6.61$, $p < .01$), OBL ($F(2,174) = 6.14$, $p < .01$), and Total ($F(2,174) = 8.43$, $p < .001$) scores. On all of these measures, *post hoc* testing revealed that both the Disagree and Unsure groups reported higher levels of disability compared persons in the Agree group.

Pain Attitudes and Beliefs

The standardized residual means and standard deviations from the SOPA are also presented in Table III. The MANCOVA conducted for the SOPA subscales also revealed a significant main effect of group ($F(14,338) = 2.11$, $p < .05$). The separate ANCOVAs revealed significant group differences on the SOPA CON ($F(2,174) = 3.42$, $p < .05$), DIS ($F(2,174) = 5.13$, $p < .01$), HARM ($F(2,174) = 11.5$, $p < .001$), and EMO ($F(2,174) = 4.45$; $p < .01$) subcales. On the CON and DIS subscales, *post hoc* analyses revealed that persons who were unsure about the cause of their pain had less perceived control over their pain and viewed it as being more disabling compared to subjects who agreed with their diagnosis. On the EMO subscale, subjects who disagreed with their diagnosis displayed less belief in the notion that pain is affected by one's emotional state compared to persons who agreed with the cause of their pain. On the HARM subscale, both the Disagree and Unsure groups expressed higher agreement with the belief that pain is a signal of harm compared to subjects who agreed with their diagnosis.

Coping with Pain

Table III also contains the standardized residual means and standard deviations from the CSQ. The group main effect in MANCOVA analyzing the CSQ subscales was statistically significant ($F(18,334) = 2.15$, $p < .01$). The separate ANCOVAs revealed significant group differences on the CSQ PH ($F(2,174) = 5.84$, $p < .01$), CAT ($F(2,174) = 7.49$, $p < .01$) and CON subscales ($F(2,174) = 4.08$, $p < .05$). *Post hoc* analyses indicated that patients in the Disagree and Unsure groups tended to use more praying and hoping compared to patients who agreed with their diagnosis, and patients who were unsure of their diagnosis displayed significantly higher

Table IV. Hierarchical Regression of Knowledge of Pain Beliefs, Cognitions and Affective Distress, and Self-Reported Pain on Pain Disability

Variable	Beta	*t*-ratio	R^2	R^2 change	*F*
Step 1			.093		6.02***
Duration	-.174	-2.30			
Litigation	.223	3.03**			
Diagnosis	.055	0.74			
Step 2			.173		7.29***
Knowledge of diagnosis				.080	7.30***
Step 3			.362		10.7***
McGill total PRI	.092	1.29			
SOPA HARM	.243	3.34**			
BSI GSI	.184	2.34*			
CSQ CAT	.163	1.98*			

*$p < .05$.
**$p < .01$.
***$p < .001$.

levels of catastrophizing compared to patients who agreed with their diagnosis. In addition, persons in the Unsure group rated themselves as having significantly less control over their pain compared to persons who agreed with their diagnosis.

Cognitive/Behavioral Model of Pain Disability

A hierarchical regression was performed to examine the importance of cognitive/behavioral factors in predicting pain disability. This data is presented in Table IV. The control variables (diagnosis, pain duration, and litigation status) were entered simultaneously in the first step, with the PDI total score as the dependent measure. In the second step, knowledge of pain etiology was entered (dummy coded as two variables). In the third step, scores from the SOPA HARM subscale, the CSQ CAT subscale, the McGill Total PRI, and the BSI GSI were entered simultaneously. The significance of R^2 was examined at each step, along with the significance of each variable at that step. The significance of each variable was determined by a *t*-test of the unstandardized regression coefficient, with the exception of knowledge of diagnosis, as this effect was represented as two variables. This effect was tested by calculating the *F*-ratio for the increment in R^2.

Table IV indicates that the control variables contributed significantly to the prediction of pain disability ($R^2 = .093$, $F(3,176) = 6.02$, $p < .001$). Shorter duration of pain ($t(176) = -.230$, $p < .05$) and involvement in litigation ($t(176) = 3.03$, $p < .01$) were significantly related to higher levels of disability, while diagnosis was not. In the second step, knowledge of diagnosis also significantly contributed to level of disability (R^2 change = .080, $F(5,174) = 7.30$, $p < .001$), and the overall equation was also significant ($R^2 = .173$, $F(5,174) = 7.29$, $p < .001$). In the third step, the overall equation was statistically significant ($F(9,170) = 10.7$, $p < .001$), with all of the variables entered accounting for 36.2% of the variance in pain disability. A greater belief that pain is a signal of harm ($t(170) = 3.34$, $p < .01$), higher levels of affective distress ($t(170) = 2.34$, $p < .05$) and greater pain catas-

trophizing ($t(170) = 1.98, p < .05$) all significantly contributed to higher levels of disability. Pain intensity as measured by the McGill Pain Questionnaire was not significantly related to pain disability.

