

Residential cohort study to assess the impact of emissions released by a cement plant on the health status of the population residing in Pederobba (Veneto Region, Northern Italy)

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ABSTRACT

OBJECTIVES

To assess the impact of a cement plant emissions on mortality, hospitalizations, and cancer incidence in the residents of the municipality of Pederobba (Veneto Region, Northern Italy).

DESIGN

Retrospective residential cohort study.

SETTING AND PARTICIPANTS

The study was conducted in Pederobba and in 7 neighbouring municipalities (Cavaso Del Tomba, Cornuda, Crocetta del Montello, Monfumo, Segusino, Valdobbiadene, Vidor). The cohort included 12,116 residents in Pederobba (151,784 person-years) and 49,004 residents in the neighbouring municipalities (660,268 person-years) in the period 1996-2017. On the basis of the model estimate of the annual average concentration of nitrogen dioxide (NO₂), the municipality of Pederobba was divided into an area with higher exposure of NO₂ and another one at lower exposure of NO₂. Two comparisons were made: the first between the residents in Pederobba and residents in the neighbouring municipalities; the second between people residing in Pederobba in the higher and in the lower exposure areas.

MAIN OUTCOME MEASURES

Analysis of cause-specific mortality and hospitalization and cancer incidence, with particular attention to the diseases for which there is evidence of association with exposure to air-pollutants. For cancer incidence, available data were limited to the municipalities of Pederobba, Cavaso Del Tomba, Cornuda, Crocetta del Montello, and Monfumo for the period 1996-2015.

RESULTS

The comparison among Pederobba and the 7 neighbouring municipalities showed that within Pederobba residents there was: a slight increase in the risk of death from all causes in women, due to circulatory diseases (HR 1.29; 95%CI 1.15-1.45), in particular ischaemic heart disease (HR 1.55; 1.27-1.89) and cerebrovascular diseases (HR 1.35; 1.06-1.72); a moderate increase in hospitalizations for circulatory diseases, such as heart failure (HR 1.17; 1.00-1.37) and cerebrovascular diseases (HR 1.41; 1.17 -1.70), especially in elderly women; a slight increase in hospitalizations for respiratory diseases, especially in older women (HR 1.19; 1.04-1.37); no difference were observed in cancer incidence, neither for all nor for single cancer sites, in both genders. The comparison between residents in the higher exposure area and those in the lower exposure area showed no difference in mortality, hospitalizations, and cancer incidence.

CONCLUSIONS

Higher mortality and hospitalization rates from circulatory and respiratory causes detected in Pederobba compared to the neighbouring municipalities were not confirmed by the comparison between residents in the higher and in the lower exposure area. Overall, data did not show a clear, well-characterized relationship between the exposure to pollutants emitted by the cement plant and the onset of chronic diseases. The excess of mortality and hospitalization for cardiovascular and cerebrovascular diseases, reported especially in older women, deserves further investigation, because of the complex cause-effect relations of these diseases.

Keywords: residential cohort; cement plant; dispersion model; georeferencing; health outcomes.

FULL TEXT

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