

Disability and Psychologic Distress in Patients with Nonspecific and Specific Arm Pain

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Abstract Psychological illness influences the experience and expression of pain and disability. We tested three null hypotheses: (1) patients with nonspecific pain (medically unexplained and idiopathic) and patients with specific pain (discrete and verifiable) are equally likely to screen for psychiatric illnesses based on a validated screening questionnaire; (2) the presence of psychiatric illness (from a screening questionnaire) will not predict whether patients have specific or nonspecific pain type; and (3) across all patients and regardless of whether they have specific or nonspecific pain, psychiatric illness will not predict disability as measured by the Disabilities of the Arm Shoulder and Hand (DASH) questionnaire. We rejected all null hypotheses. The 41 patients with nonspecific arm pain were more likely than the 40 patients with specific arm pain to

screen for a somatoform disorder (34% versus 7.5%), posttraumatic stress disorder (24% versus 7.5%), and panic disorder (12.2% versus 5%). The presence of anxiety and somatoform disorders predicted pain type (nonspecific versus specific) and arm-specific disability (DASH). Somatoform disorder was the strongest predictor of pain type and DASH scores. Based on a screening questionnaire, a comorbid psychiatric illness, a somatoform disorder in particular, is associated with nonspecific arm pain and arm-specific disability.

Level of Evidence: Level II, diagnostic study. See the Guidelines for Authors for a complete description of levels of evidence.

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Each author certifies that his or her institution has approved the human protocol for this investigation, that all investigations were conducted in conformity with ethical principles of research, and that informed consent for participation in the study was obtained.

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Introduction

Psychological illness influences the experience and expression of pain and disability [23, 24, 27]. Depression, anxiety, and somatoform disorders are common comorbid conditions in patients with various chronic pain conditions, including those that are nonspecific such as back pain, fibromyalgia, and headaches [1–8, 15, 28, 29]. The somatoform disorders are a cluster of diagnoses applied when disabling physical complaints that appear medical in origin cannot be fully explained in terms of a physical disease. Across various pain conditions, depression, anxiety, and somatoform disorders not only correlate with patients' reports of disability, but also impair adherence to prescribed therapy [36], response to medical treatments [22], and recovery after surgery [21]. This combination of influences may be a potent and perhaps synergistic catalyst of illness and disability. In this vein, patients are caught in a vicious cycle whereby their mood influences their disability which in turn impacts their mood. Despite the

aforementioned relationship between psychological distress and disability across many pain conditions, the prevalence and role of psychiatric illness in patients with nontraumatic hand and arm pain has not been explored.

Therefore, we tested three null hypotheses. Our primary null hypothesis was that patients with pain that is non-specific (medically unexplained and idiopathic) and patients with pain that is specific (discrete and verifiable) are equally likely to screen for psychiatric illnesses based on a validated screening questionnaire. Our second null hypothesis was that major psychiatric illness categories—depression (major depression and other depressive disorders), anxiety (panic disorder and other anxiety disorders), somatoform disorder, and disorders of behavioral dyscontrol (binge eating, bulimia, and alcohol abuse) will not predict whether patients have specific or nonspecific pain. Third, we hypothesized that across all patients and regardless of whether they have specific or nonspecific pain, major psychiatric illness categories will not predict disability.

Materials and Methods

We classified patients presenting to an orthopaedic hand and upper extremity practice in a tertiary care hospital from December 2005 to July 2006 into one of two groups based on an initial routine office evaluation (including radiographs at the surgeon's discretion), using established methodology [30]: (1) patients with one, specific, discrete, easily and objectively identifiable pain source (diagnosis) for which all the symptoms and signs are consistent, and the treating physician was confident about the diagnosis (specific pain cohort); and (2) patients with vague, diffuse, often disproportionate complaints and inconsistent findings that were not characteristic of any specific disease process and leave the physician puzzled (nonspecific pain cohort). We did not consider duration of pain as a factor and rather included all patients regardless of duration. We did not consider the nonspecific diagnosis definitive, but rather the conclusion of one physician at the end of the initial assessment. Based on prior work, we estimate that after one office visit 14% of all patients have nonspecific pain [30]. We excluded patients who did not fit either of these categories: patients with bilateral, multifactorial, or discrete but infrequent pain complaints. Diagnoses were considered nonspecific, discrete, or neither nonspecific nor discrete on the basis of one office evaluation, and should not be considered definitively nonspecific. We did not study these patients over time or after additional testing. Eighty-one patients in the first two categories were invited to participate in the study. Of these, 41 patients (51%) had nonspecific pain and 40 (49%) had specific pain. A power

analysis indicated a sample size of at least 23 patients per group would provide 90% statistical power ($\alpha = 0.05$; $\beta = 0.10$) to detect a mean difference of one standard deviation (SD) (effect size, 1.0) in DASH scores between cohorts using Student's *t*-test. All patients provided informed consent and were enrolled in the study.

