Important Determinants of Self-Efficacy in Patients with Chronic Musculoskeletal Pain

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ABSTRACT. ***Objective.*** To define the presenting characteristics of a population of patients with chronic musculoskeletal pain seen in a tertiary rheumatology clinic, and to investigate which factors are associated with self-efficacy in these patients.

Methods. Data were collected prospectively for 196 patients who attended the clinic for the first time between October 2000 and August 2002. The primary outcome measure was self-efficacy, measured using the Pain Self-Efficacy Questionnaire. Secondary outcome measures were pain intensity and disability due to pain. The data were analyzed using both univariate and multiple regression methods.

Results. These patients had typically undergone extensive investigations and tried various therapies but were left with persisting pain and poor self-efficacy. Multiple regression analysis showed that after adjustment for other factors, the presence of depressive symptoms and employment status were associated with self-efficacy. Patients who reported depressive symptoms had mean self-efficacy scores 7.0 units lower (95% confidence interval, CI: 2.2-11.9) than those who did not. Being employed was associated with higher self-efficacy. The retired had scores 8.3 units lower than employed people (95% CI: 2.4-14.2), whereas housewives and the unemployed had scores approximately 14 units lower (95% CI: 8.0-20.9 and 7.5-19.0, respectively) than employed people. There was also some evidence that distribution of painful sites was associated with self-efficacy. Patients with extensive pain had scores 4.1 units (95% CI: –0.4-8.6) lower than those with limited pain.

Conclusion. Depressive symptoms, occupational status, and possibly distribution of pain are associated with the reported confidence of these patients with chronic pain in their ability to carry out everyday activities. Possible links to the idea of legitimacy of pain are discussed. (J Rheumatol 2004;31:1187–92)

Key Indexing Terms:
CHRONIC PAIN
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Chronic musculoskeletal pain is an important and costly health problem. For example, the prevalences of self-reported chronic back pain and chronic painful arthritis are both 16%. The prevalence of chronic widespread pain is 10–11%. It is more common in women than men at all ages[1–3]. These figures are fairly consistent over time[1-3] and between populations studied in different countries[1,3-5]. The direct and indirect healthcare costs of chronic pain are high[6].

It is increasingly believed that chronic pain should be managed using a biopsychosocial model that takes into account the social and emotional impact of the pain in an individual patient[6]. In the community, epidemiological studies have shown that psychological factors are important predictors of both the onset and persistence of chronic widespread pain[7,8].

Some patients with chronic pain are eventually referred to secondary or tertiary care units. Rheumatologists are particularly likely to see these patients. Diagnosing and treating these patients can be challenging. Their pain is often complex, with a variety of interlocking physical, social, and psychological problems. There are many options for investigation and management of chronic painful conditions in specialist settings, which may be prolonged, expensive, and yet ultimately unrewarding for the patient. For example, 80% of 72 patients with fibromyalgia had not improved at a median of 4 years' followup, despite trying a range of treatment options[9].

Observational data from chronic pain clinics are needed both to describe the case mix seen and to develop the best

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management approach. Information derived from community surveys or from condition-specific series cannot necessarily be used for these purposes because of the heterogeneous nature of the problems that patients bring to chronic pain clinics.

Self-efficacy is a particularly important concept in the management of chronic pain. Self-efficacy is a person's level of confidence in his or her ability to perform specific behaviors under particular conditions[10]. It can be measured using validated questionnaires such as the Pain Self-Efficacy Questionnaire[11,12]. Using pathway analysis in a cross-sectional study of 126 patients with chronic pain, Arnstein, *et al*[13] showed that self-efficacy is a mediator of the relationships between pain intensity, disability, and depression. Self-efficacy scores in patients with chronic pain at the beginning of a 9-month period were predictive of pain behavior and avoidance behavior throughout that period[12]. Self-efficacy was also predictive of response in a pain management program[14].

We performed a cross-sectional study of consecutive patients referred to a chronic pain clinic in a department of rheumatology. Our aim was to determine which factors at the time of presentation were particularly closely associated with poor self-efficacy and high self-rated pain intensity and disability. Based on data from community studies, we hypothesized that presence or absence of depressive symptoms and the distribution of the pain were likely to play important roles[2,4,5,7,8,15,16].

