

EXTENDED REPORT

Increased absence due to sickness among employees with fibromyalgia

M Kivimäki, P Leino-Arjas, L Kaila-Kangas, M Virtanen, M Elovainio, S Puttonen, L Keltikangas-Järvinen, J Pentti, J Vahtera

Ann Rheum Dis 2007;66:65–69. doi: 10.1136/ard.2006.053819

See end of article for authors' affiliations

Correspondence to: Professor M Kivimäki, Finnish Institute of Occupational Health, Topeliuksenkatu 41 aA, FI-00250 Helsinki, Finland; mika.kivimaki@ttl.fi

Accepted 17 June 2006
Published Online First
22 June 2006

Background: Little is known about the effect of fibromyalgia on absence due to sickness in working populations.

Objective: To examine the risk of absence due to sickness among employees with fibromyalgia.

Methods: A prospective cohort study with 1-year follow-up of recorded and certified absence due to sickness after a survey of chronic diseases among 34 100 Finnish public sector employees (27 360 women and 6740 men) aged 17–65 years at baseline in 2000–2.

Results: 20 224 days of absence due to sickness for the 644 employees with fibromyalgia and 454 816 days for others were documented. Of those with fibromyalgia, 67% had co-occurring chronic conditions such as osteoarthritis, rheumatoid arthritis, depression or other psychiatric disorders. Compared with employees with none of these chronic conditions, the hazard ratio (HR) adjusted for age, sex and occupational status was 1.85-fold (95% confidence interval (CI) 1.53 to 2.18) for people with fibromyalgia alone and 2.63-fold (95% CI 2.34 to 2.96) for employees with fibromyalgia with coexisting conditions. The excess rate of absence due to sickness was 61 episodes/100 person-years among people with fibromyalgia alone. Among employees with musculoskeletal and psychiatric disorders, secondary fibromyalgia was associated with a 1.4–1.5-fold increase in risk of absence.

Conclusion: Fibromyalgia is associated with a substantially increased risk of medically certified absence due to sickness that is not accounted for by coexisting osteoarthritis, rheumatoid arthritis or psychiatric disorders.

Fibromyalgia is characterised by long-lasting, widespread musculoskeletal pain combined with general symptoms such as disturbed sleep and fatigue.^{1–3} It is a relatively common chronic condition, with the estimated prevalence ranging from 0.5% to 14% in the general population.^{4–10} Emphasising the societal importance of this condition, the economic consequences of fibromyalgia are evaluated to be as high as those related to chronic low back pain.¹¹

Outcomes of fibromyalgia are not well understood. Recent studies suggest that patients with fibromyalgia have an increased number of visits to doctors, reduced self-reported capacity for everyday activities, reduced health-related quality of life and increased risk of disability pension.^{9 12–15} However, little information is available on the functional capacity of patients with fibromyalgia in day-to-day working life. This is a limitation, as only 2% of patients with fibromyalgia are permanently disabled and unable to work.^[9 14]

Records of medically certified absence due to sickness are hypothesised to serve a day-to-day outcome measure that is tuned to the particular functional requirements in each employee's specific occupational setting.^{16 17} In this study, we examined the association between fibromyalgia and medically certified absence due to sickness in a large contemporary cohort of employees. As there is an increased prevalence of osteoarthritis, rheumatoid arthritis and psychiatric disorders in people with fibromyalgia,^{9 18 19} we took into account the effects of these diseases in the analysis.

METHODS

Study population

The data reported in this study were drawn from the Finnish Public Sector Study, a study focusing on all local government employees of 10 towns and also on all employees in 21 public hospitals providing specialised health care in the southern,

western and northern parts of Finland.^{20 21} The study population covers a wide range of occupations from city mayors to semi-skilled cleaners, the most common groups being nurses and teachers. Between 2000 and 2002, a postal survey on health risk factors and morbidities was sent to all employees at work at the time of the survey. Records of absence due to sickness in the year after the survey (2001–3) were collected for all those respondents who had a job contract for a minimum of 6 months in that year.

Demographic characteristics

Age, sex and occupational status (manual *v* non-manual) were obtained from employers' registers.

