Air pollution exposure during pregnancy and symptoms of attention deficit and hyperactivity disorder in children in Europe


doi: 10.1097/EDE.0000000000000874.

Abstract

BACKGROUND:
Exposure to air pollution during pregnancy may increase attention-deficit/hyperactivity disorder (ADHD) symptoms in children, but findings have been inconsistent. We aimed to study this association in a collaborative study of eight European population-based birth/child cohorts, including 29,127 mother-child pairs.

METHODS:
Air pollution concentrations [nitrogen dioxide (NO2) and particulate matter (PM)] were estimated at the birth address by land-use regression models based on monitoring campaigns performed between 2008 and 2011. We extrapolated concentrations back in time to exact pregnancy periods. Teachers or parents assessed ADHD symptoms at 3-10 years of age. We classified children as having ADHD symptoms within the borderline/clinical range and with in the clinical range using validated cut-offs. We combined all adjusted area-specific effect estimates using random-effects meta-analysis and multiple imputation and applied inverse probability weighting methods to correct for loss to follow-up.

RESULTS:
We classified a total of 2,801 children as having ADHD symptoms within the borderline/clinical range, and 1,590 within the clinical range. Exposure to air pollution during pregnancy was not associated with a higher odds of ADHD symptoms within the borderline/clinical range (e.g., adjusted odds ratio (OR) for ADHD symptoms of 0.95, 95% confidence interval (CI) 0.89-1.01 per 10µg/m increase in NO2 and 0.98, 95%CI 0.80-1.19 per 5µg/m increase in PM2.5). We observed similar associations for ADHD within the clinical range.

CONCLUSIONS:
There was no evidence for an increase in risk of ADHD symptoms with increasing prenatal air pollution levels in children aged 3 to 10 years.