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Applying two general population job exposure matrices to predict incident carpal tunnel syndrome: A cross-national approach to improve estimation of workplace physical exposures

ABSTRACT

OBJECTIVES - A job exposure matrix (JEM) is a tool to estimate workers' exposure to occupational physical risk factors. We evaluated the performance of two general population JEM (CONSTANCES and O*NET) to detect known exposure–disease relationships in an American prospective cohort study. We compared exposure estimates from three data sources and explored whether combining exposures from these two JEM, or combining exposure from each JEM with individual-level measures, improved prediction of carpal tunnel syndrome (CTS). METHODS - Using Cox proportional hazard models, we evaluated relationships between physical work exposure and incident CTS of 2393 workers using JEM-assigned and individual-level measure exposure information. We compared exposure estimates using Spearman's rank correlation and Cohen's kappa. We compared combined exposure models to single source exposure models by using binomial logistic regression and examined differences based on model fit and performance. RESULTS - The O*NET JEM [hazard ratio (HR) range 1.3–2.01] demonstrated generally similar exposure–disease associations as individual-level measures (HR range 1.00–1.42); we found fewer associations with the CONSTANCES JEM (HR range 1.08–2.05). Comparisons between the three sources showed stronger correlations and agreement at the job versus worker level. Combined models improved goodness-of-fit and had lower Akaike information criterion (AIC) values compared to single-source models. CONCLUSIONS - JEM can be applied cross nationally and there is potential to combine complementary exposure methods to improve estimation of workplace physical exposures in the prediction of CTS. More investigations are needed to explore exposure-disease associations in other samples and combinations of exposure data from different methods.

KEYWORDS: Assessment injury prevention; CTS; Ergonomics; Exposure–risk; JEM; Job exposure matrix; Musculoskeletal disorder; MSD; Occupational health; Risk

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