Gender and socio-economic variations in employment among patients with a diagnosed musculoskeletal disorder: a longitudinal record linkage study in Sweden

P. Holland, B. Burström¹, I. Möller¹ and M. Whitehead

Objective. To establish whether the employment consequences of musculoskeletal disorder vary by gender and socio-economic group in Sweden.

Methods. Two linked registers, containing diagnostic and socio-economic data for the 1.8 million residents of Stockholm County, were used to investigate the subsequent employment consequences over 5 yr of having a musculoskeletal disorder requiring hospital admission in 1996. Age-standardized employment rates of all patients with musculoskeletal disorder (n = 2185) were compared with patients employed prior to hospital admission (n = 1286) and with the general population of Stockholm. Odds of leaving employment between 1996–2001 were calculated for men, women and patients from different socio-economic groups.

Results. Employment rates increased and social differentials narrowed in the general population, while employment declined and social differentials widened among patients with musculoskeletal disorders. These trends were masked when analyses were restricted to individuals employed at baseline. Following hospital admission, the odds of leaving employment increased annually for patients; by 2001, their adjusted odds were over three times greater [odds ratio (OR) = 3.36, 95% confidence interval (CI) 2.89–3.91] than for the general population. Women with musculoskeletal disorders were significantly more likely to leave employment during follow-up than men (OR = 1.95, 95% CI 1.49–2.56). Semi- and unskilled manual workers with musculoskeletal disorders were over three times as likely to leave employment than their professional counterparts (OR = 3.40, 95% CI 2.41–4.81).

Conclusions. People with musculoskeletal disorders, particularly women and semi- and unskilled manual workers, are vulnerable to leaving employment. Health and social policies must do more to protect the employment of people with musculoskeletal disorders.

KEY WORDS: Musculoskeletal Disorder, Employment, Gender, Socio-economic group, Sweden.

Arthritis and other musculoskeletal disorders are among the most common causes of disability among people of working age in developed countries [1]. The social and economic costs to individuals with these conditions are considerable. Musculoskeletal disorders are the leading causes of work absence, long-term work disability and early retirement in Sweden [2]; in 2001, 60% of people receiving disability pension or taking long-term sick leave had a diagnosed musculoskeletal disorder [3]. In the USA, people with a musculoskeletal disorder had lower employment rates, were less likely to enter employment, and were more likely to leave employment compared with people without these disorders [4], and the presence of a comorbidity indicated below-average earnings [5]. Indirect costs of musculoskeletal disorders arising from reduced productivity, work disability and lost income outweigh the direct costs of medical care, medication and research, and have been estimated at 80 and 20%, respectively, in Sweden [3] and 70 and 30%, respectively, in Canada [6].

The impact of musculoskeletal disorders on employment is often measured using rates of ‘work disability’: typically the proportion of people initially employed at baseline (at the time of diagnosis or study inception) who have left employment by follow-up [7–10]. Most studies have focused on work disability among people with rheumatoid arthritis. In a Swedish study of 106 people with rheumatoid arthritis, a work disability rate of 37% was reported 8 yr after onset, the majority of whom had left work 1 yr following onset [7]. A UK prospective study of 160 people with rheumatoid arthritis found work disability rates of 14% at 1 yr, 33% at 5yr and 39% at 10 yr [8]. Higher rates of work disability were reported in a US study of people with rheumatoid arthritis: at 9 yr, 42% were no longer working [9].

Work disability rates provide a useful indicator of the employment consequences of musculoskeletal disease, but it is likely that they underestimate the real impact of musculoskeletal disorders on employment as they often exclude those who were not employed at study baseline [11]. For some individuals, the disabling effects of their musculoskeletal disorder may materialise prior to study recruitment [10] or diagnosis [7]. In the Early Rheumatoid Arthritis Study (ERAS) of 721 people with early rheumatoid...
arthritis in the UK, 49% were employed at presentation, and 60% of these remained in employment after 5 yr [10]. Calculating employment rates at 5 yr for the entire sample, however, rather than just for those individuals who were employed at baseline, presents a grimmer picture: only 29% of the ERAS cohort were working at the 5-yr follow-up.

