PREVENTION OF MUSCULOSKELETAL DISABILITY IN WORKING POPULATIONS: THE CUPID STUDY

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Painful musculoskeletal disorders, especially of the back, neck and upper limb, are the main cause of disability for work in Europe [1]. Known and suspected risk factors for their development, persistence, and/or recurrence include occupational tasks which mechanically load the spine or arm (e.g. heavy lifting, forceful movements of the wrist) [2], along with psychological characteristics such as low mood [3,4], tendency to be aware of and worry about common somatic symptoms (somatising tendency) [3,4], and adverse beliefs about the prognosis and need to avoid physical activity when pain occurs [5,6].

Together, however, these risk factors cannot explain major temporal changes that have been observed in disability from common musculoskeletal disorders. For example, in Britain, long-term incapacity for work because of back pain increased more than eight-fold between 1950 and 1995 at a time when the physical demands of work were generally reducing [7]. This gap in understanding prompted the hypothesis that another important cause of musculoskeletal pain and disability could be culturally driven health beliefs and expectations, differences in which might also lead to large variations in prevalence between countries.

To explore this theory, the Cultural and Psychosocial Influences on Disability (CUPID) study was conceived [8]. In an initial baseline survey, data were collected by questionnaire from some 14,000 workers in 47 occupational groups (mostly nurses, office staff using computers, and workers carrying our repetitive manual tasks with their hands or arms) in 18 countries across six continents. Participants were asked about pain at each of 10 anatomical sites, associated disability, and various potential risk factors. Subsequently, approximately 9,000 workers from 45 of the occupational groups answered a shorter follow-up questionnaire (average response rate 77%), which again asked about recent experience of pain and resultant disability.

Analysis of the baseline survey indicated large differences between the 47 occupational groups in rates of musculoskeletal pain that was disabling for everyday activities [9]. In comparison with office workers, nurses tended to report more pain in the low back and less in the wrist/hand. However, the variation by country was much greater, even among workers carrying out similar occupational activities. For example, the prevalence of disabling wrist/hand pain in office workers varied up to 14-fold between countries. This heterogeneity was not explained by known and suspected risk factors, including beliefs about occupational causes of musculoskeletal pain and awareness of terms such as “RSI”. Nor did it relate to the availability of sick pay or compensation for work-related disorders. There was, however, a strong correlation across occupational groups between the prevalence of pain in the low back and that in the wrist/hand, which suggested that whatever was responsible for the variation between groups predisposed to musculoskeletal pain in general, rather than being specific to only one or two anatomical sites.

To test this theory, a series of longitudinal analyses were conducted. The first explored the relationship of exposures and personal characteristics at baseline to the one-month prevalence of disabling low back pain at follow-up some 14 months later [10]. Expected associations were found with established risk factors such as somatising tendency, poor mental health and occupational lifting. However, a much stronger risk factor was report of pain in the year before baseline at anatomical sites other than the low back. Risk increased progressively with the number of sites that had earlier been reported as painful, with a prevalence rate ratio of 2.6 (95% confidence interval 2.2 to 3.1) when six or more sites were affected. Moreover, across occupational groups, the mean number of sites other than the low back that were painful in the year before baseline correlated with the prevalence of disabling low back pain in the month before follow-up (correlation coefficient (r) = 0.58). And when account was taken of this and other, weaker risk factors, the variation in prevalence between occupational groups was no greater than could reasonably be expected by chance, suggesting that no other major independent contributor had been missed.

In a second analysis, which took as its outcome, disabling wrist/hand pain in the month before follow-up, findings were broadly similar (submitted for publication). The strongest risk factor at baseline was the number of anatomical sites other than the wrist/hand that had been painful in the preceding year (prevalence rate ratios up to 3.6), and the correlation across occupational groups between the mean number of such sites that had been painful in the year before baseline and the prevalence of disabling wrist/hand pain at follow-up was strong (r = 0.86).

To check that these associations did not simply reflect a tendency for workers to recall and/or report symptoms more readily in some countries than others, a third analysis took as its outcomes sickness absence for musculoskeletal pain in the month before follow-up (submitted for publication). Again, after adjustment for other known and suspected risk factors, the reported extent of pain in the year before baseline was an important risk factor. For example, 235 participants reported absence at follow-up which they ascribed exclusively to pain in the low back pain (i.e. with no contribution from pain elsewhere). Risk of this outcome was highest in workers who had reported pain at the most sites outside the low back in the year before baseline (prevalence rate ratio for pain at ≥6 sites 1.8, 95% confidence interval 1.0 to 3.2).

To be sure that the correlation between pain at different anatomical sites was not an idiosyncrasy of the CUPID study sample, corroboration was sought from an independent dataset derived from successive rounds of the European Working Conditions Survey [11]. Carried out in 2010 and 2015, these provided estimates of the-one year prevalence of pain in the low back and neck/arm in the working populations of each of 33 European countries. In accordance with the CUPID study, in each of the two years, rates of low back pain correlated across countries with those of pain in the neck/arm (r = 0.42 and 0.56). Moreover, when changes in the national prevalence of pain at the two anatomical sites between 2010 and 2015 were calculated, there was an even stronger correlation across countries (r = 0.85).

Together, these findings point to the existence of one or more unidentified factors which cause major differences in rates of disabling regional pain between countries, and which impact on musculoskeletal pain in general. They cannot be mechanical exposures such as bending, twisting or forceful repetitive movements of the wrist and hand, the main loading from which is localised to only a few anatomical sites. Nor can they be health beliefs specific to certain parts of the body (e.g. about “RSI”). In theory, there might be other physical aspects of work that strongly predispose to pain across the trunk and upper limb, but it would be surprising that they had not already been identified in the extensive research that has been conducted on mechanical causes of musculoskeletal disorders. To explain variations in prevalence of the magnitude that were found in the CUPID study, their effects would have to be much stronger than those of, say, heavy lifting on back pain. Moreover, they would need to vary substantially between countries, even among workers office workers carrying out fairly similar tasks. Much more plausible is the possibility that culturally determined differences in health-related beliefs and behaviours in some way modify awareness of, and responses to, pain – perhaps through changes in the central processing of sensory information.

Important for future preventive strategies, is whether these unrecognised causes of musculoskeletal pain and disability could be modified, and if so, how. Some insight on the first question comes from a study of migrants from India to the UK [12]. Cross-sectional data on the one-year prevalence of pain at each of five anatomical sites were collected from six samples of workers distinguished by nature of their work (non-manual or manual) and their country of residence and ethnicity (UK white, UK of Indian subcontinental origin and Indian in India). After adjustment for sex and age, the number of sites reported as painful was lowest among the manual workers in India, intermediate in non-manual workers in India, and highest in the four groups of workers in the UK. Even among first generation migrants from India to the UK and those aged less than 35 years, pain at multiple sites was as frequent as in their white colleagues. This suggests that whatever underlies the higher prevalence in the UK is environmental rather than genetic, begins to act by early in adult life, and has impact soon after people move from India to the UK.

There is now a pressing need for further research to identify and characterise more fully the drivers of international differences in rates of musculoskeletal pain and disability, aiming in the long-term for new and more effective approaches to prevention. Good ergonomics has value, not least in enabling workers who have pain to remain productive. However, it is unlikely on its own to eliminate most of the disability from common musculoskeletal disorders in working populations.

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