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Effects and mediators of psychosocial work characteristics on somatic symptoms six years later: Prospective findings from the Mannheim Industrial Cohort Studies (MICS)

Raphael M. Herr[a,b,*,1], Jian Li[b,1], Adrian Loerbroks[b], Peter Angerer[b], Johannes Siegrist[c], Joachim E. Fischer[a]

[a] Mannheim Institute of Public Health, Social and Preventive Medicine, Medical Faculty Mannheim, Heidelberg University, Germany
[b] Institute of Occupational, Social and Environmental Medicine, Centre for Health and Society, Faculty of Medicine, Heinrich-Heine-University of Düsseldorf, Germany
[c] Senior Professorships on Work Stress Research, Life Science Center, Faculty of Medicine, Heinrich-Heine-University of Düsseldorf, Germany

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ABSTRACT

Objective: Ample evidence documented the adverse health effects of work stressors, and recent research has increasingly focused on somatic symptoms which are very common and costly. Prospective evidence is however sparse and yielded mixed findings. Furthermore, there is reason to assume that depression and anxiety might mediate the effects of adverse psychosocial work conditions on somatic symptoms. This study aimed to investigate longitudinal effects of work stressors on somatic symptoms and the potential mediation by anxiety and/or depression.

Methods: Six year follow-up data from 352 individuals – free of potentially stress-related chronic disease – were utilized. Somatic symptoms were assessed by 19 items of an established list of complaints at baseline and follow-up. The effort-reward-imbalance (ERI) model measured adverse psychosocial work conditions and over-commitment (OC). Linear regressions adjusted for socio-demographics, social status, lifestyle, and baseline symptoms estimated the effects of the ERI ratio, effort, reward, OC, and the ERI ratio × OC interaction on somatic symptoms six years later. Furthermore, single and multiple mediation by anxiety and/or depression was investigated.

Results: There was a strong longitudinal effect of the ERI ratio, as well as of its subcomponents, and OC on somatic symptoms (all Bs $\geq |0.49|$; p-values ≤ 0.004). Moreover, the ERI ratio × OC interaction was significant (p-value = 0.047). Multiple mediation analyses revealed especially anxiety to mediate the effect of work stressors on somatic symptoms (Sobel test = 0.007).

Conclusion: Adverse psychosocial work conditions seem to longitudinally affect somatic symptoms, potentially moderated by OC, and mediated by anxiety.

1. Introduction

The effects of work stressors have been extensively studied and include health-related consequences such as cardiovascular disease [1], depression [2], and musculoskeletal complaints [3]. More recently, research has begun to focus on the association of work stressors with somatic symptoms and other health complaints, such as pain [4,5], burnout [6], and sleep disturbances [7,8]. Single or multiple somatic symptoms may progress to or signal pre-stages of somatoform disorders (SFD), as represented in the Diagnostic and Statistical Manual of Mental Disorders (4th Edition) and the International Classification of Diseases (10th Edition) [9]. Somatic symptoms "are characterized by patterns of persistent bodily complaints for which adequate examination does not reveal sufficiently explanatory structural or other specified pathology" ([10]; page 946). Usually these symptoms are medically unexplained and cannot be attributed to clinical diseases with clear diagnostic criteria. Somatic symptoms are very frequent in primary care settings, incur high societal cost, elicit extensive diagnostic examinations and treatment [11], contribute to sickness absence due to reduced work ability [12], and result in substantial economic loss [13].

* Corresponding to: R. Herr, Mannheim Institute of Public Health, Social and Preventive Medicine, Medical Faculty Mannheim, Heidelberg University, Ludolf-Krehl-Strasse 7-11, 68167 Mannheim, Germany.
E-mail addresses: Raphael.Herr@medma.uni-heidelberg.de (R.M. Herr), Jian.Li@uni-duesseldorf.de (J. Li), Adrian.Loerbroks@uni-duesseldorf.de (A. Loerbroks), Peter.Angerer@uni-duesseldorf.de (P. Angerer), Johannes.Siegrist@med.uni-duesseldorf.de (J. Siegrist), Joachim.Fischer@medma.uni-heidelberg.de (J.E. Fischer).
[1] Equal contribution.

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The causes of somatic symptoms are not fully understood [10]. It has been suggested that psychological stress generally contributes to psychophysiological changes that alter perception, that promotes a biased appraisal of symptoms [9]. Among the potential stressors, adverse psychosocial working conditions, i.e., work stressors, have received special attention [14,15].

Ample evidence from cross-sectional studies has documented that adverse psychosocial work characteristics are associated with somatic complaints. This evidence covers various types of adverse psychosocial work conditions, including those conceptualized by the job-demand control (JDC) (support) model [16–23], and the effort reward imbalance (ERI) model [21,24–28]. Studies were conducted in various occupational subpopulations – ranging from Asian garment workers [28,29] to managers in Germany [22].

This cross-sectional evidence is supplemented by four prospective studies. Leitner and Resch [30] evaluated individual stressors quantitatively in terms of extra work (minutes/week) and found them to be correlated with somatic complaints eight years later. Applying a standardized questionnaire, Parkes and colleagues found somatic symptoms to be predicted after two months by a three way demand × skill discretion × support interaction at baseline [31]. Godin and colleagues [17] reported onset of job stressors, and one-year cumulative job stressors measured by the effort-reward model to be associated with somatization after one year. Furthermore, Pereira and Elfering [32] found social stressors at work (i.e., social climate and conflict with co-workers) to predict somatic complaints six weeks later.