DISCUSSION

The major findings of this study indicate that persons with musculoskeletal pain are more likely to disagree with their pain diagnosis, and there was a trend for persons who were unsure of their diagnosis to be more likely to have musculoskeletal pain compared to persons who agreed with their diagnosis. In addition, pain patients who fail to accurately identify or agree with their diagnosis hold stronger beliefs that pain is a signal of harm, tend to possess more maladaptive cognitive pain coping strategies, and report more severe disability. Contrary to our hypothesis, only patients who disagreed with their diagnosis displayed higher levels of pain and affective distress. A hierarchical regression supported the notion that lack of knowledge or disagreement regarding pain etiology may lead to maladaptive cognitions about pain and greater affective distress. This extends the findings of Jensen *et al.* (53) to implicate the role of knowledge of or agreement with diagnosis as a determinant of dysfunctional pain beliefs, maladaptive pain coping and affective distress among disabled chronic pain patients. Importantly and replicating previous studies (60,72), pain intensity in the current study did not significantly predict disability when controlling for other variables in the model, suggesting that the cognitive and affective variables are more potent determinants of disability due to pain than pain itself. Also of interest is the finding that affective distress, belief that pain is a signal of harm, and pain catastrophizing were each independently and significantly related to pain disability. This suggests that at least some of the observed relationships among cognitive, affective and pain-related variables reported in previous pain studies may not be spurious and that assessing each of these clinical dimensions provides valuable information for pain assessment and treatment.

The present study has several methodological limitations. Although the investigators agreed upon the rules of classification to determine patients' agreement with diagnosis, no reliability data are available regarding this assessment, nor did we examine the reliability of patients' medical diagnoses. Thus, the accuracy of the patient groupings are somewhat suspect, although we are unaware of any other systematic bias in the groupings that might account for the findings. Also, many extraneous variables that may have biased the results, such as duration of pain or litigation status, were controlled for in the statistical analyses. Second, our sample contained a high percentage of patients with musculoskeletal pain, likely due to the setting in which the study was conducted as the majority of referrals are from physiatrists who specialize in treating musculoskeletal conditions. Further, the study design is cross-sectional and thus inferences of causality between independent and dependent variables cannot be ascertained.

These data have particular relevance to the treatment of chronic musculoskeletal pain. As noted, lack of awareness of pain diagnosis is associated with pain cognitions that may predispose patients to fear of movement and avoidance of physical

activity. As therapeutic exercise and increased physical function are the mainstay of treatment for chronic musculoskeletal pain (39,40,73,74), patients who view movement-induced pain as a signal of harm or that will cause irreparable physiologic damage may lack the effortfulness and adherence to an exercise program that is necessary for effective therapy. In addition, as factors such as fear of reinjury have been found to be related to physical functioning (53,60), lack of knowledge regarding the etiology of pain may also hinder occupational rehabilitation. Thus, chronic pain patients, particularly those with musculoskeletal pain, may become overly concerned or distressed about the nature of the pain that they may experience during work-related activities and thereby unnecessarily limit themselves during these activities or stop functioning entirely.

Specific education regarding the etiology of pain, particularly musculoskeletal pain, may help to alleviate dysfunctional beliefs among chronic pain patients and thus increase their involvement in functional activities such as work. Indeed, a study by Symonds (75) found that patients suffering work-related acute low back pain who received a pamphlet designed to change attitudes toward pain (e.g., pain is not harm) evidenced significantly less absenteeism from work compared to those who did not. It would be interesting to determine whether specific information regarding the etiology of pain is more effective than general assurances that a person's pain "isn't due to a serious cause," or that patients can be "active without fear of harm." This type of information may be conveyed to patients given nonspecific diagnoses for back pain without neurologic or orthopedic abnormality (27), or while undergoing therapeutic regimens that emphasize nonspecific medical treatments for pain (76). Clinicians working with chronic pain patients have frequently encountered the distressed chronic pain patient who wants to know "what's wrong," or who expresses great relief in finding out the cause of their pain. Although it is often the case that explanations for a person's pain are not straightforward or simple, our data suggests that specific education about musculoskeletal dysfunctions in this population may be more effective than general reassurances that they will not harm themselves if they are active. Based on the findings of the present study, this issue deserves further study.

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