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# DOES A PENDING CASE AFFECT PROGNOSIS OF WORK ABILITY AMONG PATIENTS WITH BACK- OR NECK-RELATED PAIN?

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# Does a pending case affect prognosis of work ability among patients with back- or neck-related pain?


## Abstract

**Background:** Back pain is a frequent condition. In a study from 2015 executed in Denmark 36 % of adults > 16 years old were troubled by back pain.

In Denmark, patients with back pain havean extra 2.6 days of sick leave compared to the rest of the population, which generates an expense of 2.6 billion Danish crowns. Furthermore, an expense of 4.7 billion Danish crowns are spend on disability pensions due to back pain/back diseases per year.

One factor that several studies found to be related to poorer outcome among back pain patients was having a compensation claim.

The objective of this study was to examine whether having a pending case on financial compensation affected employment status at 1-year follow-up among patients referred with back- or neck-related pain.

**Methods:** Data were collected through a questionnaire and the DREAM-database that contains weekly information on sickness absence compensation and granted disability pension for Danish citizens employed in the public or private sector.

Inclusion criteria were age < 63 years, not being on disability pension or early retirement pension on date of filling in the questionnaire, and having answered the question about a pending case.

Information on having a pending case (including worker´s compensation, insurance, indemnification and/or complaint) was obtained from the questionnaire.

Information on source of income from 1 year before to one year after the patients filled in the questionnaire the DREAM database. Reduced work ability was defined as receiving disability pension, permanent part time benefit or sickness benefit.

**Results:** 754 patients were included, 42 % were < 40 years old and 389 were women. At baseline those with a pending case were more likely to report higher VAS (Visual Analogue Scale) and they more often had the opinion that work worsens/would worsen their pain. Furthermore, they were more likely to believe, that they would never return to their current job.

At 1 year follow-up having a pending case increased the odds for reduced work ability (OR 1.6 (CI 1.0-2.5)).

**Conclusion:** Having a pending case most likely increases the risk of low work ability among patients with back- or neck-related pain.

## Dansk Resume

**Baggrund:** Ryg- og nakke-smerter er hyppigt forekommende. Et dansk studie fra 2015 viste at 36 % af alle voksne danskere >16 år er besværet af rygsmerter. Mennesker med rygsmerter har 2,6 ekstra sygedage om året i forhold til resten af befolkningen, hvilket giver en udgift på 2,6 mio. danske kroner. Desuden bliver der hvert år udbetalt 4,7 mio. danske kroner til førtidspensioner giver til patienter med rygsmerter eller rygsygdomme.

Formålet med dette studie var at undersøge, hvorvidt det at have en verserende sag angående økonomisk kompensation påvirker arbejdsevnen efter 1 år bland patienter henvist med ryg- og nakke-relaterede smerter.

**Metode:** Data blev indsamlet gennem et spørgeskema samt DREAM databasen. Databasen indeholder information om danskeres forsørgelsesgrundlag.

Patienter med alder > 63 år, permanent nedsat arbejdsevne og patienter modtagende efterløn på dato for udfyldelse af spørgeskema blev ekskluderet. Desuden blev patienter, der ikke havde angivet, hvorvidt de havde en verserende sag eller ej ekskluderet.

Fra spørgeskemaet blev der indsamlet information angående, hvorvidt patienten havde en verserende sag (omfattende arbejdsskadesag, forsikringssag eller erstatningssag), gennemsnitlig VAS gennem de seneste 14 dage, rygevaner og alkoholforbrug.

Primære forsørgelsesgrundlag 9-12 måneder efter udfyldelse af spørgeskemaet blev hentet ud fra DREAM databasen og en variabel blev dannet ud fra dette. Patienter blev kategoriseret som havende lav arbejdsevne, hvis de modtog førtidspension, flex job eller sygedagpenge. Høj arbejdsevne omfattede således patienter, der efter 1 år var selvforsørgende, på dagpenge eller modtog kontanthjælp.

Deskriptiv statistik beskrivende gruppen af patienter med og gruppen af patienter uden en verserende sag blev udført med det formål at identificere potentielle underliggende årsager til en

eventuel sammenhæng mellem det at have en verserende sag og arbejdsevne efter 1 år. Dernæst gennemgik relevante variabler en logistisk regression for at identificere potentielle uafhængige risikofaktorer for lav arbejdsevne efter 1 år. Til sidst blev modeller justerende for relevante variabler opstillet.

**Resultater:** 754 patienter blev inkluderet og 389 af disse var kvinder. 42 % var < 40 år gammel. 116 patienter (15 %) havde en verserende sag, da de udfyldte spørgeskemaet. De, der havde en verserende sag havde oftere en gennemsnitlig VAS i løbet af de sidste 14 dage på 7-10, og de mente oftere, at arbejde vil eller ville forværre deres smerter. Desuden mente flere af patienterne med en verserende sag, at de aldrig ville kunne vende tilbage til deres nuværende arbejde sammenlignet med patienter, der ikke havde en verserende sag.