One of the internationally established psychosocial work stress model is the effort-reward imbalance (ERI) model. It is both theoretically sound and empirically corroborated and validated [33,34]. The ERI model conceptualizes work situations to be stressful in which efforts are insufficiently reciprocated. Given its focus on the work contract it can be applied to all types of employment contracts and occupational groups, while other theoretical models of work stress are assumed to be particularly useful for distinct occupational groups (e.g., the job-demand-control model for blue-collar workers, or organizational injustice for white-collar occupations) [5]. It is based on three main assumptions [35,36]: first, high efforts (i.e., demands and obligations) in combination with low rewards (i.e., money, esteem, and job security/career opportunities) increase the risk of poor health (extrinsic ERI hypothesis). Second, high levels of over-commitment (OC) independently increase the health risk (intrinsic over-commitment hypothesis), and, third, the combination of high OC and ERI carries the highest risk of adverse health (interaction hypothesis). The ERI model repeatedly confirmed its validity by predicting poor self-reported or medically recorded health in a variety of studies (for details see reviews [35–37]).

Mental health seems to be of particular importance for the relationship of work stressors with somatic symptoms. Psychosocial work characteristics are predictive of anxiety and depression [2,38], which in turn are risk factors for somatic symptoms [39–41]. Thus, anxiety and depression might mediate the effect of work stressors on somatic symptoms.

Our study will make novel contributions to the current literature by addressing three specific aims. First, we aim to provide the first long-term longitudinal data (i.e., covering six years) examining an established work stressor model – i.e., the ERI model, its sub-components (i.e., effort and reward), and OC – as potential predictors of somatic symptoms. In addition, the moderating effect of OC on the ER ratio upon somatic symptoms will be investigated. Among the four longitudinal studies, the measures of work stressors were not theory-based in two studies [30,32]. The other two studies [17,31], however, examined the short-term longitudinal effects on somatic symptoms only (no more than one year). Thus, our study with a standard measure of work stressors, aims at examining the long-term effects on somatic symptoms (i.e., six years). Second, to improve conclusions about causality a cross-lagged model examines bidirectional relationships between psychosocial work characteristics and somatic symptoms. Third, we will provide preliminary evidence of the mediating role of mental health in the association of adverse psychosocial work characteristics and somatic symptoms.

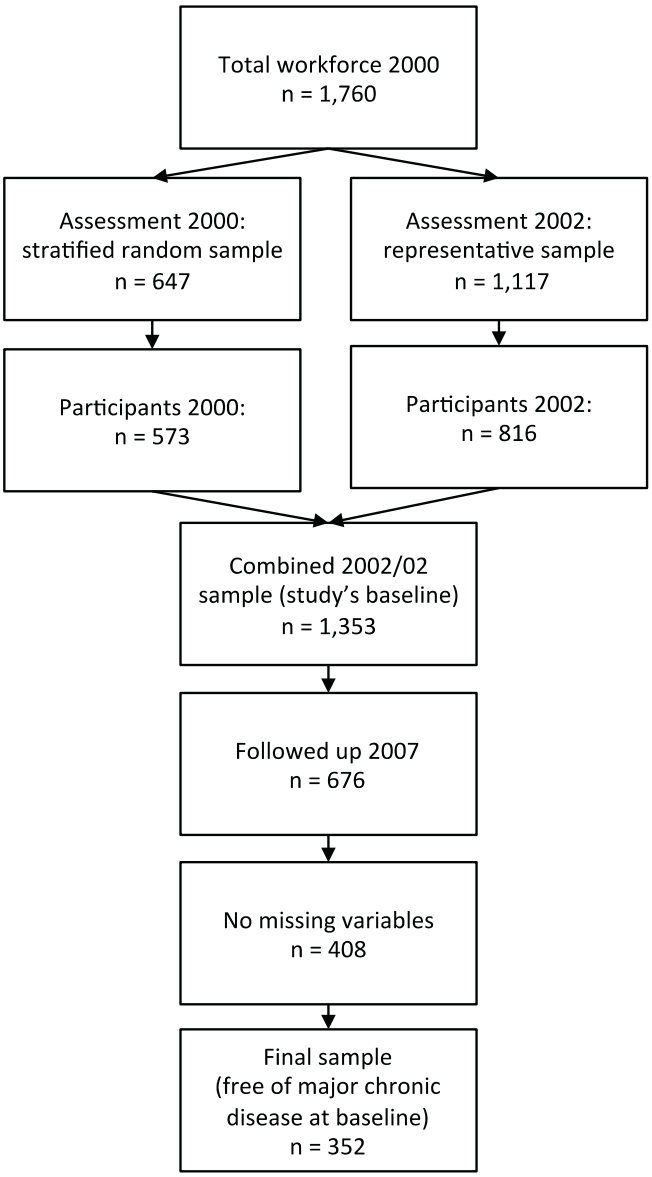

Fig. 1. Sampling procedure.

2. Methods

2.1. Participants

This study used longitudinal data from the Mannheim Industrial Cohort Studies (MICS). Specifically, we linked combined assessments in 2000 and 2002 (baseline; T1) to subsequent assessment in 2007 (follow-up; T2), as we have done previously [42]. Briefly, in 2000, a stratified random sample of 647 individuals was drawn from the total workforce at one production site of an airplane manufacturing company in Germany (n = 1760; Fig. 1). In total, 537 (83%) of those individuals participated. At the same production site, an additional representative sample of 1117 employees was invited in 2002 and 816 (73%) persons participated. Data from both surveys were combined into a single sample (2000/02), comprising 1353 individuals. Of these, 676 persons (50%) could be followed up until 2007 (mean follow-up = 6.3 years).