Family Practice
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Vol. 18, No. 3
Printed in Great Britain

The impact of chronic pain in the community

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Smith BH, Elliott AM, Chambers WA, Cairns Smith W, Hannaford PC and Penny K. The impact of chronic pain in the community. *Family Practice* 2001; **18:** 292–299.

Background. Chronic pain is known to be very common in the community. Less is known about the epidemiology of more significant or severe chronic pain. The impact of chronic pain in the community, in terms of general health, employment and interference with daily activity, has not been quantified.

Objectives. The aim of this study was to describe the prevalence and distribution in the community of chronic pain defined as 'significant' and 'severe', and to explore the impact of chronic pain on health and activity.

Methods. A questionnaire survey was carried out of a sample drawn from the general population in the Grampian region of Scotland. Questionnaires were sent to a random sample of 4611 individuals aged 25 years and over, stratified for age and gender, selected from the practice lists of 29 general practices (total practice population 136 383). The study instrument included a case definition questionnaire, from which were identified individuals with 'any chronic pain' (pain of at least 3 months duration). The instrument also included a level of expressed need questionnaire and the chronic pain grade questionnaire, from which were derived definitions for 'significant chronic pain' (based on the reported need for treatment and professional advice) and 'severe chronic pain' (based on reported intensity and pain-related disability). The SF-36 general health questionnaire and demographic questions were also included.

Results. Of the sample, 14.1% reported 'significant chronic pain', and this was more prevalent among women and older age groups. A total of 6.3% reported 'severe chronic pain', and this was more common in older age groups. On multiple logistic regression modelling, female gender, housing tenure, employment category and educational attainment were found to be independently associated with both 'significant' and 'severe' chronic pain. The presence of 'any', 'significant' and 'severe' chronic pain had progressively more marked adverse associations with employment, interference with daily activities and all measured dimensions of general health.

Conclusions. Comparison of the epidemiology of 'significant chronic pain' and 'severe chronic pain' with 'any chronic pain' allows an understanding of the more clinically important end of the chronic pain spectrum. These results support the suggestion that chronic pain is multidimensional, both in its aetiology and in its effects, particularly at this end of the spectrum. This must be addressed in management and in further research.

Keywords. Chronic pain, epidemiology, general population, primary care.

Introduction

Estimates of the prevalence of chronic pain in the general population range from 7%[1] to 55%.[2] Studies measuring the impact of chronic pain on individual life and health have tended to focus on specific conditions, such as backache,[3] temporo-mandibular disorder[5] or groups of conditions.[6–8] While these are important causes of chronic pain, they represent only part of the picture, contributing to a 'fragmented and inadequate' description of the epidemiology of chronic pain.[9,10] Other studies have examined specialized subgroups of the population such as pain clinic attenders,[11–13] disabled adults[14] or those with occupational injury,[15] from which extrapolation to the general population is difficult.[16] Studies which have

Received 4 May 2000; Revised 5 September 2000; Accepted 8 January 2001.

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assessed the impact on the general population have been hampered by unvalidated definitions of chronic pain,[17–19] the use of poorly validated instruments to measure impact,[1,17] or have focused on only one dimension of impact such as depression[19,20] or disability.[21] Other large-scale community-based studies have made little assessment of the impact of chronic pain.[2] Thus the effects of chronic pain as a clinical entity in the community remain poorly understood.

There is evidence that chronic pain has a detrimental effect on physical health,[17,22,23] daily activity,[1,21] psychological health,[7,8,19,21,22] employment[1,23] and economic well-being.[24] For example, in the UK, it was estimated that back pain led to 45 million days lost from work per year.[25] Use of the Sickness Impact Profile[26,27] found that chronic pain was associated with a reduced ability to work, and with difficulty in performing everyday activities. More recently, a multinational study showed significant interference with work and with daily activites associated with persistent pain.[21] We previously have presented data from a small study suggesting that chronic pain adversely affects all of the areas of health measured by the SF-36 general health questionnaire.[28]

We now report the results of a large community-based survey, using previously validated instruments. A description of the epidemiology of chronic pain has been presented previously, using data from this study.[29] That description included all reported chronic pain, including a significant proportion for which professional advice or treatment was not sought. This paper examines chronic pain from a clinician's perspective, and reports the prevalence and distribution of the most severe or troubling chronic pain in the community. It also examines the impact of chronic pain on daily life and general well-being.