Fibromyalgia and other chronic diseases

Prevalent morbidity was measured by postal survey using a self-administered checklist of 15 common chronic diseases and an open question about chronic diseases not included in the list.²² For each disease, the respondent was asked to indicate whether a doctor had diagnosed him or her as having the disease. Fibromyalgia, osteoarthritis, rheumatoid arthritis, depression and other psychiatric disorders were determined by affirmative response, absence of these diseases by negative response, and any non-responses were coded as missing data. Those employees with osteoarthritis, rheumatoid arthritis, depression or other psychiatric disorder who also had fibromyalgia were referred to as having secondary fibromyalgia.

Absence due to sickness

We used the participants' personal identification numbers (a unique number assigned to each Finnish citizen) to link the survey data to the employers' electronic records on absence due to sickness. Computerised records of absence due to sickness from 1 January to 31 December for the year after the

questionnaire survey were obtained from employers' registers (2001–3 depending on when the survey was sent to the organisation). These records included the first and last dates of all absences. For absences >3 days, a medical certificate from a doctor was required, but shorter absences were self-certified. Records of absence due to sickness were checked for inconsistencies and overlapping, consecutive or duplicate episodes of absence due to sickness were merged.

We chose medically certified spells of absence due to sickness as the outcome variable in this study. In previous studies, medically certified absence due to sickness has been a powerful predictor of disability pension and mortality, but no such associations have been found between self-certified absence due to sickness and these hard end points.^{17 23 24} This suggests that medically certified absence due to sickness is a more valid measure of global health than self-certified absence due to sickness.

Statistical analysis

We used Cox proportional hazards models to study the associations of fibromyalgia and other diseases with subsequent medically certified absence due to sickness. The outcome variable was the first medically certified absence due to sickness (participants with no medically certified absences were censored at study end or, if earlier, when the participants left the organisation). The time-dependent interaction term between fibromyalgia and the logarithm of the follow-up period was non-significant ($p = 0.25$ for women and 0.58 for men), confirming that the proportional hazards assumption was justified. We carried out the main analyses for a cohort combining men and women as the interaction terms "sex × fibromyalgia" and "sex × fibromyalgia with ν without co-occurring disease" predicting absence due to sickness were non-significant ($p = 0.11$ and 0.59) in the models which also included main effects. Hazard ratios for employees with fibromyalgia alone (primary fibromyalgia) and those with secondary fibromyalgia were adjusted for age, sex and occupational status using employees with no chronic conditions as the reference. We carried out a subgroup analysis of the age-adjusted and sex-adjusted association between fibromyalgia and sickness absence with nurses only—that is, health professionals who were highly competent to accurately report a doctor-diagnosed fibromyalgia.

To assess the contribution of coexisting diseases to medically certified absence due to sickness in the entire cohort, we calculated the absolute rate of absence due to sickness per 100 person-years for employees with no disease, for those with primary fibromyalgia and for those with secondary fibromyalgia. We calculated the excess risk for primary secondary fibromyalgia groups by subtracting the absolute absence rates in these groups from that observed in employees with no disease. The role of coexisting diseases was illustrated with cumulative hazard function curves, tested by the log-rank p value.

We studied whether secondary fibromyalgia predicted medically certified absence due to sickness among employees with osteoarthritis, rheumatoid arthritis, depression or other psychiatric disorders. The Cox proportional hazards models for presence versus absence of fibromyalgia were adjusted for age, sex and occupational status. All analyses were conducted with the SAS program package V.9.1.

RESULTS

Respondents

A total of 48 592 employees (9337 men, 39 255 women), aged 17–65 years, responded to the survey (response rate 68.5%). Of these, 42 019 (86.5%) gave consent to link their sickness absence records to the data and 37 343 had a job contract for a

minimum of 6 months in the year after the survey (drop-outs were those who retired, changed workplace or lost their job). In this study, we included the 34 100 respondents (6740 men and 27 360 women) who had full data on the presence or absence of fibromyalgia, osteoarthritis, rheumatoid arthritis, depression and other psychiatric disorders, and who had full data on absence due to sickness.