The specific pain cohort was comprised of 24 women (60%) and 16 men (40%) with a mean age of 58.5 years (range, 31–91 years; SD, 14.6 years). Thirty-two patients were Caucasian (80%), four were African-American (10%), and four were Asian (10%). Twenty-seven patients were married (67.5%), four were single (10%), four were divorced (10%), one was living with a partner (2.5%), and four were widowed (10%). Sixteen patients worked full-time (40%), four worked part-time (10%), 14 were retired (35.5%), four were unemployed (10%), and two did not answer the question (5%). Diagnoses in the specific pain category included trigger finger (26 patients), deQuervain's tenosynovitis (five patients), lateral elbow pain (four patients), and trapeziometacarpal osteoarthritis (five patients).

The nonspecific pain cohort was comprised of 27 women (66%) and 14 men (34%) with mean age of 35.3 years (range, 20–60 years; SD, 9.3 years). Thirty-two patients were Caucasian (80%), three were African-American (7.3%), three were Asian (7.3%), one was Hispanic (2.4%), and two described their race as other (4.9%). Twenty-three patients were single (56.1%), 13 were married (31.7%), three were living with a partner (7.3%), and two were separated or divorced (4.9%). Twenty-four were working full-time (58.5%), nine were working part-time (22.0%), four were unemployed (10%), and four did not answer the question (10%).

Patients in the nonspecific group were younger ($F = 73.1$; $p = 0.001$) and more likely to be single versus married ($\chi^2 = 23.9$; $p < 0.001$), more likely to be working ($\chi^2 = 20.2$; $p = 0.002$), and more likely to be taking prescribed psychiatric medication (12 of 41, 29% versus four of 40, 10%; $\chi^2 = 27.4$; $p < 0.001$) when compared with patients in the specific group (Table 1). The groups were comparable in terms of race.

All participants completed a brief demographic form including information on prior medical tests for the pain complaint, and The Patient Health Questionnaire (PHQ) [34], The Post-traumatic Stress Disorder (PTSD) Inventory [26], Social Phobia Inventory [9, 10], and the DASH questionnaire [20]. Patients reported whether they were taking psychotropic medications and the number and type of prior diagnostic tests they underwent to diagnose their condition.

The PHQ is designed to screen for many of the most common psychiatric illnesses, including somatoform disorder, major depressive syndrome, other depressive

Table 1. Demographic characteristics for patients with nonspecific and specific pain

Variable	Nonspecific	Specific
Number of patients	41	40
Gender		
Female	27 (67%)	24 (60%)
Male	13 (33%)	16 (40%)
Age*	35 (9.3)	58 (14.6)
Marital status		
Married*	13 (31.7%)	27 (7.5%)
Divorced/separated	2 (4.9%)	4 (10%)
Single*	23 (56.1%)	4 (10%)
Widowed	0 (0%)	4 (10%)
Living with partner	3 (7.3%)	1 (2.5%)
Work status		
Full-time*	24 (58.5%)	16 (40%)
Part-time	9 (22.0%)	4 (10%)
Unemployed	4 (10%)	4 (10%)
Not answered	4 (10%)	2 (5%)
Retired*	0 (0%)	14 (35.5%)

* Statistically significant difference.

syndrome (most resemble depression not otherwise specified), panic disorder, other anxiety disorder (most resemble generalized anxiety disorder), bulimia nervosa, binge eating disorder, and alcohol abuse [34]. Because all patients had arm pain by definition, we eliminated Item 2 (an inquiry regarding experience of pain) from the somatoform subscale in the analyses.

The PTSD Inventory is an abbreviated form of the widely used Davidson Trauma Scale and is a reliable and valid screening tool for PTSD [11, 26]. It has four items measuring startle, physiologic arousal, anger, and numbness (therefore, the name SPAN). For each item, participants rate the degree to which they were bothered by each symptom during the past month on a 4-point scale ranging from 0 = not at all, to 3 = five or more times a week, or always. According to guidelines intended to maximize sensitivity and specificity, we considered patients with a score of 5 or greater to have a positive screen for PTSD [26].

