

The epidemiology of chronic pain in the community

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Summary

Background Chronic pain is recognised as an important problem in the community but our understanding of the epidemiology of chronic pain remains limited. We undertook a study designed to quantify and describe the prevalence and distribution of chronic pain in the community.

Methods A random sample of 5036 patients, aged 25 and over, was drawn from 29 general practices in the Grampian region of the UK and surveyed by a postal self-completion questionnaire. The questionnaire included case-screening questions, a question on the cause of the pain, the chronic pain grade questionnaire, the level of expressed needs questionnaire, and sociodemographic questions.

Findings 3605 questionnaires were returned completed. 1817 (50.4%) of patients self reported chronic pain, equivalent to 46.5% of the general population. 576 reported back pain and 570 reported arthritis; these were the most common complaints and accounted for a third of all complaints. Backward stepwise logistic-regression modelling identified age, sex, housing tenure, and employment status as significant predictors of the presence of chronic pain in the community. 703 (48.7%) individuals with chronic pain had the least severe grade of pain, and 228 (15.8%) the most severe grade. Of those who reported chronic pain, 312 (17.2%) reported no expressed need, and 509 (28.0%) reported the highest expressed need.

Interpretation Chronic pain is a major problem in the community and certain groups within the population are more likely to have chronic pain. A detailed understanding of the epidemiology of chronic pain is essential for efficient management of chronic pain in primary care.

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Introduction

Chronic pain is recognised as a common problem within the community, and is known to affect general health,¹ psychological health,²⁻⁴ and social and economic well-being.^{5,6} Chronic pain is one of the most common reasons why people seek medical care; patients with chronic pain use health services up to five times more frequently than the rest of the population.^{7,8} Chronic pain also results in many days lost from work.⁹ Nevertheless, our understanding of the epidemiology of chronic pain remains limited. Several previous studies of the prevalence of chronic pain have been based on patients attending pain clinics,^{10,11} but these patients represent one extreme of the population with chronic pain and are not likely to be representative of the general population.^{12,13}

Good community-based epidemiological studies have been difficult to do. Many approaches used to estimate the prevalence of chronic pain have had limitations, such as the use of non-specific measurement instruments.^{9,14} Some studies have concentrated on patients with specific pain-related diagnoses, such as back pain, fibromyalgia, and chronic musculoskeletal pain,^{2,15,16} and others have been small.¹⁴ Previous estimates of the prevalence of chronic pain in the general population have ranged from 2% to 45%.^{2,3,9,14,16-18}

We present results from an epidemiological study of chronic pain, designed to quantify and describe the prevalence of chronic pain in the community, according to age, sex, and sociodemographic status.

