Transportation noise and blood pressure in a population-based sample of adults

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Background: There is some evidence for an association between traffic noise and ischemic heart disease; however, associations with blood pressure have been inconsistent, and little is known about health effects of railway noise. Objectives: We aimed to investigate the effects of railway and traffic noise exposure on blood pressure; a secondary aim was to address potentially susceptible subpopulations. Methods: We performed adjusted linear regression analyses using data from 6,450 participants of the second survey of the Swiss Study on Air Pollution and Lung Disease in Adults (SAPALDIA 2) to estimate the associations of daytime and nighttime railway and traffic noise (A-weighted decibels) with systolic blood pressure (SBP) and diastolic blood pressure (DBP; millimeters of mercury). Noise data were provided by the Federal Office for the Environment. Stratified analyses by self-reported hypertension, cardiovascular disease (CVD), and diabetes were performed. Results: Mean noise exposure during the day and night was 51 dB(A) and 39 dB(A) for traffic noise, respectively, and 19 dB(A) and 17 dB(A) for railway noise. Adjusted regression models yielded significant effect estimates for a 10 dB(A) increase in railway noise during the night [SBP β = 0.84; 95% confidence interval (CI): 0.22, 1.46; DBP β = 0.44; 95% CI: 0.06, 0.81] and day (SBP β = 0.60; 95% CI: 0.07, 1.13). Additional adjustment for nitrogen dioxide left effect estimates almost unchanged. Stronger associations were estimated for participants with chronic disease. Significant associations with traffic noise were seen only among participants with diabetes. Conclusion: We found evidence of an adverse effect of railway noise on blood pressure in this cohort population. Traffic noise was associated with higher blood pressure only in diabetics, possibly due to low exposure levels. The study results imply more severe health effects by transportation noise in vulnerable populations, such as adults with hypertension, diabetes, or CVD.
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