MATERIALS AND METHODS

Data collection. Patients are referred to our chronic pain clinic by general practitioners or hospital doctors. All patients have had pain for at least 3 months. All patients are seen by one of 2 consultant rheumatologists with an interest in pain (AR and MES). Since October 2000, we have entered data about these patients into an audit database held on a secure server. All the information recorded is of the type routinely obtained during the clinical consultation, except that the patients are requested to complete the Pain Self-Efficacy Questionnaire and scales that rate pain intensity and disability due to pain over the previous month. The database was created using Patient Analysis and Tracking System software (Axis Clinical Software, Inc., Portland, Oregon, USA). The Caldicott Guardian of University College London Hospitals Trust granted ethical approval for this audit.

This was a cross-sectional study in which we collected data from all patients who attended the clinic for the first time between October 2000 and August 2002. Five patients were excluded because their ability to communicate in English was so poor that the necessary data could not be recorded, and 4 because data on sites of pain were missing. In total, 196 participants were included in the study.

The Pain Self-Efficacy Questionnaire[11] consists of 10 questions about the patient's confidence in carrying out various normal activities despite the pain. The answer to each question is rated on a 7-point numerical rating scale where zero is "not at all confident" and 6 is "completely confident." This questionnaire has been used by several authors in the assessment of the effect of chronic pain upon lifestyle[12,17].

Pain intensity and disability due to pain were graded on 11-point numerical rating scales where zero is no pain/disability and 10 is very severe pain/disability. Numerical rating scales are reliable for assessing pain in patients with rheumatological disorders[18].

For the purpose of this study, patients were recorded as reporting depressive symptoms if they were being prescribed medication for depression and/or described symptoms of hopelessness, despair, or frequent crying. A specific questionnaire was not used to diagnose depression.

Distribution of painful sites. We recorded whether or not patients complained of pain in the following areas: upper back/neck, lower back, lower limbs, upper limbs, and/or "all over." We did not ask the patients to complete pain diagrams. We used these data on site of pain to divide the patients into 2 subgroups: either (1) limited pain: pain confined to one or 2 sites that are either upper back/neck + upper limbs, or lower back + lower limbs; or (2) extensive pain: all other categories of pain.

Our limited and extensive subgroups were defined such that they represented different sets of clinical possibilities. The limited pain group were those where the symptoms could conceivably be explained by a physical lesion at a single site, for example, a lumbar disc prolapse causing pain radiating from the lower back to the legs. Conversely the extensive pain group are those in whom no single site could explain all the pain.

Other authors have classified patients with chronic pain into groups with widespread and regional pain, as defined by the American College of Rheumatology (ACR)[19]. To compare our results with those previous reports, we repeated our analyses after re-allocating the patients into widespread and regional groups, by using an approximation of the ACR criteria: (1) widespread pain: pain in the axial skeleton and pain both above and below the waist, including at least one limb; (2) regional pain: all other categories of pain.

Statistical analysis. We considered 6 risk factors for pain intensity, disability, and self-efficacy. These were age, gender, distribution of painful sites, reported depressive symptoms, pain duration, and occupation. Age was split into 4 categories: under 35, 35-49, 50-64, and 65 years and over. Duration was split into 4 categories: 0-2, 3-5, 6-10, and over 10 years. Occupation was divided into 4 groups: those in paid employment, housewives, the retired, and the unemployed. We calculated mean scores and standard deviations (SD) for self-efficacy for each level of each factor, and univariate analyses were performed using either t tests or one way analysis of variance (ANOVA) depending on the number of levels of the factor. Medians and interquartile ranges (IQR) were calculated for the pain intensity and pain disability scores since their distributions were skewed. Univariate analyses for these outcomes were performed using either Mann-Whitney or Kruskal-Wallis tests depending on the factor. Two alternative groupings were used for the pain site variable (limited/extensive or regional/widespread as described above).

Multiple regression was carried out to find the effect of all 5 risk factors together on self-efficacy score. To determine the important factors in the multivariate model, we used backward elimination at the 5% level. Our convenience sample of 151 (complete case analysis) was large enough for this analysis, using the rule of thumb of 10 observations to each variable.

RESULTS

Data collection. Self-efficacy scores were collected on 158/196 (81%) participants and intensity and disability scores on 151/196 (77%) participants each. The main reason for not having these scores was inability of the participant to read the questionnaire.