The Social Phobia Inventory, short form, is a reliable and valid screening tool for social phobia derived from the 17-item SPIN [9, 10]. The measure has three items assessing fear (of people, authority, being criticized, etc), avoidance (of talking to strangers, going to parties, being the center of attention, etc), and physiologic discomfort (blushing, sweating, palpitations, shaking in front of other people). Items are rated on a scale from 0 = not at all, to 4 = extremely. A cutoff score of 6 has been suggested to differentiate between patients with and without social phobia [9].

The DASH is a 30-item patient-generated disability/symptom scale concerning the patient's health status during the preceding week [20]. The items ask about the degree of difficulty in performing different physical activities because of the arm, shoulder, or hand problem (21 items); the severity of each of the symptoms of pain, activity-related pain, tingling, weakness and stiffness (five items), and the problem's impact on social activities, work, sleep, and self-image (four items). Items are answered on a 5-point Likert scale. The assigned values for all responses are summed and averaged, producing a score out of 5. We transformed this value then to a score out of 100 by subtracting one and multiplying by 25; we did this to ease interpretation. Scores range from 0 (no disability) to 100 (most severe disability). The score for the disability/symptom scale is called the DASH score.

To test our first null hypothesis, we used Fisher's exact test (when there were less than five patients with a positive screen) and chi square analyses (when there were more than five patients with a positive screen) to compare patients with specific and nonspecific pain on psychiatric positive screens.

To test our second and third hypotheses, we combined individual diagnoses into four major categories to preserve statistical power in overlapping categories, and because some of the diagnosis categories had none or only a few cases. The four related categories are: (1) mood disorders (major and other depressive disorders from the PHQ); (2) anxiety disorders (panic and other anxiety disorders from the PHQ, social anxiety disorder from the SPIN, and PTSD from the SPAN); (3) somatoform disorders (somatoform disorders from the PHQ only); and (4) disorders of behavioral dyscontrol (bulimia, binge eating, and alcohol abuse from the PHQ).

Our second hypothesis was then tested via logistic regressions. First, we performed four univariate logistic regressions with pain type as the dependent variable and individual major categorical variable (mood disorders, somatoform disorders, anxiety, and disorders of behavioral dyscontrol) as the independent variable. After performing separate logistic regressions for each of the four psychiatric illness categories with nonspecific versus specific pain conditions as the dependent variables, we entered all four psychiatric illness categories together in a multivariable logistic regression to examine the unique variance for each. We used commercial software (SPSS Inc, Chicago, IL) for all analyses.

Consistent with a precedent in psychological scientific investigation [35], we did not include demographic variables in these analyses to increase clinical validity and importance of our finding as opposed to artificially removing variance and changing the manner in which variables present in the natural environment. For example,

one of the differences between patients with nonspecific and specific pain is that those in the specific pain category are older. By controlling for age we would artificially eliminate variance accounted by age, when in fact most specific pain conditions are a function of age (ie, age-related degenerative conditions); this control would decrease, in our view, rather than increase validity.

Results

Patients with nonspecific pain had more ($\chi^2 = 27.4$; $p < 0.001$) medical tests for their pain condition before presentation than patients with specific pain. Among the 40 patients with specific pain, one had electrodiagnostic tests and seven had radiographs. Among the 41 patients with nonspecific pain, three had electrodiagnostic tests, seven had radiographs, and 12 had radiographs and electrodiagnostic tests (with seven of these patients also having MRI, and two having computed tomography) before presentation.

Psychiatric illness was common among patients. Including patients from both cohorts, the most common diagnoses were somatoform disorder, (41.6%), PTSD (26.4%), other anxiety disorders (22.1%), and panic disorder (14.2%). We were able to partly reject our first null hypothesis, as patients with nonspecific pain were more likely than patients with specific pain to screen for diagnoses of PTSD (24% versus 7.5%; $p = 0.04$), somatoform disorder (34% versus 7.5%; $p = 0.003$), and panic disorder (12.2% versus 5%; $p = 0.04$). However, there was no difference between the two cohorts in terms of likelihood of screening for other anxiety disorders, major depression, other depressive disorders, social phobia, binge eating, bulimia, and alcohol abuse (Table 2).

