ECHO
Environmental influences on Child Health Outcomes
A program supported by the NIH

Study Summary

ECHO Study Investigates Relationship Between Chemical Exposures, Pregnancy Stress, & Birth Outcomes

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Who sponsored this study?

The Environmental influences on Child Health Outcomes (ECHO) Program, Office of the Director, National Institutes of Health supported this research.

Why was this study needed?

Most previous research on the effects of chemical exposures on birth outcomes has focused on a small number of well-established chemicals, such as bisphenol A (BPA) and certain phthalates. However, there are over 350,000 chemicals registered for global use, and the impact of many emerging or understudied chemicals on birth outcomes is not well understood. Additionally, prior studies have not adequately considered how different kinds of maternal stress (such as anxiety, depression, and adverse childhood experiences) might influence the effects of chemical exposures during pregnancy. This study examined a broader range of chemicals and evaluated the role of stress in influencing their associations with birth outcomes.

What were the study results?

Exposure to chemicals found in certain consumer and industrial products (such as phthalates, bisphenols, and insecticides) was associated with shorter pregnancies among women who experienced anxiety during pregnancy or in the early postpartum period. Depression modified how exposure to certain chemicals (such as phthalates, parabens, and insecticides) affected birthweight and length of pregnancy. Some chemicals positively correlated with length of pregnancy (duration) for mothers with more depression, while others were associated with lower birthweights when mothers had more depression symptoms. The study suggested that the effects of a mother's stress on the relationship between chemical exposures and birth outcomes depended on the type of chemical and type of stressor experienced.

What was the study's impact?

This study found that exposure to chemicals commonly found in consumer products was associated with shorter pregnancies and lower birthweights among women experiencing anxiety during or after pregnancy. While the results were mixed, the researchers observed some patterns where effects of chemical exposures were strongest among mothers who experienced depression and anxiety. These findings suggest that screening for depression and anxiety during pregnancy could help identify women who may be at a higher risk of adverse birth outcomes.

Who was involved?

The study included 1,556 mother-child pairs from 11 ECHO Cohort Study Sites. 810 of these participants provided information on perceived stress, depression, and anxiety. Additionally, 889 participants provided information on adverse childhood experiences.

What happened during the study?

Pregnant participants provided urine samples, which researchers analyzed for 113 chemicals from 10 chemical classes. Pregnant participants also reported on their stress, depression, anxiety, and adverse childhood experiences. Researchers collected information on each mother's birth outcomes, including the length of their pregnancy (in weeks) and the baby's birthweight. The researchers performed statistical analyses to examine associations between chemical exposures, stress, and birth outcomes.

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.

What happens next?

Additional studies looking at the combined effects of multiple combined exposures could help researchers better understand the role of these factors in influencing birth outcomes. Future research could also further investigate potential biological effects of maternal adverse childhood experiences.

Where can I learn more?

Access the full journal article, titled "Psychosocial Stressors as Modifiers of the Associations Between Well-Studied and Understudied Chemicals and Birth Outcomes in the ECHO Cohort," in *Environmental Pollution*.