426 Group-based exposure measurement strategies and their effects on trunk rotation and low-back pain exposure-outcome associations

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Session: *14. Exposure Assessment II*

Session Date: 20/06/2013
Presentation Time: 12:15 - 12:30

Abstract
Objectives: In epidemiological studies of occupational exposures (e.g. lifting) and low-back pain (LBP), group-based exposure measurement strategies are common. Workers are classified into exposure groups; exposure is measured only in a selection of workers in each group, and their mean exposure is assigned to all workers in the group. Exposure-outcome relationships are then determined by regression, relating exposure estimates with individual LBP data from all subjects. The objective of this study was to assess the effect of different group-based measurement strategies on exposure-outcome associations.
Methods: 1122 workers, classified into 19 groups on the basis of job-related exposure, participated in this study. In each group, videos were collected from ~25% of the workers (in total, 370 workers), and percentage of the work day spent in trunk rotation was estimated by observation of the videos. This estimate of trunk rotation was significantly associated with self-reported LBP during three years of follow-up (OR:1.43 (1.06-1.93)).
Using a bootstrap simulation, workers per group (n=10,20,30,40) and percentage of observed workers (k=10,20,30,40,50%) were varied. For each combination, (nk) workers were selected with replacement in each job group among those observed, and n(100-k) workers among those not observed. The mean exposure of the observed workers was assigned to all group members which was related to individual LBP data. ORs and accompanying p-level was estimated using logistic-regression.
Results: A group-based measurement protocol led to significant ($p<0.05$) ORs when the total number of workers was larger than n=30 in each job group, *and* ≥20% was actually observed.
Conclusions: The proportion of observed workers did have an effect on p-values, but it appeared weaker than that of changing the total group size. These results suggest that it may be sufficient to observe only a minor proportion of workers if the overall size of the population is reasonably large.