Uafhængige risikofaktorer for lav arbejdsevne efter 1 år var at have VAS 7-10, det at mene at arbejde forværrer/vil forværre smerten og mene, at man aldrig vil kunne komme tilbage til nuværende arbejde. Desuden var det også en uafhængig risikofaktor for lav arbejdsevne efter 1 år, hvis man 1 år inden udfyldelse af spørgeskemaet modtog sygedagpenge.

Et år efter udfyldelse af spørgeskemaet havde patienter med en verserende sag en OR på 1.7 for at have lav arbejdsevne (OR juseteret for køn, alder og VAS 7-10).

**Konklusion:** Patienter med en verserende sag havde en odds ratio på 1.6 (CI 1.0-2.5) for at have lab arbejdsevne ved 1 års opfølgning. Det indikerer, at det at have en verserende sag, bør anses som en selvstændig risikofaktor for at have lav arbejdsevne blandt patienter med ryg- eller nakke-relaterede smerter.

## Introduction

Back pain is a frequent condition. In a study from 2015 executed in Denmark 36 % of adults > 16 years old were troubled by back pain (1). Another Danish study showed that only 36 % of patients who report having back pain have a diagnose related to the pain (2). Patients with back pain have an extra 2.6 days of sick leave compared to the rest of the population, which generates an expense of 2.6 billion Danish crowns. Furthermore, an expense of 4.7 billion Danish crowns are spend on disability pensions due to back pain/back diseases (2).

Back pain is not as any other musculoskeletal disorder when predicting return-to-work. In patients with pain from fracture clinicians agree but when it comes to back pain they do not, indicating that back pain is harder to assess and measure than pain with another location (3,4).

Because of a high prevalence and the public expenses to support these patients, it would be necessary to identify patients at risk for poor outcome as it could help bring down the expenses and help patients return to their life before their back pain. Many studies have tried to make these identifications:

When reading literature it was obvious that different authors had chosen different outcomes in their attempt to determine how well back pain patients recovered. Examples of ways to measure recovery was questionnaires that collected information on self-perceived health, use of analgesics, pain, disability and functional testing of back movements and strength. Patients with back pain who are at risk for worse outcome than others have been shown to be elder (5), female (3,5,6), longer duration (5) and higher intensity of pain (7). Next, having low initial disability were a risk factor for a poor prognosis (5). Furthermore, they are more likely to have a certain type of leader at work and certain movements at work (8).

Although more than one study showed that women were at higher risk for poor outcome another study showed that women were not more likely to be on sick leave or have low work ability than men after back pain (9).

One factor that several studies found to be related to poorer outcome among back pain patients was having a compensation claim (6,7,10–13). Although the patients manage worse than others, they do benefit from treatment (14) and one study did not find association between compensation and poorer outcome (15).

How a pending case affects patients depended on factors involving both type of patient and type of pending case and the society both existed in. Some patients benefitted from receiving compensation and some did not. Especially patients who experienced external locus of control could benefit from accepted claim (15). Furthermore, a no fault compensation system was more beneficial than others (16), and patients whose compensation was limited by time were better off than those with unlimited compensation (17).

Studies have tried to identify who was more likely to seek for compensation and showed that it depended on socioeconomic group, diagnose and dissatisfaction with work or treatment (18). Furthermore, these patients are more likely to be elder (18), have more non-organic signs (14) and have a long post-injury time (18). In contrast to patients with non-organic signs, patients who went through surgery or had a verified herniation were also more likely to seek for compensation. There was no difference between the genders in who sought for compensation.

People who sought for compensation were less likely to have a high pre-injury wage, have high education level and to be satisfied with their job and treatment (18).

Patients who sought for compensation had several disadvantages at follow-up compared to patients who did not seek for compensation. These disadvantages were both physical and psychological

(19). Furthermore, the patients were more disabled (20) which have been shown to be related to ability to return to work (7).

Knowing that these patients were disadvantaged and the unique opportunity to estimate their work ability through registrations in a database made it relevant and possible to perform this study. The objective of the study was to shed light on the group of patients with back-/neck-related pain patients who had a pending case and determine if they had a lower work ability at 1-year follow-up than other patients with the same disorder.

## Methods

### Study Design

The study was a questionnaire- and register-based follow-up study conducted at a multidisciplinary non-surgical spine clinic at Aalborg University Hospital.

### Setting

Denmark has a strong social security system where Citizens who are not capable of working under regular labour market terms can receive complete or partial compensation for their reduced work ability. Short-term sickness benefit (2 weeks) is paid by the employer, and thereafter by the municipality sometimes with a supplement from the employer. Both Self-employed and employees are covered (21).