Evidence suggests that work disability is socially patterned and is more strongly predicted by socio-economic than by biomedical factors [12, 13]. Being employed in manual work, having a physically demanding job, being older or less educated increases the risk of becoming work disabled [7, 9, 13–16]. In the ERAS study, for example, people with rheumatoid arthritis employed in manual occupations were almost five times more likely to be work-disabled at 5 yr compared with those in sedentary jobs, and job loss occurred earlier among those employed in manual occupations [10]. Most studies exploring whether the employment consequences of musculoskeletal disorders differ for men and women have focused on rheumatoid arthritis, and the evidence is inconclusive. While most studies find gender does not significantly predict work disability [7, 9, 16, 17], others suggest that women are more vulnerable to leaving employment than men [10, 14].

Investigating whether the employment consequences for people with musculoskeletal disorders are socially patterned is important, as evidence suggests that if chronic illness leads to unemployment, the risk of further ill health may increase [18]. For people in lower socio-economic groups, loss of employment may lead to a vicious circle of more severe illness and disability, exacerbating existing social inequalities in health [19]. In previous analyses, using cross-sectional sample surveys and self-reported health measures in Britain and Sweden, we found much lower employment rates among less skilled socio-economic groups with limiting illness than among their counterparts in professional and managerial occupations. Although this pattern was found in both countries, the effect was more severe in Britain [20, 21]. In the present study, we use linked longitudinal diagnostic and socio-economic data for the entire population of Stockholm County to explore the employment consequences of diagnosed musculoskeletal disorders for men and women from different socio-economic groups in the 5 yr following admission to hospital. Focusing only on the employment consequences of patients who were working prior to admission to hospital indicated a significant event in the course of their disease, possibly surgery. The sample, therefore, may underestimate the size of the observed impact on employment. We therefore compared the age-standardized employment rates of all patients diagnosed with a musculoskeletal disorder with those of patients who were employed prior to receiving in-patient care. We also assessed whether the magnitude of differential employment consequences between social groups was sensitive to the methods of measurement.

Materials and methods

Study population

In Sweden, personal identification numbers facilitate the linkage of population data gathered from national surveys and comprehensive population registers, permitting the linkage of diagnostic and health service data to employment status and other socio-economic information. Two linked population registers, covering the 1.8 million residents of Stockholm County, were used to assess the employment consequences of having a diagnosed musculoskeletal disorder requiring hospital in-patient admission in 1996.

The study sample was drawn from VAL (meaning ‘Choice’), a database which is updated monthly and consists of administrative records of all publicly financed health-care in Stockholm County, including registers from in-patient and out-patient care, geriatric, surgical and primary care and other specialties [22]. VAL contains diagnoses of chronic and acute disorders recorded by a physician during an out-patient visit or an in-patient stay, and personal identification numbers allow patients to be followed over time. Men and women who had received hospital in-patient care for a musculoskeletal disorder were the focus of our study. Data on receipt of in-patient care were not available for 1994 so, in an attempt to control for previous ill health, the sample was restricted to residents of Stockholm County who were admitted to hospital during 1996 but who did not have an in-patient episode in 1995. Patients who died between hospitalization in 1996 and follow-up were excluded from the study.

As employment status was the focus of this study, only men and women who were aged between 31 and 63 when they received in-patient care in 1996 were included in the sample. We set the upper age limit as 63 at the time of hospital admission in 1996, and follow-up was terminated when they became 65, the retirement age for both men and women in Sweden. In Sweden, socio-economic status in the population was last measured in the 1990 Census. To allow measurement of achieved socio-economic group, the sample was restricted to men and women who were aged 25 or older at the 1990 Census, thus aged 31 or older when they were hospitalized in 1996. There were 40,576 men and women, aged 31–63, who received hospital in-patient care in 1996 from the Stockholm County population.

