Financial compensation and vocational recovery: a prospective study of secondary care neck and back patients

L Hestbaek1,2, C Rasmussen3, C Leboeuf-Yde1

1Back Research Centre, Hospital of Funen, part of Clinical Locomotion Science, University of Southern Denmark, Odense, 2Nordic Institute of Chiropractic and Clinical Biomechanics, part of Clinical Locomotion Science, Odense, and 3The Spine Clinic, Hjørring Hospital, Hjørring, Denmark

Objectives: Financial compensation has been shown to be a negative prognostic factor for pain and disability in patients with neck or low back pain. It is unclear whether this association is causal and to what extent it hampers return to work. The objective of this study was to assess the direct influence of a financial compensation process on the ability to remain in regular employment in patients with suspected disc herniation.

Methods: A prospective cohort study with a register-based follow-up at 1, 3, and 5 years after baseline was carried out at two multidisciplinary, non-surgical spine clinics in two public hospitals in Denmark. The study population comprised consecutive patients in regular employment with neck pain radiating to the arm or low back pain radiating to the leg. The exposure variable was any type of claim for financial compensation for the actual low back/leg or neck/arm pain. The outcome measure was receiving income compensation benefits. This information was obtained through national registers. Follow-up points were 1, 3, and 5 years after inclusion.

Results: The study included 1243 low back pain patients and 202 neck pain patients. The odds ratio, adjusted for relevant confounders, of receiving income compensation benefits in case of baseline financial claim was approximately 2 for low back/leg pain patients and about 4 for neck/arm pain patients at 1, 3, and 5 years.

Conclusions: In employed patients, a claim for financial compensation for low back or neck pain with radiating pain was found to be independently associated with receipt of income compensation benefits after 1, 3, and 5 years.

A previous meta-analysis has shown financial involvement to be an independent negative prognostic factor for pain and disability in patients with chronic pain (1). However, in many of the studies in the meta-analysis, the influence of the compensation process was not assessed directly. Instead, compensation was usually regarded as a covariate and was found to correlate with other work-related, injury-related, or social factors. In addition, outcome was often based on subjective measures, such as self-rated pain and disability. Finally, there are very few studies with long-term follow-up, which are necessary because of the often lengthy claim processes. This is important because patients may have financial and complex psychosocial incentives to remain symptomatic until the end of the claim process.

A strong link between claim for financial compensation at baseline and no global improvement after 1 year was demonstrated previously in the patient population of this study (2). In Denmark, all types of public income substitutions are registered centrally and linked to the individual by means of a unique civil registration number. This system allows researchers access to high-quality objective follow-up information about employment for as long as needed (www.dst.dk). Therefore, it was also possible to look at the influence of claims for financial compensation on the vocational outcome in this population.

The objective of this study was to assess the direct influence of a financial compensation process on the ability to remain in regular employment in patients with suspected disc herniation. Regular employment was defined as not receiving any health-related public income compensation benefits (PICB). We also attempted to address some of the shortcomings of previous studies through long-term follow-up using comprehensive, objective registers and by including some of the possible confounders in the analyses.

Materials and methods

Study design

A prospective cohort study with a register-based follow-up at 1, 3, and 5 years after baseline.
Setting

The study was conducted at two multidisciplinary, non-surgical spine clinics at two public hospitals in the County of Northern Jutland, Denmark. The study was approved by the Danish Data Protection Agency. Approval from the local ethics committee was not required, as the study is based on existing data.

Patients

The criterion for referral to the spine clinics was suspected disc herniation. The herniation was not confirmed through imaging but was defined as neck pain radiating to the arm or low back pain radiating to the leg. Symptoms had to have lasted from 4 to 12 weeks without significant improvement. Patient selection and intervention are described elsewhere (2, 3). Rheumatologists examined the patients between September 1997 and November 1999 and physiotherapists subsequently provided treatment. Questionnaires containing information relating to pain, disability, intake of analgesics, smoking, and any pending compensation claims relating to the back or neck were filled out prior to the physical examination. Information about job function and possible PICB was collected at baseline by the rheumatologists. As the aim of the study was to determine whether patients who were in regular employment without PICB at baseline received PICB at follow-up, we excluded patients who were not in regular employment at baseline. This meant that patients were not considered for the study if they had received any type of PICB, except if they had been in receipt of sickness benefit for their current low back/leg or neck/arm pain episode for <3 months.