As the Danish system differ from others an overview of different payments is needed:

> Subsidized employment: Paid by the Public Employment Service to an employer of a long-term unemployed person.
>
> Social assistance: Transfer income administered by the municipal social service department. The amount is based on a calculation of economic needs. The payment

normally requires that the person is seeking a job through the Public Employment Service.

Sickness benefit: A municipally administered benefit paid to the person or transferred to the employer, if the employer pays the normal wage to the sick-listed employee.

Flex job: Jobs created for persons with permanent limited work ability. The person receives the normal wage and the benefit is transferred to the employer.

Disability pension: Health related pension to people with permanent no or very low work ability.

Early retirement pension: Persons who have been members of an unemployment insurance fund for the requisite number of years are entitled to retire at the age of 60 and receive a national benefit comparable to unemployment benefit (22).

**Data sources**

Questionnaire: Patients were examined by rheumatologists from 1st January 2012 to 31rd December 2013 and subsequently they were treated in a multidisciplinary team.

Patients at this specific department have suspected disc herniation and could be referred after 4 weeks of pain if no improvement was found. Patient with lower back pain or spinal stenosis could also be referred after 8 weeks of pain if no improvement was found.

Before their first visit to the department of rheumatology at Aalborg University Hospital all patients answered a questionnaire that collected information including pain location and intensity, the relation of pain to work and physical activity, alcohol and smoking habits, and whether they had a pending case. The questionnaire was meant as an addition to the clinical examination.

**Table 1: Selected codes for transfer payments included in the DREAM database**

| Primary group | Dream-code | Name of benefit | Classification 1 |
|---|---|---|---|
| **A: Low work ability** | 890-899 | Sickness benefits | **Sickness benefits** |
| | 784 | Rehabilitation programme | |
| | 771-774 | Flex job | **Permanent low work ability: Flex job** |
| | 740-748 (ledighedsydelse) | Unemployed after flex job | |
| | 781 (skånejob) | Light job | **Permanent low work ability: Disability pension** |
| | 783 (førtidspension) | Disability pension | |
| **B: High work ability** | No codes | | **Self-supportive** |
| | 621-622 | Early retirement pension | |
| | 651-652, 661 | the State Education fund | |
| | 121-126 (ferieydelse) | | |
| | 511, 521-522, 881 | Education and other leave of absence | |
| | 111-113, 130-139, 211-218, 231-232, 299 | Subsidized employment | **Subsidized employment/Social assistance** |
| | 730-739, 750-758,760-768, 141-146 | Social assistance | |

DREAM: The DREAM-database (Danish register of evaluation of marginalization) is based on data from the Danish Ministry of Employment, Ministry of Social Affairs, Ministry of Education, Ministry of Integration, the 241 municipalities, and Statistics Denmark. DREAM includes all persons with a Danish civil personal registration number (CPR) who have received social benefits or any other transfer income since July 1991. Persons not included are not supposed to have received any transfer income from any Danish authority. The type of transfer payment is recorded for a week if the person has received the benefit for just one day (22)**.** At present the DREAM database includes over a 100 different codes for transfer income (see Table 1).

Using the civil registration number the patient's data were linked to the DREAM-database. We collected information from this database on the participating patients' income from 1 year before to 1 year after they filled in the questionnaire.

**Data processing**

*Exclusion criteria:* Patients with permanent low work ability (see Table 1) or receiving early retirement pension on the date of filling in the questionnaire were excluded.
Furthermore, patients who were > 63 years at baseline were excluded. If the question on having a pending case were not answered the patients were also excluded. If dead or no longer living in Denmark at follow-up, the patients were also excluded.

*Outcome.* The outcome was having low or high work ability at 1-year follow-up and was obtained from the DREAM-database (see Table 1). The outcome variable was defined as the main source of income 9-12 months after the date of filling in the questionnaire.

*Exposure.* The exposure variable was having ≥1 pending case.

A pending case was classified as positive if the patient answered yes to one of the following questions in the baseline questionnaire: Have you filed a claim for work injury? Have you filed an

insurance claim? Have you filed a claim for indemnification? Not all patients answered all three questions. If the patient had answered "yes" on having at least one pending case, the missing answers were considered as "no". If a worker suffered from a disease that might be caused by the job, he/she performed the disease or injury was by law demanded to be reported to the National Board of Industrial Injuries by making a claim for work injury. The board could grant worker's compensation.

*Potential confounders.* Gender, age, smoking and alcohol consumption were considered as potential confounders. Information on smoking habits (yes/no) was obtained from the questionnaire. Weekly consumption of alcohol measured in units per week was also obtained. The National Health Service (NHS) recommend ≤7 units per week for women and ≤ 14 units per week for men. Given these recommendation a 0/1 variable was created from available data (0 = not above NHS's recommendations, 1 = above NHS's recommendations).