Employment status and socio-economic group

Employment status and other socio-economic data were drawn from the Longitudinal Population Register on Education, Income and Work (LOUISE) for the period 1994–2001. The LOUISE register included all residents aged 16 yr and older [23]. Information on employment status is gathered directly from employers. To allow an examination of the employment consequences of having a musculoskeletal disorder, employment data were included for the 2 yr prior to hospitalization (1994–1995), the year of hospitalization (1996) and 5 yr following the in-patient episode (1997–2001). Individuals in the population were classified as being professional or managerial workers (Swedish economic classification ‘SEI’ 44 46, 54–57, 60); lower non-manual (SEI 33–36); skilled manual (SEI 21–22); semi- and unskilled manual (SEI 11–12); or farmers and self-employed workers (SEI 79, 89).

Diagnosis of musculoskeletal disorder

We examined all people who received hospital in-patient care in 1996 for a diagnosed musculoskeletal disorder, including patients with rheumatoid arthritis, osteoarthritis and other arthropathies and related disorders (ICD-9: 710–719); and patients with ankylosing spondylitis, intervertebral disc disorders and other spondyloarthropathies (ICD-9: 720–724). While for some patients hospital admission in 1996 may have been their first diagnosis, marking the onset of musculoskeletal disorder, it is likely that, for most patients, admission to hospital indicated a significant event in the course of their disease, possibly surgery. The sample, therefore, consisted of people diagnosed with musculoskeletal disorder who were able to work during the 2 yr prior to their hospital admission, whatever the history or severity of their disease.

Statistical analysis

The proportion of men and women in each age and socio-economic group, who were diagnosed with a musculoskeletal disorder, was calculated. Mean age (s.d.) at hospital admission was calculated and t-tests were performed to test for statistically significant differences in age between the general population and patients with a musculoskeletal disorder, and between socio-economic groups.

Employment rates, age-standardized to the general population of Stockholm County using the direct method, were calculated for two patient groups. Firstly, for people diagnosed with a musculoskeletal disorder and who were employed at baseline in
1994 and 1995 (2 yr prior to their in-patient episode of 1996), we calculated the proportion that were still working in the year of in-patient admission (1996) and 5-yr follow-up (1997–2001). Secondly, we calculated age-standardized employment rates for all people who received hospital in-patient care for a musculoskeletal disorder in 1996, regardless of their employment status at baseline. In both analyses, employment rates are presented for non-manual and manual workers. Men and women aged 31–64 in the general population of Stockholm County served as a reference group.

The odds of leaving employment were calculated for patients who were employed at baseline using binary logistic regression. Two separate models were estimated. The first quantified the likelihood of leaving employment following receipt of in-patient care, independent of other social and demographic risk factors, by controlling for age, gender, marital status and socio-economic group. In this model, the general population of Stockholm County was selected as the reference group. The second model examined whether the employment consequences of the diagnosis of a musculoskeletal disorder varied by gender and socio-economic group. The years between receipt of in-patient care and the final year of observation were combined, and the odds of ever leaving employment at any time between 1996 and 2001 were calculated, stratified by gender and socio-economic group. Men and professional workers were referents. In both models, age was entered as a continuous variable. All analyses were conducted using SPSS for Windows, version 11.0.

Ethical permission

Ethical permission for the study was granted by the regional ethics committee in Stockholm (ref. 04–521/5). Statistics Sweden provided the register data.

Results

Baseline characteristics

Of the 40,576 men and women who received hospital in-patient care in 1996, 2185 were diagnosed with a musculoskeletal disorder (41% with rheumatoid arthritis or osteoarthritis). Just over half of the patients were women (53%) and from non-manual groups (63.6%) (Table 1). At 1994–5 baseline (2 yr prior to receiving in-patient care), 58.9% of patients with musculoskeletal disorder were employed, compared with 63.7% of the general population of Stockholm County. A greater proportion of patients with musculoskeletal disorders were employed in manual occupations than people in the general population (36.4 vs 30.5%, P < 0.0001). Patients employed at baseline were significantly older at hospital admission in 1996 than employed people in the general population [mean age 47.8 yr (s.d. 9.2) vs 45.9 yr (s.d. 8.9), P < 0.001]. Men in manual occupations who had a musculoskeletal disorder were significantly younger at admission than male patients in non-manual occupations (mean age 45.9 yr (s.d. 9.2) vs 47.8 yr (s.d. 9.3), P = 0.02), and women in manual occupations who had a musculoskeletal disorder were significantly younger than their non-manual peers [47.1 yr (s.d. 9.4) vs 49.7 yr (s.d. 8.8), P = 0.001].

