Breastfeeding decreases the respiratory health effects of air pollution in children: The Seven Northeastern Cities (SNEC) Study

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Introduction

- Breastfeeding and exposure to ambient air pollution are both important factors for respiratory symptoms and illness in children.
- Evidence suggests that breastfeeding may reduce the risk of environmental risk factors on children’s respiratory systems.

Objective

- To evaluate whether breastfeeding modifies the effects of air pollution on children’s respiratory symptoms and asthma

Methods

- 31,049 Chinese children, ages 2 to 14 years old, were selected from 25 elementary schools and 50 kindergartens within the SNEC in China.
- Parents of selected children completed questionnaires that characterized the children’s histories of respiratory illness, associated risk factors, and means of feeding.
- Three-year average concentrations of particles with an aerodynamic diameter ≤10 μm (PM10) of sulfur dioxide (SO2), nitrogen dioxide (NO2), and Ozone (O3) were calculated from monitoring stations in each of the 25 study districts among the SNEC.
- The 25 districts were selected to maximize the range of exposures and to obtain a variety of profiles exposed to a mix of criteria air pollutants measured in Northeast China (see Figure 1).
- The association of air pollution with reported symptoms and illness was examined in participating children who were breastfed and children who were not breastfed.

Results

- Breastfeeding modified the effect of exposure to air pollution in children: statistically significant effects were observed for the interactions between air pollution and breastfeeding on child respiratory symptoms and illness.
- All non-breastfed children exhibited positive associations between all pollutants and the risks of all surveyed respiratory illness and symptoms.
- Compared to children who had been breastfed for at least 3 months, children who were not breastfed exhibited consistently stronger effects of air pollution on respiratory symptoms and asthma. Odds ratios (ORs) ranged from 1.17 per 21 μg/m³ increase in NO2 for current wheeze (95% confidence interval (CI), 1.00–1.37) to 1.42 per 10 μg/m³ increase in NO2 for phlegm (95% CI, 1.18–1.72).
- Stronger interactions were observed among kindergartners than among elementary school children.

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References


Discussion

- Few published studies exist regarding the interaction between air pollution and breastfeeding on respiratory symptoms and illness among children.
- The effect of breastfeeding may be due to the anti-infectious and anti-inflammatory factors found within breast milk.2,3 Human milk contains a number of components that support the infant’s host defense immune system, both passively and actively.
- Further research should address the timing, frequency, and duration of breastfeeding during the first six months of a child’s life and clarify the etiologic relationships and public health implications of these present findings.

![Figure 1. Locations of the SNEC, China](image-url)