Main VAS within the last 14 days was stated in the questionnaire for both peripheral and central pain. Having a peripheral/central VAS 7-10 was defined as high pain intensity and having VAS 0-6 as having low pain intensity.

The relation of pain to physical activity and work was measured as the patients agreed or disagreed on a scale from 0 to 6 to several statements:

1. Physical activity worsens my pain.
2. Work worsens or would worsen the pain.
3. I will never return to my current job.

If marked 4-6 the patients were more likely to agree with the statement, if marked 0-3 they were more likely to disagree.

Receiving sickness benefits 1 year before filling in the questionnaire was also considered a potential confounder.

**Analysis**

All statistical analyzes were performed with neck or back pain as one group of patients. Descriptive analyses were presented in tables. At first the difference between the pending case-group and no-pending case group was described using $chi^2$-test in relation to potential confounders. Furthermore, a table relating possible confounders to the outcome by an odds ratio (OR) along with a confidence interval (CI) was presented after making $chi^2$-test and logistic regression. Next, models adjusting for relevant confounders were made and logistic regression was used. Last, the same odds ratios were made after categorizing patients receiving subsidized employment/social assistance at follow-up as having low work ability.

Analyzes were performed in StataIC 13.

The study was approved by the Danish Data Protection Agency.

## Results

1200 questionnaires were distributed, the spinal clinic had 1181 visits and 6 of them turned out to be re-referrals leading to 1175 patients, 1139 patients had filled in a questionnaire. 754 patients were included in this study (see Fig. 1).

Of these 389 were women and 365 were men. 116 patient had a pending case, 96 had a work injury claim, 20 had another type of pending case and 17 of these had both a work injury claim and another type of pending case. The age group < 40 years old were the largest and included 42 %. 81 % had back-related pain and 19 % had neck-related pain. Most patients (56 %) had experienced a main pain intensity of 7-10 during the last two weeks. 10 % reported an alcohol consumption above NHS's guidelines and 46 % were smokers (see Table 2).

Of those who had a pending case, 56 % were women, 47 % were < 40 years old and 68 % experienced VAS 7-10. Furthermore, 71 % of patients with a pending case agreed that work worsens/would worsen their pain and at last 25 % believed that they would never return to their current job.

**Figure 1: Flow diagram illustrating sample construction**

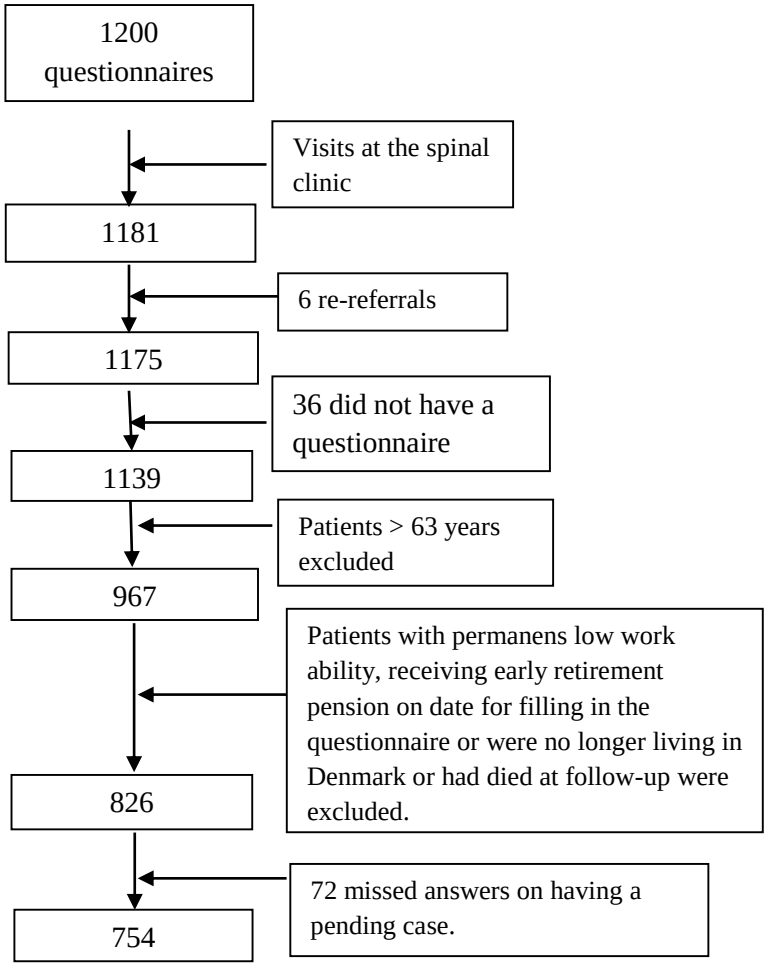



Table 2 showed that VAS and opinion on relation of pain to work varied between the patients who had a pending case and those who did not. However, gender, age, pain location, smoking, alcohol use and opinion on relation of pain to physical activity did not vary between the two groups at a statistically significant level. Therefore, only three potential confounders could be identified: VAS

7-10, and believing that work worsens/would worsen the pain or that they would never return to their current job.

