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Short communication

Effort-reward imbalance at work and the risk of antidepressant treatment in the Danish workforce

Maj Britt D. Nielsen [a,b], Ida E.H. Madsen [a], Birgit Aust [a], Hermann Burr [c], Reiner Rugulies [a,d,e,*]

[a] National Research Centre for the Working Environment, Copenhagen, Denmark
[b] COWI A/S, Kongens Lyngby, Denmark
[c] Federal Institute of Occupational Safety and Health (BAuA), Berlin, Germany
[d] Department of Public Health, University of Copenhagen, Denmark
[e] Department of Psychology, University of Copenhagen, Denmark

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ABSTRACT

Background: Previous studies have shown that high effort-reward imbalance (ERI) at work is a risk factor for the onset of self-reported depressive symptoms. In this study, we examined whether ERI predicts risk of treatment with antidepressant medication in a representative sample of the Danish workforce.
Methods: We linked survey data on ERI and covariates of 4541 participants from the Danish Work Environment Cohort Study 2000 with the Danish National Prescription Registry that includes all legally purchased prescription drugs at pharmacies in Denmark since 1995. Participants with a history of antidepressant treatment or with self-reported depressive symptoms at baseline were excluded. Using Cox proportional hazard analyses we examined the prospective association between ERI at baseline and incident antidepressant treatment while adjusting for potential confounders. Time of follow-up was 5 years.
Results: A total of 309 (6.8%) participants started antidepressant treatment during follow-up. Exposure to ERI at baseline was not related to risk of antidepressant treatment (hazard ratio: 0.91, 95% CI=0.81–1.03 after adjustment for potential confounders).
Limitations: The use of antidepressant treatment as an indicator for onset of depression might have led to misclassification, because (a) antidepressants are also used to treat other conditions than depression and (b) a considerable proportion of individuals with depression are not treated with antidepressants.
Conclusions: ERI did not predict incident antidepressant treatment, contradicting previous findings on ERI and self-reported depression. To clarify the association of ERI with risk of depression, we recommend further prospective studies using non-self-reported measures of ERI, clinical assessments of depression, or both.

1. Introduction

Depression has a complex and multifactorial aetiology, involving biological, psychological and social factors (Kendler et al., 2002, 2006). Chronic exposure to adverse psychosocial working conditions has been considered a possible risk factor for the onset of depression in recent years, however, evidence is still limited (Bonde, 2008; Ndjaboué et al., 2012; Netterstrøm et al., 2008; Siegrist, 2008).

The model of effort-reward imbalance (ERI) is one of the most established theories on potentially health-hazardous psychosocial working conditions. It postulates that a lack of reciprocity between "costs" (spending high effort at work) and "benefits" (monetary gratifications, career opportunities, esteem, respect, and job insecurity) produces emotional distress that affects both mental and physical health (Siegrist et al., 2004). Several prospective studies have reported associations between ERI and onset of self-reported depression (Buddeberg-Fischer et al., 2008; Godin et al., 2005; Kivimäki et al., 2007; Stansfeld et al., 1999). However, it is unknown whether ERI also predicts depression that is not self-reported. This is a concern, because the association of self-reported ERI with self-reported depression may be inflated by common method bias, i.e. bias due to using self-report for assessing both ERI and depression (Podsakoff et al., 2003). Thus, the assumption that ERI is a risk factor for depression would be strengthened, if it

* Corresponding author at: National Research Centre for the Working Environment, Lersø Parkallé 105, DK-2100 Copenhagen, Denmark.
E-mail address: rer@nrcwe.dk (R. Rugulies).

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could be shown that ERI also predicts depression that is not measured by a self-administered questionnaire but by a clinical assessment.

Recently, we reported a prospective association of ERI with risk of onset of self-reported severe depressive symptoms in a representative sample of the Danish workforce (Rugulies et al., 2013). Additionally, we found that the association of ERI with severe depressive symptoms was stronger among employees of lower occupational grade than among employees of higher occupational grade.

In this article, we examine, in the same study population, whether ERI predicts treatment with antidepressants assessed in a national registry on prescription drugs. Based on our previous findings, we hypothesize that (i) ERI predicts treatment with antidepressants and (ii) that the association between ERI and antidepressant treatment is stronger among participants of lower occupational grade.

2. Methods

2.1. Study design and population

We linked survey data on self-reported working conditions and health from the Danish Work Environment Cohort Study in 2000 (DWECS-2000) with the Danish National Prescription Registry (DNPR) using the participants' social security number. Detailed descriptions of the two datasets are published elsewhere (Burr et al., 2003; Kildemoes et al., 2011).