Employment rates during follow-up

Patients employed at baseline. Of the general population who were employed at the 1994–5 baseline, 90.8% were in employment in 2001, a fall of 9 percentage points (Table 2). Patients with a musculoskeletal disorder, however, experienced a greater fall in employment: almost 24 percentage points between baseline and 2001. By 2001, only 76.3% of patients with a musculoskeletal disorder were still in employment. The employment differential between the general population and patients with a musculoskeletal disorder increased every year and was at its greatest in 2001.

All patients with a musculoskeletal disorder. Age-standardized employment rates for all patients with musculoskeletal disorder (whether employed at baseline or not) are presented in Table 2. In 1994, 72.3% of patients were employed, and by 2001 their employment rate had fallen to 65%. In the 5 yr between hospital admission and 2001, employment rates for patients with a musculoskeletal disorder decreased by 5.3 percentage points, but increased by 5.3 percentage points in the general population.

Socio-economic differentials in employment rates

Patients employed at baseline. In the general population employed at baseline, employment rates fell by 13.8 percentage points among manual workers and by 6.9 percentage points among non-manual workers between baseline and 2001 (Fig. 1). Manual workers with musculoskeletal disorders, however, suffered the greatest fall in employment: only 65.2% were employed in 2001, a loss of 34.8 percentage points from baseline, compared with a fall of 18.3 percentage points for non-manual patients. Among patients with a musculoskeletal disorder, however, suffered the greatest fall in employment: only 65.2% were employed in 2001, a loss of 34.8 percentage points from baseline, compared with a fall of 18.3 percentage points for non-manual patients. Among patients with a musculoskeletal disorder, socio-economic

| Table 1. Baseline characteristics (1994–5) of people in the general population and people subsequently admitted to hospital in 1996 with a musculoskeletal disorder: residents of Stockholm County, Sweden, aged 31–63 |
|-----------------------------------------------|-----------------------------------------------|
| General population of Stockholm              | Patients diagnosed with a musculoskeletal disorder |
| Total in population n | Employed at baseline n (%) | Total in population n | Employed at baseline n (%) |
| Men | 396833 | 255708 (64.4) | 1021 | 647 (63.4) |
| Women | 392049 | 246661 (62.9) | 1164 | 639 (54.9) |
| Age group | | | | |
| 31–45 | 417571 | 255288 (61.1) | 895 | 545 (60.9) |
| 46–59 | 315180 | 221264 (70.2) | 1052 | 638 (60.7) |
| 60–64 | 56131 | 25817 (46.0) | 238 | 103 (43.3) |
| Socio-economic group b | | | | |
| Professional and Managerial | 265988 | 211635 (79.6) | 626 | 454 (72.5) |
| Lower non-manual | 133144 | 93577 (70.3) | 405 | 263 (64.9) |
| Skilled manual | 8884 | 55149 (62.1) | 293 | 178 (60.8) |
| Semi-unskilled Manual | 136611 | 78515 (57.5) | 425 | 233 (54.8) |
| Self-employed and farmers | 32800 | 20567 (62.7) | 100 | 46 (46.0) |
| Total | 788882 | 502369 (63.7) | 2185 | 1286 (58.9) |

*aDenotes that an individual was employed in both 1994 and 1995; \(b\)the number of people within each socio-economic group is less than the total due to missing occupational data.
Table 2. Age-standardized employment rates in the general population and in patients who received hospital in-patient care in 1996 for a musculoskeletal disorder: residents of Stockholm County, Sweden, aged 31–63