**Table 2: Baseline characteristics of the study sample**

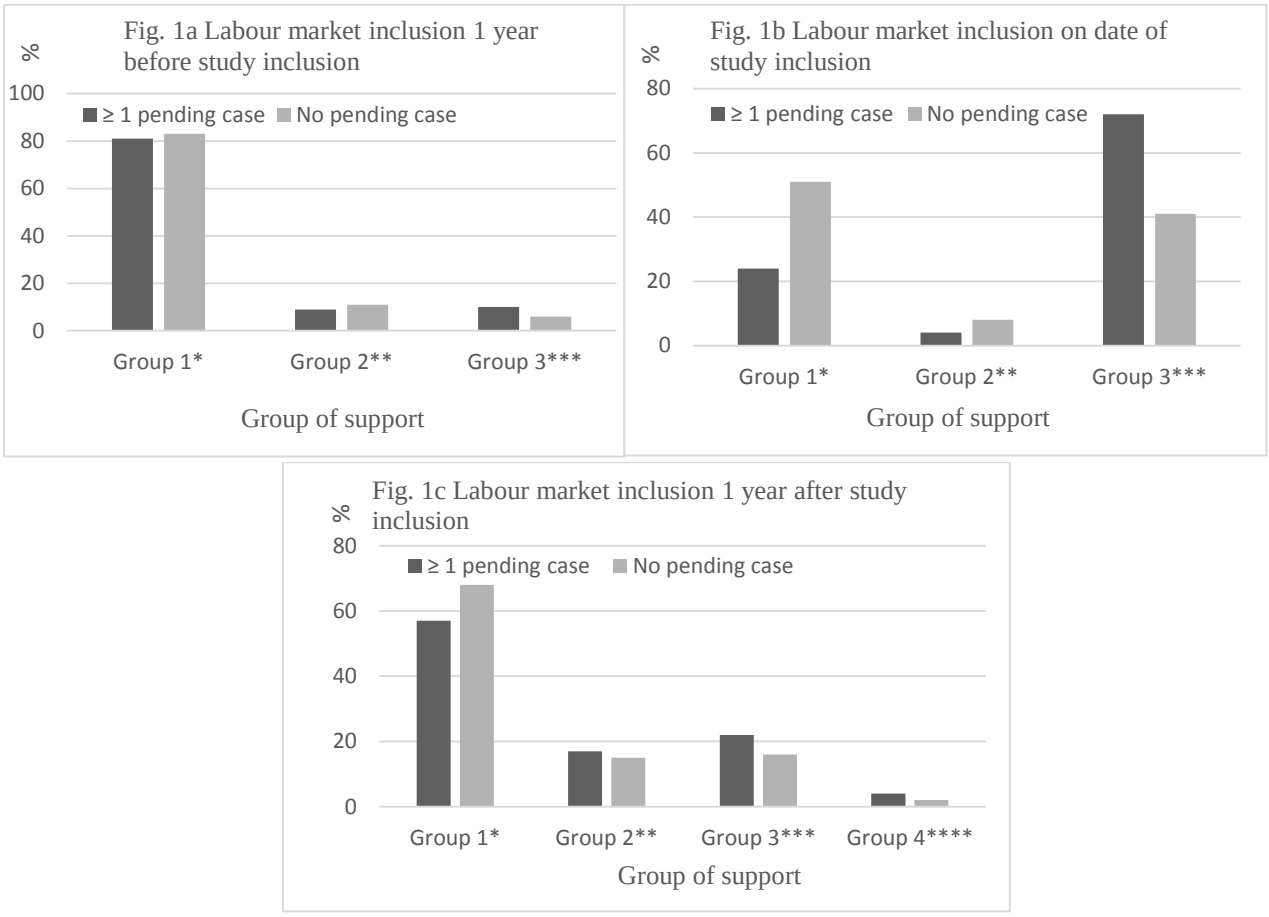
| Type of variable | Variables | ≥ 1 pending case N=116 n(15 %) | No pending case N=638 n(85 %) | p-value |
|---|---|---|---|---|
| **Sociodemographic variables** | Gender: Women | 65 (56) | 324 (51) | |
| | Men | 51 (44) | 314 (49) | 0.7 |
| | Age: ≤ 40 | 55 (47) | 259 (41) | |
| | 41-50 | 32 (28) | 212 (33) | |
| | ≥ 51 | 29 (25) | 167 (26) | 0.3 |
| **Clinical variables** | Type of patient: Back pain | 92 (79) | 520 (82) | |
| | Neck pain | 24 (21) | 118 (18) | 0.8 |
| | VAS: 7-10 | 78 (68) | 347 (57) | |
| | 0-6 | 36 (32) | 266 (43) | 0.02 |
| | Missing | 2 | 25 | |
| **Lifestyle** | Alcohol consumption: Above NHS's guidelines* | 10 (10) | 67 (11) | |
| | Beneath NHS's guidelines | 95 (90) | 519 (89) | 0.6 |
| | Missing | 11 | 52 | |
| | Smoking: Yes | 34 (30) | 212 (33) | |
| | No | 81 (70) | 421 (67) | 0.4 |
| | Missing | 1 | 5 | |
| **Own opinion of pain** | Physical activity is bad for my back/neck | 48 (45) | 235 (41) | |
| | Agree | 58 (55) | 241 (59) | 0.4 |
| | Disagree | 10 | 62 | |
| | Missing | | | |
| | Work worsens/would worsen my pain | | | |
| | Agree | 77 (71) | 288 (50) | |
| | Disagree | 32 (29) | 290 (50) | 0.0 |
| | Missing | 7 | 60 | |
| | I will never return to my current job | | | |
| | Agree | 26 (25) | 74 (13) | |
| | Disagree | 79 (75) | 508 (87) | 0.0 |
| | Missing | 11 | 56 | |

