Work-Related, Upper-Limb Disorders

GJ Macfarlane et al. Annals of Rheumatic Diseases. September (2001) Vol. 60 #9 p 852.

It is becoming increasingly clear that the occurrence and effects of pain at work are influenced by physical and psychosocial factors. Whether or not pain and responses to pain are related to injury outcomes however, remains highly uncertain.

The research reported here studied links between physical and psychosocial demands and shoulder pain, the outcomes of interest, being disabling pain or, high risk of pain.

This cross-sectional survey was performed in 5 manual occupational settings. 931 workers were asked to take part, 775 completed (83%).

The five occupational settings were picked on the basis of ergonomic exposure. I.e. exposure to adverse ergonomic exposure was expected to be high.

Exposure and outcome variables were measured by questionnaire as follows, after specifying one hour in the day as the reference period:

- physical demands at work (Manchester Occupational Physical Demands Questionnaire based on one specified hour);
- psychosocial working environment (demand-control-support model of Karasek),
- GHQ12 for degree of distress (range = 12 to 48),
- shoulder pain (duration >24 hr continuous in the last month) and,
- related disability (shoulder disability scale by Croft. et al 1994).

Univariate factors then used in a multivariate model.

The study found that 198 workers (26%) had the required level of disabling pain during the study period. 127 of these were unilateral (i.e. apparently not systemic), which means 71 had bilateral shoulder pain.

Female gender and increasing age were associated with increasing prevalence (not very significantly).

Other risk factors for reports of disabling shoulder pain were determined as prevalence rate ratios (PRR). These were measured relative to lowest exposure group out of the 198 who reported pain. Ie risk factors were not measured relative to those who reported no disabling shoulder pain, which would be the more usual way of establishing risk factors for the general working population.

Physical demands:

Those with disabling shoulder pain were more likely to work with:

- shoulders above the level for more than 10 minutes in the specified hour. PRR = 2.6 (95% CI = 1.8 to 3.7)
- Lifting with one hand >10 mins. PRR = 2.3 (95% CI = 1.6 to 3.2)
- Lifting above shoulder level > 5 mins. PRR = 2.0 (95% CI = 1.3 to 3.1)
- Pulling weights > 5 mins. PRR = 1.8 (95% CI = 1.2 to 2.8))

Psychosocial demands:

Those with disabling shoulder pain were more likely to work with the highest exposure category of:

- Does work cause stress/worry most of the time/always? PRR = 1.9 (95% CI = 1.2 to 2.9)
- Hectic/too fast - always/mostly; PRR = 1.5 (95% CI = 1.1 to 2.1)
- Always/mostly monotonous; PRR = 1.6 (95% CI = 1.1 to 2.3)
- GHQ score of between 24 to 48; PRR = 2.3 (95% CI = 1.6 to 3.4)

The above results assumed no interaction between risk factors i.e. univariate analysis. A multivariate model, sex and age adjusted, showed:

- Work above level > 10.5 mins; PRR = 2.2 (95% CI = 1.5 to 3.3)
- Lifting with 1 hand >6.1 mins; PRR = 2.0 (95% CI = 1.4 to 2.8)
- GHQ, 24 or more; PRR = 1.9 (95% CI = 1.3 to 2.9)
- Does work always/mostly cause worry PRR = 1.4 (95% CI = 1.0 to 2.1)

These were the significant risk factors after mutual interaction was corrected for. The extreme physical exposures were more significant than the extreme psychosocial exposures. In every case, the strength

of association decreases relative to the univariate analysis, probably indicating that a significant determinant of disabling shoulder pain is the combination of physical and psychosocial factors.

This is further illustrated by an analysis of combinations of high exposures. The number of people with just one high exposure was 276, of these, 73 (26%) had disabling shoulder pain during the study period. There were 97 with two high exposures, of these, 43 (44%) had disabling shoulder pain. There were 29 people with three high exposures, of these, 23 (79%) had disabling shoulder pain.

56 (16%) of the 353 who were in low exposure groups reported disabling shoulder pain.

Clearly, disabling shoulder pain does occur without any exposure at work, but the more high exposures at work, the higher the prevalence.

Comment

Disabling shoulder pain is not an objective outcome, depending as it does on attitude, perception, motivation, injury status, company policy and so on. However, the research provides strong support for a biopsychosocial model of the disabling effects of working practices. If significant discomfort were to become compensable, this research would seem to identify factors that should be considered when assessing the standards appropriate to a duty of care.

Lack of support and, low decision latitude, were not found to be risk factors though they might have been expected to be. Mental distress alone has been promoted as a cause of upper limb pain even in the absence of any physical exposure. This research is not able to confirm or refute this suggestion.

A crude analysis shows that compared with low exposure groups, subjects require at least three high exposures before the prevalence rate ratio exceeds 2.0, the usual threshold for the balance of probabilities.