The study cohort did not differ from all respondents in terms of sex (the proportion of women was 80.2% in the cohort and 80.8% among all respondents), mean age (44.6 ν 44.7 years) and occupational status (14.3% ν 14.8% manual). However, the prevalence of fibromyalgia was slightly lower in the study cohort (1.9%) than among all respondents (2.3%). This was also the case for osteoarthritis (13.9% ν 15.5%), rheumatoid arthritis (1.5% ν 1.8%), depression (11.0% ν 12.1%) and other psychiatric disorders (2.0% ν 2.1%).

Of the 644 employees with fibromyalgia, 597 were women (cohort prevalence 2.2%) and 47 men (cohort prevalence 0.7%). The proportion of women was higher among employees with fibromyalgia (92.7%) than among the rest of the study cohort ($p < 0.001$). Employees with fibromyalgia were also older (mean (SD) age 49.4 (7.1) years) and more often worked in manual occupations (18.2%; both $p < 0.003$).

Association between fibromyalgia and absence due to sickness

Table 1 presents the statistics of absence due to sickness for employees with fibromyalgia or other diseases and for those with no chronic disease (note that figures for number of days absent due to sickness and self-certified absences are given in addition to medically certified absences, which is the principal outcome variable). The crude levels of medically certified absence due to sickness were substantially higher for employees with fibromyalgia than for healthy employees, but differences in self-certified absences between these groups were smaller.

Compared with those with no chronic disease, the absolute excess risk of absence due to medically certified sickness was 93.5 episodes/100 person-years among employees with primary or secondary fibromyalgia. The size of relative risk for absence due to medically certified sickness was slightly higher among employees with fibromyalgia than among those with osteoarthritis, rheumatoid arthritis, or a psychiatric disorder. After adjustment for age, sex and occupational status, employees with fibromyalgia (with or without coexisting disease) had a 2.33-fold (95% CI 2.11 to 2.57) excess risk of absence due to medically certified sickness compared with their colleagues who were free of chronic diseases. The corresponding hazard ratio (HR) was 2.63 (95% CI 2.34 to 2.96) for patients with secondary fibromyalgia and 1.85 (95% CI 1.53 to 2.18) for those with primary fibromyalgia.

In a subsidiary analysis with only nurses, the age-adjusted and sex-adjusted HR of absence due to medically certified sickness for all patients with fibromyalgia ($n = 61$) compared with those with no disease ($n = 2642$) was 2.82 (95% CI 2.04 to 3.90).

Contribution of coexisting conditions

Of all employees with fibromyalgia, 48.8% had osteoarthritis, 16.0% rheumatoid arthritis, 33.1% depression and 7.0% some other psychiatric disorder. In total, 66.6% of the patients with fibromyalgia had at least one of these co-occurring conditions.

Figure 1 presents cumulative hazard functions for absence due to medically certified sickness by disease status. The likelihood of surviving without medically certified absence for 1 year was highest for healthy employees, markedly lower for those with fibromyalgia alone and lowest for employees with secondary fibromyalgia.

Table 1 Sickness absence figures by absence type, and hazard ratios for medically certified absence spells among employees with fibromyalgia, osteoarthritis, rheumatoid arthritis and psychiatric disorders compared with the disease-free population using Cox proportional hazard models adjusted for age, sex and occupational group

