

Low maternal cholesterol tied to premature birth

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Pregnant women who have very low cholesterol may face a greater risk of delivering their babies prematurely than women with more moderate cholesterol levels, a team led by the National Human Genome Research Institute (NHGRI), part of the National Institutes of Health (NIH), reported today.

In a study published in the October issue of the journal *Pediatrics*, NHGRI's Max Muenke, M.D.; Robin J. Edison, M.D., M.P.H.; Kate Berg, Ph.D.; and colleagues from the NIH Clinical Center; Kennedy Krieger Institute, Baltimore; Howard University, Washington; and Greenwood Genetic Center, Greenwood, S.C., confirm previous findings by other groups that very high levels of maternal cholesterol can increase the risk of premature birth. However, in a surprising new twist, the researchers found that low maternal cholesterol levels, which may be related to a woman's genetic makeup, diet or other health factors, also may lead to adverse birth outcomes, including premature birth and low birth weight.

“Based on our initial findings, it appears that too little cholesterol may be as bad as too much cholesterol during pregnancy, but it is too early to extrapolate these results to the general population. More research is needed to replicate this outcome and to extend it to other groups,” said Dr. Muenke, the study's senior author and chief of the Medical Genetics Branch in NHGRI's Division of Intramural Research. “For now, the best advice for pregnant women is to follow the guidance of their health care providers when it comes to diet and exercise.”

Premature birth is a major cause of infant death and raises the risk of many potentially disabling conditions, including cerebral palsy, cognitive impairment, blindness, deafness and respiratory illness. Factors contributing to premature birth include maternal genetics, fetal genetics and environmental components, such as nutrition, stress, and infection.

In their study of 1,058 South Carolina women and their newborns, researchers found about 5 percent of the women with cholesterol levels in the moderate range of 159-261 milligrams per deciliter (mg/dl) gave birth prematurely. In contrast, white women with the lowest cholesterol levels — less than 159 mg/dl — had a 21 percent incidence of premature births. Interestingly, no increase in premature births was observed among African American women in the low-cholesterol category. However, full-term babies born to both white and African Americans with low cholesterol weighed 5 ounces less on average than full-term babies born to women with moderate cholesterol.

“The right amount of cholesterol is fundamental for good health, both before and after birth,” explained Dr. Muenke. “During pregnancy, cholesterol is critical for both the placenta and the developing baby, including the brain.”

As in past studies, the new research showed very high cholesterol levels (more than 261 mg/dl) to be a major risk factor for premature birth. About 12 percent of white and African American women with very high cholesterol levels gave birth prematurely.

The study involved pregnant women between the ages of 21 and 34 who were referred to South Carolina clinics for routine prenatal care between 1996 and 2001. According to their medical records, they were all nonsmokers without diabetes who were carrying just one child. It looked at cholesterol levels from their second trimester of pregnancy. Premature birth was defined as delivery before 37 weeks of gestation.

Taking into account the natural rise in maternal cholesterol during pregnancy, researchers examined the effects of maternal cholesterol levels on rates of premature delivery, impaired fetal growth and birth defects. In addition, they analyzed measurements of newborn weight, length and head circumference. No differences were seen in the rate of birth defects, but researchers did detect a trend towards smaller head sizes among babies born to women with very low cholesterol.

“This study sheds important light on the intricate biological mechanisms at work during human gestation,” said NHGRI Scientific Director Eric Green, M.D., Ph.D. “In light of these findings, researchers have a renewed impetus to establish the genetic and environmental causes of low cholesterol levels because of its relevance to pregnancy.”

In the Pediatrics paper, the NHGRI-led research team called for more studies to refine our understanding of cholesterol levels in pregnant women, and to explore the genetic, nutritional and other factors that influence maternal cholesterol. They also pointed out the need for further investigation into the differing impact of low cholesterol levels on the rates of premature delivery in white and African American mothers.

Besides the South Carolina study, Dr. Muenke and his colleagues have undertaken a number of other investigations aiming to determine the role of cholesterol in embryonic development. They have identified genes that impact congenital brain defects and established the role that cholesterol plays in modulating the actions of such genes.

Source: National Human Genome Research Institute

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