***** Women: > 7 units/week for; Men: > 14 units/week.

Fig. 2 showed how the two groups differed in labour market inclusion 1 year before, on the date of and 1 year after filling in the questionnaire. 1 year before the two groups were much alike, about 80 % were self-supportive and < 10 % receivedsickness benefits in both groups.

When filling in the questionnaire those who had a pending case differed more than previous from those who did not have a pending case. They were more likely to receive sickness benefits (75 % vs. 41 %) which is equal to lower work ability. After 1 year they were still more likely to receive sickness benefits or have permanent low work ability but the difference were not as noticeable as it was on the date for filling in the questionnaire.

**Figure 2: Difference in work ability between patients with ≥ 1 pending case and patients with no pending case 1 year before, on date and 1 year after study inclusion.**




***** Group 1: Self-supportive; **Group 2: Subsidized employment/Social assistance; ***Group 3: Sickness benefit; ****Group 4: Permanent low work ability – disability pension/flex job.

When comparing the pending case group with the no-pending case group in relation to the outcome 30 % of those with a pending case received either sickness benefit, flex job or disability pension

whereas the same number for those with no pending case was 19 %. Furthermore, those with a pending case were also more likely to receive subsidized employment or social assistance.

Table 3 showed the unadjusted odds ratios for low work ability at 1-year follow-up. Having a pending case increased the odds for having low work ability at follow-up (OR 1.8). Furthermore having VAS 7-10 was a risk factor for having low work ability (OR 2.1). Patients who believed that work worsened/would worsen their pain or that they would never return to their current job had OR's on 3.3 and 4.8 respectively. Smoking was also an independent risk factor for having low workability (OR 1.6)

Receiving subsidized employment/social assistance or receiving sickness benefits 1 year before study-start were also risk factors for having low work ability at 1-year follow-up with odds ratios on 2.2 and 3.7 respectively.

Table 3 showed that gender, age, alcohol consumption and opinion on physical activity and relation to work were not independent risk factors for low work ability at 1-year follow-up.

At last, the OR for having low work ability at 1-year follow-up was adjusted for several variables to see if these would affect the result. Model 1 (see Table 3) was adjusted for both gender and age and as expected the OR for having low work ability after 1 year for patients with ≥ 1 pending case was at a constant level of 1.8. Model 2 adjusted for gender, age and VAS 7-10 which reduced the OR to 1.6 but still statistically significant.

