AMERICAN JOURNAL OF INDUSTRIAL MEDICINE
INCORPORATING ENVIRONMENTAL AND OCCUPATIONAL HEALTH

Volume 50, Issue 3
March 2007
Pages 208-216

Article

Socioeconomic status, particulate air pollution, and daily mortality: Differential exposure or differential susceptibility

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First published: 17 July 2006 | https://doi.org/10.1002/ajim.20368 | Cited by: 125

Abstract

Background

Short-term increases in particulate air pollution are linked with increased daily mortality and morbidity. Socioeconomic status (SES) is a determinant of overall health. We investigated whether social class is an effect modifier of the PM_{10} (particulate matter with diameter <10 micron)-daily mortality association, and possible mechanisms for this effect modification.

Methods

Area-based traffic emissions, income, and SES were available for each resident in Rome. All natural deaths (83,253 subjects) occurring in Rome among city residents (aged 35+ years) during the period 1998–2001 were

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Citations: 125

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Keywords

air pollution income mo
particulate matter
socioeconomic status

Publication History

Issue Online:

identified. For each deceased individual, all the previous hospitalizations within 2 years before death were available via a record linkage procedure. PM_{10} daily data were available from two urban monitoring sites. A case-crossover analysis was utilized in which control days were selected according to the time stratified approach (same day of the week during the same month). Conditional logistic regression was used.

Results

Due to the social class distribution in the city, exposure to traffic emissions was higher among those with higher area-based income and SES. Meanwhile, people of lower social class had suffered to a larger extent from chronic diseases before death than more affluent residents, especially diabetes mellitus, hypertension, heart failure, and chronic obstructive pulmonary diseases. Overall, PM_{10} (lag 0–1) was strongly associated with mortality (1.1% increase, 95%CI = 0.7–1.6%, per 10 μg/m^3). The effect was more pronounced among persons with lower income and SES (1.9% and 1.4% per 10 μg/m^3, respectively) compared to those in the upper income and SES levels (0.0% and 0.1%, respectively).

Conclusions

The results confirm previous suggestions of a stronger effect of particulate air pollution among people in low social class. Given the uneven geographical distributions of social deprivation and traffic emissions in Rome, the most likely explanation is a differential burden of chronic health conditions conferring a greater susceptibility to less advantaged people. Am. J. Ind. Med. 50: 208–216, 2007. © 2006 Wiley-Liss, Inc.

21 February 2007

Version of Record online:
17 July 2006

Manuscript accepted:
22 May 2006

Citing Literature

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