Patient group*	Number of participants* (prevalence %)	Number of absence days (median, interquartile range)	Number of self-certified episodes (rate per 100 person-years)	Number of medically certified episodes (rate per 100 person-years)	Adjusted HR (95% CI) for first medically certified episode
All (n = 34 100)					
No chronic disease†	25 821 (75.7)	278 775 (3, 0 to 11)	32 122 (127.7)	15 274 (60.7)	1
OA or RA	5035 (14.8)	125 524 (8, 1 to 29)	7152 (145.1)	5673 (115.1)	1.85 (1.77 to 1.93)
Depression or other psychiatric disorder	4077 (12)	105 639 (10, 2 to 31)	7582 (191.4)	4849 (122.4)	1.89 (1.68 to 2.13)
FM	644 (1.9)	20 224 (14, 3 to 40)	1129 (180.5)	964 (154.2)	2.33 (2.11 to 2.57)
Women (n = 27 360)					
No chronic disease†	20 503 (74.9)	234 188 (4, 0 to 12)	27 902 (139.9)	12 894 (64.7)	1
OA or RA	4155 (15.2)	107 048 (9, 2 to 31)	6319 (155.5)	4834 (118.9)	1.85 (1.76 to 1.94)
Depression or other psychiatric disorder	3378 (12.4)	90 403 (11, 3 to 32)	6626 (202.1)	4187 (127.7)	1.94 (1.84 to 2.03)
FM	597 (2.2)	19 614 (16, 3 to 41)	1085 (187.2)	934 (161.2)	2.40 (2.16 to 2.65)
Men (n = 6740)					
No chronic disease†	5318 (78.9)	44 587 (1, 0 to 7)	4220 (81.0)	2380 (45.7)	1
OA or RA	880 (13.1)	18 476 (5, 0 to 22)	833 (96.4)	839 (97.1)	1.79 (1.61 to 2.17)
Depression or other psychiatric disorder	699 (10.4)	15 236 (6, 0 to 23)	956 (140.1)	662 (97.0)	1.95 (1.73 to 2.20)
FM	47 (0.7)	610 (3, 0 to 14)	44 (95.9)	30 (65.4)	1.59 (1.02 to 2.48)

FM, fibromyalgia; OA, osteoarthritis; RA, rheumatoid arthritis.

*Patient groups overlap as a person may have several chronic conditions.

†Those with no diagnosed OA, RA, depression, other psychiatric disorders or FM.

Table 2 shows the estimation of the extent to which co-occurring diseases contributed to absence due to medically certified sickness among employees with fibromyalgia. Compared with employees with no disease, fibromyalgia alone related to an absolute excess absence rate from sickness of 61 episodes/100 person-years. For secondary fibromyalgia, the corresponding excess rate was 124.6 episodes/100 person-years. Depression and psychiatric disorders were slightly more important contributing factors than osteoarthritis and rheumatoid arthritis. In total, 34.7% of the excess absence rate due to medically certified sickness among all patients with fibromyalgia was attributable to the effects of coexisting diseases.

Effect of secondary fibromyalgia

In all, 20.3% of the employees with rheumatoid arthritis reported fibromyalgia. The corresponding prevalences for employees with osteoarthritis and for employees with depression or other psychiatric disorder were 6.6% and 5.4%, respectively. To examine the effect of fibromyalgia on absence due to sickness among employees with common diseases, we calculated age, sex and occupational status adjusted hazard

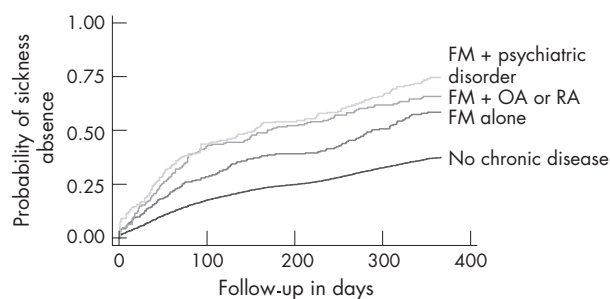


Figure 1 Cumulative hazard function for first medically certified sickness absence episode by status of fibromyalgia (FM) and coexisting diseases. OA, osteoarthritis; RA, rheumatoid arthritis; psychiatric disorders include depression.

ratios for presence versus absence of fibromyalgia among employees with these chronic conditions (table 3). Among those with osteoarthritis, rheumatoid arthritis or psychiatric disorders, fibromyalgia was associated with a 1.4–1.5-fold increased risk of absence due to sickness.

DISCUSSION

In this contemporary cohort of over 30 000 employees, those with fibromyalgia had a 1.9 times higher risk for absence due to sickness than their colleagues with no chronic disease, and a relative risk slightly larger than that for workers with diseases of major public health importance, such as osteoarthritis and depression. In absolute terms, the excess rate of absence due to medically certified sickness for fibromyalgia alone was 61 episodes/100 person-years. These estimates indicate that fibromyalgia is associated with a large burden of absence due to sickness.

