The impact of psychosocial work environment factors on the risk of disability pension in Denmark

Karl B. Christensen, Helene Fëveile, Merete Labriola, Thomas Lund

This study quantifies the impact of psychosocial work environment factors on the risk of disability pension. Differences in risk of disability pension were estimated in a representative sample of Danish employees followed for a total of 118 117 person-years of risk time. After control for smoking, BMI and ergonomic work environment, low decision authority and low variation in work showed a statistically significant association with disability pension. Adverse psychosocial work environment factors accounted for 10–15% of disability pension cases.

Keywords: disability pension, psychosocial work environment factors, register data

Introduction

Prevention of disability is an important public health issue. Identification of risk factors for labour market exclusion and quantification of their impact is needed in order to target interventions aimed at reducing disability pension rates. Previous studies have found heavy physical work,1–5 low control,4,5,6 socioeconomic position,7,8 being single,7 smoking,1,2,5,6 and BMI,5,6 to be associated with disability pension. This study features an expansion of the data and a refinement of the methods employed in a study by Albertsen and colleagues,5 but fewer variables were available.

A Sickness Benefit Act was introduced in Denmark on 1 January 1973 covering wage earners, self-employed and unemployed. An important principle was that all citizens should be entitled to economical help no matter what caused the loss of income.

The total number of disability recipients in Denmark has not changed dramatically during the study period. Starting out around 255 000 in 1992, reaching a level of around 270 000 in the last half of the 1990s and decreasing to a level of around 260 000 in the end of the study period. The yearly number of new disability cases was around 12 000 in the beginning of the study period, but increased to a level of around 22 000 in the years 1994–97. There was a decrease to a level of around 12 000 in 1999, and the remainder of the study period saw a steady increase to a level of around 17 000.

From 1998 to 1999, a reform was enforced decreasing the refund from the State to the granting municipal authorities. This caused the increase through 1998 and the much lower number in 1999.

Methods

This study is based on a merger of work environment exposure information from the Danish Work Environment Cohort Study (DWECS) and information about granted disability pension from a national register of social transfer payment: the DREAM register.10 The merger is done using the unique identification number held by all inhabitants in Denmark.

DWECS is a national work environment survey conducted every fifth year and consists of three national cohorts supplemented to compensate for ageing and immigration: in 1990, a simple random sample consisting of people aged 18–59 years was drawn from the Danish centralized civil register. In 1995 and 2000, additional cohorts consisting of 18 to 22-year-olds and immigrants were drawn. The sizes of these supplementing cohorts reflected the proportion of the relevant groups of the total population. Persons were contacted in 1995 and 2000 irrespective of participation in previous waves. In each wave, people who had been employees within two months prior to the interview were asked questions regarding work environment and health behaviour. A comprehensive description of the design of DWECS can be found elsewhere.11

DREAM is an administrative register of all social transfer payments in Denmark containing information on all granted disability pensions. When a municipality grants a disability pension, it is automatically registered in one of the sub-registries that supply data to DREAM. This implies, that DREAM has a 100% coverage of granted disability pensions in Denmark. Municipalities grant disability pension, based on assessment of whether the individual’s work ability is reduced to such a degree that return to work is unlikely. DREAM, however, does not include information about the underlying diagnosis for disability pension. While it is possible to return to work or part time while receiving disability pension, these options are rarely used and disability pension in reality means a permanent exit from the labour market. Upon turning 60 years there are various age pension schemes available instead of disability pension. A comprehensive description of DREAM can be found elsewhere.10 Disability is a dichotomous variable, since partial disability is not possible.

In this study a total of 8475 employees, 4288 men and 4187 women, responding in any of the three waves of DWECS were followed in the DREAM register from the time of first interview and were censored, at the time of their 60th birthday, emigration, death or end of follow-up (18 June 2006). Only data collected using identical questions in all DWECS waves were used in this study and baseline data from participants were updated according to responses in subsequent waves of DWECS when available. The Cox proportional hazards model
was used to examine the impact of psychosocial work environment factors on future disability pension. For factors showing a significant association with disability in the fully adjusted model, attributable fractions were computed using the Miettinen formula.

