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Severe depressive symptoms as predictor of disability pension: a 10-year follow-up study in Denmark

Ute Bültmann^{1,2}, Karl B. Christensen¹, Hermann Burr¹, Thomas Lund¹, Reiner Rugulies¹

Are severe depressive symptoms prospectively associated with disability pension? To answer that question, we linked data from a representative sample of the Danish workforce with disability pension (DP) award data from the National Registry on Public Transfer Payments. Of the 5106 study participants, 111 employees (2.2%) received DP during the 10-year follow-up. Severe depressive symptoms, reported in 1995, predicted DP award during follow-up (adjusted hazard ratio=2.38, 95% confidence interval 1.22–4.66). Further research is needed to understand more fully the pathway(s) from severe depressive symptoms to DP.

Keywords: depression, disability, general working population, longitudinal study, predictor

Introduction

Over the last several years, depression has emerged as a major public health problem in many countries.¹ Depression is highly adverse in itself, has a negative impact on well-being, social and work functioning, is associated with an increased risk of physical diseases, and contributes substantially to years lived with disability.^{1–3}

Earlier, we have demonstrated that severe depressive symptoms predict the onset of long-term sickness absence in economically active people in Denmark.⁴ However, to our knowledge, no study has yet analysed the association between depressive symptoms and disability pension (DP) award in a national workforce. A Norwegian study, conducted in the County of Nord-Trøndelag, has reported an association between depression and anxiety with DP award.⁵

The aim of the present study is to examine whether severe depressive symptoms are prospectively associated with the award of DP during a 10-year follow-up period in the general working population in Denmark.

Methods

The study is based on data from the Danish Work Environment Cohort Study (DWECS) and the National Register on Public Transfer Payments (DREAM). Records were linked using the Central Population Register number, a unique identifier assigned to each resident in Denmark. In 1995, a representative sample of the Danish population was interviewed in DWECS (response rate 80%). Among the respondents, 5369 were employed and provided information on demographics, work factors, health behaviours and health. In the present study, we included 5106 employees (48% women) aged 18 to 59 without missing data. Full details of DWECS have been reported elsewhere.⁶

At baseline, depressive symptoms were assessed with the five-item Mental Health Inventory (MHI-5), a subscale of the Short Form-36 questionnaire.⁷ The responses to the individual items were summed up and standardized into scores ranging from 0 to 100, with higher scores indicating fewer depressive symptoms. Full details on the use of the MHI-5 scale in DWECS have been published elsewhere.⁸ Following an established procedure from the literature, participants scoring ≤ 52 points were classified as cases with severe depressive symptoms.⁹

We recorded the covariates age, gender, cohabitation (living with a partner yes/no), children living at home (yes/no), retirement of spouse (yes/no), socioeconomic position (five levels), smoking (smokers, ex-smokers, never smoked), BMI and the self-reported presence of a chronic disease (yes/no). These variables were included because other studies have found them to be associated with DP.^{10,11}

Study endpoint was the award of DP due to any cause, i.e., independent of diagnosis. Data on DP were obtained from DREAM. This database contains weekly information on all public transfer payments for all residents in Denmark.¹² DREAM is based on data from the Danish Ministries of employment, social affairs, education and integration as well as the municipalities and Statistics Denmark. The cohort was followed-up in DREAM for 10 years (1 January 1996 to 31 December 2005).

In Denmark, DP is granted by the municipal authorities. Before 2003, DP was granted when the earning capacity was reduced by at least 50% due to physical or mental illness and/or social circumstances. Since 2003, the award of DP is subject to (i) the applicants' working capacity being permanently reduced and (ii) the reduction being so severe that the applicant will be unable to provide for him/herself by means of a remunerated job. In other words, the municipalities (i.e. the case manager who collects information from e.g. medical, rehabilitation and/or job consultants) must be able to document that it is unlikely that medical treatment or vocational rehabilitation will improve the applicants working capacity and that he/she is unable to work in a so-called flex-job (i.e. working capacity must be reduced with at least 67%).

The Cox proportional hazard model was used to estimate hazard ratios and 95% confidence intervals (95% CI) of the predictive effect of severe depressive symptoms, measured in 1995, on DP award during follow-up. The observation time for each participant started on the day of the DWECS survey and

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was censored by the day of DP award, receiving (interim) welfare payments, reaching the age of 60 (and thus eligible for the early retirement scheme), emigration, death or the end of data reading, whichever came first. The analyses were stepwise adjusted for demographic and health behaviour variables. Data were analysed using the PHREG procedure in SAS.

