



KEY POINT SUMMARY

OBJECTIVES

This study examined the relationship between work-related noise exposure, health conditions, and professional quality of life in nurses.

Noise exposure and quality of life among nurses

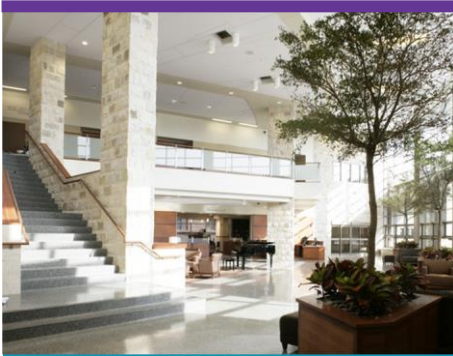
McCullagh, M. C., Xu, J., Dickson, V. V., Tan, A., Lusk, S. L., 2022 | Workplace Health & Safety, Volume 70, Issue 4, Page(s) 207-219

Key Concepts/Context

Research shows that the effects of high-noise environments extend beyond hearing damage. Excessive noise levels can negatively impact cardiovascular health, mental health, sleep, and lead to tinnitus. Healthcare work environments are inherently noisy due to paging systems, telephones, monitor alarms, treatment equipment, and ice machines. Findings from this secondary data analysis indicated that nurses who were exposed to noisy environments were more likely to report illness, work-related stress, poor work environments, and burnout symptoms.

Methods

Researchers conducted a secondary data analysis on a subset of demographic and wellness data collected as part of a 2018 national study of nurses. Demographic data included: (a) age; (b) sex; (c) race/ethnicity; (d) education; (e) marital status; (f) history of chronic illness; (g) smoking history (including type of smoking device and setting); (h) primary role in nursing; and (i) hours of work per day/shift. Wellness data included: (a) self-reported noise exposure; (b) depression; (c) anxiety; (d) stress; (e) professional quality of life (ProQOL); (f) self-reported physical & mental health; (g) perceived workplace wellness support; and (h) medical errors made in the five years prior to data collection. Bivariate tests (t test and chi-square statistics) were used to examine associations of high noise exposure with various demographic characteristics and wellness measures. For the purposes of this study, “high noise” required one to raise their voice in order to be heard by someone three feet away. Researchers used effect sizes (i.e., Cohen’s D; odds ratio [OR]) and statistical significance (p value) of the bivariate analysis to determine between-group differences. To examine unadjusted effects of high noise exposure to ProQOL each independent variable was included in a linear regression model as a single predictor. To examine adjusted effects of high noise exposure to ProQOL covariates significantly associated with high noise exposure in the bivariate analysis ($p < .001$) (age, primary role, education, hours of work day/shift, history of depression, history



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of back pain or musculoskeletal problems, history of arthritis, and smoking indoor at home/work) were included simultaneously as predictors of ProQOL.

Findings

Health conditions reported by participants (n = 3,818) included hypertension (25%), heart disease (3%), depression (23.4%), and anxiety (19.1%), and only 3.3% were current smokers. Those more likely to report high noise exposure were younger nurses (p >.001), nurses in clinical practice (p < .001), those who worked shifts greater than 11 hours (p >.001), and those with a history of depression (p >.007), back or musculoskeletal pain (p >.010) or arthritis (p >.005). Researchers also examined the relationship between smoking and noise exposure, as smoking has a demonstrated synergistic relationship with noise in contributing to hearing loss. Respondents who smoked either at home or at work were at least twice as likely to report high noise exposure as non-smokers. Nurses reporting high noise exposure had lower ProQOL total scores, higher burnout scores, and were more likely to report that employment was stressful (all with medium-size effects) compared with participants who had low noise exposure. Respondents with lower noise exposure were more likely to report a supportive employment environment (medium-effect size). While participant reports of hypertension, cardiovascular disease, and depression associated with higher noise exposure are consistent with previous findings, the finding of high noise perceptions in younger nurses may be attributed to younger nurses working in noisier clinical settings.

Limitations

While the authors acknowledged *levels of annoyance* due to noise may be different from measured noise levels, only perceived noise was studied. Limitations resulting from the convenience sampling used in this study include potential bias to complete the survey due to personal interest in work-related noise and underrepresentation by minority nurses. Additional limitations include the cross-sectional nature of the study preventing causal inferences, that the survey item on noise was not initially intended as a quantitative measure, and that the survey item did not include the source or duration of the noise. Finally, only a short list of health problems was assessed.

Design Implications

Findings from this study support the reduction of high levels of noise in healthcare settings. The authors cite research emphasizing even modest reductions in noise



can have beneficial effects on staff, including lowering the prevalence of hypertension and coronary artery disease. Further research is necessary to better understand how to measure perceptions of noise and how to mitigate negative impacts.

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