There were slight differences between the participants for whom scores were not available and those from whom scores were available, in terms of gender (37% male compared to 25%), mean age (45.3 yrs compared to 49.0), and presence of depressive symptoms (23% compared to 18%). None of these differences was statistically significant.

Characteristics of the whole population of 196 participants. Most participants were women (72%). The mean age of the

population was 48.3 (± 14.2). Most of the participants were aged between 30 and 60 (70%).

These participants had lived with pain for many years. Pain duration of greater than 5 years was reported by 84/196 (43%) and greater than 10 years by 35/196 (18%). They had extensive previous investigations and treatments. Imaging investigations were especially common. Plain radiographs of the painful sites had been done on 139/196 (71%) of the participants, and 59/196 (30%) had undergone magnetic resonance imaging.

The different forms of treatment experienced by these participants are summarized in Table 1. Drugs (170/196, 87%) and physiotherapy (120/196, 61%) were the most common previous treatments reported.

The mean pain self-efficacy score (range 0-60, score for full self-efficacy, 60) for the whole group was 28 (± 15.2) whereas the median scores for pain intensity and disability were 7 (IQR 5-9) and 7 (IQR 5-8), respectively.

Depressive symptoms were reported by 61/196 (31%) of the participants, 84/196 (43%) described tiredness, and 49/196 (25%) limited mobility.

Division into subgroups according to distribution of painful sites. There were 111 participants (57%) with limited pain and 85 (43%) with extensive pain. All but 21 participants in the extensive pain group fulfilled the ACR criteria for widespread pain. Therefore, according to those criteria, there were 64 (33%) participants with widespread pain and 132 (67%) participants with regional pain.

Univariate analysis of the effect of 6 factors in the subgroup of 158 participants for whom self-efficacy data were available. Table 2 shows the mean self-efficacy scores and median intensity and disability scores by each risk factor, and Table 3 gives the results of univariate analyses. These analyses suggested the following associations. Participants with extensive or widespread pain, or reporting depressive symptoms had lower self-efficacy scores than those with limited/regional pain or those without depressive symptoms, respectively. In addition, pain duration and not being in paid employment were associated with low self-efficacy. Participants with longer pain duration, or who were housewives, or unemployed had much lower self-efficacy scores than those with shorter duration or those who were employed. For the factors associated with lower self-efficacy scores, there was also an association with higher intensity and disability scores, except that there was no significant association with the presence of widespread pain. These univariate analyses take no account of correlations between the 6 factors and there are possible issues regarding multiple comparisons. We therefore carried out multiple regression analysis to obtain a clearer picture of these associations.

Table 1. Previous treatment.

Type of Treatment	Participants Who Had Been Treated, n = 196 (%)
Drugs (any)	170 (87)
NSAID	131 (67)
Paracetamol	101 (52)
Codeine derivatives	116 (59)
Tramadol	23 (12)
Tricyclic antidepressants	53 (27)
SSRI	33 (17)
Other	19 (10)
Physiotherapy	120 (61)
Injections	33 (17)
Osteopathy	24 (12)
Chiropractic	5 (3)
Surgery	12 (6)
Other treatments	29 (15)

NSAID: nonsteroidal antiinflammatory drugs; SSRI: selective serotonin re-uptake inhibitors.

Multiple regression analysis. Using backward elimination at the 5% level, 2 factors were found to be significantly associated with self-efficacy score in a multivariate model. These were reporting depressive symptoms ($p = 0.005$) and occupation ($p < 0.001$). R^2 for this regression was 25.8%, indicating that a quarter of the variation in this outcome measure was explained by these 2 risk factors.

After adjusting for occupation, participants with depressive symptoms had mean scores 7.0 units lower (95% CI: 2.2-11.9) than those without depressive symptoms. After adjusting for depressive symptoms, the retired had mean scores 8.3 units lower than employed people (95% CI: 2.4-14.2), whereas housewives and the unemployed had mean scores approximately 14 units lower (95% CI: 8.0-20.9 and 7.5-19.0, respectively) than employed people.