Results

Incidence of DP

In all, 111 (2.2%) employees, 44 (1.7%) men and 67 (2.7%) women, were granted a DP during the 10-year follow-up period.

Severe depressive symptoms and DP

At baseline, a total of 150 (2.9%) employees, 52 (2.0%) men and 98 (4.0%) women, were designated as cases with severe depressive symptoms. Among these, 11 (7.3%) employees received DP during follow-up, compared with 100 (2.0%) awarded DP's among the 4956 employees without severe depressive symptoms.

Employees with severe depressive symptoms at baseline had a hazard ratio (HR) of 2.90 for DP award after adjustment for age, gender, cohabitation, children living at home, retirement of spouse and socioeconomic position (table 1). Further adjustments for smoking and BMI attenuated this effect only marginally. After the adjustment for the presence of a chronic disease, the HR was further reduced to 2.38, but remained statistically significant.

Discussion

This prospective study showed that severe depressive symptoms predict DP award in the Danish workforce. During the 10-year follow-up period, 2.2% of this representative sample of the working population received DP. Although a comparison with studies from other countries is often impossible because of differences in social insurance systems, in particular DP definitions and award practices, a recent Norwegian study showed that anxiety and depression were prospectively related to DP, measured over a 2-year follow-up period and granted to 2.3% of the persons.⁵

The focus here was on severe depressive symptoms as predictor for DP award, recognizing that other factors have been reported in the literature.^{10,11} While we were able to adjust for some of the potentially confounding variables, we acknowledge, that the 1995 DWECs data is limited with regard to the inclusiveness of confounding and explanatory variables. When we adjusted for the presence of a chronic disease at baseline, associations between severe depressive symptoms and DP became attenuated, but remained statistically significant. To more fully understand the pathway(s) from severe depressive symptoms to DP award, future longitudinal studies should incorporate 'process' information from the persons and organizations with a stake in the process towards a DP award.

The strengths of our study are its prospective design, the representative sample of the working population, and the record linkage with the DREAM database to identify new DP awards. A limitation concerns the assessment of depressive symptoms, which are not measured with the gold standard, i.e., a diagnostic interview, but with a questionnaire. Although several studies have shown that the MHI-5 scale is a reliable instrument for measuring depression,^{8,9} it is not officially recognized as a depression scale. Consequently, we did not use terms such as 'clinical depression' or 'major depression' but rather the more general term severe depressive symptoms. Another issue pertains to the absence of information on

Table 1 Adjusted HR and 95% CI for employees reporting severe depressive symptoms (≤ 52 points) and DP award during 10 years of follow-up

Severe depressive symptoms	Number of cases n (%)	Adjusted HR (95% CI)		
		Model 1	Model 2	Model 3
Total				
No (n = 4956)	100 (2.0)	1	1	1
Yes (n = 150)	11 (7.3)	2.90 (1.49–5.65)	2.88 (1.48–5.61)	2.38 (1.22–4.66)

Model 1: adjusted for age, gender, cohabitation, children living at home, retirement of spouse, and socioeconomic position

Model 2: adjusted for 1) and health behaviour (smoking, BMI)

Model 3: adjusted for 2) and the presence of a chronic disease

diagnoses. Our outcome concerns DP 'due to any cause', because DREAM does not contain information on diagnoses. Thus, we do not know whether the DP has been granted because of a depression or another disease/disorder. It is important to note, however, that when a DP has been granted by a municipal authority it is automatically registered in one of the sub-databases that are linked with DREAM; i.e. DREAM has a full coverage of awarded DP's in Denmark. Moreover, Hjollund *et al.*¹² showed that the DREAM database is feasible for register-based follow-up of social and economic consequences of disease.

To conclude, the findings show that severe depressive symptoms are prospectively associated with DP award after adjusting for several covariates. However, further research is needed to explore more fully the pathway(s) from severe depressive symptoms to DP, thereby considering the impact of sickness absence, treatment and return-to-work practices. Moreover, future research should elucidate the role of the workplace system (e.g. employer, supervisor), the health care system (e.g. physicians, psychologists), the legislative/insurance system (e.g. case managers) and last but not least of the family/friends of the employee.

Conflicts of interest: None declared.

Key points

- Severe depressive symptoms predict DP award 'due to any cause' in a representative sample of the Danish workforce.
- Further research is needed to understand more fully the pathway(s) from severe depressive symptoms to DP, thereby considering the role of sickness absence, treatment and return-to-work practices.
- Early detection of severe depressive symptoms in the general working population might help to prevent or at least reduce DP and support a sustainable work participation.

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