

Mothers' high normal blood sugar levels place infants at risk for birth problems

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Pregnant women with blood sugar levels in the higher range of normal—but not high enough to be considered diabetes—are more likely than women with lower blood sugar levels to give birth to babies at risk for many of the same problems seen in babies born to women with diabetes during pregnancy, according to a study funded in large part by the National Institutes of Health.

These problems included a greater likelihood for Caesarean delivery and an abnormally large body size at birth. Infants born to women with higher blood sugar levels were also at risk for shoulder dystocia, a condition occurring during birth, in which an infant's shoulder becomes lodged inside the mother's body, effectively halting the birth process.

The study authors declined to make recommendations for acceptable blood sugar levels for pregnant women. The researchers were unable to identify a precise level where an elevation in blood sugar increased the risk for any of the outcomes observed in the study. Rather, the chances for the outcomes were observed to increase gradually, corresponding with increases in the women's blood sugar levels.

It is well known that high blood sugar levels characteristic of the diabetes that occurs during pregnancy present risks for expectant mothers and the infants born to them. The current study is the first to document that higher blood sugar levels, not high enough to be considered diabetes, also convey these increased risks. Furthermore, when the researchers mathematically adjusted for other potential causes of these risks—such as older maternal age, obesity, and high blood pressure—the increased risks due to higher blood sugar levels were still present.

“These important new findings highlight the risks of elevated blood sugar levels during pregnancy,” said Duane Alexander, M.D., director of the NIH's

Eunice Kennedy Shriver National Institute of Child Health and Human Development, which provided much of the funding for the study. “NIH-supported studies now in progress will provide guidance on how to manage them. Until the results of those studies are available, all pregnant women should consult a health care professional about being screened for diabetes during pregnancy.”

Additional NIH funding was provided by the National Institute of Diabetes and Digestive and Kidney Diseases, and the National Center for Research Resources.

Diabetes results from difficulty transferring sugar (glucose) from the blood to the body's tissues. It occurs in roughly 5 percent of all pregnancies in the United States. Mothers with diabetes during pregnancy are also at increased risk for preeclampsia, a potentially fatal disorder involving dangerously high blood pressure. Babies born to mothers with diabetes—when they reach adulthood—are at higher risk for obesity as well as diabetes, high blood pressure, and heart disease.

The seven-year study involved more than 23,000 pregnant women at 15 centers in 9 countries.

The results of the Hyperglycemia and Adverse Pregnancy Outcomes (HAPO) study appear in the May 8 New England Journal of Medicine. The researchers were led by Boyd E. Metzger, M.D. Professor of Medicine at the Northwestern University Feinberg School of Medicine in Chicago.

Dr. Metzger explained that before the current study, physicians were not sure at which point elevated maternal blood sugar posed a risk for the baby. Frequently, high maternal blood sugar levels accompany such conditions as obesity, high blood pressure and older maternal age—all known to increase the likelihood for Caesarean delivery. For this reason, it wasn't known whether the increased risk for Caesarean delivery and other problems

seen with mild elevations in blood sugar during pregnancy were caused by the elevated blood sugar levels, or by these accompanying conditions. In their study, however, the researchers made adjustments for these accompanying conditions and found that the higher blood sugar levels still conveyed increased risks.

To conduct the study, the researchers performed an oral glucose tolerance test on each woman, from the 24th through the 32nd week of pregnancy. For the test, the women fasted, after which their blood glucose level was measured. Next, the women drank a glucose solution, and then their blood glucose was measured at predetermined intervals. Women with blood sugar levels high enough to raise safety concerns were referred for treatment and were not included in the study. The remaining women were observed throughout the study until they gave birth.

The researchers found that the higher the mother's blood sugar levels, the greater the chances that they would deliver by Caesarean section. In addition, the higher the mother's blood sugar levels, the more likely the infants were to have high insulin levels and low blood sugar levels at birth. Both conditions indicate exposure to high glucose levels in the womb. Moreover, the higher the mother's blood sugar levels, the more likely the women were to develop preeclampsia, and the more likely their infants were to be born prematurely, and to experience shoulder dystocia. So, for example, women with the lowest fasting blood sugar levels gave birth to abnormally large babies roughly 5 percent of the time, while women with the highest blood sugar level gave birth to large babies 26 percent of the time.

"These relationships are continuous and generally increase incrementally over the range of blood glucose levels we saw in the study," he said.

Source: NIH/National Institute of Child Health and Human Development

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