We also were able to partly reject our second null hypothesis. Anxiety ($\beta = -0.92$; $p = 0.049$) and somatoform disorder ($\beta = 1.87$; $p = 0.007$), but not depression ($\beta = 0.72$; $p = 0.42$) and disorders of behavioral

dyscontrol ($\beta = 0.03$; $p = 0.93$), were associated with having a nonspecific versus a specific pain condition (Table 3). Somatoform disorder was the sole independent predictor ($p = 0.02$) of having nonspecific versus specific pain. Patients who screened for somatoform disorder had a 5.5 times greater chance of having nonspecific versus specific pain as compared with patients who did not have somatoform disorder. The average DASH score among patients with nonspecific pain was greater ($F = 73.7$; $p < 0.001$) than in patients with specific pain (28.4, range, 0–96, SD, 20.2 vs 26.5, range, 0–74, SD, 20.9, respectively).

We were able to partly reject our third null hypothesis. The diagnosis of depression, anxiety, and somatoform disorders, but not disorders of behavioral dyscontrol, were individually associated with increased disability (DASH scores; all $p < 0.05$; Table 4). When all variables were entered together in the regression equation, as they naturally occur in the environment, they had a cumulative significant effect ($F = 6.97$; $p < 0.001$), but only somatoform disorders significantly predicted increased disability ($\beta = 0.439$; $p < 0.001$).

Discussion

Psychological illness influences the way in which patients experience and express pain and disability. The combination of pain and disability with such illness may act in a synergistic way to exaggerate both. To explore this relationship we tested three hypotheses: (1) patients with nonspecific pain (medically unexplained and idiopathic) and patients with specific pain (discrete and verifiable) are equally likely to screen for psychiatric illnesses; (2) the presence of psychiatric illness (from a screening questionnaire) will not predict whether patients have specific or nonspecific pain type; and (3) across all patients and regardless of whether they have specific or nonspecific pain, psychiatric illness will not predict disability.

Our study should be interpreted in light of its limitations. First, diagnoses of psychiatric illnesses were estimated based on self-report screening measures. Although these measures have been validated with high specificity and sensitivity [9–11, 20, 26], this approach may be less accurate than careful clinical diagnosis. Second, there are inherent difficulties of reliably making a nonspecific diagnosis: further evaluations or testing might reveal specific, discrete, treatable diagnoses in some patients. For the purposes of the study, we judged it sufficient that the pain was not associated with any initially apparent objective abnormalities or impairment, was not characteristic of any specific known pathologic process, and was medically unexplained in one visit and with evaluation by one

Table 2. Positive screens for psychiatric diagnosis

Diagnosis	Nonspecific	Specific
Major depression	2 (4.9%)	2 (5%)
Other depressive disorder	2 (4.9%)	0 (0%)
Panic disorder*	5 (12.2%)	2 (5%)
Posttraumatic stress disorder*	10 (24.4%)	2 (7.5%)
Other anxiety disorder	7 (17.1%)	2 (5%)
Somatoform disorder*	14 (34.1%)	3 (7.5%)
Bulimia	2 (4.9%)	0 (0%)
Binge eating	3 (7.3%)	4 (10%)
Alcohol abuse	3 (7.3%)	5 (12.5%)

* Statistically significant difference.

Table 3. Do psychiatric illnesses predict nonspecific arm pain?

Model	β	Standard error	Odds ratio	P	95% Confidence interval of the odds ratio
Univariate analyses					
Mood disorder	-0.72	0.90	0.4	0.42	0.08–2.82
Anxiety disorder*	-0.92	0.47	0.40	0.049	0.16–1.01
Somatoform disorder*	-1.86	0.69	0.16	0.007	0.04–0.60
Behavioral dyscontrol	0.03	0.59	1.03	0.96	0.33–3.32
Multivariable analysis					
Mood disorder	0.13	1.09	1.14	0.91	0.13–9.68
Anxiety disorder	-0.61	0.55	0.55	0.27	0.18–1.61
Somatoform disorder*	-1.71	0.75	0.18	0.02	0.04–0.79
Behavioral dyscontrol	0.58	0.71	0.42	0.42	0.44–7.19

* Statistically significant.

Table 4. Do psychiatric illnesses predict disability across patients with idiopathic versus discrete pain?

