

# A prospective study of primary care patients with musculoskeletal pain: the identification of predictive factors for chronicity

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## SUMMARY

*Primary care faces the challenge of reducing the proportion of patients continuing with musculoskeletal pain beyond the acute phase. This study assessed patients presenting in general practice with a four- to 12-week history of pain and re-assessed them 12 weeks later. Patients whose pain was described as 'none' or 'slight' were allocated to the 'acute group', and those whose pain continued to be 'moderate' or 'severe' were allocated to the 'chronic group'. Comparative analysis of the two groups' responses at initial assessment identified pain intensity, active coping score, and previous pain episode to be factors independently predictive of chronicity.*

**Keywords:** *musculoskeletal pain; chronicity; general practice; comparative analysis.*

## Introduction

THE prognosis of chronic pain is poor both in terms of perceived pain intensity and functioning, even when treated in the best centres. Therefore, increasing attention has been paid to strategies in the management of acute pain problems presenting in primary care aimed at the prevention of chronic pain and disability. In the absence of evidence for an organic cause for the current epidemic of chronic pain, much interest has centred on psychological factors. The prevalence of maladaptive pain behaviours has been recognised in the Clinical Standards Advisory Group guidelines<sup>1</sup> on the management of acute low back pain, and the principles underlying the guidelines may be applicable to the range of acute musculoskeletal pain problems. Implementation of these principles will be facilitated by knowledge of risk factors associated with the development of chronicity.

## Method

Consecutive patients consulting their general practitioner (GP) were screened using a brief questionnaire. Those patients aged 18 to 65 years, who indicated that they were consulting for an uncomplicated musculoskeletal pain problem that had caused daily pain for between four and 12 weeks, were invited for inter-

view. The subjects' ages, sex, and social classes were noted along with any current medication, past medical history, history of pain problem, and family history of chronic pain. The following measures were applied:

- General Health Questionnaire, 28-item version (GHQ-28).<sup>2</sup>
- Three 10 cm visual analogue scales for present and average pain intensity and distress owing to pain.
- A Verbal Rating Scale (VRS) for pain intensity. This was self-rated along a scale: none/slight/moderate/severe.
- Pain Management Inventory (PMI).<sup>3</sup> This is an 18-item self-completion questionnaire enquiring about the frequency of actions employed to cope with pain that yields:
  - Active Coping Score (ACS) (range = 0–35)
  - Passive Coping Score (PCS) (range = 0–55)

The measures were repeated 12 weeks after the initial interview by postal contact. At this stage the subjects were allocated to two groups on the basis of their responses to the VRS:

1. 'Acute' group — VRS response of 'none' or 'slight' pain.
2. 'Chronic' group — VRS response of 'moderate' or 'severe'.

## Analysis

A univariate analysis was conducted comparing the two outcome groups for the independent variables measured at the initial assessment, using chi-square test for categorical variables and the Mann-Whitney U test for continuous variables. The data were also subjected to a multivariate technique, linear logistic regression.<sup>4</sup> This was achieved using the computer package GLIM.<sup>5</sup> A forward stepwise regression procedure was used, and interaction effects between variables were incorporated into this process.

## Results

A total of 203 out of 9060 patients screened were eligible for the study, and 196 agreed to be interviewed. Of 141 (69%) who complied with both assessments and who were not found to have a psychiatric disorder, 68 formed the chronic group and 73 the acute group.

### Univariate analysis

Table 1 compares the outcome groups on the main independent variables measured at the initial assessment. The level of pain and the distress owing to pain are associated with the maintenance of pain at 12 weeks. Pain maintenance is also associated with previous experience of an episode of continuous pain, a low active coping score, and a high passive coping score.

### Multivariate analysis

All variables listed in Table 1 were subjected to a multivariate analysis. Missing data reduced the number of subjects available for the multivariate analysis to 130. In the final model, only the verbal rating of pain intensity ( $P < 0.001$ ), active coping score ( $P = 0.014$ ), and a previous episode of continuous pain ( $P = 0.025$ ) were significant and independently related to the development of chronic pain. The probability of the maintenance of pain at 12

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**Table 1.** Comparison of chronic and acute groups by responses at initial assessment.

