Exposure to Common Type of Pesticide During Pregnancy Was Not Linked to Autism-Related Traits in Children

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KEY TAKEAWAY:

- Exposure to organophosphates, a common type of pesticide, during pregnancy was not associated with more autism-related traits in children.

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?

Organophosphate pesticides are a type of chemical used to control insects on crops. People in the United States may be exposed to low levels of these pesticides through food, especially non-organic produce. These chemicals are known to affect the nervous system, and past studies have consistently linked prenatal organophosphate pesticide exposure to neurodevelopmental outcomes such as thinking and learning problems and attention-deficit hyperactivity disorder (ADHD). However, the research on their link to autism spectrum disorder (ASD) or autism-related traits in children have been mixed. Many studies have had smaller sample sizes or focused on populations with higher pesticide exposure. ECHO researchers wanted to know whether lower level organophosphate pesticide exposure during pregnancy was associated with autism-related traits in children in a large, geographically diverse U.S. sample. They also looked at whether associations differed for girls and boys or were influenced by maternal diet.

What were the study results?

Overall, prenatal exposure to certain pesticides was not associated with an increase in autism-related traits in children. Researchers measured exposure by looking at levels of pesticide-related metabolites—substances produced when the body processes or breaks down certain pesticides—in the participant's urine during pregnancy.

After accounting for several other factors, higher prenatal levels of these pesticide-related metabolites were not linked to higher scores on a questionnaire that measures autism-related social and behavioral traits. Results were similar when researchers looked separately at girls and boys, when they focused on children with higher autism-related trait scores, and when they included available information about maternal diet.

What was the study's impact?

Given evidence of other neurodevelopmental harms, this study should not be interpreted to mean that these chemicals are safe. However, this study adds to evidence that exposure to this type of pesticide at relatively low levels commonly seen in the general U.S. population may not meaningfully contribute to autism-related traits in childhood. Future studies may collect urine

samples at multiple points during pregnancy to better understand pesticide exposure over time, assess links with pesticide mixtures, and focus on particularly vulnerable populations, such as those who are highly exposed or have genetic factors that increase susceptibility.

Who was involved?

Researchers used data from 3,339 mother-child pairs from 20 ECHO Cohort Study Sites across the United States. The analysis included participants who were recruited from 1997 – 2019.

What happened during the study?

During pregnancy, mothers provided urine samples that were later tested for pesticide-related metabolites. Caregivers reported children's autism-related traits using the Social Responsiveness Scale (SRS), a questionnaire that measures social communication and related behaviors often associated with autism. Children were between ages 2 and 19 when autism-related traits were assessed, with an average age of about 6 years. Researchers used statistical models to examine whether higher prenatal levels of these pesticide-related metabolites were linked to higher SRS scores or to scores high enough to suggest at least mild autism-related traits. They also looked at whether results differed by child sex and whether maternal diet affected the findings.

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.

Where can I learn more?

Access the full journal article, titled "Prenatal Organophosphate Exposure and Autism-Related Traits in Children: Results in the ECHO Cohort" in *JAMA Pediatrics*.

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