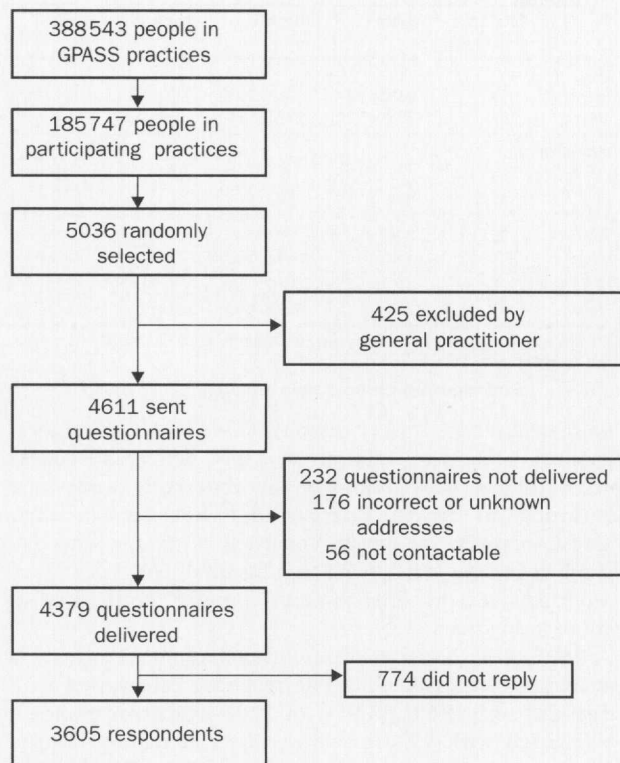
Methods

Participants and procedures

The International Association for the Study of Pain defines chronic pain as "pain that persists beyond normal tissue healing time, which is assumed to be 3 months".¹⁹ This definition does not allow for intermittent pain, so for the purposes of this study we defined chronic pain, after pilot testing, as "pain or discomfort, that persisted continuously or intermittently for longer than 3 months".

The study was done in the Grampian region of northeast Scotland. All practices that used the General Practice Administrative System for Scotland (GPASS) were invited to collaborate. We had to limit the study to these practices because GPASS was required for a related study. Of the 67 practices eligible to participate in the study, 29 (43%) were keen to be included. These practices accounted for about 35% of the total Grampian population and were representative of the practices in Grampian in terms of size of practice, geographical location, and socioeconomic status of those attending. There was no follow-up of the remaining practices.

5036 patients aged 25 years and older who attended participating practices were selected randomly from the community health index (a list of all patients registered with a general practitioner). The sample was stratified for sex and age (six age-groups ranging from 25–34 years to 75 years and over) and was weighted to ensure an equal representation of patients in each of the subgroups. Each list of patients was screened by the relevant general practitioner so that inappropriate or insensitive inquiries could be prevented (for example, in the



Study profile

case of terminal illness). No specified criteria for the exclusion of patients were provided. General practitioners were simply asked to score through the name of anyone whose inclusion they felt would be unsuitable or inappropriate.

Questionnaire

Participants were surveyed by a postal self-completion questionnaire, developed through piloting and validation. This questionnaire included case-screening questions, a question on the cause of the pain, the chronic pain grade questionnaire, the level of expressed needs questionnaire, and sociodemographic questions.

Chronic pain cases were identified through two questions: one question to assess whether pain or discomfort was present, and a second to establish whether this pain or discomfort had started longer than 3 months ago. Patients were asked to say whether they knew what caused their pain and were given a choice of responses (based on pilot studies) of angina, arthritis, back pain, injury, women's problems, don't know, and other.

The chronic pain grade questionnaire^{7,20} is a seven-item questionnaire that measures severity of chronic pain in three dimensions: persistence, intensity, and disability. The results of the questionnaire enable patients to be classified into five hierarchical grades: grade 0 (pain free), grade I (low disability, low intensity), grade II (low disability, high intensity), grade III (high disability, moderately limiting), and grade IV (high disability, severely limiting). This questionnaire has been tested

	Number of respondents	Odds ratio* (95% CI)	p
Education			
No educational qualifications	1637	1.00†	
Secondary school qualifications	960	0.93 (0.78–1.10)	0.40
Higher education qualifications	735	0.99 (0.82–1.19)	0.89
Marital status			
Never married	376	1.00†	
Currently married	2528	1.23 (0.98–1.54)	0.08
No longer married	659	1.20 (0.91–1.57)	0.20
Housing tenure			
Owned or mortgaged	2436	1.00†	
Council rented	898	1.29 (1.10–1.51)	0.01
Privately rented and other	208	0.97 (0.72–1.29)	0.82
Number of occupants			
Living alone	751	1.00†	
Living with others	2639	0.99 (0.83–1.17)	0.87
Employment status			
Employed	1809	1.00†	
Retired	1086	1.33 (1.03–1.72)	0.03
Not able to work owing to illness/disability	161	8.15 (5.03–13.21)	<0.001
Others not employed	428	0.92 (0.73–1.16)	0.50
Social class (occupation based)			
Highly skilled	708	1.00†	
Skilled	719	1.02 (0.82–1.26)	0.87
Part or non-skilled	351	1.07 (0.82–1.40)	0.61

*Adjusted for age and sex. †Reference category.