**Table 3: Work ability at 1-year follow-up.**

| | | Low work ability | | |
|---|---|---|---|---|
| **Type of variable** | | **Yes N=155 n (21 %)** | **No N=599 n (79 %)** | **OR (CI)** |
| **Pending case** | ≥1 | 34 (29) | 82 (71) | 1.8 (1.1-2.8) |
| | 0 | 121 (19) | 517 (81) | |
| **Gender** | Women | 80 (21) | 309 (79) | 1.0 (0.7-1.4) |
| | Men | 75 (21) | 290 (79) | |
| **Age** | ≤ 40 | 66 (21) | 248 (79) | 1.0 |
| | 41-50 | 57 (23) | 187 (77) | 1.1 (0.8-1.7) |
| | ≥ 50 | 32 (16) | 164 (84) | 0.7 (0.5-1.2) |
| **Smoking** | Yes | 64 (26) | 182 (74) | 1.6 (1.1-2.3) |
| | No | 91 (18) | 411 (82) | |
| **Alcohol consumption** | Above national guidelines* | 18 (23) | 59 (77) | 1.2 (0.7-2.1) |
| | Below national guidelines* | 127 (21) | 487 (79) | |
| **Clinical variables** | Type of patient: Back pain | 130 (21) | 482 (79) | 1.2 (0.8-1.9) |
| | Neck pain | 25 (18) | 117 (82) | |
| | VAS | | | |
| | 7-10 | 109 (26) | 316 (74) | 2.1 (1.4-3.1) |
| | 0-6 | 43 (14) | 259 (86) | |
| **Own opinion of pain** | Physical activity is bad for my back/neck | | | |
| | Agree | 62 (22) | 221 (78) | 1.2 (0.8-1.7) |
| | Disagree | 78 (20) | 321 (80) | |
| | Work worsens/would worsen the pain | | | |
| | Agree | 103 (28) | 262 (72) | 3.3 (2.2-5.1) |
| | Disagree | 34 (11) | 288 (89) | |
| | I will never return to my current job | | | |
| | Agree | 47 (47) | 53 (53) | 4.8 (3.1-7.6) |
| | Disagree | 91 (16) | 496 (85) | |
| **Work ability 1 year before inclusion** | Self-supporting | 108 (17) | 515 (83) | 1.0 |
| | Subsidized employment/Social assistance | 26 (31) | 57 (69) | 2.2 (1.3-3.6) |
| | Sick leave | 21 (44) | 27 (56) | 3.7 (2.0-6.8) |

Model 3 took in two variables that were not true confounders, as they did not differ between the two groups of no-pending case and ≥1 pending case. These were smoking and having low work ability 1 year before filling in the questionnaire and in this model the OR was reduced to 1.7 but still significant.

Model 4 adjusted for gender, age, and the three confounder; VAS 7-10 and opinion of pain and it's relation to work. This resulted in an OR of 1.3 which was not statistically significant.

Including patients who received subsidized employment/social assistance at follow-up in the low work ability group changed the relation between having a pending case and low work ability (OR 1.5 CI 1.0-2.3)

**Table 4: Adjusted odd ratios for having low work ability at 1-year follow-up.**

| Variable | N | Unad-justed | Model 1* | Model 2** | Model 3*** | Model 4**** |
|---|---|---|---|---|---|---|
| **≥ 1 pending case** | | | | | | |
| No | 638 | 1.0 | | | | |
| Yes | 116 | 1.8 | 1.8 (1.1-2.8) | 1.6 (1.0-2.5) | 1.7 (1.0-2.6) | 1.3 (0.8-2.2) |
| **Gender** | | | | | | |
| Male | 365 | 1.0 | | | | |
| Female | 389 | 1.0 | 1.0 (0.7-1.4) | 1.0 (0.7-1.4) | 1.0 (0.7-1.5) | 1.1 (0.7-1.7) |
| **Age** | | | | | | |
| ≤ 40 | 314 | 1.0 | | | | |
| 41-50 | 244 | 1.1 | 1.2 (0.8-1.8) | 1.2 (0.8-1.8) | 1.2 (0.8-1.8) | 1.2 (0.8-1.9) |
| ≥ 50 | 196 | 0.7 | 0.7 (0.5-1.2) | 0.8 (0.5-1.3) | 0.8 (0.5-1.4) | 0.9 (0.5-1.5) |
| **VAS** | | | | | | |
| 0-6 | 302 | 1.0 | | | | |
| 7-10 | 425 | 2.1 | | 2.0 (1.4-3.0) | 1.7 (1.2-2.6) | 1.7 (1.1-2.7) |
| **Smoking** | | | | | | |
| No | 502 | 1.0 | | | | |
| Yes | 246 | 1.6 | | | 1.3 (0.9-2.0) | |
| **Work ability 1 year before inclusion** | | | | | | |
| Self-supportive | 623 | 1.0 | | | | |
| Subsidized employment/Social assistance | 83 | 2.2 | | | 1.9 (1.1-3.2) | |
| Sickness benefit | 48 | 3.7 | | | 3.2 (1.7-6.0) | |
| **Relation of pain to work** | | | | | | |
| **Work worsens/would worsen** | | | | | | |
| No | 322 | 1.0 | | | | |
| Yes | 365 | 3.3 | | | | 1.9 (1.2-3.1) |
| **I will never return to my current job** | | | | | | |
| No | 587 | 1.0 | | | | |
| Yes | 100 | 4.8 | | | | 3.2 (1.9-5.2) |

*adjusted for gender and age.**adjusted for gender, age and VAS 7-10.***adjusted for gender, age, VAS 7-10, smoking and work anility 1 year before inclusion.****adjusted for gender, age, VAS 7-10 and relation of pain to work.

## Discussion

Patients who had a pending case at baseline had a higher risk of having low work ability at 1-year follow-up that is having permanent low work ability or receiving sickness benefits. Adjusting for the potential confounder VAS 7-10 decreased the risk slightly but did not change the overall impression that having a pending case seem to increase the risk of leaving the regular labour market.