<table>
<thead>
<tr>
<th>Employed at baseline</th>
<th>Baseline</th>
<th>In-patient episode</th>
<th>Follow-up</th>
<th>Percentage point change in proportion employed&lt;sup&gt;c&lt;/sup&gt;</th>
<th>2001–1994</th>
<th>2001–1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>General population</td>
<td>502 369 (100%)</td>
<td>502 369 (100%)</td>
<td>473 913 (96.1%)</td>
<td>447 1789 (92.3%)</td>
<td>411 799 (91.6%)</td>
<td>396 092 (91.2%)</td>
</tr>
<tr>
<td>Patients with a musculoskeletal disorder</td>
<td>1286 (100%)</td>
<td>1286 (100%)</td>
<td>1162 (94.2%)</td>
<td>1019 (86.2%)</td>
<td>948 (82.7%)</td>
<td>870 (81.1%)</td>
</tr>
<tr>
<td>Employment differential&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
<td>−1.9</td>
<td>−7.3</td>
<td>−9.6</td>
<td>−10.5</td>
</tr>
</tbody>
</table>

Whole population

| General population | 539 525 (74.7%) | 544 122 (74.4%) | 541 058 (74.3%) | 529 083 (74.7%) | 518 976 (75.9%) | 509 803 (77.2%) | 490 132 (79.6%) | +4.9 | +5.3 |
| Patients with a musculoskeletal disorder | 1414 (72.3%) | 1380 (70.6%) | 1321 (70.3%) | 1177 (66.4%) | 1047 (65.4%) | 990 (65.3%) | 935 (65.0%) | −7.3 | −5.3 |
| Employment differential<sup>b</sup> | −2.4 | −3.8 | −4.0 | −8.3 | −8.6 | −11.8 | −13.1 | −14.6 |

<sup>a</sup>Employment rates of patients are age-standardized to the general population of Stockholm County; <sup>b</sup>difference between the employment rates of patients with musculoskeletal disorder and those of the general population; <sup>c</sup>increase/decrease in employment rates between (i) 1994 and the end of observation, and (ii) in-patient episode and the end of observation.

Discussion

Using linked diagnostic and socio-economic data for the entire population of Stockholm County, we explored the employment consequences of having a diagnosed musculoskeletal disorder compared with their counterparts in the general population. Repeating this model with cohorts aged 31–63, we observed that patients with a musculoskeletal disorder had greater odds of losing employment compared with the general population, but the odds ratios decreased over time, from 2.4 times greater odds (95% CI 2.3–2.5) in 1996 to 1.8 times greater odds in 2001 (95% CI 1.7–2.0).

Gender and socio-economic variations in the likelihood of leaving employment. Between 1994 and 2001, the odds of leaving employment were significantly higher for women than for men. The odds of leaving employment were almost twice as high for women compared with men (OR = 2.0, 95% CI 1.9–2.1) in 1994. By 2001, the odds were 2.5 times greater for women compared with men (OR = 2.5, 95% CI 2.4–2.6).

Socio-economic variations in employment. For patients with musculoskeletal disorders, who were almost twice as likely to leave employment compared with the general population, after adjusting for age, gender, marital status and socio-economic status, the odds of leaving employment were 2.89 (95% CI 2.8–3.9) times greater for patients with musculoskeletal disorders, and by 2001, their odds were over three times greater (OR = 3.3, 95% CI 2.9–3.8).

Loss of employment. All patients with a musculoskeletal disorder had an increased risk of leaving employment compared with the general population. Between 1994 and 2001, the odds of leaving employment were greater for women than for men. The odds of leaving employment were almost twice as high for women compared with men (OR = 2.0, 95% CI 1.9–2.1) in 1994. By 2001, the odds were 2.5 times greater for women compared with men (OR = 2.5, 95% CI 2.4–2.6).

In both the general population and among patients, there was a significant difference in the odds of leaving employment between non-manual and manual workers. For non-manual workers, the odds were 1.9 times greater (95% CI 1.5–2.4) in 1994 and 2.1 times greater in 2001 (95% CI 1.7–2.4).

Between 1994 and 2001, both women and men with a musculoskeletal disorder had a greater odds of leaving employment compared with the general population, after adjusting for age, gender, marital status and socio-economic status (Table 3). The odds of leaving employment increased every year for manual workers with a musculoskeletal disorder. By 2001, the odds of leaving employment were over three times greater for women compared with men (OR = 3.3, 95% CI 2.9–3.8).

