

POSTER PRESENTATION

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Placental nitrosative stress and in utero exposure to particulate matter

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Background and aims

A wide variety of adverse health effects on both fetuses and neonates have been ascribed to particulate matter (PM) air pollution. Recent evidence suggests that PM exposure results in increased oxidative and nitrosative stress. In the ENVIRONAGE birth cohort, we investigated the association of placental 3-nitrotyrosine (3-NT) with PM exposure during various time windows of pregnancy.

Methods

3-NT levels were measured in 341 placental tissue samples, selected from the ENVIRONAGE birth cohort, using a competitive ELISA. Daily PM₁₀ and PM_{2.5} exposure levels were interpolated for each mother's residential address using a spatiotemporal interpolation method in combination with a dispersion model. Multiple linear regression models were used to assess the association between 3-NT and PM exposure for different pregnancy windows.

Results

The placental 3-NT level, adjusted for gender, gestational age, maternal age, pre-gestational BMI, smoking status, and warm or cold period at delivery, raised with 31.0% ($p = 0.0008$) for an interquartile range increment in whole pregnancy PM_{2.5} exposure. The association was driven by PM_{2.5} exposure during the first trimester (25.7 %, $p = 0.01$) and second trimester (37.0%, $p = 0.003$) of pregnancy.

Conclusions

We observed a positive association between 3-NT levels in the placenta and PM_{2.5} exposure during whole pregnancy.

Our findings, which are in line with experimental evidence on cigarette smoke and diesel exhaust exposure, indicate the influence of PM exposure during pregnancy on placental oxidative stress. The impact of placental 3-NT with regard to PM exposure on newborn's health needs further elucidation.

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