Methods

The study was undertaken in the Grampian region of Scotland, using the populations of 29 general practices (total population 136 383). A random sample of 5036 patients aged 25 years or over, stratified for age and gender, was drawn from the Community Health Index, a list of all patients registered with a GP. Prior to survey, the names of all patients were screened by their GPs in order to preclude inappropriate or insensitive inquiry, for example in the case of terminal illness or death. GPs were not asked to specify a reason for excluding their patients from the study. Remaining patients were sent a survey questionnaire, followed by up to two reminders in the event of non-response.

The survey instrument included a simple case definition questionnaire (CDQ), the chronic pain grade (CPG) questionnaire,[30,31] a level of expressed need (LEN) questionnaire,[29] the SF-36 general health questionnaire[32] and questions on demographic details. The CDQ was based on the International Association for the Study of Pain's definition of chronic pain,[33] and was validated in a pilot study.[28] The CPG is a simple 7-item measure of chronic pain severity in the dimensions of intensity and disability, which has been validated for use in both the USA[30] and the UK.[31] It classifies four hierarchical grades of severity of chronic pain (I–IV), and includes a question about the number of days interference with usual activities in the previous 6 months. The LEN is a new measure of individuals' response to chronic pain in terms of seeking treatment and using painkillers.[29] The SF-36 has been well validated for use in the UK,[34] providing a score with a maximum of 100 in each of eight dimensions of health. Finally, respondents were asked if they had a 'long-term limiting illness', copying a question from the 1991 UK population census.[35]

Three categories of chronic pain were defined for analysis, in order to assess the impact of chronic pain of different severity.

- 'Any chronic pain'—continuous or intermittent pain or discomfort which has persisted for at least 3 months.[28,33]
- 'Significant chronic pain'—continuous or intermittent pain or discomfort which has persisted for at least 3 months, and for which painkillers have been taken *and* treatment sought recently *and* frequently. This represents the most severe level of expressed need as defined in our previous work.[28]
- 'Severe chronic pain'—continuous or intermittent pain or discomfort which has persisted for at least 3 months, resulting in high disability and severe limitation (CPG IV).[30]

Data were entered and analysed using the SPSS for Windows statistical package. Age- and sex-specific sample proportions of 'significant' and 'severe' chronic pain were calculated using basic descriptive statistics. These figures were extrapolated to estimate the general population prevalences using the age and gender profiles of the participating practices. Odds ratios for associations with socio-demographic variables were calculated. Variables which were found to be associated ($P < 0.2$[36]) were entered into a backward stepwise multiple logistic regression model, in order to determine associations which were independent of confounding variables. Occupation-based social class was omitted from this modelling because of a large number of cases that could not be categorized (mainly retired individuals), and a high degree of co-linearity with housing tenure.[37] The relationship between chronic pain and measures of general health and employment status was assessed by cross-tabulation. The question in the CPG questionnaire relating to the number of days interference in the previous 6 months was used as a basis for assessing pain-related disability.

Results

Of 5036 patients sampled, 4611 were sent a questionnaire after exclusion of others by the GPs. Of these, 3605 were returned, representing a corrected response rate of 82.3% after allowing for incorrect addresses (176) and questionnaires which could not be completed by recipients (56).

The sample proportion of 'any chronic pain' was 50.4%, (48.9% of men and 51.8% of women), which was extrapolated to an estimated population prevalence of 46.5%.[29] The proportion of individuals in the sample with 'significant chronic pain' was 14.1% [95% confidence interval (CI) 13.0–15.2%] (509/3605). Among men, the proportion was 12.3% (10.6–13.8%) and, among women, 15.8% (14.1–17.5%) (chi-square = 9.3, $P < 0.01$). The proportion increased with age from 6.3% (4.2–8.4%) (25–34 years) to 22.9% (19.4–26.4%) (>75 years) [chi-square = 74.9 (5 d.f.); $P < 0.001$]. After adjustment to the sampling frame, the overall estimated population prevalence of 'significant chronic pain' was 12.3% (11.2–13.4%).