Absence due to sickness is not solely affected by health.^{23–25} However, the outcome measure in our study, records of absence due to medically certified sickness, has been shown to have a higher predictive validity for hard disease end points than other measures of absenteeism.^{17 26 27} In the Whitehall II study of British civil servants, for example, absence due to medically certified sickness was a more powerful predictor of overall mortality than established self-reported health measures and available objective measures of specific physical illnesses and medical conditions.¹⁷ The strong association between absence due to medically certified sickness and mortality has been replicated by other studies, including the 10-town study, which involves a cohort partially overlapping with ours.²⁴ Whereas absence due to sickness has been used as an outcome measure for back pain^{28–31} and depression,^{32–34} the research to examine its applicability in relation to fibromyalgia has only now begun.

Coexisting conditions are an important consideration in outcome research. In this study, 33% of the employees with fibromyalgia had concurrent depression, which is in agreement with the 30% prevalence of depressive and anxiety disorders previously reported for patients with fibromyalgia.¹⁸ In all, 20% of the employees with rheumatoid arthritis, reported

Table 2 Absolute and excess rate of absence due to medically certified sickness for employees with fibromyalgia alone and those with secondary fibromyalgia

	FM alone*	FM with		Depression/other psychiatric disorder
		Secondary FM*	OA or RA	
Number of employees	215	429	346	220
Number of certified episodes	254	710	570	389
Rate (/100 person-years)	121.7	170.3	170.0	182.6
Excess rate (/100 person-years)†	61.0	124.6	109.3	121.9

FM, fibromyalgia; OA, osteoarthritis; RA, rheumatoid arthritis.

*Employees with FM alone are free of OA, RA, depression and other psychiatric disorders. Employees with secondary FM have FM and one or more of these chronic conditions.

†Compared with employees free of FM, OA, RA, depression and other psychiatric disorders.

fibromyalgia; the corresponding prevalence of secondary fibromyalgia for employees with osteoarthritis was 7%. In prior investigations, 12% of individuals with rheumatoid arthritis and 7% of patients with osteoarthritis met the criteria for fibromyalgia,¹⁹ again in accordance with the figures in the present study.

A total of 67% of the employees with fibromyalgia had a co-occurring musculoskeletal or psychiatric disorder, and their level of absence due to sickness was higher than that among patients with fibromyalgia alone. The aetiology of fibromyalgia is poorly understood.^{1 35-40} Considering this, it remains unclear to what extent coexisting conditions contributed to fibromyalgia, and to what extent fibromyalgia increased the risk of coexisting diseases or whether it is due to shared risk factors. Nevertheless, it is noteworthy that among employees with musculoskeletal and psychiatric disorders, secondary fibromyalgia increased the risk of absence due to sickness by 40–50%, a finding further supporting the status of fibromyalgia as an independent risk factor for absence due to sickness.

Fibromyalgia may be associated with various types of neck and back pain not directly measured in this study. Although taking into account these diseases may change the observed absolute excess rate of absence due to sickness for fibromyalgia, a major change in relative risk is unlikely. According to a further analysis of the present data, patients with fibromyalgia with no chronic conditions on the list of 14 common chronic diseases and a negative response to an open question about any chronic diseases not included in the list had a 2.16-fold (95% CI 1.49 to 3.14) increased risk of absence due to medically certified sickness compared with employees with no chronic diseases. The corresponding absolute excess rate was 46.7 absence episodes/100 person-years.

The study population comprised Finnish public sector employees. Further research is needed to assess the generalisability of

our results to working populations in other countries and contexts. Although the study population covered a wide range of occupations (the largest groups being nurses and teachers), industrial or commercial professions and self-employed people were not included. The respondents of this study were representative of Finnish public sector employees in terms of sex and age (77% female, mean age 44.6), but the female predominance did not correspond to the sex distribution of the Finnish general working population (48% female, mean age 45.5; www.stat.fi). Previous research on work disability in patients with rheumatoid arthritis in Finland and the USA suggests that the social security system or the economic environment may create differences between countries in disability rates of patient groups.⁴¹ Possibly, this also applies to fibromyalgia and temporary disability, as indicated by absence due to sickness.

