

CAN AIR POLLUTION IN PREGNANCY AFFECT BABY’S COGNITIVE DEVELOPMENT?

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Exposure to air pollution during pregnancy has been linked with adverse birth outcomes.¹

Sarajevo was named the most polluted capital city in Europe in 2022, with an average PM2.5 concentration of 32.4µg/m³.²

World Health Organization Recommended Air Quality Guideline Levels ³		
Pollutant (µg/m ³)	Averaging time	AQG level (µg/m ³)
Particulate matter _{2.5}	Annual	5
Particulate matter ₁₀	Annual	15

‘Rapid cell division occurs during fetal development and is, therefore, a critical window of exposure to adverse environmental pollutants’

Royal College of Obstetricians & Gynaecologists (RCOG) Position Statement⁴

High-efficiency particulate air (HEPA) filters can improve indoor air quality by removing particulate matter. Additionally, adequate airflow and the use of multiple air cleaners can improve the effectiveness of HEPA air cleaners.⁵

Portable HEPA Filter Air Cleaner Use during Pregnancy and Children’s Cognitive Performance at Four Years of Age: The UGAAR Randomized Controlled Trial⁶

Objective ❖ To assess the **impact of reducing exposure to particulate matter** during pregnancy on **children’s cognitive performance** at 4 years of age

Methods

- A **single-blind, parallel-group, randomized controlled trial** assigned 540 nonsmoking pregnant women to receive portable HEPA filter air cleaners or no air cleaners.
- The cleaners were used from a median of 11 weeks gestation till the end of pregnancy.
- The primary outcome was **Full-scale intelligence quotient (FSIQ)** assessed via the Wechsler Preschool and Primary Scale of Intelligence, Fourth Edition (WPPSI-IV).

Results

- ✓ The mean FSIQ score of children born to mothers in the intervention group was **2.5 points higher** than that of the control group, but this difference was **not statistically significant** (95% CI, -0.4 to 5.4).
- ✓ Aside from verbal comprehension, the two groups had **no statistically significant differences** in the remaining domains of the **Wechsler scale**.

WPPSI-IV Composite scores, mean (SD)

Index	Intervention	Control
FSIQ	99.8(13.9)	97.3 (15.2)
Verbal comprehension	100.8(16.1)	97.3(16.5)
Working memory	104.3(14.3)	103(15.1)
Processing speed	99.6 (13.7)	99.0(14.1)
General ability	99.6(14.7)	96.9(15.9)
Cognitive proficiency	102.6(13.8)	101.5(15.0)

Our thoughts:

- A complex interplay of numerous prenatal and postnatal factors influences a child’s intelligence quotient.⁷
- The authors themselves recognized that the study was limited by an insufficient sample size to assess the impact of the intervention on an outcome with so many confounders.
- Therefore, a larger or better-controlled trial may be necessary.
- As this study was conducted in a region with a high level of air pollution, more research may also be needed to determine the generalizability of the findings in a different setting.

References

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