Table 2: Association of demographic factors with chronic pain

for use in a UK population,²¹ and was found to be acceptable, valid, and reliable for use as a self-completion postal questionnaire. Only those patients who responded positively to the case-screening questions, which identified whether chronic pain was present, were asked to complete the chronic pain grade questionnaire.

The level of expressed needs questionnaire is based on previous work.²² It represents a measure of patients' response to chronic pain in a way that reflects demand for and uptake of health-service resources and has meant that a series of increasing amounts of help-seeking behaviour can be identified. The questionnaire enquires about the treatment sought by patients in an attempt to relieve their pain, as measured by how recently and frequently patients used painkillers or visited health professionals. For the purposes of this study, this questionnaire consisted of four questions: Have you sought treatment for your pain or discomfort recently? Have you sought treatment for your pain or discomfort often? Have you taken painkillers for your pain or discomfort recently? Have you taken painkillers for your pain or discomfort often?

From the number of positive responses we were able to identify five levels of expressed need for patients with chronic pain from level 0 (no expressed need; answered no to all four questions) to level 4 (high expressed need; answered yes to all four questions).

The sociodemographic section included questions on education, marital status, housing tenure, employment status, occupation, and the number of occupants living in the patient's home. Although occupational data can be used to determine social class for people in work, housing tenure is a valid substitute to assess socioeconomic status.²³

	Men		Women		All respondents	
	n	Rate of chronic pain (range*)	n	Rate of chronic pain (range*)	n	Rate of chronic pain (range*)
Age-group (years)						
25–34	76	31.8 (19.1–58.9)	94	31.6 (23.3–49.6)	170	31.7 (21.3–54.3)
35–44	102	38.3 (25.6–58.8)	140	43.6 (35.0–54.8)	242	41.2 (30.3–56.8)
45–54	139	47.6 (35.8–60.6)	170	53.1 (42.9–62.1)	309	50.5 (39.4–61.4)
55–64	173	53.9 (44.5–62.0)	198	60.2 (50.4–66.7)	371	57.1 (47.4–64.3)
65–74	189	56.6 (49.6–61.9)	190	57.9 (50.0–63.7)	379	57.3 (49.8–62.8)
≥75	173	59.9 (49.6–66.8)	173	64.3 (51.3–71.5)	346	62.0 (50.4–69.1)
Total	852	48.9 (37.0–61.4)	965	51.8 (41.8–61.1)	1817	50.4 (39.4–61.2)

*Minimum rates assume no non-responders had chronic pain; maximum rates assume all non-responders had chronic pain.

Table 1: Prevalence of self-reported chronic pain

	Number of respondents	Odds ratio* (95% CI)	p
Sex			
Men	1511	1.00*	
Women	1610	1.24 (1.07–1.43)	0.003
Age-group (years)			
25–34	505	1.00*	
35–44	545	1.53 (1.19–1.96)	<0.001
45–54	562	2.02 (1.58–2.59)	<0.001
55–64	567	2.38 (1.85–3.07)	<0.001
65–74	543	2.25 (1.63–3.09)	<0.001
≥75	399	2.90 (2.07–4.05)	<0.001
Housing tenure			
Owned or mortgaged	2224	1.00*	
Council rented	732	1.23 (1.03–1.47)	0.02
Privately rented and other	165	0.92 (0.66–1.29)	0.63
Employment type			
Employed	1672	1.00*	
Retired	917	1.32 (1.00–1.74)	0.047
Unable to work owing to illness/disability	136	7.75 (4.59–13.09)	<0.001
Others not employed	396	0.96 (0.76–1.22)	0.73

*Reference category.

Table 3: **Logistic-regression model of factors significantly associated with chronic pain**

Data analysis

Each patient was sent a copy of the questionnaire accompanied by a letter, signed by his or her own general practitioner and the general practitioner in the research group. Up to two reminders were sent after intervals of 2 weeks to maximise the response rate.