There was some evidence for an association between distribution of painful sites and self-efficacy score, but this was not statistically significant ($p = 0.07$). Those with extensive pain had mean scores 4.1 units lower (95% CI: –0.4-8.6) than those with limited pain, after adjusting for depression and occupation. There was very little change in the effect of occupation or reporting depressive symptoms when site of pain was left in the model.

We repeated the analysis using the regional/widespread coding of pain, and similar results were achieved although the association with site of pain did not approach statistical significance ($p = 0.36$).

DISCUSSION

Despite multiple previous therapeutic measures, the participants in our study still had chronic musculoskeletal pain, with poor self-efficacy and high perceived disability. Our results suggest that low self-efficacy in this cohort of patients with chronic pain is associated with the presence of depressive symptoms, with occupational status, and possibly with site of pain.

In a postal survey of 3004 people, McBeth and

Table 2. Mean (standard deviation) self-efficacy scores and median (interquartile range, IQR) pain intensity and disability scores by each factor. Values (n) refer to participants who returned self-efficacy data. The values for intensity and disability scores refer to a slightly smaller population of 151 participants, since 7 participants returned self-efficacy questionnaires but not intensity or disability scores.

Factor Level	n	Mean Self-Efficacy Score (SD)	Median Intensity Score (IQR)	Median Disability Score (IQR)
Age				
< 35	26	28.3 (10.4)	7 (6–8)	7 (6–7)
35–49	58	26.6 (16.9)	8 (5–9)	7 (5–9)
50–64	46	27.7 (15.2)	7 (5–9)	7 (5–9)
≥ 65	28	31.3 (15.3)	8 (6–9)	7 (4.5–8.5)
Sex				
Male	40	28.6 (15.0)	7 (5–9)	6 (5–8)
Female	118	27.9 (15.3)	7 (6–9)	7 (5–8.5)
Site				
Limited	93	31.3 (14.9)	7 (5–8)	6 (5–8)
Extensive	65	23.4 (14.5)	8 (7–9)	7 (6–9)
Regional	110	29.7 (15.5)	7 (5–9)	6 (5–8)
Widespread	48	24.2 (13.7)	8 (7–9)	7 (6–9)
Depressive symptoms				
No	107	31.6 (14.9)	7 (5–9)	6 (5–7)
Yes	46	20.9 (13.3)	8 (6–9)	8 (6–9)
Pain duration, yrs				
0–2	42	32.4 (14.4)	7 (4–8)	6 (5–7)
3–5	53	29.6 (16.6)	7 (5–9)	6 (5–8)
6–10	37	23.2 (12.8)	8 (6–9)	7 (5–9)
> 10	25	25.0 (14.8)	9 (7–9)	8.5 (7–9)
Occupation				
Employed	64	35.9 (12.1)	7 (5–8)	6 (5–7)
Housewife	24	20.0 (16.3)	9 (8–9)	8 (6–9)
Retired	29	27.5 (15.8)	7.5 (6–9)	7 (4.5–8.5)
Unemployed	39	19.7 (11.5)	8 (5–9)	7.5 (5–9)

colleagues showed that both the persistence[7] and the onset of chronic widespread pain[8] were strongly influenced by illness behavior and psychological distress (as measured by the General Health Questionnaire). A quarter of people who had consulted a doctor about chronic widespread pain were found to have evidence of a mental disorder (commonly depression) at interview[20]. A high prevalence of depression in patients with chronic widespread musculoskeletal pain was also reported in Canadian[21] and American[19] populations.

The patients we studied are similar to those identified in these population studies in that they are predominantly female and have a high prevalence of depressive symptoms. However, it is clear that many people who report chronic pain in the general population experience complete resolution of this symptom within 2 years[1,5,7]. Our patients represent a particular group of people with chronic pain, who have not improved and who have sought medical help to the extent of attending a tertiary referral center. An association between self-efficacy and presence of depressive symptoms was seen in this group.

We did not use a validated questionnaire to determine whether participants had depression. This was a deliberate choice, because we wanted to know whether the presence of depressive symptoms, as determined by the clinician during a routine consultation, could be a useful predictive factor in managing these patients. This is more relevant to the routine management of chronic pain than use of questionnaires. However, our results would only be generally applicable if our criteria for deciding whether a patient has depressive symptoms are reasonable. These criteria are described in the methods section.