A potential limitation is that the information on fibromyalgia diagnosis was based on self-report. We found a greater prevalence of fibromyalgia among women (2.2%) than men (0.7%), and this accords with a recent study of a very large national probability sample of Canadians (n = 115 137, prevalence of fibromyalgia 2.0% for women and 0.4% for men),⁹ as well as with other investigations on sex differences in fibromyalgia.^{18 42 43} The observed prevalence of fibromyalgia of 1.9% was also within the range of reported community prevalence rates in prior studies (prevalence varied between 0.5% and 14%).⁴⁻¹⁰ Yet, this prevalence of fibromyalgia may be low considering the fact that we included secondary fibromyalgia, unlike some earlier studies, and that most of our sample were women. The diagnosis of fibromyalgia is typically made long after the onset of symptoms, causing some employees with fibromyalgia to be misclassified in the non-fibromyalgia group in self-reported data.^{37 38}

Further, attrition analysis showed a slight selection bias, with greater drop-out rates among patients with fibromyalgia or

Table 3 Hazard ratio for first medically certified absence episode by status of coexisting fibromyalgia among employees with osteoarthritis, rheumatoid arthritis or psychiatric disorders calculated from Cox proportional hazards models adjusted for age, sex and occupational status

Patient group	Number of participants	Number of medically certified episodes (rate/100 person-years)	Adjusted hazard ratio (95% CI)
Patients with OA or RA			
No FM	4689	5103 (111.1)	1
FM	346	570 (170)	1.44 (1.26 to 1.65)
Patients with psychiatric disorders			
No FM	3857	4460 (119.0)	1
FM	220	389 (182.6)	1.48 (1.26 to 1.74)

FM, fibromyalgia; OA, osteoarthritis; RA, rheumatoid arthritis.

other morbidities. Measurement imprecision and a healthy-worker effect may lead to underestimation rather than overestimation of relationships. In line with this possibility, our data analysis for nurses only (ie, a subcohort highly competent to accurately report a diagnosis of fibromyalgia) showed a slightly stronger association between fibromyalgia and absence due to sickness than for the entire cohort.

Conclusions and implications

This is the first study to show that fibromyalgia is associated with a substantial burden of recorded absence due to medically certified sickness in a large contemporary working population. In terms of relative risk, this burden was at least as great as that for osteoarthritis and depression—that is, conditions for which absence due to sickness is an established outcome. Although coexisting conditions increased the risk of absence among employees with fibromyalgia, these conditions explain only a small part of their excess absence due to sickness.

A fluctuating level of disability is a key disadvantage related to fibromyalgia in working life. Our data suggest that absence due to medically certified sickness could be used as a complementary outcome measure in future trials and observational studies of fibromyalgia.

Authors' affiliations

M Kivimäki, P Leino-Arjas, L Kaila-Kangas, M Virtanen, J Pentti, J Vahtera, Finnish Institute of Occupational Health, Helsinki, Finland
S Puttonen, L Keltikangas-Järvinen, Department of Psychology, University of Helsinki, Helsinki, Finland
M Elovainio, National Research and Development Centre for Health and Welfare, Helsinki, Finland

Funding: This study was supported by the Finnish Work Environment Foundation and the Academy of Finland (project numbers 117604 and 105195).

Competing interests: None declared.

