

Short-Term Exposure to Particulate Matter and Asthma: A Link Between Environment and Respiratory Emergencies

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Rationale The present study evaluates the impact of short-term exposure to Particulate Matter (PM) on the Emergency Department admissions and hospitalizations for Asthma Exacerbation (AE) in Brescia, known for being among the European cities, one with the highest yearly levels of airborne pollutants. **Methods** A dedicated database with ED Admission records, starting from January 1st, 2014 to December 31st, 2017, has been created for this study. Only records related to Asthma Exacerbation events have been considered. Daily mean PM concentrations were collected in the same database. PM data have been provided by the Environmental Protection Regional Agency (ARPA). A single and multiple day-lagged time series analysis has been performed, and the results have been expressed in terms of Relative Risk (RR) and Excess of Relative Risk (ER) for a 10µg/m³ increase in PM₁₀ and PM_{2.5} concentration. **Results** 543 admission records have been added to the database. For the immediate exposure effects of PM 2.5 (lag0-1), a RR (CI 95%) increase of 1.24 and an ER of 24.15% for ED visits. For the multiple-day airborne exposure (lag0-5), a RR (CI95%) of 1.12 and an ER of 12.53% have been found (p≤0.05). Studying the immediate exposure effects (lag0-1) on the population living exclusively in the city, we obtained a RR (CI95%) for PM₁₀ and PM_{2.5}, respectively, of 1.21 and 1.34 with ERs of 20.82% and 33.75% (p<0.05). Finally, we evaluated the RR and ER of hospitalizations. As an immediate exposure effect (lag0-1), we found a RR (CI95%) of 1.31 and an ER of 30.67% for PM_{2.5} (p<0.05). **Conclusions** In the last two decades, increased interest in airborne pollutants' effects on public health has been raised. In this picture, PM plays a crucial role in the onset and worsening of several respiratory diseases. In this work, we observed that short-term PM_{2.5} exposure plays a critical role in inducing Asthma Exacerbation-related ED visits, and hospitalizations.

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