Questionnaire responses were entered into the Microsoft Access database (version 2) and the data were analysed with SPSS (version 6). χ^2 tests were used to test for associations between sociodemographic variables and questionnaire responses, and Mantel-Haenszel tests were used to investigate trends across age-groups. To identify the sociodemographic factors that were associated with chronic pain, odds ratios (adjusted for age and sex), 95% CI, and p values for a two-sided test were calculated. We considered for inclusion in a model all factors for which the odds ratio had a p value below 0.2,³⁴ that were deemed clinically important, or that had had a significant association with chronic pain in previous studies. Backward stepwise logistic-regression modelling was then used to obtain a subset of sociodemographic factors that were associated with chronic pain. We used likelihood ratio tests to judge whether or not to remove factors.

Results

Of the 5036 individuals randomly selected, 425 were excluded from the survey by general practitioners (figure). The reason for exclusion was not always given. 267 exclusions were explained: 72 patients had died; 99 were no longer registered with the practice; 18 had terminal illness; 43 were demented, frail, or very elderly; nine had mental illness; 12 were in hospital; and 14

	Back pain	Arthritis	Injury	Angina	Women's problems	Don't know
Sex						
Men	259 (14.9%)	239 (13.7%)	133 (7.6%)	85 (4.9%)	0	90 (5.2%)
Women	317 (17.0%)	331 (17.8%)	80 (4.3%)	76 (4.1%)	139 (7.5%)	64 (3.4%)
Age-group						
25–34	64 (11.9%)	6 (1.1%)	36 (6.7%)	1 (0.2%)	28 (5.2%)	16 (3.0%)
35–44	97 (16.5%)	29 (4.9%)	31 (5.3%)	0	47 (8.0%)	24 (4.1%)
45–54	108 (17.6%)	76 (12.4%)	36 (5.9%)	7 (1.1%)	31 (5.1%)	32 (5.2%)
55–64	120 (18.5%)	131 (20.2%)	33 (5.1%)	41 (6.3%)	17 (2.6%)	30 (4.6%)
65–74	101 (15.3%)	171 (25.8%)	37 (5.6%)	50 (7.6%)	6 (0.9%)	26 (3.9%)
≥75	86 (15.4%)	157 (28.1%)	40 (7.2%)	62 (11.1%)	10 (1.8%)	26 (4.7%)
Total	576 (16.0%)	570 (15.8%)	213 (5.9%)	161 (4.5%)	139 (3.9%)	154 (4.3%)

Percentages are of total in each subgroup.

Table 4: **Self-reported cause of pain**

	Total with chronic pain	Grade I	Grade II	Grade III	Grade IV
Sex					
Men	693	348 (50.2%)	176 (25.4%)	70 (10.1%)	99 (14.3%)
Women	752	355 (47.2%)	177 (23.5%)	91 (12.1%)	129 (17.2%)
Age-group					
25–34	159	90 (56.6%)	40 (25.2%)	11 (6.9%)	18 (11.3%)
35–44	211	120 (56.9%)	48 (22.7%)	17 (8.1%)	26 (12.3%)
45–54	276	140 (50.7%)	74 (26.8%)	22 (8.0%)	40 (14.5%)
55–64	299	144 (48.2%)	70 (23.4%)	35 (11.7%)	50 (16.7%)
65–74	280	138 (49.3%)	69 (24.6%)	38 (13.6%)	35 (12.5%)
≥75	220	71 (32.3%)	52 (23.6%)	38 (17.3%)	59 (26.8%)
Total	1445	703 (48.7%)	353 (24.4%)	161 (11.1%)	228 (15.8%)

Percentages are of total with chronic pain in each subgroup who completed the chronic pain grade questionnaire.

Table 5: **Self-reported chronic pain severity**

were excluded for other reasons. Of 4611 questionnaires mailed, 176 questionnaires were not delivered because the address was unknown or incorrect, and were returned to us. 56 people did not receive their questionnaires; this group consisted of people who had died recently, who were in hospital, or who were working overseas. The patients' families notified us of these individuals.

