

TIME WINDOW OF EXPOSURE IN THE RELATION TO PRETERM BIRTH FROM AMBIENT AIR POLLUTION

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Background and Aims: Whether air pollution contributed to preterm birth is as yet unanswered with the previous evidence pointing in different directions, but none of the previous epidemiological studies has elaborated the susceptible embryologic period of preterm birth. The study was to assess the time window of exposure and its role in the relation between ambient air pollution and the risk of preterm birth.

Methods: We conducted a nation-wide cross-sectional study of 1,490,247 singleton Taiwanese births in 2001-2007 using information from the Birth Registry. The outcome of interests was preterm delivery (gestational age < 37 weeks). The exposure assessment was based on residential address during pregnancy, and applied geographic information system (GIS) to integrate monthly air pollutant data from 72 EPA monitoring stations which was interpolated to pollutant surfaces using inverse distance weighting method (IDW). The effect estimates were presented as odds ratios per 10 ppb changes for O₃, NO₂, 10 µg/m³ changes for PM₁₀, 1 ppb changes for SO₂ and 100 ppb changes for CO.

Results: In the logistic regression adjusting for confounding, the risk of preterm birth was increased in relation to the first (adjusted OR=1.031, 95% CI: 1.026, 1.037), second (adjusted OR=1.015, 95% CI: 1.010, 1.021), and third (adjusted OR=1.025, 95% CI: 1.019, 1.031) trimester O₃. The effect estimates for preterm birth were significantly elevated during the third (adjusted OR=1.010, 95% CI: 1.006, 1.014) trimester PM₁₀ exposure.

Conclusions: The study provides evidence that exposure to outdoor air O₃ and PM₁₀ may increase the risk of preterm birth and the most susceptible time periods are during the whole pregnancy for O₃ and third trimester of gestation for PM₁₀.