REFERENCES

- 1 Wolfe F, Smythe HA, Yunus MB, Bennett RM, Bombardier C, Goldenberg DL, et al. The American College of Rheumatology 1990 Criteria for the Classification of Fibromyalgia. Report of the Multicenter Criteria Committee. *Arthritis Rheum* 1990;**33**:160–72.
- 2 Baumgartner E, Finckh A, Cedraschi C, Vischer TL. A six year prospective study of a cohort of patients with fibromyalgia. *Ann Rheum Dis* 2002;**61**:644–5.
- 3 Katz RS, Wolfe F, Michaud K. Fibromyalgia diagnosis: a comparison of clinical, survey, and American College of Rheumatology criteria. *Arthritis Rheum* 2006;**54**:169–76.
- 4 Wolfe F, Ross K, Anderson J, Russell IJ, Hebert L. The prevalence and characteristics of fibromyalgia in the general population. *Arthritis Rheum* 1995;**38**:19–28.
- 5 Gran JT. The epidemiology of chronic generalized musculoskeletal pain. *Best Pract Res Clin Rheumatol* 2003;**17**:547–61.
- 6 Lawrence RC, Helmick CG, Arnett FC, Deyo RA, Felson DT, Giannini EH, et al. Estimates of the prevalence of arthritis and selected musculoskeletal disorders in the United States. *Arthritis Rheum* 1998;**41**:778–99.
- 7 White KP, Harth M. Classification, epidemiology, and natural history of fibromyalgia. *Curr Pain Headache Rep* 2001;**5**:320–9.
- 8 Kivimäki M, Leino-Arjas P, Virtanen M, Elovainio M, Keltikangas-Järvinen L, Puttonen S, et al. Work stress and incidence of newly diagnosed fibromyalgia: prospective cohort study. *J Psychosom Res* 2004;**57**:417–22.
- 9 Kassam A, Patten SB. Major depression, fibromyalgia and labour force participation: a population-based cross-sectional study. *BMC Musculoskelet Disord* 2006;**7**:4.
- 10 Picavet HS, Schouten JS. Musculoskeletal pain in the Netherlands: prevalences, consequences and risk groups, the DMC(3) study. *Pain* 2003;**102**:167–78.
- 11 Boonen A, van den Heuvel R, van Tubergen A, Goossens M, Severens JL, van der Heijde D, et al. Large differences in cost of illness and wellbeing between patients with fibromyalgia, chronic low back pain, or ankylosing spondylitis. *Ann Rheum Dis* 2005;**64**:396.
- 12 Lundberg G, Gerdle B. Tender point scores and their relations to signs of mobility, symptoms, and disability in female home care personnel and the prevalence of fibromyalgia syndrome. *J Rheumatol* 2002;**29**:603–13.
- 13 Bruusgaard D, Evensen AR, Bjerkedal T. Fibromyalgia—a new cause for disability pension. *Scand J Soc Med* 1993;**21**:116–19.