3605 questionnaires were completed and returned—a response rate of 82.3%. The response rate varied with age and sex. 1864 (83.9%) of 2223 women responded, compared with 1741 (80.8%) of 2156 men ($p<0.01$). The response rate increased with age from 72.3% (536 of 741) in the age-group 25–34 years to 88.9% (558 of 628) in the age-group 65 years and older ($p<0.001$).

The proportion of respondents reporting chronic pain was 50.4% (table 1). There was no significant difference between men and women in the proportion reporting chronic pain (48.9 vs 51.8%) but the proportion significantly increased with age from 31.7% for the youngest age-group to 62.0% for the oldest age-group ($p<0.001$). By standardising the sample to the age and sex distribution of the total population of patients registered with participating practices, we estimated the prevalence of chronic pain in the general population as 46.5% (95% CI 44.8–48.2).

To assess the possible effect of differences in response in the various age-sex groups, we calculated the minimum possible rate of chronic pain (based on the assumption that none of the non-responders had chronic pain), and the maximum possible rate (based on the assumption that all of the non-responders had chronic pain).

Table 2 gives odds ratios for pain associated with various sociodemographic factors. Individuals living in rented council accommodation were more likely to have chronic pain than those who lived in owned or mortgaged property. Individuals who were retired or not able to work were also more likely to report chronic pain than those who were employed. To obtain a subset of sociodemographic variables associated with chronic pain, backward stepwise logistic-regression modelling was done (table 3). Age, sex, housing tenure, and employment status were identified as factors independently and significantly associated with chronic pain. Although sex was not a significant factor in the univariate analysis, it was included in the final model as a significant factor, with women more likely than men to report chronic pain. Chronic pain was also associated with older age, living in rented council accommodation, and being retired or unable to work.

	Total with chronic pain	Level 0	Level 1	Level 2	Level 3	Level 4
Sex						
Men	852	174 (20.4%)	158 (18.5%)	195 (22.9%)	110 (12.9%)	215 (25.2%)
Women	965	138 (14.3%)	132 (13.7%)	253 (26.2%)	148 (15.3%)	294 (30.5%)
Age-group						
25-34	170	32 (18.8%)	28 (16.5%)	57 (33.5%)	19 (11.2%)	34 (20.0%)
35-44	242	53 (21.9%)	41 (16.9%)	50 (20.7%)	36 (14.9%)	62 (25.6%)
45-54	309	55 (17.8%)	63 (20.4%)	80 (25.9%)	37 (12.0%)	74 (23.9%)
55-64	371	64 (17.3%)	56 (15.1%)	92 (24.8%)	54 (14.6%)	105 (28.3%)
65-74	379	60 (15.8%)	62 (16.4%)	89 (23.5%)	62 (16.4%)	106 (28.0%)
≥75	346	48 (13.9%)	40 (11.6%)	80 (23.1%)	50 (14.5%)	128 (37.0%)
Total	1817	312 (17.2%)	290 (16.0%)	448 (24.7%)	258 (14.2%)	509 (28.0%)

Percentages are of total with chronic pain in each subgroup.

Table 6: Expressed need of patients with chronic pain

Back pain and arthritis were the two most commonly reported causes of chronic pain, accounting for about a third of all reported causes (table 4). Back pain was the most common problem in men and in the younger age-groups, and arthritis was the most frequent cause of pain in women and in the older age-groups. A large number of other causes of pain were given. Some people identified the actual complaint and others reported an anatomical site for their symptoms. The most frequently reported complaints in this category were leg pain (1.7%) and headaches (1.0%). All other causes given were reported by less than 1% of the sample.

