Job strain as a measure of exposure to psychological strain

Although work contributes to material wellbeing and might be beneficial to health, strain caused by qualitative or quantitative elements of an individual's work can be harmful to a person's physical or mental health. Karasek and colleagues' 1981 job-strain model[1] was a breakthrough in the epidemiology of work-related psychosocial factors and diseases. The model suggested that high job demands plus low individual control over those demands would contribute an essential part of the psychological load that might lead to stress and, therefore, an increased risk of development of cardiovascular and mental diseases, particularly in industrial work environments.[2,3] The model was noteworthy in its ability to predict potential risks[4]—eg, the prevalence of antidepressant drug use and sickness absence in the Finnish working population.[5,6]

In *The Lancet*, Mika Kivimäki and colleagues[7] report findings from their collaborative meta-analysis of individual participant data from 197 473 European men and women without pre-existing coronary heart disease. 30 214 participants (about 15%) reported job strain. The investigators measured exposure to job strain (high demands and low control) on the basis of just one baseline assessment (done between 1985 and 2006), noting an association between job strain and coronary heart disease across age groups, sexes, socioeconomic strata, and regions, and after adjustments for socio-economic status, and lifestyle and conventional risk factors. The sex-adjusted and age-adjusted hazard ratio for job strain versus no job strain (all other combinations of demands and control) was 1·23 (95% 1·10–1·37). The investigators used data from both unpublished (1·16, 1·02–1·32) and published (1·43, 1·15–1·77) studies to minimise publication bias; however some bias still seems to be present, but with no material effect on the conclusions. Furthermore, the study sought to reduce bias owing to reverse causation by exclusion of disease events that occurred in the first 3 years (1·31, 1·15–1·48) and 5 years (1·30, 1·13–1·50) of follow-up.

The article's appendix provides data for alternative measures of job strain in four categories: low strain (low demands and high control), passive (low demands and low control), active (high demands and high control), and high strain (high demands and low control). Only a few studies have reported the possible synergistic effect of high demands and low control.[2,8] The hazard ratios were 0·93 (95% CI 0·89–0·98) for high control and 1·02 (0·96–1·08) for high demands. With the combination of high control and low demands as comparator, the hazard ratios were 1·12 (0·99–1·27) for low demands and low control, 1·06 (0·94–1·19) for high demands and high control, and 1·28 (1·11–1·48) for high demands and low control. These findings support Karasek´s idea that harmful psychological load often results from a combination of high demands and low job control, rather than from either of these factors alone.

Karasek's method of measuring exposure in the psychosocial work environment does not distinguish between quantitative, cognitive, and emotional de-mands.[9] Whereas quantitative and emotional demands might be a burden for workers, cognitive demands could be a stimulating challenge in many jobs.[10] Furthermore, high work pace is not necessarily a stressor if sufficient time is allowed, and difficult tasks might be a challenge rather than being excessively strenuous if achieved successfully; hence, different types of work will have different strain profiles.

The formulation of the job-strain model is best suited to industrial work. Societal developments have also contributed to the limitations of the job-strain model: in developed countries, the diminished industrial setting of working environments will reduce the prevalence of this type of exposure. The control dimension in particular seems to be of reduced importance because variation

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in the use of skills and degree of freedom, which are the major components of control, is less in most developed countries. Other models, such as the effort-reward imbalance model, and exposures such as job insecurity and factors related to social capital and emotions, are likely to be of major importance in the future.[11,12] The present economic crisis will almost certainly increase this importance.

Job strain is a measure of only part of a psychosocially damaging work environment, which implies that prevention of workplace stress could reduce incidence of coronary heart disease to a greater extent than stated in the authors' interpretation of the calculated population-attributable risk for job strain. However, the job-strain model will remain a useful method to assess part of the psychosocial strain in workplaces, especially in the developing world. Few of the published studies with the job-strain model as an exposure measure have analysed the interaction between demand and control. Because these two dimensions might work in synergy, the statistical association between the outcome and the two dimensions should be reported separately (as in Kivimäki and colleagues' appendix) and together to clarify this possibility.

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