Long-term air pollution exposure and diabetes in a population-based Swiss cohort

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Air pollution is an important risk factor for global burden of disease. There has been recent interest in its possible role in the etiology of diabetes mellitus. Experimental evidence is suggestive, but epidemiological evidence is limited and mixed. We therefore explored the association between air pollution and prevalent diabetes, in a population-based Swiss cohort. We did cross-sectional analyses of 6392 participants of the Swiss Cohort Study on Air Pollution and Lung and Heart Diseases in Adults [SAPALDIA], aged between 29 and 73 years. We used estimates of average individual home outdoor PM10 [particulate matter >10 \( \mu \text{m} \) in diameter] and NO2 [nitrogen dioxide] exposure over the 10 years preceding the survey. Their association with diabetes was modeled using mixed logistic regression models, including participants’ study area as random effect, with incremental adjustment for confounders. There were 315 cases of diabetes (prevalence: 5.5% [95% confidence interval (CI): 2.8, 7.2%]). Both PM10 and NO2 were associated with prevalent diabetes with respective odds ratios of 1.40 [95% CI: 1.17, 1.67] and 1.19 [95% CI: 1.03, 1.38] per 10 \( \mu \text{g/m}^3 \) increase in the average home outdoor level. Associations with PM10 were generally stronger than with NO2, even in the two-pollutant model. There was some indication that beta blockers mitigated the effect of PM10. The associations remained stable across different sensitivity analyses. Our study adds to the evidence that long term air pollution exposure is associated with diabetes mellitus. PM10 appears to be a useful marker of aspects of air pollution relevant for diabetes. This association can be observed at concentrations below air quality guidelines.