Table 5 shows the pain severity as measured by the chronic pain grade questionnaire. Of 1445 individuals who reported chronic pain, 703 (48.7%) had pain graded as least severe (grade I), and 228 (15.8%) had pain graded as most severe (grade IV). There was no significant difference in the distribution of grades of pain between men and women but the frequency of the more severe pain grades (grades III and IV) increased with age ($p < 0.001$).

Of those patients with chronic pain, 312 (17.2%) showed no expressed need and 509 (28.0%) showed the highest level of expressed need (table 6). The small percentage of individuals with chronic pain who had no apparent expressed need suggests that patients with chronic pain are likely to make extensive use of health services. Women were more likely to report high expressed need than were men ($p < 0.001$). The level of expressed need also varied significantly with age ($p < 0.001$).

Discussion

This study shows that chronic pain is a major problem in the community, with about half of the sample reporting chronic pain; after standardisation we estimate that 46.5% of the general population have chronic pain. This figure is higher than previous estimates of chronic-pain prevalence in general population studies.^{2,3,9,14,16-18} This discrepancy is likely to reflect differences in the research methods and case definitions used; differences that previously accounted for the majority of variation in general-population prevalences.¹⁸ Prevalence of chronic pain also varies widely across different geographical locations.³

These findings expand our understanding of chronic pain in two important ways. Unlike many previous studies, our study was done in a community setting and used a definition of chronic pain based on the most commonly used standard definition, that of the International Association for the Study of Pain. Also,

our study is the first general population study of all chronic pain to use validated measures of the severity and significance of chronic pain. This approach allows stratification of chronic pain, which means that in addition to providing prevalence rates for any chronic pain we have established the prevalence of severe and significant chronic pain. These prevalence rates are likely to be of greatest clinical significance, and of more use, to physicians and health-service planners.

The response rate for the study was high, with slightly higher response rates from women than men, and increasing response rates with age. The increase in response rate with age is likely to be related to the fact that prevalence of chronic pain increases with age. To explore the possible effects of non-response on the prevalence of chronic pain, we calculated minimum and maximum rates for each subgroup of age and sex. The range between the minimum and maximum rates is widest for the youngest age-group, reflecting the lower response rate in these patients.

Analysis of the sociodemographic factors identified age, sex, housing tenure, and employment status as a subset of factors significantly associated with chronic pain. These findings highlight subsets of the general population who may be more likely to have chronic pain and are important in consideration of the onset and management of this important and common problem. Further longitudinal studies are needed to establish the direction of these sociodemographic associations, and to differentiate causes from effects.

Although the proportion of our sample who had chronic pain was high, most individuals (48.7%) reported pain of the mildest chronic pain grade. Even so, 17.2% of those with chronic pain reported no expressed need. A fairly small proportion (15.8%) reported the most severe grade of pain, yet 28.0% of all those with chronic pain reported the highest expressed need. These results suggest a disparity between reported severity of chronic pain and the expressed need of patients, but the disparity arises because the two instruments measure different features of chronic pain. The chronic pain grade assesses severity of chronic pain in terms of intensity and disability, and the level of expressed need questionnaire measures patients' response to their chronic pain in terms of treatment and analgesics. Our results suggest that response to chronic pain, as measured by the level of expressed needs questionnaire, is not solely dependent on pain intensity and disability and may reflect the multifactorial and subjective experience of, and response to, chronic pain. The disparity between the two measures is important since it may highlight areas of unmet need and highlight

those patients who display high expressed need yet have mild chronic pain. Further research into the complexities of this issue is in progress.

There is evidence that many patients with pain, in many cases treated inadequately, could be relieved with improved management by general practitioners.²⁵ Management strategies need to be practicable and appropriate for use in primary care, where the majority of patients who seek treatment will present. These management strategies must be evaluated by randomised control trials, the design and interpretation of which will be informed by epidemiological studies of chronic pain in primary care.

Contributors

Blair Smith, Cairns Smith, and Alastair Chambers designed the study. Alison Elliott collected the data. Alison Elliott and Kay Penny analysed the data. The paper was drafted by Alison Elliott and edited by all other investigators.

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