For patients relative to non-manual workers in the general population, the odds of leaving employment were 2.89 (95% CI 2.8–3.9) times greater for patients with musculoskeletal disorders, and by 2001, their odds were over three times greater (OR = 3.3, 95% CI 2.9–3.8).

All patients with a musculoskeletal disorder. Between 1994 and 2001, both women and men with a musculoskeletal disorder had a greater odds of leaving employment compared with the general population, after adjusting for age, gender, marital status and socio-economic status (Table 3). The odds of leaving employment increased every year for manual workers with a musculoskeletal disorder. By 2001, the odds of leaving employment were over three times greater for women compared with men (OR = 3.3, 95% CI 2.9–3.8).

Socio-economic differentials narrowed in the general population, but increased among manual workers. For patients relative to non-manual workers in the general population and women with a musculoskeletal disorder, the employment differentials between non-manual and manual workers in 1996 were smaller, but increased by 9.5 percentage points in 2001. By the end of observation in 2001, 4.8% of non-manual and 6.2% of manual workers with musculoskeletal disorders were employed, compared to 1.9% of non-manual and 1.7% of manual workers in the general population, respectively.
disorder requiring hospital admission in 1996. There were gender inequalities in the employment consequences of having a musculoskeletal disorder. We found that women with musculoskeletal disorders had a significantly higher risk than men of leaving employment. This is consistent with findings from the ERAS study of work disability among people with rheumatoid arthritis in the UK [10] and analysis of cross-sectional survey data in the US [24], although gender differences in the likelihood of losing employment have not been detected in other prospective studies in the UK [8], Finland [17] or the USA [9].

FIG. 1. Trends in age-standardized employment rates among the general population and patients who received hospital in-patient care in 1996 for a musculoskeletal disorder, by socio-economic group: residents of Stockholm County, Sweden, aged 31–63, who were employed in 1994 and 1995.


TABLE 3. Odds ratios (95% CI) of leaving employment in the years following receipt of in-patient care in 1996 for a musculoskeletal disorder: residents of Stockholm County, Sweden, aged 31–63, who were employed in 1994 and 1995

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</tr>
</thead>
<tbody>
<tr>
<td>General population</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Patients diagnosed with musculoskeletal disorder</td>
<td>1.60 (1.25–2.05)</td>
<td>2.53 (2.14–3.00)</td>
<td>2.68 (2.29–3.14)</td>
<td>2.83 (2.42–3.31)</td>
<td>2.98 (2.55–3.47)</td>
<td>3.36 (2.89–3.91)</td>
</tr>
</tbody>
</table>

The model is adjusted for age, sex, marital status and socio-economic group.
Our findings reveal that the employment consequences of a diagnosed musculoskeletal disorder also differ by socio-economic group. There was a social gradient in the likelihood of leaving employment following hospital admission: patients employed in non-manual, skilled manual and semi- or unskilled manual occupations had an increased risk of leaving work relative to professional patients. Although employment in a non-manual occupation may be more compatible with a musculoskeletal disorder than one involving physical work, lack of discretion over the pace of work or workload have been demonstrated to be instrumental in determining the ability to remain in employment even among non-manual workers [25]. That semi- and unskilled manual workers with musculoskeletal disorders were especially vulnerable to leaving employment is consistent with evidence from other studies demonstrating that manual work is predictive of work disability [7, 9, 10, 13–16]. In our study, patients were more likely to be employed in a manual occupation at hospital admission, as has been found elsewhere [26]. Manual occupations require physical agility or manual dexterity of their workers, and in factories and on assembly lines the pace of work is often non-negotiable. People employed in these contexts may have no other choice but to leave their employment if they develop a musculoskeletal disorder [27], and the likelihood of leaving work may increase if their condition worsens. This could partly explain the widening differences we observed in the employment rates of non-manual and manual workers with a musculoskeletal disorder in the 5 yr following hospital admission.

