Studies in occupational epidemiology and the risk of overadjustment

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Commentary on the paper by Lötters *et al* (see page 794)

Lötters and colleagues' study¹ about return to work in musculoskeletal disorders is important for three reasons. First, it deals with a type of disorder that is widespread and costly in terms of increased sickness absence and healthcare use.²⁻³ Second, it recognises return to work as a biopsychosocial phenomenon that is influenced by medical, environmental, and personal factors. Third, it uses a strong prospective cohort design to examine the effect of depressive symptoms, fear-avoidance, and self-efficacy on return to work.

The study shows that in employees with musculoskeletal disorders, depressive symptoms play a central role in the return-to-work process. Interestingly, this finding is compatible with return-to-work research among workers with other prevalent disorders such as common mental disorders⁴ and cardiovascular disorders.⁵ Given that these three disorders account for the majority of sickness absence days in western countries, the early recognition and treatment of depressive symptoms seems crucial in occupational health care.

Contrary to other studies,^{4,6} Lötters *et al* failed to show an effect of self-efficacy (recovery expectations) on return to work. The concurrent analysis of depression and self-efficacy may explain this inconsistency. The literature shows that depression and self-efficacy are related constructs. Self-efficacy prevents depression whereas the lack of self-efficacy is a risk factor of depression.⁷ Moreover, worthlessness (i.e. lack of self-efficacy) is a core symptom of depression. If one chooses, for clinical reasons, to search for the strongest predictor among the two, the concurrent analysis of depression and self-efficacy

is appropriate. However, if one chooses to find out if and how depression and self-efficacy are theoretically related to return to work, the inter-relationship of the two variables might be reflected on when analysed concurrently in one model.

Another reason why the study by Lötters *et al* failed to show an effect of self-efficacy on return to work may be the inclusion of several risk factors as confounder in the regression model. According to the authors, these risk factors, such as pain and fear of income loss act as confounders because of their association with the presumed causal variable and presumed outcome. To avoid "spurious" precision,⁸ it is, undeniably, important to control for potential confounders. It should be realised, however, that confounding occurs *only* where an association between a presumed causal variable and a presumed outcome is accounted for by a common cause not in the postulated causal pathway.⁹ Thus, if risk factors lie on the causal pathway from psychological factors to return to work, it might be risky to adjust for these factors. This type of adjustment is referred to as overadjustment. One example of overadjustment in the study by Lötters *et al* seems the inclusion of fear of income loss. Theoretically, fear of income loss seems an unlikely common cause of depression and return to work. In fact, it may both precede and follow a depressed mood.

The study by Lötters *et al* does not stand alone in this respect. Studies in occupational epidemiology tend to include many confounders in their analyses without a clear argumentation. The underlying reason for this

overadjustment seems the absence of theoretical models, as opposed to categorical models, that function as a point of departure for the formulation of research questions and corresponding analyses. Most categorical models assign risk factors for return to work or related constructs into medical, environmental, and personal categories, and state that these categories of risk factors are interrelated. However, not only the question on *whether or not*, but also the question on *why* biological, psychological, and social risk factors are interrelated should be answered when deciding to include multiple confounders and predictive factors into one regression model. Entering variables in a regression model without a clear justification will move us further away rather than bring us closer to the truth.

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