

AIR POLLUTION EXPOSURE DURING PREGNANCY AND MATERNAL AND FETAL C-REACTIVE PROTEIN LEVELS. THE GENERATION R STUDY

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Background and Aims Exposure to air pollution has been associated with increased levels of the inflammatory marker C-reactive protein. We investigated the associations of exposure to particulate matter (PM₁₀) and nitrogen dioxide (NO₂) during pregnancy with high-sensitivity C-reactive protein (hs-CRP) levels in mothers in first trimester and neonates in a population-based cohort study among 7339 pregnant women in Rotterdam, the Netherlands.

Methods Air pollution levels were modelled at the home address using a combination of advanced GIS based modelling and hourly monitoring data. For different periods preceding the blood sampling, average exposures to air pollution were assessed. Hs-CRP levels were measured in maternal blood samples collected in early pregnancy and in cord blood samples. Hs-CRP levels were log-transformed and multivariate linear and logistic regression analyses were performed. Models were adjusted for known determinants of CRP levels (maternal age, body mass index, ethnicity, education, parity, folic acid supplementation use, smoking, and alcohol consumption), and for season of conception and road traffic noise exposure.

Results Mean exposure levels during pregnancy were 30.3 •g/m³ (SD 3.2) for PM₁₀ and 39.8 •g/m³ (SD 4.2) for NO₂. In early pregnancy, higher air pollution exposure levels were not associated with hs-CRP levels. An increase in PM₁₀ and NO₂ exposure levels during pregnancy was associated with an increased risk of detecting a hs-CRP level above 1.00 mg/L in neonates (odds ratio 2.37, 95% confidence interval 1.16 to 4.88).

Conclusions Maternal exposure to higher PM₁₀ and NO₂ levels during pregnancy was associated with increased fetal hs-CRP levels. In contrast, maternal air pollution exposure was not associated with hs-CRP levels in early pregnancy. Our results suggest that maternal exposure to air pollution during pregnancy may promote the inflammatory process in neonates.