We also chose to describe distribution of painful sites by a simple method, which did not involve using a pain diagram. Again, this was designed to make it easy for others to use our methods. We have used the terms "limited" and "extensive" rather than widespread and regional, since the ACR[19] has explicitly defined the latter terms.

We found that the presence of extensive rather than limited pain was strongly associated with reduced self-efficacy in a univariate analysis. Other groups have shown that patients with widespread pain are more impaired than those with non-widespread pain as determined by ability to carry out activities of daily living[16], requirement for sick leave[5], or need to visit the doctor[4,15].

Since this is a cross-sectional study, no inference of

Table 3. Results from t test/ANOVA analyses for self-efficacy scores and Mann-Whitney/Kruskal-Wallis analyses for pain intensity and disability scores by each factor. For age, pain duration, and occupation, p values represent the probability that there is no difference between the groups using the test of equal group means (ANOVA) for self-efficacy and test of equal populations (Kruskal-Wallis) for other outcomes. For sex, site, and depression, p values represent the probability that there is no difference between the groups using the test of equal group means (t test) for self-efficacy and test of equal populations (Mann-Whitney) for other outcomes.

Factor Level	Self-Efficacy Difference from Baseline* (95% CI)	p	Intensity p	Disability p
Age				
< 35*	0	0.61	0.75	0.98
35–49	–1.7 (–8.8 to 5.4)			
50–64	–0.6 (–8.0 to 6.7)			
≥ 65	3.0 (–5.2 to 11.2)			
Sex				
Male*	0	0.80	0.48	0.43
Female	–0.7 (–6.2 to –4.8)			
Site of pain				
Limited*	0	0.001	0.03	0.01
Extensive	–7.8 (–12.5 to –3.1)			
Regional*	0	0.03	0.10	0.20
Widespread	–5.7 (–10.7 to –0.4)			
Depressive symptoms				
No*	0	< 0.001	0.04	0.002
Yes	–10.7 (–15.7 to –5.7)			
Pain duration, yrs				
0–2*	0	0.03	0.02	0.008
3–5	–2.7 (–8.8 to 3.3)			
6–10	–9.1 (–15.8 to –2.5)			
> 10	–7.3 (–14.8 to 0.1)			
Occupation				
Employed*	0	< 0.001	< 0.001	0.001
Housewife	–16.0 (–22.3 to –9.6)			
Retired	–8.4 (–14.3 to –2.5)			
Unemployed	–16.2 (–21.6 to –10.8)			

causation can be made from the observed associations. In fact, the links between pain, self-efficacy, depressive symptoms, and disability are complex, as described in a number of studies on patients from chronic pain clinics[12-14]. Arnstein, *et al*[13] carried out a cross-sectional study of 126 patients from New England. They collected data on pain intensity, depression, disability, and self-efficacy. Statistical analysis showed that these data were compatible with a model in which self-efficacy acted as a mediator between pain intensity and disability and between pain intensity and depression. Presence of depressive symptoms did not mediate between pain intensity and disability, but the study, unlike ours, excluded all patients who had previously been diagnosed with depression, so that the effect of this factor may have been underestimated. In postulating a central mediating role for self-efficacy, the authors argued that a lack of belief in one's own ability to manage pain could predict the extent to which individuals with chronic pain become disabled and/or depressed. This concept is consistent with the finding of Asghari and Nicholas[12] that low self-efficacy predicts the extent to which patients with chronic pain adopt patterns of pain and avoidance behavior, even after controlling for pain severity, chronicity, age, gender, depression, and physical disability.

In summary, our results show that reporting depressive symptoms, occupational status, and presence of extensive pain are associated with low self-efficacy in patients with chronic pain referred to our tertiary care clinic. Despite the fact that occupational status was more strongly associated with self-efficacy than site of pain, we believe that information on site of pain is likely to be more useful clinically, since occupational status can be affected by many other factors unrelated to pain.

One possible explanation of the apparent reduction in self-efficacy associated with more extensive pain comes from the idea that diffuse pain, with no obvious organic cause, may be viewed by patients, care givers, and healthcare staff as less "legitimate" than more limited and explicable symptoms. The psychosocial effects of such perceptions may affect patients' views about their own abilities[22]. It is now important to carry out a longitudinal study to determine whether depression and extensive pain also

predict outcome in patients with chronic pain, and to what extent this is influenced by treatment.

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