Our results indicate that investigations into the employment consequences of having a diagnosed musculoskeletal disorder are sensitive to the methods used. Calculating age-standardized employment rates for all patients with a diagnosed musculoskeletal disorder, regardless of their employment status at baseline, revealed widening inequality during 1996–2001 between the employment rates of people with a musculoskeletal disorder and those of the general population. While employment rates rose in the general population of Stockholm County during this period, they fell among patients with musculoskeletal disorders. Furthermore, our study revealed narrowing social differentials in employment among the general population but widening social differentials among patients with musculoskeletal disorders, trends which were masked when analyses were restricted to people employed at baseline. Patients had lower employment rates than the general population at baseline, which may indicate a health-related exit from employment for some patients prior to their hospitalization. This suggests that in studies where work disability is measured among employed people only, the impact of musculoskeletal disease on employment may be underestimated. Such studies may also fail to capture widening inequality in employment differentials between people with and without musculoskeletal disorders and mask socio-economic employment differentials among patients.

Our previous studies of how men and women with limiting longstanding illness fare in Britain and Sweden found much poorer employment chances for less-skilled socio-economic groups in Britain than in Sweden [20–21]. It is possible that the labour market position of people with musculoskeletal disorders is even worse in other European countries than in Sweden.

The main strengths of this register-based study lie in the availability of individual-level socio-economic and health-related data covering the entire population of Stockholm County; the presence of a musculoskeletal disorder was clinically diagnosed by a physician during receipt of hospital in-patient care; and we were able to follow individuals longitudinally for 5 yr following hospital admission. One limitation is that the magnitude of the employment consequences identified in this study may be less severe for patients with the same diagnoses but whose condition was not serious enough to warrant in-patient care in 1996. People with more severe or advanced musculoskeletal disorders may have been included in the study than if patients had been identified from registers of out-patient or primary care rather than in-patient care.

As is common in many countries, the majority of patients with musculoskeletal disorders in Sweden are treated in out-patient care. It is possible that the patients in this study may have experienced considerable pain and disability which may have warranted their admission to hospital for surgical treatment. While surgery may have resulted in an improvement in their ability to remain in employment, it is possible that the impact was differential by socio-economic group and that manual workers may have returned to their work to a lesser degree than non-manual workers. Finally, as the study focused only on the risk of leaving employment, our findings are likely to underestimate the full extent of the impact of musculoskeletal disease on labour market participation. People with musculoskeletal disorders may adopt a number of coping strategies to accommodate their condition and remain in work, including reducing their working hours, changing jobs, working at home or increasing their medication [8, 28], and these outcomes were not recorded in our study.

Compared with the general population of Stockholm County, we found that a higher proportion of patients with musculoskeletal disorders were employed in manual occupations, and that patients in manual groups were the most likely to leave employment following hospital admission. Work disability itself can lead to further illness, pain and depression [29] and for people in manual occupations losing employment may increase the risk of entering a vicious circle of more severe illness and disability, exacerbating existing social inequalities in health. Welfare policies need to focus more intensely on protecting the employment of people with musculoskeletal disorders, especially those employed in manual occupations.

### Table 4. Age-adjusted odds ratios (95% CI) of leaving employment in any year between 1996 and 2001, following receipt of in-patient care for a musculoskeletal disorder: residents of Stockholm County, Sweden, aged 31–63, who were employed in 1994 and 1995

<table>
<thead>
<tr>
<th>General population</th>
<th>Patients diagnosed with musculoskeletal disorder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>1.00</td>
</tr>
<tr>
<td>Women</td>
<td>1.38 (1.36–1.41)</td>
</tr>
<tr>
<td>Professionals</td>
<td>1.00</td>
</tr>
<tr>
<td>Lower non-manual</td>
<td>1.43 (1.40–1.46)</td>
</tr>
<tr>
<td>Skilled manual</td>
<td>2.13 (2.08–2.19)</td>
</tr>
<tr>
<td>Semi-/unskilled</td>
<td>2.53 (2.48–2.58)</td>
</tr>
</tbody>
</table>

**Rheumatology**

- Social differentials in employment rates widened among patients with musculoskeletal disorders, yet narrowed in the Swedish population.
- Women and manual workers with musculoskeletal disorders are more likely to leave employment than men and professionals.

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The authors have declared no conflicts of interest.

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