Adjusting for opinion of pain and it's relation to work at follow-up decreased the risk markedly. The explanation might be that if the pain were related to their job they may have had a work injury claim. Most of the pending cases were work injury claims. Therefore, having a pending case and having an opinion that the pain was related to work may have been closely correlated.

The result did not change considerably in the multivariate analysis. One explanation could be the rough categorization of the potential confounders, which could lead to residual confounding. Wijnhoven et al. found that smoking was related to absence of work as this study did (9) although smoking could not be considered as a confounder. Smoking was a yes/no variable and if we could have estimated the amount of tobacco use this variable could have altered the result. Furthermore, the patients' VAS score was categorized into $\geq 7$ or $< 7$ independent from whether it was central or peripheral localized pain or both. A more nuanced categorization of pain may have affected the overall result more than with the existing categorization.

One of the strengths of this study was the relatively large sample size, although further categorizations of some variables was not possible as the groups would be too small to analyze. In example, it could be interesting to investigate whether the risk of having low work ability at follow-up was higher among patients with a work injury claim than any other types of pending cases. As the latter group only consisted of 20 people, the group was too small for analysis. A work injury

claim was a more precisely defined pending case as it in general was a claim that was dictated by law contrary to claim for indemnification and insurance claim. This could have led to an underestimated prevalence of claims for indemnification and insurance claims. In relation to how the patients understood and answered the questionnaire it was important to acknowledge that the questionnaire was not made with research work in mind but as a tool in the consultation process at the spinal clinic. VAS was a validated score-system for measuring worst or general pain (23) but other questions have not been validated earlier. A validated questionnaire might have altered the results.

1 year before study inclusion the sample was a homogeneous group in relation to labour market inclusion and many of them was working under regular labour market terms suggesting that it was a healthy group at the beginning (see fig. 2) and the difference between patients with and patients without a pending case was not significant. When included into the study a far larger group was not working under regular labour market terms (71 % of those with a pending case, 41 % with no pending case), suggesting that their back pain had affected their ability to work. The difference between patients with and without a pending case was at this point significant arguing that patients with a pending case were more affected by their pain in relation to managing a job.

Another strength of this study was the register-based follow-up, which prevented selection bias. 36 patients did not hand in a questionnaire and a total of 72 patients were not included due to missing answers on having a pending case. It may have influenced the prevalence of having a pending case. The outcome was categorized into two groups and with a register-based follow-up and an outcome defined as main way of support in a 3 months period the risk of misclassification was minimal. Whether the classification truly represents high and low work ability could be discussed. Whether work ability was a good measurement of rehabilitation among back/neck pain patients was hard to say.

In this study, the follow-up time was 9-12 months. With a longer follow-up would make it more uncertain whether other factors have influenced the patients' work ability. With a shorter follow-up time the patients may not have had a change to reach their maximum rehabilitation and work ability.

Some patients were placed in high work ability although they may actually had very low work ability (social assistance). Categorizing the subsidized employment/social assistance-group as low work ability did not change the OR for low work ability among patients with a pending case. In the light of this it could be argued that part of the subsidized employment/social assistance-group was more like the patients with low work ability and some more like patients with high work ability. This suggested that the subsidized employment/social assistance-group was heterogenic. An elaborated view of this group may have given a more nuanced result.

It could have been interesting to implement other confounders. In example, socioeconomic group was found to affect whether the patients sought for compensation (18) and could have been a possible confounder although we did not have data on this subject. A measurement of non-organic signs would have been interesting and might have been unequally distributed among patients with a pending case and patients without (14).

Other studies have found age (5) and gender (3,5,6) to affect outcome but it was not the case in this particular study. Smoking was an independent risk factor for poorer outcome in both this study and others (9).

In line with other studies, the overall impression after this study is that a pending case would affect the rehabilitation of patients with back/neck pain (6,7,10–13). The studies used many different definitions of poor outcome and it would be difficult to compare them further but all except one agree. Patients who have filed a claim for financial compensation have a poorer outcome than those

who had not. A poorer outcome was the case both when the outcome was clinical measures such as pain intensity or psychological measurements (19) or in relation to work ability (11). The odd ratios for poor outcome among patients with a filed claim varied from 2.0-17.4 in different outcome measures. Furthermore, the risk (RR) for having no improvement in disability was found to be 2.6 (12).

Patients with a pending case have a poorer outcome but this might be an indicator for something else. They may have a more difficult disease and the poor outcome may not be because of their pending case but because of their underlying physiological disease, their psychological health or a third factor and it is hard to identify all other risk factors that might have confounded this result.

## Conclusion

Self-supported or patients receiving subsidized employment/social assistance who had a pending case at baseline were 1.6 as likely to have low work ability after 1 year compared to those without a pending case. This indicates that having a pending case should be considered an independent risk factor for poor prognosis in relation to work ability among patients with back pain.

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