	Chronic pain group		Acute pain group		Chi-squared test
	n	%	n	%	
Sex					
Male	24	35.5	34	46.6	P = 0.23
Female	44	64.7	39	53.4	
Age					
<40 years	28	41.2	36	49.3	P = 0.21
40–50 years	23	33.8	15	20.5	
>55 years	17	25.0	22	30.1	
Site of pain					
Trunk	16	23.5	20	27.4	P = 0.54
Head	14	20.6	10	13.7	
Limbs	38	55.9	43	58.9	
Current drug therapy	50	73.5	51	69.9	P = 0.77
Mild/moderate analgesia	24	35.5	25	34.2	P = 1.0
On NSAIDs	22	32.4	25	34.2	P = 0.95
Previous history of similar episode of pain	29	42.6	16	22.2	P = 0.016
Family history of chronic pain	19	27.9	14	19.4	P = 0.32
Pain intensity (VRS)					
Slight	2	2.9	27	37.0	P<0.0001
Moderate	45	66.2	37	50.7	
Severe	21	30.9	9	12.3	
GHQ (total score)					
<5	36	53.7	43	60.6	P = 0.52
5+	31	46.3	28	39.4	
		Median		Median	Mann–Whitney U test
VAS present		30.5		21	P = 0.044
VAS average		57		37	P = 0.0002
VAS distress		44		30	P = 0.0014
Active coping score		21		24	P = 0.002
Passive coping score		29		25	P = 0.0008

NSAIDs = non-steroidal anti-inflammatory drugs.

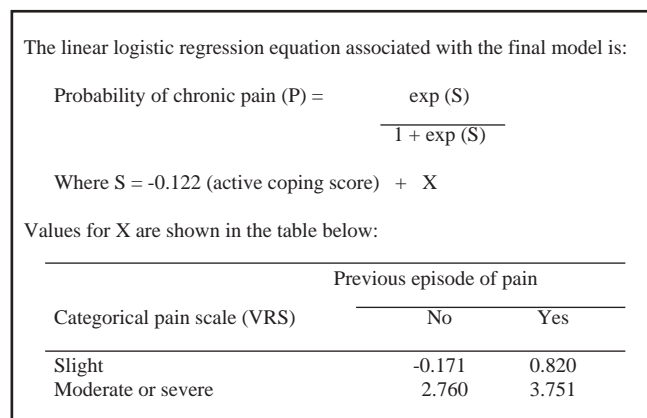


Figure 1. The Keele Pain Outcome Prediction (KPOP) model.

weeks as a function of these three variables derived from the regression model is shown in Figure 1. We have named this the ‘Keele Pain Outcome Prediction (KPOP) model’.

**Discussion**

This study has identified measurable factors predictive of chronic pain development. The perceived pain intensity at initial assessment was strongly related to maintaining pain. The results, sug-

gesting that poor reliance on active coping strategies was associated with a poor prognosis, are consistent with the results of other studies.<sup>6</sup> The past experience of a pain problem also predicted pain maintenance, and this are also consistent with previous studies.<sup>7</sup> This three-variable model for the prediction of chronic pain now requires validation on a separate dataset to test the goodness of fit between predicted and actual outcomes.

General practitioners may be reluctant to depart from the biomedical paradigm applied to the management of pain, for reasons such as time constraints, fears of missing serious underlying pathology, and patients’ demands to ‘get to the bottom’ of the problem. Although a more active approach to the management of acute pain hastens functional recovery; the use of physical therapy and patient information booklets may be insufficient to prevent chronic pain and disability in patients with entrenched beliefs and maladaptive pain behaviours. Some methods of targeting therapy on those at risk of developing chronic pain will be helpful in improving the outcome of patients presenting with musculoskeletal pain. The predictive variables identified in the present study may be used to identify such at-risk populations and suggest that, in addition to routine clinical management, a cognitive-behavioural approach may be valuable to modify the patients’ views of their problem and their coping strategies.<sup>8</sup>

## References

1. Clinical Standards Advisory Group. *Back Pain*. London: HMSO, 1994.
2. Goldberg DP, Hillier VF. A scaled version of the General Health Questionnaire. *Psychol Med* 1979; **9**: 139-145.
3. Brown GK, Nicassio PM. Development of a questionnaire for the assessment of active and passive coping strategies in chronic pain patients. *Pain* 1987; **31**: 53-64.
4. Cox DR. *Analysis of binary data*. London: Methuen, 1970.
5. Baker RJ, Nelder JA. *The GLIM system, release 4. Generalised linear interactive modelling manual*. Oxford: Numerical Algorithms Group, 1993.
6. Philips HC. Avoidance behaviour and its role in sustaining chronic pain. *Behav Res Ther* 1987; **25**: 273-279.
7. Smedley J, Egger P, Cooper C, Coggon D. Prospective cohort study of predictors of incident low back pain in nurses. *BMJ* 1997; **286**: 523-525.
8. Enright SJ. Cognitive behaviour therapy – clinical applications. *BMJ* 1997; **314**: 1811-1816.

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