Variables

Outcome. The outcome was defined as receiving any type of PICB. (yes/no) People who receive these benefits from the Danish social security system are unable to support themselves on regular labour market terms. There are several types of PICB in Denmark, giving full or partial compensation. These include, but are not limited to, full or partial disability pension, sickness benefit, unemployment benefit, and vocational rehabilitation benefit.

Follow-up was based on register data from Statistics Denmark. In the Danish social security system, private insurance plays only a minor role and usually depends on the patient being declared 'disabled' by the public authorities. It is therefore possible to identify people with all types of PICB using public registers. The extraction of personal information was possible because of the Danish system of individual civil registration numbers. The patient files from the spine clinics in this study included this civil registration number, and at Statistics Denmark, all data with regard to employment and types of public PICB are registered at an individual level by this number.

The PICB data were obtained for the 12th, 36th, and 60th month after baseline; thus data relating to a patient included in May 1998 were obtained for May 1999, May 2001, and May 2003.

Exposure. The exposure variable was claiming for financial compensation for the current low back/leg or neck/arm pain episode at baseline (claim yes/no). ‘Claim’ was classified as positive if the patient answered ‘yes’ to at least one of the following questions on the baseline questionnaire: filing a claim for work injury, filing an insurance claim for injury outside work, having reopened any older claims, or applying for disability pension. The majority of the claims were work injury cases. These were verified by register data from the National Board of Industrial Injuries from 1 year before to 1 year after the baseline examination. Other types of claims could not be verified through public registers. It was not possible to determine whether the claims had been resolved, settled, or reopened during the follow-up period.

It may seem obvious that the risk of receiving disability pension at follow-up is higher if the patient has applied for it at baseline. However, it must be remembered that the point of inclusion of these patients is also the beginning of treatment. It is very unusual to apply for disability pension before treatment has been terminated or is at least well under way. In the few cases where this does happen, it might indicate an underlying ‘high-risk personality’ rather than a ‘high-risk condition’. This is one of the reasons to control for symptom-related variables.

Potential confounders/modifiers. Age, sex, social class [based on job description according to the Danish National Centre for Social Research; from 1 (high) to 5 (low)], smoking (no/yes), present intensity of neck or back pain (box scale from 0 to 10), present intensity of arm or leg pain (box scale from 0 to 10), duration of neck or back pain (days), duration of arm or leg pain (days), use of analgesics in the past 2 weeks (from 0 = no use of analgesics to 10 = use of morphine > 4 days/week; intermediate scores were given to paracetamol, non-steroidal anti-inflammatory drugs, tramadol, and combinations thereof. Values > 6 will indicate use of sedating analgesics, most often tramadol), and disability in the past 2 weeks (calculated scale from 0% to 100%, based on questionnaires relating to physical and psychological pain, disability, intake of analgesics, smoking, and any pending compensation claims relating to the current low back/leg or neck/arm pain episode at baseline (claim yes/no).
was defined as p level of statistical significance in the final analyses. Corporation, College Station, TX, USA), and the analyses regardless of the p-value. Of those employed, that is, they had already received some kind of PICB status at baseline and PICB at follow-up, a bar chart was drawn, comparing claimants to non-claimants.

