

Prenatal cigarette, cannabis exposure may have associations with childhood obesity

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Childhood obesity rates continue to rise in the United States, putting kids at risk for asthma, sleep apnea, type 2 diabetes, and other health conditions. Children prenatally exposed to both tobacco and cannabis

had a 12 times higher risk for obesity by middle childhood (9–12 years of age) compared to non-exposed children, according to recent research, although more research is needed to determine if other factors account for these findings.

Rina Das Eiden, professor of psychology and Social Science Research Institute (SSRI) cofunded faculty member at Penn State, and Kai Ling Kong, associate professor of pediatrics at Children's Mercy Hospital Kansas City and the University of Missouri-Kansas City School of Medicine, began collaborating on the project when they were colleagues at the University of Buffalo, along with co-lead Payanotis Thanos, senior research scientist, and a team of collaborators.

"Two of the most commonly used substances during pregnancy are cigarettes and cannabis, and they are often used together," said Eiden. "While we know about the risks of prenatal tobacco exposure and [child obesity](#), less is known about co-exposure to tobacco and cannabis. We wanted to examine a potential relationship between prenatal co-exposure and obesity risk from birth to middle childhood."

The researchers began the project after noticing [children](#) who were participating in a larger, earlier assessment were overweight and realized that there was little known about the co-exposure effects of tobacco and cannabis use on child obesity risk.

In the larger study, all pregnant women receiving [prenatal care](#) at an urban hospital located in western New York completed a health screener. Eligible women who use cannabis and/or tobacco were invited to complete detailed measures of substance use and provide [biological samples](#) that were tested for substance use.

Pregnant participants were then assessed at the end of each trimester, with 259 women completing laboratory visits with their child at

approximately 2, 9, 16 and 24 months of child age, and again after the child entered kindergarten and during mid-childhood.

The researchers examined the difference in obesity development from birth to mid-childhood among children whose mothers used tobacco only, and both tobacco and cannabis, while pregnant. They then compared the children in the study to a demographically similar group of non-exposed children.

"We found that children in both exposure groups had a steeper increase in BMI trajectories from birth to mid-childhood, but among co-exposed children, girls had a steeper BMI increase compared with boys of the same age," Kong said. "Overall, we found 12 times higher odds of having obesity among those co-exposed than those non-exposed to tobacco and cannabis. Children in the co-exposed group also had significantly greater fat mass and fat mass percent compared with non-exposed children. Children exposed only to tobacco were not different in fat mass compared to non-exposed children."

The work appears in the journal *Pediatric Obesity*.

According to researchers, comparing the study participant groups to a control group with similar demographics is critical.

"Many previous studies failed to use appropriate comparison groups, making it challenging to determine the influence of substance exposure," said Eiden.

The researchers will continue to follow these families and plan to examine trajectories of weight and weight status over time as the children move into late adolescence. They also plan to measure interpersonal processes and health risk behaviors in adolescence in a collaboration with Pamela Schuetze, professor of psychology at SUNY

Buffalo State, and Emily Ansell, associate professor of biobehavioral health and SSRI cofunded faculty member at Penn State

Many additional studies are needed to better understand the relationship between prenatal substance exposure and children's health, especially to tease apart direct effects of exposure from other established risk factors. These include studies with a larger sample size, the authors note, as well as those that include assessment of the postnatal environment—including caregiver stress and mental health, exposure to second hand smoke, and the child's diet, physical activity, and sleep. Also essential are studies that explore the potential impact of social determinants of health such as financial strain.

"This study highlights the importance of examining prenatal exposure to substances and their risks for [obesity](#), sex differences in these associations, and the importance of providing care for [pregnant women](#) who use substances and need support," said Kong. "In the future, more research also needs to be done on children exposed to cannabis only to understand if co-exposure results were due to cannabis or a combination of both [tobacco](#) and cannabis use."

More information: Kai Ling Kong et al, Prenatal tobacco and cannabis co-exposure and offspring obesity development from birth to mid-childhood, *Pediatric Obesity* (2023). [DOI: 10.1111/ijpo.13010](https://doi.org/10.1111/ijpo.13010)

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