- 14 Tait RC, Margolis RB, Krause SJ, Liebowitz E. Compensation status and symptoms reported by patients with chronic pain. *Arch Phys Med Rehabil* 1988;**69**:1027–9.
- 15 Picavet HS, Hoeymans N. Health related quality of life in multiple musculoskeletal diseases: SF-36 and EQ-5D in the DMC3 study. *Ann Rheum Dis* 2004;**63**:723–9.
- 16 Marmot M, Feeney A, Shipley M, North F, Syme SL. Sickness absence as a measure of health status and functioning: from the UK Whitehall II study. *J Epidemiol Community Health* 1995;**49**:124–30.
- 17 Kivimäki M, Head J, Ferrie JE, Shipley MJ, Vahtera J, Marmot MG. Sickness absence as a global measure of health: evidence from mortality in the Whitehall II prospective cohort study. *BMJ* 2003;**327**:364.
- 18 Nampiaparampil DE, Shmerling RH. A review of fibromyalgia. *Am J Manag Care* 2004;**10**:794–800.
- 19 Wolfe F, Cathey MA. Prevalence of primary and secondary fibrositis. *J Rheumatol* 1983;**10**:965–8.
- 20 Kivimäki M, Virtanen M, Vartiainen M, Elovainio M, Vahtera J, Keltikangas-Järvinen L. Workplace bullying and the risk of cardiovascular disease and depression. *Occup Environ Med* 2003;**60**:779–83.
- 21 Vahtera J, Kivimäki M, Pentti J, Linna A, Virtanen M, Virtanen P, et al. Organisational downsizing, sickness absence, and mortality: 10-town prospective cohort study. *BMJ* 2004;**328**:555.
- 22 Haapanen N, Miilunpalo S, Pasanen M, Oja P, Vuori I. Agreement between questionnaire data and medical records of chronic diseases in middle-aged and elderly Finnish men and women. *Am J Epidemiol* 1997;**145**:762–9.
- 23 Kivimäki M, Vahtera J, Thomson I, Griffiths A, Cox T, Pentti J. Psychosocial factors predicting employee sickness absence during economic decline. *J Appl Psychol* 1997;**82**:858–72.
- 24 Lund T, Labriola M, Christensen KB, Bultmann U, Villadsen E, Burr H. Psychosocial work environment exposures as risk factors for long-term sickness absence among Danish employees: results from DWECES/DREAM. *J Occup Environ Med* 2005;**47**:1141–7.
- 25 Head J, Kivimäki M, Martikainen P, Vahtera J, Ferrie JE, Marmot MG. Influence of change in psychosocial work characteristics on sickness absence: The Whitehall II Study. *J Epidemiol Community Health* 2006;**60**:55–61.
- 26 Kivimäki M, Forma P, Wikstrom J, Halmesmaki T, Pentti J, Elovainio M, et al. Sickness absence as a risk marker of future disability pension: the 10-town study. *J Epidemiol Community Health* 2004;**58**:710–11.
- 27 Vahtera J, Pentti J, Kivimäki M. Sickness absence as a predictor of mortality among male and female employees. *J Epidemiol Community Health* 2004;**58**:321–6.
- 28 Lotters F, Burdorf A. Prognostic factors for duration of sickness absence due to musculoskeletal disorders. *Clin J Pain* 2006;**22**:212–21.
- 29 van den Heuvel SG, Ariens GA, Boshuizen HC, Hoogendoorn WE, Bongers PM. Prognostic factors related to recurrent low-back pain and sickness absence. *Scand J Work Environ Health* 2004;**30**:459–67.
- 30 Alexopoulos EC, Stathi IC, Charizani F. Prevalence of musculoskeletal disorders in dentists. *BMC Musculoskelet Disord* 2004;**5**:16.
- 31 Alexanderson KA, Borg KE, Hensing GK. Sickness absence with low-back, shoulder, or neck diagnoses: an 11-year follow-up regarding gender differences in sickness absence and disability pension. *Work* 2005;**25**:115–24.
- 32 Nakata A, Haratani T, Takahashi M, Kawakami N, Arito H, Kobayashi F, et al. Association of sickness absence with poor sleep and depressive symptoms in shift workers. *Chronobiol Int* 2004;**21**:899–912.
- 33 Simon GE, Barber C, Birnbaum HG, Frank RG, Greenberg PE, Rose RM, et al. Depression and work productivity: the comparative costs of treatment versus nontreatment. *J Occup Environ Med* 2001;**43**:2–9.
- 34 Hensing G, Brage S, Nygård JF, Sandanger I, Tellnes G. Sickness absence with psychiatric disorders—an increased risk for marginalisation among men? *Soc Psychiatry Psychiatr Epidemiol* 2000;**35**:335–40.
- 35 Simms RW. Is there muscle pathology in fibromyalgia syndrome? *Rheum Dis Clin North Am* 1996;**22**:245–66.
- 36 Hadler NM. Fibromyalgia, chronic fatigue, and other iatrogenic diagnostic algorithms. Do some labels escalate illness in vulnerable patients? *Postgrad Med* 1997;**102**:161–72.
- 37 White KP, Nielson WR, Harth M, Ostbye T, Speechley M. Does the label “fibromyalgia” alter health status, function, and health service utilization? A prospective, within-group comparison in a community cohort of adults with chronic widespread pain. *Arthritis Rheum* 2002;**47**:260–5.
- 38 Hazemeijer I, Rasker JJ. Fibromyalgia and the therapeutic domain. A philosophical study on the origins of fibromyalgia in a specific social setting. *Rheumatology (Oxford)* 2003;**42**:507–15.
- 39 Fitzcharles MA, Boulos P. Inaccuracy in the diagnosis of fibromyalgia syndrome: analysis of referrals. *Rheumatology (Oxford)* 2003;**42**:263–7.
- 40 Suhr JA. Neuropsychological impairment in fibromyalgia: relation to depression, fatigue, and pain. *J Psychosom Res* 2003;**55**:321–9.
- 41 Chung CP, Sokka T, Arbogast PG, Pincus T. Work disability in rheumatoid arthritis: differences in patients with early disease in Finland and the United States. *Ann Rheum Dis* 2007. In press.
- 42 Burckhardt CS, Jones KD, Clark SR. Soft tissue problems associated with rheumatic disease. *Lippincotts Prim Care Pract* 1998;**2**: 20–9; quiz 30–1).
- 43 Schneider MJ. Tender points/fibromyalgia vs. trigger points/myofascial pain syndrome: a need for clarity in terminology and differential diagnosis. *J Manipulative Physiol Ther* 1995;**18**:398–406.