The proportion of individuals in the sample with 'severe chronic pain' was 6.3% (5.9–6.7%) (228/3605), with no significant gender differences [5.7% (4.6–6.8%) in males and 6.9% (5.7–8.1%) in females, chi-square = 2.3, $P = 0.13$]. The proportion increased with age from 3.4% (1.9–4.9%) (25–34 years) to 10.6% (8.0–13.2%) (>75 years) [chi-square = 31.8 (5 d.f.); $P < 0.001$]. After adjustment to the sampling frame, the estimated population prevalence of 'severe chronic pain' was 5.7% (4.9–6.5%).

Of those with 'significant chronic pain', 35.5% (154/434, 76 missing values) reported 'severe chronic pain', while 67.5% (154/228) of those with 'severe chronic pain' reported 'significant chronic pain' (Fig. 1).

Table 1 shows socio-demographic associations for 'significant' and 'severe' chronic pain on univariate analysis. Most of the associations lost their significance after multiple logistic regression. In both categories of chronic pain, the employment status and age group variables were highly correlated, resulting in several empty cells on cross-tabulation. Employment status and age group could therefore not both be entered into the multiple regression models. Since employment status was the more significantly associated factor in each case, this was entered into the models to the exclusion of age group. The factors entered into the backward stepwise logistic regression models were therefore gender, marital status, housing tenure, employment status and educational level. Factors independently associated with both 'significant' and 'severe' chronic pain were female gender, living in council rented accommodation, being retired or unable to work through sickness or disability, and lower educational level. The results of multiple logistic regression modelling are summarized in Table 2 which also includes previously presented results for 'any chronic pain'.[29]

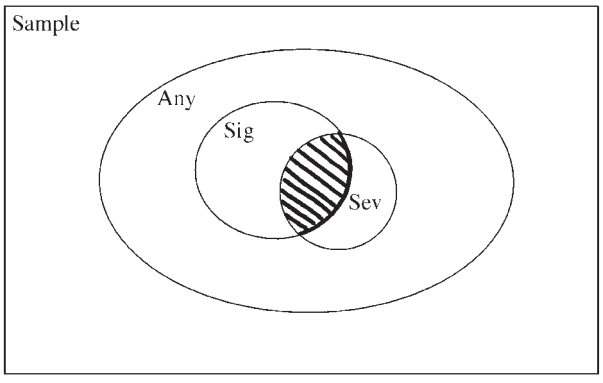

FIGURE 1 *Distribution of 'any chronic pain', 'significant chronic pain' and 'severe chronic pain' in the study sample. Sample = study sample (*n = *3605); Any = 'any chronic pain' (*n = *1817); Sig = 'significant chronic pain' (*n = *509); Sev = 'severe chronic pain' (*n = *154)*

The association of chronic pain with employment status was explored further by analysis of respondents of working age (assumed to be under 65 years for men, and under 60 years for women) (Table 3). There is a clear pattern of high rates of employment (81.2%) among those without chronic pain, falling (to 23.9%) among those with 'severe chronic pain'. This contrasts with a low rate of inability to work (1.3%) in the absence of chronic pain, rising to 61.1% in the presence of 'severe chronic pain'.

Chronic pain was found to cause considerable interference with daily activities (Table 4), particularly where the pain was 'significant' or 'severe'. Caution must be applied, however, to the interpretation of the impact of 'severe chronic pain' on daily activities because the question on which this analysis was based forms part of the CPG, which also defined 'severe chronic pain'.

