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Title: Noise exposure during sleep and risk of OSAS: A population-based study

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Body: Background: Noise-induced sleep fragmentation increases upper airway collapsibility and sleep-disordered breathing (SDB). Heart rate variability (HRV) is altered in SDB, as obstructive sleep apnea/hypopnea syndrome (OSAS). We investigated the association between exposure to nocturnal traffic noise and HRV as proxy of OSAS in a representative sample from the Swiss adult population. Methods: 1363 participants of the SAPALDIA study underwent a 24-hour ECG. SDB was defined by physician-diagnosed OSAS or respiratory pause during sleep. Using the HRV frequency-domain component of the 24-hour ECG, we calculated the percentage of the very low frequency increment interval (VLFI) over the total power spectral density, a surrogate marker of OSAS (%VLFI 4%). Night-time traffic noise exposure (10pm-6am) obtained from SONBASE, the Swiss databank on noise pollution, was linked to participants' home addresses. Logistic regression models using 35dB(A) cut-off were adjusted for relevant covariates. Subjects treated for OSAS or under beta-blockers were excluded from analyses. Results: MeanSD %VLFI was 5.983.28 in men and 4.11±2.40 in women (p<0.0001; interaction %VLFI*sex, p<0.0001). Higher %VLFI values were found in subjects reporting SDB (n=137) compared to controls (n=1200) (5.773.17 vs. 4.932.99; p=0.002). Exposure to noise levels >35 dB(A) at night was significantly associated with increased %VLFI in men (OR: 1.54; CI: 1.03-2.32; p=0.036), but not in women (OR: 0.96; CI: 0.65-1.40; p=0.825). Conclusion: In this large population, the %VLFI index derived from the 24h-ECG proved useful to corroborate reports of SDB. This study suggests that nocturnal noise is an independent factor for OSAS in men, but not in women.

