

Validity of a job exposure matrix for physical activity

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Introduction and objective For the benefit of epidemiological research on physical activity and the risk of cancer, a job exposure matrix for physical activity (JEMPA) was made, including all occupations of the Dutch version of the 4-digit ILO occupational classification system. Physical activity was defined by number of hours sitting per 8-hour working day in 3 categories (6-8 hrs; 2-6 hrs; 0-2 hrs per day) and the energy expenditure (EE) in kJ per minute in 3 categories (less than 8 kJ/min; 8-12 kJ/min; more than 12 kJ/min). In this study we validated the JEMPA against two other databases with physical activity data on job level.

Material and Method The JEMPA was validated against two databases with objective measurement information on movements and postures in a variety of occupations, i.e. 18 occupations from the Function Information System (FIS), which is used in The Netherlands as a tool to find jobs for partially industrially disabled persons, and 29 occupations from the baseline measurements of the Dutch longitudinal study on musculoskeletal disorders (LONGI). In these databases, the information on time spent sitting, walking, lifting, bending, etcetera, was measured by observation. Using this information in combination with EE data from the literature for each of these activities, the EE was estimated for each occupation of interest. The number of hours sitting could be directly derived from both databases. We calculated the average number of hours sitting and average EE of occupations categorized according to JEMPA and compared them with the values that were attributed to the abovementioned JEMPA categories.

Results The average number of hours sitting estimated with FIS were 6.7 hrs, 3.6 hrs and 0.5 hrs, and 7.7 hrs, 3.1 hrs and 1.0 hrs estimated with LONGI, which corresponded well with the categories of the JEMPA. Differences between the categories were statistically significant with an alpha of 0.05. The energy expenditure values estimated with FIS data were 2.6, 6.0 and 7.0 kJ/min and 2.7, 5.3 and 14.9 kJ/min if estimated with LONGI data. Increasing trends were seen in both estimations, but the differences between the second and third category were not statistically significant.

Discussion and Conclusions Only few occupational codes could be included in this validation because of the relatively limited number of occupations observed and included in the LONGI database. Also, since the FIS is designed to indicate maximal (physical) activity in a job, the FIS parameters for each occupation had to be evaluated by hand. Yet, we included occupations which are common in the Dutch population and which vary in physical activity. The energy expenditures were estimates because energy expenditure data of some postures were lacking. Nevertheless, we may conclude that the JEMPA is valid for the purpose of classifying occupations into contrasting groups according to occupational physical activity.