Chronic pain was associated with poor health in all dimensions of the SF-36 (Table 5). This was more marked with 'significant chronic pain' and, particularly, 'severe chronic pain'. The effect was greatest in the pain and physical health dimensions, and least in the mental health dimension. Of those with 'any chronic pain', 42.6% (95% CI 40.3–44.9%) reported having a long-term limiting illness (LTLI), compared with 10.3% (8.8–11.7%) of those without chronic pain (chi-square = 467.9, $P < 0.001$). In comparison, 66.1% (61.9–70.2%) of those with 'significant chronic pain' and 86.2% (81.6–90.7%) of those with 'severe chronic pain' reported having an LTLI.

Discussion

While other studies have described the epidemiology of chronic pain in the community elsewhere,[1,2,6,8,17–21] this is the first to provide a detailed description of chronic pain which is categorized by significance or severity as subsets

TABLE 1 *Association of socio-economic factors with 'significant chronic pain' and 'severe chronic pain'—unadjusted odds ratios*

Socio-economic category	Subgroup category	% of sample	'Significant chronic pain'[a] Odds ratio (95% CI)	*P*	'Severe chronic pain'[b] Odds ratio (95% CI)	*P*
Gender	Male[c]	48.3	1.0		1.0	
	Female	51.7	1.3 (1.1–1.6)	0.003	1.2 (0.9–1.6)	0.13
Age group	25–34[c]	14.9	1.0		1.0	
	35–44	16.3	1.7 (1.1–2.7)	0.01	1.3 (0.7–2.5)	0.38
	45–54	17.0	2.0 (1.3–3.1)	0.001	2.1 (1.1–3.6)	0.02
	55–64	18.0	2.8 (1.9–4.3)	<0.001	2.4 (1.4–4.2)	0.002
	65–74	18.4	2.8 (1.9–4.2)	<0.001	1.6 (0.9–2.9)	0.11
	>75	15.5	4.4 (3.0–6.6)	<0.001	3.4 (2.0–5.8)	<0.001
Age	Per year	–	1.03 (1.02–1.03)	<0.001	1.02 (1.01–1.03)	<0.001
Marital status	Never married[c]	10.6	1.0		1.0	
	Living as married	70.9	1.3 (1.0–2.0)	0.07	1.1 (0.7–1.8)	0.68
	No longer married	18.5	2.5 (1.7–3.7)	<0.001	2.5 (1.5–4.2)	<0.001
Social class (occupation based)	1[c]	6.7	1.0		1.0	
	2[c]	33.1				
	3N	20.6	1.5 (1.0–2.3)	0.04	1.2 (0.5–2.9)	0.68
	3M	19.9				
	4	14.6	2.1 (1.3–3.3)	<0.001	3.2 (1.4–7.5)	0.007
	5	5.2				
Housing tenure	Owned/mortgaged[c]	68.8	1.0		1.0	
	Council rent	25.4	2.2 (1.8–2.6)	<0.001	2.8 (2.2–3.8)	<0.001
	Private rent/other	5.8	1.0 (0.6–1.6)	0.94	1.3 (0.7–2.5)	0.34
Employment	Employed[c]	51.9	1.0		1.0	
	Retired	31.2	2.5 (2.0–3.2)	<0.001	4.2 (2.8–6.3)	<0.001
	Unable to work	4.6	11.1 (7.8–15.8)	<0.001	53.2 (33.5–84.4)	<0.001
	Others not employed	12.3	1.4 (1.0–2.0)	0.04	3.5 (2.1–5.9)	<0.001
Education	Higher education[c]		39.3	1.0		1.0
	Secondary school certificate	38.6	1.8 (1.2–2.5)	0.002	2.8 (1.5–5.0)	0.001
	No qualifications	22.1	2.9 (2.1–4.0)	<0.001	5.0 (2.8–8.6)	<0.001

[a] Intermittent or continuous pain or discomfort, lasting at least 3 months, and for which painkillers have been taken and treatment sought recently and frequently.
[b] Intermittent or continuous pain or discomfort lasting at least 3 months, of reported CPG IV severity.
[c]Reference category in each variable.

of 'any chronic pain'. Although our population was restricted to one part of Scotland, the sample was large and representative, and therefore the picture is likely to be similar in other areas.

