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Physical activity, psychological complaints, and occupational health

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responsible for changing patterns of diseases like NHL.

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Health and safety

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Commentary on the paper by Bernaards *et al* (see page 10)

Occupational health professionals and researchers are primarily concerned with examining and preventing the specific health effects of exposures to chemical and physical agents that are unique to the work environment. When looking beyond work related diseases to other diseases and broader health outcomes such as disability, absenteeism, and general health status, we must also consider the effects of factors outside of work, and the interaction of these factors with work exposures. The article by Bernaards and colleagues[1] provides further evidence of the importance of taking a broader view of worker health and safety.

The study by Bernaards and colleagues used data from the Dutch SMASH study (Study on Musculoskeletal disorders, Absenteeism, Stress, and Health), a three year prospective cohort study of over 1700 Dutch workers. Baseline and annual questionnaire data on strenuous leisure time physical activity were used to predict four health outcomes: depression, emotional exhaustion, perceived general health status, and work absenteeism due to psychological complaints. The study found that strenuous leisure time physical activity was associated with a lower risk of depression, emotional exhaustion, and poor general health, as well as with a lower risk of work absenteeism due to psychological complaints. The beneficial effects of exercise were strongest in persons with sedentary jobs. These results join those of a few other longitudinal studies showing that higher levels of leisure time physical activity are associated with lower risks of future depression and depressive symptoms.[2 3]

Surprisingly, this study found that strenuous physical activity at a frequency of once or twice a week was associated with lower risks of depression than exercise at three or more times per week. Unfortunately, the relatively small number of workers in the highest category of exercise frequency meant that this study did not have the statistical power to accurately determine the shape of the dose-response curve, which differed in the various analyses conducted for different health outcomes in their study. A larger study would be needed to determine whether the psychological and work enabling health benefits of exercise increase in a monotonic dose-response fashion, whether there is a plateau with decreasing incremental benefits at higher exercise levels, or whether there is truly a ''U-shaped'' curve with decreasing psychological benefits resulting from more exercise. Though this latter possibility seems unlikely, it is conceivable that people prone to depression reported exercising more, or that ''overtraining'' led to depressive symptoms in some subjects. Another surprising result, which was not discussed by the authors, was the increasing prevalence of current depressive symptoms during the study, from 9.1% of all subjects at baseline to 15.8% three years later. This is especially surprising because people with depression at baseline were more likely to drop out of the study.

Though this study was carefully performed, it nonetheless has some methodological limitations, shared by other studies in this area, that limit conclusions regarding causality. One such problem is potential bias because the exposure of interest is likely to be affected by the outcome of interest: people with poor general health or depression are less likely to exercise than those with good health or without depression. The one year lagging of exposure used by the authors reduces, but probably does not eliminate this potential bias. Similarly, the relation between exercise frequency and work absenteeism is likely to be confounded by health and emotional status. The small number of subjects in the highest exercise category limited the conclusions that could be drawn regarding the level of exercise that provided benefits. Restricting the analysis of sick leave to those with sick leave attributed to psychological disorders left few subjects for analysis, and was probably subject to under-reporting. Complementing the results of this paper is another publication from the SMASH study which showed that all-cause sickness absences, and the duration of these absences, was lower among workers who reported regular physical activity.[4]

Despite methodological limitations, this study shows an important relation between strenuous recreational physical activity and psychological health. The

results of this and similar studies make sense—anyone who has experienced a ''runners' high'' knows that exercise can lead to a sense of psychological well-being. It seems logical that current exercise habits can, to some extent, predict future symptoms of depression and related health outcomes. Placing this and similar studies in the context of occupational safety and health requires us to think about several points: Is this a topic that is important to occupational health professionals and researchers? What else do we need to know about the effects of physical activity in working populations, and how should we learn it? What are the policy implications of this and other studies linking worker lifestyle to worker health?

- Is this type of study relevant to occupational health professionals and researchers?

If we are to adopt a more comprehensive view of worker health and safety, the answer is clearly yes. Chronic diseases related to individual lifestyle choices are a major source of disability, morbidity, and mortality among workers, and a major expense for employers. Depression, a very common disorder, has been estimated to cost US employers $44 billion per year in lost productivity;[5] the majority of this cost is invisible, and explained by lost productivity while at work rather than by absenteeism. In addition, psychological factors and obesity have a contributory role in the aetiology and prognosis of work related disorders, including musculoskeletal disorders. To the extent that it will improve health, changing the exercise and other lifestyle habits of working populations is obviously a worthy goal, and the social organisation provided by worksites has made worksite based health promotion an active topic of activity and research for several decades. The US National Institutes of Occupational Health and Safety has recently joined this effort through a new initiative, *Steps to a Healthier US Workforce*,[6] which calls for collaborative programmes that focus on both workplace and personal risk factors. This greater coordination of prevention efforts may offer improvements in worker health through an approach that encompasses workplace factors, lifestyle choices, and social structures.

- What do we still need to learn?

Quite a lot. There is a large gap between the tantalising findings of risk factor epidemiology studies and the demonstrated results of interventions. Though worksite based physical activity programmes seem to hold great promise for improving health, enthusiasm for these programmes needs to be tempered by the lack of well designed studies that show the effectiveness of these interventions to improve psychological health—or indeed, to improve any other important health outcome. Worksite based interventions are difficult to implement, and even more difficult to study rigorously. Existing literature on the effectiveness of physical activity programmes is of generally poor methodological quality.[7] Many of the intervention studies reporting health improvements have focused on beneficial changes among the study participants, while strategies to promote participation in physical activity programmes by under-represented populations have not been adequately designed or tested. Appropriate studies need to look at the effect of interventions across the entire workforce, including non-participants. Randomised evaluation of intervention studies to promote physical activity are probably best performed as group randomised trials, given the logistical difficulties of offering and providing effective interventions to only some workers in the same location.

- What are the policy implications of an integration of traditional workplace health and safety with health promotion?

Employers and governments have an interest in the personal health habits of their workforces, but this interest must respect the privacy and right to self-determination of each worker. Employees can be encouraged, but not compelled or coerced into adopting healthier behaviours. Also, a focus on personal health behaviours must not obscure the role of workplace exposures in causing disease, and programmes must not focus only on personal responsibility for health behaviours, but also on programmes and social structures that foster healthy behaviours. Many employers have taken steps, and many more could take steps, to encourage increased physical activity among their workforce. Simple actions include the provision of clean and well lit stairways to encourage use of the stairs instead of the elevator; encouraging employees to run, walk, or bike to work through provision of showers and bicycle parking; access to fitness classes or facilities; and other steps to facilitate and encourage employee physical activity. Paired with other actions such as smoking cessation programmes and the availability of attractive and affordable healthy food choices, worksite based programmes to encourage physical exercise may provide benefits to employer and employee alike.

The article by Bernaards and colleagues helps to expand our view of the benefits of physical activity in a sedentary workforce, and supports the idea that integration of healthy lifestyle choices with more traditional worker health and safety may offer significant benefits to workers and employers. High quality intervention studies are needed to show how much we can actually gain from such integration. The resources required to perform such studies are large, but so are the potential health and economic benefits if successful.

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