

**Prado-Leon LR, Celis A, Avila-Chaurand R. Occupational lifting tasks as a risk factor in low back pain: A case-control study in a Mexican population. Work 2005;25:107-114.**

Design: Case-control study

Population/sample size/setting:

- 231 Mexican workers of both sexes in the Guadalajara region between ages 18 and 55 insured by the Mexican Social Security Institute (IMSS) between May 1996 and May 1998, of whom 77 were cases of LBP and 154 were selected as controls
- Cases were selected from the IMSS disability determination list, with controls selected from insured workers on record in the same locality; the list of cases was updated monthly
- Controls were matched on age, and two controls were chosen for each case identified, and were excluded if they reported having LBP when selected
- Workers were excluded if they might have spinal stenosis or if they were shorter than 1.45 m, and were excluded if they had mental or psychological disorders restricting their ability to be interviewed, if they had serious chronic ailments or were pregnant

Main outcome measures:

- Primary outcome was designated “lumbar spondyloarthrosis” confirmed by clinical examination, imaging study, and diagnostic review by a committee of IMSS experts
- Exposure was ascertained from a structured interview using a 77-item questionnaire administered by 4 trained research assistant psychologists
- Questionnaire gathered information on lifting/lowering loads, its accumulation over time, load weight, lifting height, trunk flexion/rotation during lifting, task duration and frequency, and lifting tasks outside work
- Other potential LBP factors were examined, including obesity, smoking, pregnancies, sports activities, work as a driver, prolonged standing on the job, and related factors
- The main outcome was the odds ratio (OR) for the exposures and the occurrence of LBP, analyzed with conditional logistic regression
  - o The logistic regression tested both the effects of the job exposures and the effects of their interactions (e.g., between driving and lifting)
- Lifting outside the workplace could not be assessed because too few workers reported doing it
- Lifting at work (OR=0.9) and working as a driver (OR=0.4) did not predict LBP by themselves, but significant interactions were observed between lifting and driving; when both were present, the OR was 7.3
  - o When lifting tasks were further defined in terms of weight and hours of lifting, there was an increase in the OR for LBP with increasing load demands

- For example, the OR for lifting 2-38 kg was 2.6 when compared to no lifting; the OR for lifting more than 40 kg was 4.2; both odds ratios were adjusted for pushing/pulling and for carrying tasks
- Similarly, cumulative time spent lifting/lowering loads was associated with LBP: using 0-3 months as the reference category, the OR for 1-9.5 years was 2.6, and for lifting more than 9.5 years, the OR was 4.2
- Hours of daily lifting and height range of lifting also showed a dose-response effect, with greater risk at higher levels of exposure
- Another interaction was observed for trunk flexion and trunk rotation; there was not a significant OR for trunk flexion, but when rotation was added to flexion the OR rose to 7.6
- Lifting and smoking also had an interaction; when both smoking and lifting were reported, the OR was 4.9

Authors' conclusions:

- Lifting has an important effect in the development of lumbosacral spondyloarthritis
- There are normal time-related degenerative process in the spine, which may be accelerated by loads which exceed the capacity of the functional unit
- The questionnaire, developed specifically for the current study, has not been independently validated, and bias cannot be ruled out
- It may be feasible to reduce incidence of LPB with ergonomic redesign of the workplace, especially for lifting tasks

Comments:

- The selection of cases appears to be appropriate for an ideal case-control study: controls were drawn from the source population for the cases, making them representative of a theoretical cohort for both cases and controls
- "Lifting" by itself is not well enough to be a well-defined exposure, since there were clear and strong dose-response effects for different levels of lifting
- The controls were matched to the cases on age, which takes care of confounding by age, but prevents direct estimation of the effect of age on LBP
  - A display of odds ratios for different age groups would have provided an opportunity to see if older workers were more likely than younger workers to experience LBP with lifting, but the data were not reported
- Since it is a matter of contention whether lifting by itself is a risk factor for LPB, it is important to have a study in which the authors developed a regression model which estimated interaction directly

Assessment: Adequate for evidence that cumulative exposure to lifting in the workplace is associated with the development of LBP, and that the effects of lifting may only become apparent when considered in combination with other work exposures