If chronic pain affects around half of the population,[1,29] this presumably includes much that might be considered as minor, or not intrusive enough to require medical attention or treatment. Our definition of 'significant chronic pain' may reflect the proportion of chronic pain which places most demands on the health services, while 'severe chronic pain' may reflect that which has the greatest impact on individuals, and so presumably might be most likely to benefit from effective treatment. The consistent pattern, of progressive deteriorations in a number of indicators of well-being as the definition of chronic pain changes from 'any', through 'significant' to 'severe' chronic pain, supports the validity of this categorization. An understanding of the epidemiology of the different categories of chronic pain will inform the provision of health services as well as the targeting of intervention and prevention strategies. Even at the severe end of the spectrum, the prevalence of 'severe chronic pain' appears to be high, representing an important cause of suffering and disability in the community, and a major challenge to the health services.

The pattern of association of chronic pain with indicators of poor socio-economic status is interesting, and supports previous research on chronic pain.[7,13,19] Most of the previous studies did not adjust for confounding variables. It is not clear from this cross-sectional research whether the demonstrated socio-demographic associations are cause or effect. Equally, this study cannot determine whether all of the demonstrated

TABLE 2 *Significance of socio-economic factors after multiple logistic regression modelling*

Socio-economic category	Subgroup category	'Any chronic pain'[a,29]		'Significant chronic pain'[b]		'Severe chronic pain'[c]	
		Odds ratio (95% CI)	*P*	Odds ratio (95% CI)	*P*	Odds ratio (95% CI)	*P*
Gender	Male[d]	1.0		1.0		1.0	
	Female	1.2 (1.1–1.4)	0.003	1.7 (1.3–2.1)	<0.001	1.6 (1.1–2.7)	0.006
Housing tenure	Owned/mortgaged[d]	1.0		1.0		1.0	
	Council rent	1.2 (1.0–1.5)	0.02	1.3 (1.0–1.7)	0.02	1.8 (1.3–2.5)	0.001
	Private rent/other	0.9 (0.7–1.3)	0.63	0.8 (0.5–1.4)	0.54	0.7 (0.3–1.6)	0.44
Employment	Employed[d]	1.0		1.0		1.0	
	Retired	1.3 (1.0–1.7)	0.047	2.1 (1.6–2.7)	<0.001	3.4 (2.2–5.4)	<0.001
	Unable to work	7.8 (4.6–13.1)	<0.001	10.1 (6.9–14.8)	<0.001	49.4 (29.9–81.7)	<0.001
	Others not employed	1.0 (0.8–1.2)	0.73	1.0 (0.7–1.5)	0.81	2.8 (1.6–4.9)	<0.001
Education	Higher education[d]	–	–	1.0		1.0	
	Secondary school certificate	–	–	1.5 (1.0–2.2)	0.03	2.2 (1.1–4.2)	0.02
	No qualifications	–	–	2.0 (1.4–2.8)	<0.001	2.6 (1.4–4.9)	0.002

[a] Intermittent or continuous pain or discomfort, lasting at least 3 months. Note: age group was also included in this model as an independent predictor of 'any chronic pain', but the odds ratios are omitted from this table for clarity of comparison.
[b] Intermittent or continuous pain or discomfort, lasting at least 3 months, and for which painkillers have been taken and treatment sought recently and frequently.
[d] Intermittent or continuous pain or discomfort lasting at least 3 months, of reported CPG IV severity.
[d] Reference category in each variable.