To examine the true influence of an independent variable on the dependent variable, potential confounders must be defined. Therefore, a number of relevant covariates, as described above, were tested against both the independent variable (claim) and the dependent variable (PICB) at the 1-year follow-up in bivariate logistic regression analyses. The covariates, which had associations with both claim status at baseline and PICB with p-values < 0.10, were considered potential confounders. They were included in multiple logistic regression analyses in their original form (as dichotome, categorical or continuous variables). To detect possible subgroups, which might not be evident from the multivariate analyses, we performed gender- and age-stratified analyses. For this purpose, the multiple logistic regression analyses were repeated, stratified first for sex and then for age, categorized into 10-year groups.

Sensitivity analysis. As the sample of patients with neck/arm pain is fairly small, simply basing the identification of confounders on statistical significance may be unsuitable. Therefore, we repeated the multiple logistic regression analyses for the neck/arm pain patients, taking the strength of the association into account. Thus, statistically non-significant covariates with odd ratios > 1.5 were added to the analyses regardless of the p-value.

All analyses were performed using Stata 9.0 (Stata Corporation, College Station, TX, USA), and the level of statistical significance in the final analyses was defined as p < 0.05.

Results

We identified 202 consecutive patients with neck/arm pain and 1243 with low back/leg pain. Fifty-four of the neck/arm patients and 385 of the low back/leg patients were not in regular employment at baseline; that is, they had already received some kind of PICB and were therefore excluded. Of those employed, claim status at baseline was not described sufficiently for 10 neck/arm pain patients and 37 low back/leg pain patients and they were also excluded. Thus, the final sample consisted of 138 neck/arm pain patients and 821 low back/leg pain patients. Of these, 35 neck/arm pain patients (25%) and 253 low back/leg pain patients (31%) had filed a claim for financial compensation at baseline. As follow-up data were register based, these were complete. The final study sample is described in Table 1. The excluded subjects were more often women, had higher intensity and longer duration of pain, and higher disability level at baseline. These differences were statistically significant for the neck/arm pain patients but not for the patients with low back/leg pain (data not shown). Both Table 1A and 1B show a significant difference between claimants and non-claimants in the proportion of patients receiving PICB at follow-up. This is further illustrated in Figure 1.

Table 1A also shows that for the neck/arm pain patients, sex and level of disability are the only potential confounders that vary between claimants and non-claimants at a statistically significant level (p < 0.10). Table 1B shows that there are several significant differences between claimants and non-claimants with low back/leg pain. The claimants were more often women, of lower social class, smokers, and had a higher intensity of low back pain and a higher level of disability. However, use of analgesics, intensity of leg pain, and duration of pain, which are often considered important risk factors for chronicity, did not vary between the two groups at a statistically significant level.

Identification of confounders

The results of bivariate logistic regression analyses of the associations between potential confounders and the 1-year follow-up outcome (PICB) and the exposure (claim), respectively, were as follows: (i) for the patients with neck/arm pain, female sex and higher level of disability were associated with both claim status at baseline and PICB at follow-up (p < 0.10); (ii) for the patients with low back/leg pain, female sex, lower social class, smoking, higher intensity of back pain, more analgesics used, and higher level of disability were associated with both claim status at baseline and PICB at follow-up (p < 0.10). Thus, these variables were included in the multivariate analyses.

Strength of associations

The multivariate logistic regression analyses showed statistically significant associations between claim
status at baseline and receiving PICB at 1, 3, and 5 years after inclusion. Table 2A shows the crude and adjusted odds ratios for receiving PICB at follow-up for neck/arm pain patients with a claim at baseline compared to those without a claim at baseline. The adjusted odds ratios are approximately 4 for all three points of follow-up with no significant difference between the three estimates. Table 2B shows the same for patients with low back/leg pain. Here, the adjusted odds ratios are approximately 2 at all three points of follow-up, again with no significant difference between the three estimates.

Stratification for sex and age

There were no statistically significant differences between genders or between age groups for either patients with neck/arm pain or patients with low back/leg pain in relation to the association between claim and PICB. In addition, when ignoring the issue of statistical significance, it was not possible to detect any consistent pattern for either sex or age.

