The effects of lifetime occupational noise exposure and age on speech perception and self-reported hearing symptoms: An online study in Palestine

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Abstract

Background: Workers in developing countries are typically exposed to unsafe levels of occupational noise throughout their lifespan due to the lack of enforcement of occupational health and safety measures. The effects of occupational noise exposure may be more apparent in the older adult worker population and may manifest as decreased ability to understand speech, especially in noisy environments, tinnitus, and hyperacusis. In this study, we tested the hypotheses that there are effects of occupational noise exposure and aging on (i) speech-perception-in-noise (SPiN) thresholds, (ii) the presence of chronic tinnitus, (iii) self-reported hearing ability, and (iv) severity of self-reported hyperacusis.
Methods: We recruited 251 adults (females: 152, age range: 18-70, mean age: 35.1) who are workers in either noisy or non-noisy industries in the Palestinian Territories, with no past diagnosis of hearing or memory impairments. Subjects completed a set of online instruments in Arabic including an otologic health and demographic questionnaire, the online forward and backward digit span test, a noise exposure questionnaire (which evaluates lifetime occupational, recreational, and firearm noise exposure), the Khalfa hyperacusis questionnaire, the short-form Speech, Spatial and Qualities of Hearing Scale (SSQ12), the Tinnitus Handicap Inventory (THI), and an Arabic online digits-in-noise (DIN) test. Multiple linear regressions, including both age and occupational noise exposure as predictors, were employed to test hypotheses (i) (iii) and (iv), while logistic regression was used to test hypothesis (ii). The covariates of sex, recreational noise exposure, and cognitive function, as measured by the forward and backward digit span test score and the highest qualification of formal academic attainment, were accounted for in all the statistical models.

Results: Preliminary analyses showed that both occupational noise exposure and age were significant predictors of SPiN (DIN thresholds). Only age significantly predicted self-reported hearing ability as reflected by the SSQ12 scores, while only occupational noise predicted the severity of hyperacusis. Neither occupational noise exposure nor age were significant predictors of the presence of chronic tinnitus.
Conclusions: There are significant differences in hearing ability due to age and occupational noise exposure among adult workers in Palestine. Many workers in Palestine seem to suffer from the auditory effects of aging and occupational noise damage despite no past formal

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diagnosis. These findings highlight the importance of occupational noise monitoring and the implementation of hearing-related health and safety regulations in developing countries like Palestine.