TABLE 3 *The impact of chronic pain on the community: relationship of chronic pain severity to employment of men aged <65 years, women aged <60 years and the total sample*

Employment category	No chronic pain		'Any chronic pain'[a]		'Significant chronic pain'[b]		'Severe chronic pain'[c]	
	n	%	*n*	%	*n*	%	*n*	%
Employed	910	81.2	701	72.4	128	66.3	27	23.9
Retired	30	2.7	24	2.5	2	1.0	2	1.8
Unable to work due to illness or disability	15	1.3	123	12.7	39	20.2	69	61.1
Otherwise not employed (inc. housewives, students, unemployed)	166	14.8	120	12.4	24	12.4	13	11.5
Total	1121	100	968	100	193	100	113	100

[a] Intermittent or continuous pain or discomfort, lasting at least 3 months.
[b] Intermittent or continuous pain or discomfort, lasting at least 3 months, and for which painkillers have been taken and treatment sought recently and frequently.
[d] Intermittent or continuous pain or discomfort lasting at least 3 months, of reported CPG IV severity.

impairment of activity and well-being is directly attributable to the presence of chronic pain; confounding variables, such as co-morbidity, may be present, or pain may be a secondary symptom of another condition, such as ischaemic heart disease. Longitudinal research would help to clarify this situation.

Although there was a substantial overlap between the categories of 'significant' and 'severe' chronic pain, many individuals reported one without the other. This supports the notion that factors other than chronic pain severity often determine an individual's need for treatment and advice. There were many [23.8% (21.5–26.1%);

TABLE 4 *Chronic pain and interference with daily activities*

	n	No. of days' interference with daily activities in previous 6 months (%)				
		0–6 days	7–14 days	15–30 days	>31 days	Total
'Any chronic pain'	1497	67.5	10.8	8.4	13.2	100
'Significant chronic pain'	442	40.3	15.8	13.6	30.3	100
'Severe chronic pain'[a]	228	–	–	23.2	76.8	100

Note: percentages are rounded to the nearest decimal place.
[a] At least 15 days' interference with daily activities was a criterion for classification as grade III or IV chronic pain severity, and therefore 'severe chronic pain'.

TABLE 5 *Median SF-36 scores and interquartile ranges (IQRs) for each definition of chronic pain*

	No chronic pain Median (IQR)	'Any chronic pain' Median (IQR)	'Significant chronic pain' Median (IQR)	'Severe chronic pain' Median (IQR)
Physical function	95.0 (87.5–100.0)	75.0 (44.0–90.0)	45.0 (15.0–75.0)	25.0 (5.0–50.0)
Social function	100.0 (87.5–100.0)	75.0 (50.0–100.0)	62.5 (37.5–87.5)	37.5 (25.0–50.0)
Role physical	100.0 (100.0–100.0)	75.0 (0.0–100.0)	0.0 (0.0–75.0)	0.0 (0.0–0.0)
Role emotional	100.0 (100.0–100.0)	100.0 (33.3–100.0)	66.7 (0.0–100.0)	0.0 (0.0–100.0)
Pain	100.0 (84.0–100.0)	51.0 (41.0–72.0)	41.0 (22.0–51.0)	22.0 (21.0–31.0)
Mental health	84.0 (72.0–92.0)	76.0 (60.0–88.0)	68.0 (52.0–80.0)	60.0 (44.0–76.0)
Energy and vitality	75.0 (75.0–85.0)	55.0 (35.0–70.0)	45.0 (30.0–55.0)	30.0 (15.0–45.0)
General health	82.0 (72.0–90.0)	62.0 (42.0–77.0)	45.0 (30.0–62.0)	35.0 (20.0–45.0)

unpublished data] who had a high 'expressed need'[38] for treatment yet who did not report severe symptoms (CPG I). On the other hand, some patients [2.0% (1.5–2.5%); unpublished data] did not seek treatment or advice frequently despite reporting severe symptoms (CPG IV). It is important that we understand better the reasons for these disparities as they may indicate ways in which services might be developed.

Regardless of the dimension measured (general health, employment or disability), chronic pain was found to have a high impact. This points to a considerable problem, for both individuals and society, and highlights the need to address it effectively. It also indicates the multidimensional nature of the problem, and consequent need for multidimensional management, including social and psychological approaches as well as medical.[39]

Several previous general population studies have reported in depth the association between chronic pain and depression.[8,19,21] This study was not able to examine this specifically, although the previously reported significant associations between chronic pain and poor mental and emotional health were supported by the low scores in the 'Mental health' and 'Role emotional' dimensions of the SF-36. However, although the association between chronic pain and emotional role limitation was found to be strong in our study, the association with mental health was found to be much weaker. The previous strong associations found between chronic

pain and mental health may have arisen because earlier studies investigated pain clinic populations,[11] primary care attenders[21] or health maintenance organization enrolees.[40] On the other hand, there is strong evidence from longitudinal studies that pre-existing depression is a strong predictor of the onset of chronic pain.[19,40] The relatively weak associations found in this study therefore differ to some extent from those of previous studies.