DWECS was established in 1990, when a sample of 9563 individuals, aged 18–59, was randomly selected from the central population register. The cohort was followed-up in 1995 and 2000, and has been supplemented with young people and immigrants at each follow-up (Burr et al., 2003). In DWECS-2000, a sample of 11,437 Danish residents was approached and 8583 (75%) responded. Among the respondents, 4977 were gainfully employed with complete data on the ERI-measure. We excluded 57 employees with missing values on key covariates, 116 with self-reported severe depressive symptoms in the survey, 20 without a valid social security number and 243 who had purchased antidepressants in the five years preceding the survey, yielding a final study sample of 4541 participants. Mean age was 40 years (standard deviation (SD)=10) and 48% were women.

2.2. Measurement of ERI

We measured ERI with four proxy measures of effort and seven proxy measures of reward. A detailed report on the construction of the measures and the wording of each item is published elsewhere (Rugulies et al., 2009a). In accordance with the literature, we calculated an effort and a reward scale by summing up the respective items and constructed an “effort-reward imbalance ratio” (ERI-ratio) by dividing the effort score by the reward score (Siegrist et al., 2004).

2.3. Measurement of antidepressant treatment

Since January 1st, 1995 all purchases of prescription drugs at pharmacies in Denmark are recorded in DNPR (Kildemoes et al., 2011). We used the registrations for all types of antidepressants, coded N06A, according to the Anatomical Therapeutic Chemical (ATC) classification system (World Health Organization, 2009).

Purchases of antidepressants were followed for 5 years after the respondents' baseline survey. Incident use of antidepressants was defined as at least one purchase of antidepressants during follow up.

2.4. Measurement of covariates

We used the same covariates as in our previous study on ERI and self-reported severe depressive symptoms (Rugulies et al., 2013), that is age, sex, occupational grade, family status, health behaviours (smoking, heavy alcohol consumption, leisure-time physical activity), self-rated health, sleep disturbances, and self-reported non-severe depressive symptoms score. Full details of these variables are published elsewhere (Burr et al., 2003; Bültmann et al., 2013; Rugulies et al., 2009a, 2013).

2.5. Statistical analysis

We calculated hazard ratios (HR) and 95% confidence intervals (95% CI) for the prospective association of ERI at baseline with incident antidepressant treatment at follow-up. Participants contributed with risk time from baseline until the date they purchased an antidepressant, migrated from Denmark, died, or end of follow-up, whichever came first. The proportional hazards assumption was assessed by visual inspection of the log-log hazard plots.

We analysed ERI both as a categorical (quartiles) and as continuous predictor (1 SD increase). Model 1 was adjusted for age and sex, model 2 was further adjusted for family status and health behaviours, and model 3 was further adjusted for self-rated health, sleep disturbances and non-severe depressive symptom score. Additionally, we conducted a sensitivity analysis, by restricting the endpoint to treatment with selective serotonin reuptake inhibitors (SSRIs) only.

In accordance with our previous publication on ERI and self-reported severe depressive symptoms we repeated the analyses stratified by occupational grade.

All analyses were carried out in SAS, version 9.1.3.

3. Results

During the 5-year follow-up, 309 participants (6.8%) started with antidepressant treatment (142 per 10,000 person-years). Proportion of cases was higher among women (n=171, 7.9%) than among men (n=138, 5.8%).

Table 1 shows the prospective association between ERI and risk of antidepressant treatment. Neither the categorical, nor the continuous ERI-variable predicted risk of antidepressant treatment.

The sensitivity analysis restricted to cases treated with SSRIs yielded results similar to those in the main analysis (data not shown).

Table 2 shows the analyses stratified by occupational grade. There was no association between ERI and antidepressant treatment among occupational grades I, II, and III. In the two lowest occupational grades (grade IV and V), there was a tendency that participants with medium-low and medium-high ERI were at increased risk of antidepressant treatment compared to the reference group of participants with low ERI, however this was not statistically significant in the most-adjusted model.

4. Discussion

Based on the results of an earlier prospective study on ERI and severe depressive symptoms, we hypothesized that (i) ERI would predict risk of antidepressant treatment and (ii) that this risk would be more pronounced among employees of lower occupational grade. Both hypotheses were rejected. ERI was not related to risk of antidepressant treatment, and the results did not differ by occupational grade.