14th ICBEN 2023 18 - 22 JUNE BELGRADE

14th ICBEN Congress on Noise as a Public Health Problem

The association between occupational noise and workplace injuries: a summary of several epidemiological studies in the US

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ABSTRACT

Fatal and nonfatal occupational injuries represent a substantial public health burden globally. While there are several factors that are associated with increased injury risk, the relationship between occupational noise exposure – which may reduce situational awareness, mask warning sounds, cause fatigue and distraction, and increase errors – and workplace injuries has not been sufficiently characterized. Since 2021, we have conducted a series of evaluations of the association between occupational noise and injuries using cross-sectional, ecological, and retrospective epidemiological study designs. In these studies, we have evaluated rates of nonfatal and fatal injuries, as well as the impacts of noise on mental workload, which may contribute to risk of injury. We have also assessed noise exposure using a variety of methods, including prospective personal noise measurement as well as application of our US/Canada National Job Exposure Matrix for Noise (https://noisejem.sph.umich.edu/). Our assessments have consistently indicated that risk of occupational injury increases with higher levels occupational noise exposure. We estimated that approximately 3% (95% CI: 2.4%-4.4%) of US acute injuries resulting in days away from work in 2019 were attributable to high levels of occupational noise; this could reach as high as 20.3% (95% CI: 11.2%-29.3%) in high hazard industries like mining. We have also identified a threshold exposure level of 88 dBA (measured as a workshift Time-Weighted Average, TWA), above which risk of occupational injury increases significantly. Collectively, these results suggest that reducing occupational noise exposure may provide injury reduction benefits, in addition to lowering the risk of noise-induced hearing loss.

Keywords: Occupational noise, nonfatal injuries, fatalities, mining, workplace