Study Summary

Effects of Metal Mixture Exposure During Pregnancy on Fetal Growth

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Who sponsored this study?

This research was supported by the Environmental influences on Child Health Outcomes (ECHO) program, Office of The Director, National Institutes of Health.

Why was this study needed?

Exposure to toxic metals can harm fetal growth (how much a baby grows during pregnancy), while nutritionally essential metals can support fetal growth. Previous research studying the effects of metals during pregnancy on fetal growth has usually focused on one metal at a time. However, most people are exposed to multiple metals, which may have complex effects on fetal growth. Therefore, combining data from three ECHO cohorts representing different geographic regions in the U.S., the research team looked at how maternal exposure to multiple metals affects fetal growth, an important indicator of future health.

Who was involved?

This study included approximately 1,000 pairs of mothers and newborns who are participating in three ECHO cohorts:

1) The MADRES study, a predominantly lower income Hispanic cohort in Los Angeles, California
2) The NHBCS, a primarily non-Hispanic white cohort in northern New England
3) The PROTECT study, a Hispanic cohort in northern Puerto Rico.

What happened during the study?

The research team combined data from the three cohorts to measure multiple metals in the mothers’ urine samples collected during pregnancy. They then looked at associations between seven metals and birth weight for gestational age using a multi-chemical mixture approach. Birth weight for gestational age is commonly used as a measure for fetal growth.

What were the study results?

Researchers found that combined exposure to all metals in the mixture did not affect birth weight. Mothers with high levels of the metal antimony in their urine had smaller babies across all three of the ECHO cohorts. Two other metals – cadmium and molybdenum – had no impact on fetal growth. Findings for other metals (cobalt, mercury, nickel, tin) varied depending on the study population and whether the baby was male or female.
Footnote: Results reported here are for a single study. Other or future studies may provide new information or different results. You should not make changes to your health without first consulting your healthcare professional.

Impact

This study used an approach that looked at multiple chemicals at once, in contrast to previous studies that have typically evaluated one chemical at a time. The findings suggest that antimony, an understudied metalloid, may harm fetal growth in different populations across the United States.

What happens next?

Since antimony may harm fetal growth, it is important to identify major sources of exposure to this metal so that exposure can be reduced for pregnant women. In future studies, the team would like to include more ECHO cohorts in their research, explore other indicators of metal exposures (such as placental measures of metals), and identify time periods when toxic and essential metal exposures are most harmful or beneficial for pregnant women and their children.

Where can I learn more?

The full journal article, titled “Prenatal metal(loid) mixtures and birth weight for gestational age: a pooled analysis of three cohorts participating in the ECHO Program” is published in Environment International.

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