

Exposure to particulate matter and risk of dementia in subjects with mild cognitive impairment

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Background:

Exposure to air pollutants increases the risk of several chronic diseases, possibly including neurodegenerative disease such as Alzheimer's dementia. In this study, we aimed to evaluate the effect of long-term exposure to a major outdoor air pollutant, particulate matter $\leq 10\mu\text{m}$ (PM10), on the risk of dementia in a cohort of subjects with mild cognitive impairment.

Methods:

We recruited a cohort of 53 subjects newly diagnosed with mild cognitive impairment residing in Modena and Reggio Emilia provinces. We geocoded their residence address, and we estimated their exposure to PM10 from motorized traffic using a validated air dispersion model. We investigated the relation of baseline exposure to subsequent conversion to dementia using a Cox proportional hazards model. We computed hazard ratio (HR) and 95% confidence interval (CI) of dementia according to increasing PM10 exposure, adjusting for sex, age, and education.

Results:

During a median follow-up of 42 months, 24 participants developed dementia, 19 of Alzheimer's type. Baseline average PM10 exposure concentrations were $9.6\mu\text{g}/\text{m}^3$. Using PM10 levels below $5\mu\text{g}/\text{m}^3$ as reference, we found a dose-response increase in any dementia risk, with a HR of 1.04 (95% CI 0.41-2.66) $5\text{-}10\mu\text{g}/\text{m}^3$, 1.32 (95% CI 0.36-4.92) at $10\text{-}20\mu\text{g}/\text{m}^3$, and 1.38 (95% CI 0.14-13.13) above $20\mu\text{g}/\text{m}^3$.

Conclusions:

Using a cohort study design, we found that exposure to outdoor PM10 was associated with increased risk of conversion from mild cognitive impairment to dementia. However, the limited study size suggests caution in the interpretation of this finding.

Key messages:

- Air pollution may be a risk factor for dementia.
- Dementia risk may be linked to modifiable environmental risk factors.