

Fevile H, Jensen C, Burr H. Risk factors for neck-shoulder and wrist-hand symptoms in a 5-year follow-up study of 3990 employees in Denmark. *Int J Occup Environ Health* 2002;75:243-251.

Design: Prospective cohort study

Population/sample size/setting:

- 3990 subjects (male mean age in 1995 was 34.7, female mean age was 37.3) who participated in a nationwide survey in Denmark in 1995
- Initial setting was a 1990 simple random sample (n=9653) drawn from the Danish Central Population register, of whom 8664 agreed to be interviewed and 5940 of whom were employed; the exposure data reported in 1990 was used in the 1995 analyses
- Analyses were done on newly emerging musculoskeletal symptoms between 1990 and 1995
- In 1995, follow-up interviews were conducted on 5001 of the 5940 subjects who had been working in 1990, and 3990 of these were employed in 1995
- Work exposures and musculoskeletal symptoms were gathered by telephone interviews among persons who had been working at least 21 hours per week in 1990

Main outcome measures:

- Physical demands from the 1990 interview included physically hard work (“do you have to breathe faster?”), twisting or bending (“do you twist or bend your body in the same way several times per hour?”), working with hands raised at or above shoulder level, and repetitive work tasks (“do you repeat the same tasks several times per hour?”)
- Physical demands were divided into three categories: $\geq 75\%$ of work time, 25=50% of time, and seldom/never
- Psychosocial factors (psychological job demands, skill discretion, decision authority, and social support) were also elicited
- Heavy lifting (20 kg objects daily), sedentary work (sitting position), and vibrating hand tool use (e.g., pneumatic hammer, power saw) was also assessed by the same questionnaire
- Symptom outcomes were classified as either present or absent: “Have you experienced pain or discomfort in the past 12 months?” for the neck, shoulder, wrist, or hand
- Logistic regression models were developed separately for neck-shoulder symptoms and hand-wrist symptoms; women and men were analyzed separately in these models
- Odds ratios for wrist-hand symptoms in men were elevated for twisting and bending $\geq 75\%$ of working time (OR=1.74) and also for 25-50% of the working time (OR=1.80) compared to seldom/never
- Odds ratios for wrist-hand symptoms in women were similar to those for men: OR was 1.94 for twisting/bending $\geq 75\%$ of the time, and was 1.39 for

twisting/bending 25-50% of the time, but the confidence interval for the latter included the null value of 1.0

- For both men and women, “stress” had an elevated odds ratio for hand-wrist symptoms (OR of 1.74 and 1.67 respectively)

Authors’ conclusions:

- Both physical and psychological factors were associated with musculoskeletal symptoms
- Most of the problems with data analysis (dropouts between 1990 and 1995, changes in exposure between 1990 and 1995) would be expected to dilute any real associations between work factors and musculoskeletal symptoms
- Twisting and bending refers to the movements of the trunk, and are likely to be indicators of the presence of other risk factors for the hand and wrist, such as holding wrists in awkward positions
- Stress could be associated with symptoms through increasing muscle tension and the total load on affected muscle groups

Comments:

- There is a problem with categories of bending/twisting exposures: the categories of seldom/none, 25-50% of working hours, and $\geq 75\%$ of working hours excludes the possible exposure of 50-75% of working hours
- However, in Table 3 and Table 5, the tables refer to a category of exposure $\geq 25\%$ of working time, which may refer to a category from 25-75% of working time; this seems very likely to be the case, and the 25-50% is simply an error
- The authors are probably correct in stating that exposure data gathered at baseline is likely to lead to a diluted odds ratio for symptoms that are reported 5 years later
- The presence of symptoms in the hand and wrist are not indicative of specific diagnoses
- There is an advantage to having a prospective population-based cohort study, which minimizes problems with recall bias
- Because bending/twisting had an elevated odds ratio for both men and women when done more than $\frac{3}{4}$ of the working day, this may be approximated as 6 hours of exposure per day
- Because of the expected dilution of odds ratios with the study design, it is very possible that fewer than 6 hours of repetitive bending/twisting could also be associated with the emergence of musculoskeletal symptoms
- Overall, the considerable liabilities of the study are balanced by the advantages

Assessment: Adequate for evidence that bending/twisting and awkward hand postures for more than 6 hours per day may be associated with a variety of hand/wrist symptoms, but not specific diagnoses