Sensitivity analysis

The use of less stringent criteria for inclusion in the multivariate analyses of the neck/arm pain patients (considering both the statistical significance and the strength of association) resulted in a model including sex, smoking, social class, and disability. This changed the estimates by < 3%, which we considered irrelevant.

Discussion

Patients who were employed at baseline, who had a claim of financial compensation when consulting a spine clinic for spinal pain radiating into the arm or leg, had a considerably increased probability of leaving the regular labour market, that is receiving some sort of PICB, up to 5 years later. This effect was twice as high for neck/arm pain patients as for low back/leg pain patients. Adjusting for potential confounders lowered the estimates slightly, but did not change the overall impression; a claim for financial compensation at baseline in self-supporting patients seems to be an independent risk indicator for leaving the regular labour market. This is in line with the findings of other authors.
who investigated various types of pain syndromes (4–6).

Denmark is a homogeneous country, with a small population and a unique and generous social security system. Almost one-third of the general Danish population aged between 18 and 64 years are not in the labour market on normal market terms. It is therefore difficult to compare the size of this fraction to other countries. The relatively easy access to PICB in Denmark might result in lower return-to-work rates compared to other countries. Nevertheless, the influence of a claim process seems to have a negative prognostic effect similar to that seen in other western cultures and social systems (1, 6).

Adjusting for possible indicators of chronicity (intensity and duration of pain, disability level, use of analgesics, smoking, gender, and age) in multivariate analyses did not modify the estimates considerably. This could be because we did not include all relevant confounders. We measured physical and demographic parameters and social class. The validated scale for disability consisted partly of questions relating to psychological factors, social function, and recovery beliefs. Adjusting specifically for psychological factors such as depression, expectation of recovery, victimization feeling, and coping style might have altered the results. The small difference between the raw and the adjusted estimates might also imply that the recovery process of back and neck pain does not depend on physical mechanisms alone, but is more complex. Future studies should take psychological parameters at baseline into account. In Hadler’s words: ‘...our need to recall the pain, complain of it, or launch a Worker’s Compensation claim are surrogate behaviors for the magnitude of difficulty we face in coping on our own’ (6). There might be a selection process between people who consider their problems to be worthy of compensation and those who do not that is not entirely based on physical symptoms. Such a selection process could be based on social and/or cultural characteristics, as seen in a study of Volinn et al, who demonstrated a large disparity between back pain claim rates in the USA and Japan despite similar back pain prevalence rates (7). The selection process could also be based on recovery expectations because people with low expectations of recovery might have higher incentives to file a claim for financial compensation. Cole et al demonstrated that injured workers expecting to return to usual activities quickly had a faster rate of terminating benefits than those with less positive expectations. Positive recovery expectations were

![Figure 1](image1.png)

Figure 1. Proportion of patients with (A) neck/arm pain and (B) low back/leg pain who received income substitution at follow-up, by claim status at baseline (95% confidence interval).

Table 2. Odds ratios (ORs) for receiving income compensation benefit (ICB) at follow-up for (A) neck/arm pain patients and (B) LBP/leg pain patients with a claim at baseline. Reference: no claim at baseline.

<table>
<thead>
<tr>
<th>Follow-up</th>
<th>Crude OR (95% CI)</th>
<th>AOR (95% CI)</th>
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<tbody>
<tr>
<td>(A) Neck/arm pain patients* (n = 133)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 year</td>
<td>4.94 (2.09–11.69)</td>
<td>3.94 (1.46–10.59)</td>
</tr>
<tr>
<td>3 years</td>
<td>4.58 (1.95–10.74)</td>
<td>3.53 (1.31–9.46)</td>
</tr>
<tr>
<td>5 years</td>
<td>6.30 (2.72–14.59)</td>
<td>4.44 (1.71–11.51)</td>
</tr>
<tr>
<td>(B) LBP/leg pain patients** (n = 787)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 year</td>
<td>2.58 (1.85–3.59)</td>
<td>1.81 (1.26–2.60)</td>
</tr>
<tr>
<td>3 years</td>
<td>2.82 (2.06–3.86)</td>
<td>2.00 (1.42–2.82)</td>
</tr>
<tr>
<td>5 years</td>
<td>2.78 (2.04–3.81)</td>
<td>2.11 (1.49–2.99)</td>
</tr>
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AOR, adjusted odds ratio; CI, confidence interval.
*AORs adjusted for sex and disability at baseline. **AORs adjusted for sex, social class, smoking, intensity of back pain, disability, and use of analgesics at baseline.
also associated with a reduction in pain grade and an improvement in functional status (8). Although recovery expectations are usually considered psychologically determined, they may also be socially or culturally dependent in some instances. Finally, they could also depend on previous history of disease, comorbidity, etc.