Decision authority was measured with the question ‘Do you participate in planning your own work (e.g. what to do, how to do it, or who to work with)?’, and information with the question ‘Are you informed about decisions that concern your workplace?’. Response options were categorized as follows: low = ‘Seldom’ or ‘Never’, medium = ‘Mostly’ and high = ‘Always’. Variation in work was assessed using the question ‘Is your work varied?’. Response options were categorized as follows: low = ‘Only to a less extent’ or ‘No, or only to a small extent’, medium = ‘To some extent’, and high = ‘To a large extent’.

BMI was calculated from self-reported weight and height and categorized according to the standard classification of the National Institutes of Health (BMI < 18.5, underweight; BMI 18.5–24.9, normal; BMI 25–29.9, overweight; BMI ≥ 30, obesity). The population was divided into heavy smokers (15 cigarettes or more per day), ex-smokers and non-smokers.

Ergonomic work environment exposures were assessed with questions on physically hard work, working with hands above the shoulders, and working in a squatting or kneeling position. Those responding ‘Seldom’ or ‘Never’ were categorized as unexposed, whereas those responding between ‘1/4 of working hours’ and ‘Almost all working hours’ were categorized as exposed.

### Results

A total of 4092 women and 4206 men without missing data who were under 60 at the time of interview were included in this study. The average follow-up time was 11.3 years (SD = 4.2) and the median was 13.5 years. The total follow-up time constituted 58019.58 and 60097.54 person-years of risk time for women and men, respectively. During the follow-up time, 447 of these employees were granted disability pension: 263 women and 184 men. Table 1 shows hazard ratios for disability pension and 95% confidence intervals. Analyses are adjusted for age, smoking status, BMI and ergonomic work environment.

In women low and medium levels of decision authority and variation increased the risk of disability, but effects were attenuated when controlling for potential confounders. In the fully adjusted model 13.1% of disability pension cases were attributable to decision authority, and 15.3% to variation in work. In men low levels of decision authority and variation showed a consistent and strong association with disability: 9.9% of disability pension cases were attributable to decision authority, and 14.4% to variation. Further adjusting for socioeconomic position made differences borderline significant in women and insignificant in men (results not shown).

### Conclusions

This study identified decision authority and variation in work as predictors of disability pension and quantified their potential for reducing disability pension rates. This finding may reflect the fact that high decision authority and high skill discretion are helpful in adjusting work conditions to health status, thus preventing expulsion from the labour market. Reforms of Danish disability pension schemes performed during the study period could imply that the strength of the association was underestimated in the latter part of the study period.

More studies are needed to confirm low decision authority and low variation in work as risk factors for disability, but decision authority and variation in work were related to disability pension in Denmark, and improving the psychosocial work environment might decrease the risk of disability.

### Table 1 The impact of psychosocial work environment factors on the risk of disability pension: Hazard ratios (HR) end 95% confidence intervals