Independent variable (pain type and psychiatric illness)	R ²	F	P value model	β	Semipartial r ²	p Value factor
Univariate						
Nonspecific versus specific	0.10	8.61	> 0.01	-0.31		> 0.01
Multivariable model 1						
Idiopathic versus specific	0.14	6.41	> 0.01	-0.30	0.09	> 0.01
Mood disorder				0.20	0.04	0.05
Multivariable model 2						
Idiopathic versus specific	0.15	7.06	> 0.01	-0.26	0.07	0.02
Anxiety*				0.24*	0.06*	0.03*
Multivariable model 3						
Idiopathic versus specific	0.31	17.2	> 0.01	-0.16	0.02	0.12
Somatoform*				0.48*	0.21*	> 0.01*
Multivariable model 4						
Idiopathic versus specific	0.10	4.50	0.01	-0.31	0.10	> 0.01
Behavioral dyscontrol				0.07	0.005	0.50
Multivariable model 5						
Idiopathic versus specific	0.32	6.97	> 0.01	-0.14	0.02	0.16
Depression				0.07	0.004	0.49
Anxiety				0.08	0.005	0.45
Somatoform disorder*				0.44*	0.14*	> 0.01*
Behavioral dyscontrol				-0.04	0.001	0.67

* There was a significant influence of the factor after accounting for nonspecific versus specific diagnosis.

physician at the time of enrollment in the study. With time, some of specific causes of the pain or disability might become apparent in some patients, but we presume it would not be a large number. Third, as we evaluated only very high and very low diagnostic confidence, it is not clear how the findings apply to the average patient.

Using brief, validated self-report screening instruments, numerous patients with hand and arm pain presenting to an orthopaedic department screened for common psychiatric illnesses. Consistent with our primary hypothesis, patients with nonspecific pain were more likely than patients with specific pain to screen for PTSD, somatoform disorder, or

panic disorder, according to the screening instruments we used. Our findings are consistent with prior work for specific and nonspecific chronic pain conditions [1, 2, 4, 12–14, 19, 25]. The rates of provisional (questionnaire-based) psychological diagnoses obtained in our study patients generally are lower than those obtained by pain clinics for patients with chronic pain conditions [2, 16, 31, 33]. Nonetheless, the prevalence of provisional psychiatric illness among patients presenting to an orthopaedic hand surgeon, particularly among patients with nonspecific pain, suggests the psychiatric correlates of arm illness may be underappreciated and potentially undertreated. This is important and supports the need to evaluate and treat psychiatric illness early during the patients' pain experience.

That most individual psychiatric illnesses predicted pain type (specific versus nonspecific) suggests that when a diagnosis is difficult to make and the patient's pain is vague and diffuse a psychiatric contribution to the illness should be considered. That somatoform disorder was the sole predictor of having nonspecific arm pain suggests that this psychiatric illness is the most important psychological factor in patients with nonspecific pain.

Our finding that psychological illnesses, particularly somatoform disorders, are predictive of nonspecific arm pain is consistent with prior studies of nonspecific arm pain and other relatively nonspecific conditions such as fibromyalgia, irritable bowel syndrome, chronic pelvic pain, atypical chest pain, and interstitial cystitis [1–3, 13, 14, 19, 25]. Nonspecific pain is common with seemingly a condition for every anatomic area and several for the entire body (eg, fibromyalgia, chronic fatigue syndrome). These nonspecific chronic pain illnesses feature "preoccupation with or fear of having, or the idea that one has, a serious disease, based on a person's misinterpretation of bodily symptoms" and concern that there is something seriously wrong similar to hypochondriasis [3], and may largely represent a subtype of somatoform disorder.

Consistent with our third hypothesis, most of the individual psychiatric illness categories predicted arm disability over and above nonspecific and specific pain; somatoform disorder was the sole predictor of perceived arm disability when all psychiatric variables were accounted for. This underscores the role of psychologic distress in general, and of excessive concern with illness in particular, in reports of disability in patients with arm pain. This finding is consistent with prior research in other chronic pain areas suggesting the important role of psychiatric illness, and in particular of health anxiety and hypochondriasis (a subgroup of somatoform disorders), in reports of disability [3, 7, 17, 18].

Pain and disability are exacerbated by psychological distress, ineffective coping skills, negative illness concepts, and heightened illness concern, particularly when the

illness is puzzling [5–7, 23, 24, 32, 33]. Psychological distress, ineffective coping skills, and heightened illness concern are responsive to cognitive behavioral therapy [4]. Based on the data in this study, and as part of our ongoing development of a multidisciplinary hand and upper extremity service, we plan to test the hypothesis that cognitive behavioral therapy decreases pain and disability in patients with arm disorders.

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