After such a possible selection process has occurred and the claim has been filed, the need to prove oneself ill might in itself impede recovery. This is supported by the findings of Cassidy et al, who noted that elimination of compensation for pain and suffering improved the prognosis of whiplash injuries (9). Whether it is the factors underlying the decision to file a claim, the claim process itself, or a combination of both that is detrimental to the vocational recovery cannot be determined in this study.

Nevertheless, to improve the situation, attempts could be made to change attitudes among patients, doctors and, preferably, society at large to accept pain syndromes as common, remittent, and intermittent predicaments of life and unsuitable for the usual compensation systems. Whatever the approach, the results of this study indicate a need to regard patients with pending cases as having a relatively high risk of long-term work disability. Our long-term follow-up indicates that the poor vocational prognosis continues even after settlement of the claim. PICB is most often awarded lifelong and to patients with an average age of 46 years. These circumstances make compensation for pain a significant societal problem.

The claim factor was less important for low back/leg pain than for neck/arm pain. This suggests that the physical component of the disabling process is relatively larger for low back/leg pain patients than for neck/arm pain patients. There could be several explanations for this, apart from the obvious: that they may be more severely affected. Low back pain is very common and an often-used reason for seeking compensation for a work injury. Therefore, the workplace or a general practitioner will often file a claim routinely without much consideration of the patient. Neck pain is not in the same way routinely acknowledged as a work injury. Thus, neck-pain patients who decide to file a claim may have given this more attention and the claim process might therefore have a greater impact on recovery. Another explanation, given that the outcome is work related, is that people with low back pain can more easily alter their job functions and work environment to accommodate a low back pain problem.

As the follow-up is based on comprehensive registries, there is no loss to follow-up, providing a high internal validity, and there is no selection bias in the follow-up data, providing a high external validity. However, a fairly large proportion of the original cohort was excluded. The excluded patients were, on average, more severely affected than the included.

This was to be expected, because most excluded patients were already in receipt of PICB related to a health problem or were aged >60 years. The incentive of these patients to file some sort of claim, as well as the risk of not being employed at follow-up, was probably higher. Furthermore, it was not possible to determine whether claims have been resolved, settled, or settled but reopened, or whether new claims were filed in the follow-up period. However, claim processes lasting more than 5 years are uncommon. Thus, it is not possible to study whether termination of a claim is advantageous or not. In addition, cases with claims filed more than 1 year after inclusion will count as non-claimants in our analyses and might bias our results. However, both types of bias would weaken our estimates rather than inflate them, and therefore neither possibility invalidates our conclusion.

Conclusion

Employed patients with neck and arm pain who had a pending claim for financial compensation at baseline were about four times as likely to be out of work after 1, 3, or 5 years compared to those without pending claims. For patients with low back and leg pain, the corresponding odds ratios were about 2. This indicates that a filed claim for compensation in itself should be considered an independent risk indicator for long-term work disability in patients with neck or low back pain with radiating pain.

Acknowledgements

This study was funded by the Velux Foundation, who had no influence on the design and conduct of the study; collection, management, analysis, and interpretation of the data; and preparation, review, or approval of the manuscript.

References