Susceptibility factors and long term effects of air pollution: mortality among 3 sub-cohorts of the Italian Longitudinal Study. Results of the LIFE MED HISS project (LIFE12 ENV/IT/000834)


1. Environmental Epidemiologic Unit, Regional Agency for Environmental Protection, Piedmont Region, Italy
2. ScADU Epidemiology ASL TO3, Piedmont Region, Italy
4. Department of Management, University of Torino, Italy
5. Department of Clinical and Biological Sciences, University of Torino, Italy

Corresponding author: cecilia.scarinzi@unito.it

Introduction

There are few cohort studies assessing the effects of susceptibility factors to long term exposure to air pollution. The objective of the study was to estimate the impact of air pollution on mortality among people affected by diabetes, cardiovascular diseases (cvd) and respiratory diseases and to evaluate the role of age as a possible effect modifier.

Methods

The study is based on a 13 years follow-up for mortality in three sub-cohorts of susceptible members (with diabetes, cvd or respiratory diseases) belonging to the Italian Longitudinal Study (1999-2012) that included 1,449 Municipalities. Two age classes were analysed: ≥ 35 years and ≥ 65 years at baseline. The exposure (to PM2.5 and NO2 as annual mean of the municipality of residence) was based on modeled data with spatial resolution of 4x4 Km² that were first integrated with measured values and then up-scaled at municipality level. Simulated gridded data for 5 calendar years from 1999 to 2010 were available in the national database and used in these analyses.

Self-reported diseases, collected in the National Health Interview Survey, were used to recruit the three sub-cohorts of susceptible. Natural and cause-specific mortality risks were computed using a multivariate time-dependent Cox model, controlling for individual confounders (age, gender, educational level, body mass index, smoking status, activity status, physical activity status, living alone status, indicator of urban/rural municipality status) and testing the assumption of proportional risks and effect modification. Pearson and Spearman correlation coefficients were calculated in addition to univariate descriptive analyses. We computed hazard ratios (HRs) and 95% robust confidence intervals (CI) adjusted for family within each municipality (correlated observation) with regard to the sampling design of the Italian Health Interview survey. The results are shown according to a 10 µg/m³ increase in exposure.

Conclusion

Pre-existing diseases or age over 65 years (data not shown) turned out to be relevant risk modifiers, associated with a higher impact of air pollution. The role played by the health characteristics of these subjects needs more comprehension. The result for bladder cancer among diabetics deserves in-depth analyses. These results are relevant for a better environment and health governance, in order to support and address national and local policy-makers to implement effective public health preventive measures for more susceptible populations.