<table>
<thead>
<tr>
<th></th>
<th>Total risk time (years)</th>
<th>Events</th>
<th>HR (95% CI)</th>
<th>HR (95% CI)</th>
<th>HR (95% CI)</th>
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<tr>
<td><strong>Women</strong></td>
<td></td>
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<td>a</td>
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<td><strong>Decision authority</strong></td>
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<tr>
<td>Low</td>
<td>9807.35</td>
<td>52</td>
<td>1.66 (1.20–2.29)</td>
<td>1.54 (1.11–2.13)</td>
<td>1.41 (1.02–1.96)</td>
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<tr>
<td>Medium</td>
<td>17645.83</td>
<td>84</td>
<td>1.33 (1.01–1.75)</td>
<td>1.30 (0.99–1.72)</td>
<td>1.27 (0.96–1.67)</td>
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<tr>
<td>High</td>
<td>30566.40</td>
<td>127</td>
<td>1.00</td>
<td>1.00</td>
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<td>Low</td>
<td>8865.92</td>
<td>48</td>
<td>1.46 (1.04–2.05)</td>
<td>1.45 (1.04–2.04)</td>
<td>1.34 (0.95–1.89)</td>
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<tr>
<td>Medium</td>
<td>21359.00</td>
<td>99</td>
<td>1.15 (0.88–1.50)</td>
<td>1.17 (0.89–1.53)</td>
<td>1.14 (0.87–1.49)</td>
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<tr>
<td>High</td>
<td>27794.65</td>
<td>116</td>
<td>1.00</td>
<td>1.00</td>
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<td><strong>Variation in work</strong></td>
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<td></td>
<td></td>
<td>a</td>
<td>b</td>
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<tr>
<td>Low</td>
<td>11139.62</td>
<td>57</td>
<td>1.49 (1.08–2.05)</td>
<td>1.41 (1.02–1.94)</td>
<td>1.29 (0.93–1.79)</td>
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<tr>
<td>Medium</td>
<td>18120.04</td>
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<td>1.45 (1.10–1.91)</td>
<td>1.44 (1.09–1.89)</td>
<td>1.40 (1.06–1.84)</td>
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<tr>
<td>High</td>
<td>28759.92</td>
<td>113</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
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<td><strong>Men</strong></td>
<td></td>
<td></td>
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<tr>
<td>Low</td>
<td>9146.81</td>
<td>41</td>
<td>1.95 (1.35–2.81)</td>
<td>1.85 (1.28–2.67)</td>
<td>1.82 (1.26–2.63)</td>
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<tr>
<td>Medium</td>
<td>17702.85</td>
<td>44</td>
<td>1.00 (0.70–1.43)</td>
<td>0.98 (0.69–1.41)</td>
<td>0.95 (0.66–1.36)</td>
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<tr>
<td>High</td>
<td>33247.88</td>
<td>99</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
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<tr>
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<td></td>
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<td>b</td>
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<tr>
<td>Low</td>
<td>9902.38</td>
<td>35</td>
<td>1.06 (0.72–1.57)</td>
<td>1.01 (0.69–1.49)</td>
<td>0.96 (0.65–1.43)</td>
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<tr>
<td>Medium</td>
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<td>54</td>
<td>0.79 (0.56–1.10)</td>
<td>0.79 (0.57–1.11)</td>
<td>0.77 (0.53–1.08)</td>
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<tr>
<td>High</td>
<td>28521.42</td>
<td>95</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
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<tr>
<td><strong>Variation in work</strong></td>
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<td>a</td>
<td>b</td>
</tr>
<tr>
<td>Low</td>
<td>9752.44</td>
<td>44</td>
<td>1.95 (1.36–2.81)</td>
<td>1.78 (1.24–2.57)</td>
<td>1.75 (1.21–2.53)</td>
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<tr>
<td>Medium</td>
<td>17748.42</td>
<td>51</td>
<td>1.18 (0.84–1.67)</td>
<td>1.17 (0.82–1.65)</td>
<td>1.16 (0.82–1.64)</td>
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<tr>
<td>High</td>
<td>32596.67</td>
<td>89</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
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</tbody>
</table>

Bold face indicates p-values < 5%

a: adjusted for age
b: adjusted for age, smoking and BMI
c: adjusted for age, smoking, BMI, and ergonomic work environment exposures
Key points

- Decision authority and variation in work were related to disability pension in Denmark.
- High decision authority and high skill discretion may be helpful in adjusting work conditions to health status, thus preventing expulsion from the labour market.
- More studies are needed, but improving the psychosocial work environment may decrease the risk of disability.

References


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