Conclusions

'Any chronic pain', which is very common in the community, is shown to have important deleterious effects on health, employment and daily life. 'Significant' and 'severe' chronic pain, which may reflect the parts of the spectrum of chronic pain of greatest importance to the health services, are also relatively common, and are associated with even poorer indicators of health and disability. A multidimensional approach is required to address the problem in the community, and this must begin with further research.

Acknowledgements

This work was funded by a grant from the Scottish Office Home and Health Department, Chief Scientist Office (Ref K/RED/4/C286). BS is supported by an NHS R&D Primary Care Career Scientist Award, funded by the Chief Scientist Office, Scottish Executive.

References

[1] Bowsher D, Rigge M, Sopp L. Prevalence of chronic pain in the British population: a telephone survey of 1037 households. *Pain Clin* 1991; **4:** 223–230.

[2] Andersson HI, Ejlertsson G, Leden I, Rosenberg C. Chronic pain in a geographically defined general population: studies of differences in age, gender, social class, and pain localization. *Clin J Pain* 1993; **9:** 174–182.

[3] Follick MJ, Smith TW, Ahern DK. The Sickness Impact Profile: a global measure of disability in chronic low back pain. *Pain* 1985; **21:** 67–76.

[4] Sanders SH. Automated vs. self-help monitoring of 'up-time' in chronic low back pain patients: a comparative study. *Pain* 1983; **15:** 399–405.

[5] Dworkin SF, Von Korff M, Le Resche L, Truelove E. Epidemiology of temperomandibular disorders (TMD): initial clinical and self-report findings. In Dubner R, Gebhart GF, Bond MR (eds). *Pain Research and Clinical Management*, Vol 3. Amsterdam: Elsevier, 1988: 499–505.

[6] Sternbach RA. Survey of pain in the United States: the Nuprin pain report. *Clin J Pain* 1986; **2:** 49–53.

[7] Von Korff M, Dworkin SF, Le Resche L. Graded chronic pain status: an epidemiologic evaluation. *Pain* 1990; **40:** 279–291.

[8] Croft P, Rigby AS, Boswell R *et al*. The prevalence of chronic widespread pain in the general population. *J Rheumatol* 1993; **20:** 710–713.

[9] National Institutes of Health. *The Integrated Approach to the Management of Pain*. NIH Consensus Development Conference Statement 6, 1986.

[10] Crombie IK, Davies HTO, Macrae WA. The epidemiology of chronic pain: time for new directions. *Pain* 1994; **57:** 1–3.

[11] Becker N, Bondegaard TA, Olsen AK *et al*. Pain epidemiology and health related quality of life in chronic non-malignant pain patients referred to a Danish multidisciplinary pain center. *Pain* 1997; **73:** 393–400.

[12] McQuay HJ, Machin L, Moore RA. Chronic non-malignant pain: a population prevalence study. *Practitioner* 1985; **229:** 1109–1111.

[13] Ektor-Anderson J, Janzon L, Sjolund B. Chronic pain and the sociodemographic environment: results from the Pain Clinic at Malmo General Hospital in Sweden. *Clin J Pain* 1993; **9:** 183–188.

[14] Astin M, Lawton D, Hirst M. The prevalence of pain in a disabled population. *Soc Sci Med* 1996; **42:** 1457–1464.

[15] Sheikh K. Occupational injury, chronic low back pain and return to work. *Public Health* 1987; **101:** 417–425.

[16] Crombie IK, Davies HTO. Selection bias in pain research. *Pain* 1998; **74:** 1–3.

