

Maternal obesity linked to increased risk of early-onset neonatal sepsis

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The risk of early-onset neonatal bacterial sepsis increases with maternal obesity, according to a new study of University of Michigan and the Karolinska Institute in Sweden.

Lead researcher Eduardo Villamor, a professor of epidemiology at U-M's School of Public Health, said the study builds on previous research into exposure to motherly [obesity](#) and [health risks](#) to the baby. The study has been published in *Clinical Infectious Diseases*.

"We had found that [maternal obesity](#) is related to adverse pregnancy outcomes and to some adverse developmental outcomes for the children, such as cerebral palsy and epilepsy," Villamor said. "Now we found that maternal obesity is also related to increased risk of early-onset neonatal bacterial [sepsis](#)."

"Sepsis, popularly known as [blood poisoning](#), is a generalized [bacterial infection](#) that can be fatal, and even in children who survive it can have long-lasting consequences, especially in terms of neurodevelopment."

Villamor and colleagues used a nationwide population-based retrospective cohort of about 1.9 million live singleton infants born in Sweden between 1997 and 2016.

The infants were followed through their first three days of life for a culture-confirmed sepsis diagnosis. Mothers were categorized per weight (BMI). The researchers also considered co-variables such as maternal age, country of origin, education level, cohabitation with a partner, smoking during pregnancy and year of delivery.

Villamor said sibling comparisons offered a unique opportunity to enhance causal inference by controlling associations for confounders shared within families.

"By making comparisons within the family, between full siblings with the same mother and father, you are basically controlling for everything that does not change over time, like genetics, and some predisposing characteristics," he said. "If you find that the association is the same in

the within-family comparison as it is in the conventional comparison of children independent of kinship, that enhances your ability to say there may be a causal link here.

"In the comparison among siblings, we found that when a child had had sepsis, the mother had a higher BMI before pregnancy than when she gave birth to the baby that did not have sepsis. One extra BMI unit between pregnancies, which is equivalent to about six pounds for a woman of average height and weight in this population, would translate into an 8% increase in risk of sepsis for the baby."

Villamor said they were able to map out how the risk process might lead from the mother having obesity to the child having sepsis. Maternal obesity increases the risk of preeclampsia, which leads to an emergency [cesarean section](#). Often, preeclampsia happens before term.

"If you have a combination of these events, that could explain about 50% of the potential effect of maternal obesity on sepsis," Villamor said.

"The babies of preeclamptic mothers have fewer bacteria-fighting cells in their blood, so they might be more likely to get infected.

"If they're born before term, their immune system might be immature because it didn't have time to develop in utero. And if the mother undergoes emergency C-section, that also puts them at a higher risk of infection because it is an emergency surgical procedure."

Villamor said the research may also point to a clinical solution to prevent sepsis among newborns: when [mothers](#) with obesity need an emergency C-section, they might benefit from a higher dose of prophylactic antibiotics than what is usually prescribed.

"Until now, there was not a clear clinical reason to do it, but it was a practice based on lab studies that showed that due to the obesity the

antibiotics might not reach the concentration needed to be effective," he said. "This work contributes strong evidence as to why doctors should really consider increasing the antibiotic dose when they have to do preoperative prophylaxis on a mother with obesity."

More information: Eduardo Villamor et al. Maternal obesity and risk of early-onset neonatal bacterial sepsis: Nationwide cohort and sibling-controlled studies, *Clinical Infectious Diseases* (2020). [DOI: 10.1093/cid/ciaa783](https://doi.org/10.1093/cid/ciaa783) Nardy Baeza Bickel

Provided by University of Michigan

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