

Anemic, underweight pregnant women at greater risk for deadly hepatitis E, study suggests

January 12 2016

Researchers from the Johns Hopkins Bloomberg School of Public Health have found a link between pre-existing nutritional deficits and immune dysfunction and the risk of hepatitis E infection during pregnancy.

Hepatitis E, a virus that is largely transmitted through contaminated drinking water, can be particularly deadly in [pregnant women](#). As many as 30 percent of pregnant women who contract hepatitis E die from the infection compared with an overall mortality rate of between 0.5 to 2 percent. Hepatitis E is likely responsible for as many as 10 percent of maternal deaths in Southeast Asia.

The study, published on January 6 in the journal *American Society of Tropical Medicine and Hygiene*, is thought to be the first to identify pre-existing characteristics that lead to an increased risk of hepatitis E infection.

"For decades, we've been asking why pregnant women who get hepatitis E die at an alarming rate. This research suggests that pre-existing differences could be the key we've been seeking," says study leader Alain Labrique, PhD, an associate professor in the Bloomberg School's Department of International Health. "Even though women are exposed to similar environmental risk factors, the differences in pre-existing characteristics seem to put some women at a much higher risk of getting infected, sick and dying. These findings could pave the road for stepped-

up nutritional monitoring of pregnant women in this part of the world and lead to recommendations for nutritional supplements."

Researchers found that anemia occurred in nearly three times the number of women who became infected compared to those who didn't (27.5 percent versus 10 percent). Forty-five percent of infected women had a body mass index that categorized them as underweight compared to a quarter of the control group. Researchers also found that women who were vitamin-D deficient and who had lower levels of zinc were more likely to be infected than the control group of pregnant women at a similar risk level who did not become infected with the virus.

Ninety-five percent of the women who became infected were vitamin-D deficient in the first trimester compared to 82.5 percent of the control group. In the third trimester, 17.5 percent of women were zinc-deficient compared to only 2.5 percent of the control group.

The study, which was conducted at the Bloomberg School's flagship JiVitA Research Project in Bangladesh, also found that women who became infected had higher levels of both pro- and anti-inflammatory cytokines, important to immune system functioning. This suggests that pre-existing [immune dysfunction](#) may also increase the risk of getting hepatitis E or other infectious diseases.

For their study, researchers collected blood samples at three different times from 1,100 women living in northern Bangladesh: early in pregnancy, in the third trimester and three months after giving birth. Forty women became infected with the virus over the course of the study. A [control group](#) of pregnant women who did not become infected was matched by several factors including age and residence to minimize differences in exposure to the virus or other external risk factors.

Roughly 20 million people are infected each year with hepatitis E,

resulting in an estimated 70,000 deaths and 3,000 stillbirths annually in developing countries.

"Our research group estimates that hepatitis E causes about 10,500 [maternal deaths](#) every year just in Southeast Asia, and the nearly 30 percent fatality rate among pregnant women is as high as Ebola's during some outbreaks," says lead author Brittany Kmush, a doctoral student in the Department of International Health at the Bloomberg School.

"Most of the current knowledge about how [hepatitis E](#) affects pregnant women comes from studies looking at women who are already infected," says Labrique. "This population-based study was able to look at the health status of pregnant women before they became infected. If we can better understand what predisposes pregnant women to infection we could also develop better programs that prevent infection from ever occurring."

Provided by Johns Hopkins University Bloomberg School of Public Health

Citation: Anemic, underweight pregnant women at greater risk for deadly hepatitis E, study suggests (2016, January 12) retrieved 19 April 2024 from <https://medicalxpress.com/news/2016-01-anemic-underweight-pregnant-women-greater.html>

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