[17] Crook J, Rideout E, Browne G. The prevalence of pain complaints in a general population. *Pain* 1984; **18:** 299–314.

[18] Brattberg G, Thorslund M, Wikman A. The prevalence of pain in a general population. The results of a postal survey in a county of Sweden. *Pain* 1989; **37:** 215–222.

[19] Magni G, Marchetti M, Moreschi C, Merskey H, Luchini SR. Chronic musculoskeletal pain and depressive symptoms in the National Health and Nutrition Examination. I. Epidemiologic follow-up study. *Pain* 1993; **53:** 163–168.

[20] Magni M, Caldieron C, Rigatti-Luchini S, Merskey H. Chronic musculo-skeletal pain and depressive symptoms in the general population. An analysis of the 1st National Health and Nutrition Examination Survey data. *Pain* 1990; **43:** 299–307.

[21] Gureje O, Von Korff M, Simon GE, Gater R. Persistent pain and well-being. A World Health Organization study in primary care. *J Am Med Assoc* 1998; **280:** 147–151.

[22] Becker Niels, Thomsen AB, Olsen AK *et al*. Pain epidemiology and health related quality of life in chronic non-malignant pain patients referred to a Danish multidisciplinary pain center. *Pain* 1997; **73:** 393–400.

[23] Latham J, Davis BD. The socioeconomic impact of chronic pain. *Disabil Rehab* 1994; **16:** 39–44.

[24] Locker D. *Disability and Disadvantage*. London: Tavistock Publications, 1983.

[25] Rigge M. Pain (Research on prevalence of pain in Britain). *Which? Way to Health* April 1990; 66–68.

[26] Bergner M, Bobbitt RA, Pollard WE *et al*. The Sickness Impact Profile: validation of the health status measure. *Med Care* 1976; **14:** 56–67.

[27] Bergner M, Bobbitt RA, Carter WB, Gilson BS. The Sickness Impact Profile: development and final revision of a health status measure. *Med Care* 1981; **19:** 787–805.

[28] Purves AM, Penny KI, Munro C *et al*. Defining chronic pain for epidemiological research—assessing a subjective definition. *Pain Clin* 1998; **10:** 139–147.

[29] Elliott AM, Smith BH, Penny KI, Smith WC, Chambers WA. The epidemiology of chronic pain in the community. *Lancet* 1999; **354:** 1248–1252.

[30] Von Korff M, Ormel J, Keefe FJ, Dworkin SF. Grading the severity of chronic pain. *Pain* 1992; **50:** 133–149.

[31] Smith BH, Penny KI, Purves AM *et al*. The chronic pain grade questionnaire: acceptability and validity in postal research. *Pain* 1997; **71:** 141–147.

[32] Ware JE, Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Med Care* 1992; **30:** 473–483.

[33] International Association for the Study of Pain. Classification of chronic pain. *Pain* 1986; **Suppl 3:** S1–S225.

[34] Garratt AM, Ruta DA, Abdalla MI *et al*. The SF36 health survey questionnaire: an outcome measure suitable for routine use within the NHS? *Br Med J* 1993; **306:** 1440–1444.

[35] McCormick A, Fleming D, Charlton J. *Morbidity Statistics from General Practice. Fourth National Study 1991–1992.* Office of Population Censuses and Surveys. London: HMSO, 1995.

[36] Altman DG. *Practical Statistics for Medical Research*. London: Chapman and Hall, 1991.
[37] Stoate HG. Can health screening damage your health? *J R Coll Gen Pract* 1989; **39:** 183–195.
[38] Bradshaw J. *The Conceptualisation and Measurement of Need: A Social Policy Perspective*. London: Popay and Williams, Routledge, 1994.
[39] Sullivan MD, Turner JA, Romano J. Chronic pain in primary care: identification and management of psychological factors. *J Fam Pract* 1991; **32:** 193–199.
[40] Von Korff M, Le Resche L, Dworkin SF. First onset of common pain symptoms: a prospective study of depression as a risk factor. *Pain* 1993; **55:** 251–258.