

Pregnancy outcomes in overweight women improved with low-glycemic diet

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Overweight and obese women following a low-glycemic-load diet during pregnancy are less likely to deliver early, have babies with larger head circumferences and show fewer cardiovascular risk factors than women on commonly prescribed low-fat diets, finds a randomized, controlled trial led by Children's Hospital Boston and performed in collaboration with Beth Israel Deaconess Medical Center.

The researchers, led by Erinn Rhodes, MD, MPH, Dorota Pawlak, PhD, and David Ludwig, MD, PhD, of the Division of Endocrinology at Children's, randomly assigned 46 women pregnant with a single infant to follow either a low-fat diet or a low-glycemic-load (low-GL) diet, starting in the second or third trimester of pregnancy. The team then followed the women closely until delivery.

"This was one of very few studies that examine diet as an independent factor, controlling for other influences, and focusing on overweight and obese women," says Ludwig, senior investigator on the study, published online by the [American Journal of Clinical Nutrition](#) on October 20.

"We used methods that improved treatment fidelity, and allowed us to look at the effects of the different diets in a real-world setting. Our findings suggest that the amount and nature of the food a mother eats during pregnancy could have lifelong consequences for the offspring."

The low-GL diet moderately reduces total carbohydrates and replaces carbs that are rapidly digested and that raise blood sugar and insulin to high levels (such as white bread, refined breakfast cereals and juices)

with carbs that are low in sugar or release sugar more slowly (such as [whole grains](#), whole fruits, vegetables, nuts and legumes).

To encourage adherence to both diets, each group received cooking ingredients and some prepared foods and snacks, as well as written guides and regular nutritional counseling. The women were interviewed by phone at various unannounced times and asked to recall what they had eaten during the previous 24 hours.

At the end of the pregnancy, maternal weight gain and infant birth weight did not differ statistically between the diets, but there was a trend toward decreases in the low-GL group. Ludwig believes these changes would become more pronounced if the intervention were started earlier, in a larger sample of women.

However, the team did find a significant difference in [cardiovascular risk factors](#). The low-GL group had smaller increases in triglycerides (49 vs. 93 mg/dl) and in total cholesterol (13 vs. 33 mg/dl), as well as a greater decrease in C-reactive protein, a blood marker of inflammation (2.5 vs. 0.4 mg/dl). Evidence from prior observational studies suggests that increases in these risk factors during pregnancy can have implications for future heart disease.

And, unexpectedly, infants in the low-GL group had significantly longer gestations (39.3 vs. 37.9 weeks) and were less likely to be born at or before 38 weeks (13 vs. 48 percent). Prior research suggests that even infants born at 37 and 38 weeksâ€™ gestation have a 1.5- to 2-fold higher risk of adverse outcomes than those born at 39 to 40 weeks.

Infants in the low-GL group also had a larger head circumference (35 vs. 34.2 centimeters), a gross measure of brain development that predicts early-childhood IQ.

"We didn't go into the study thinking that we would see these outcomes,"

says Ludwig, who directs the Optimal Weight for Life (OWL) program at Children's. "But we think there are clear biological explanations for these findings. We would like to do a follow-up study involving much larger numbers of patients, and look into the mechanisms more intensively."

Pregnancy itself tends to cause insulin resistance and an increase in serum lipids, the paper notes. While these changes promote normal fetal nutrition and growth, they are exacerbated by obesity or excessive weight gain. As a result, obese pregnant women often develop metabolic and hormonal abnormalities, including hyperglycemia, hypertension and chronic inflammation, putting them at greater risk for diabetes, preeclampsia and preterm delivery, and ultimately for cardiovascular disease. And there is increasing evidence that these abnormalities can affect the infant's development and long-term health.

Other lines of investigation suggest that the longer gestations in the low-GL group may be related to a reduction in chronic inflammation. The low-GL group had a greater drop in C-reactive protein, a marker of inflammation that predicts preterm delivery. This reduction, coupled with the drop in cholesterol, might also have salutary effects on blood vessels, Ludwig speculates, making for a healthier placenta that is better able to sustain a pregnancy to term.

Why would a low-GL diet lead to a greater head circumference? "We don't know exactly," says Ludwig. "It may be that hormonal changes redirect calories into fat tissue, leaving fewer calories available for brain growth. Hormones affected by diet, such as insulin, could affect brain development directly."

Provided by Children's Hospital Boston

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