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Associations between road traffic noise, air pollution and incidence of dementia in the Danish Nurse Cohort

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ABSTRACT

Several studies suggest associations between road traffic noise and incidence of dementia. However, findings are inconsistent when air pollution, a recognized risk factor for dementia, is considered. We investigated associations between road traffic and incidence of dementia adjusting for air pollution. We followed 26,461 women from the Danish Nurse Cohort from baseline (1993 or 1999) until their first hospital contact or 2nd prescription of dementia medication, whichever came first until 2021 using Danish registers. Annual mean of air pollution ($PM_{2.5}$ and NO_2) and road traffic noise estimates (L_{den}) were modelled at nurses' residential address using DEHM/UBM/OPSM and Nord2000 models, respectively. We applied time-varying Cox models to estimate associations between 10- year running mean of L_{den} and dementia. Models were adjusted for baseline year, individual lifestyle, socio-economic factors and municipality characteristics. A total of 1557 cases of dementia were diagnosed during the follow up. Median L_{den} exposure was 53.2 dB (interquartile range - 9.3 dB). We detected weak positive association between L_{den} and dementia incidence with hazard ratio (HR) of 1.05 per IQR and 95% confidence interval (0.97-1.13). Associations with noise diminished when adjusting for NO_2 (1.00; 0.92-1.08), but not when adjusting for $PM_{2.5}$ (1.04; 0.96-1.12). Our results show a weak association between noise and dementia incidence, which in part may be explained by traffic-related air pollution, but seem independent of effects of $PM_{2.5}$.

Keywords (3-6): Noise, Road Traffic, Dementia, Air Pollution, Cohort Study