Depressed pregnant women could be at higher risk for severe response to flu infection

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(PhysOrg.com) -- Pregnant women with significant symptoms of depression tend to have a stronger biological reaction to the seasonal flu vaccine than do women with lower depression levels, according to a new study.

The finding provides an argument in favor of flu vaccination during pregnancy, researchers say, because it suggests that the immune systems in depressed pregnant women are not functioning typically. This immune dysregulation could affect symptom severity among women who become infected with influenza.

Previous studies have established a link between some preterm births and gestational high blood pressure cases and infection or inflammation. Avoiding the flu with a safe vaccine might be one way to lower the chances of complications, according to researchers.

An internal inflammatory response to vaccination is not uncommon - it's an essential part of the process the immune system initiates to prepare for a successful fight against an actual infection. But it's also expected to be a weak and brief response.

"Inflammatory responses to vaccination do no harm, are mild, and typically go away within a few days. But an extended inflammatory response to vaccination, such as the one seen in women with the most

depressive symptoms, isn't expected, and it serves as a way to estimate how somebody might respond to an actual infection or illness," said Lisa Christian, an assistant professor of psychiatry at Ohio State University and lead author of the research.

Despite public health recommendations that pregnant women get seasonal flu shots, only an estimated 12 percent to 13 percent of pregnant women in the United States have done so in recent years, according to the Centers for Disease Control and Prevention (CDC).

"It will be interesting to see how that might change this year," said Christian, in light of CDC recommendations that pregnant women receive both seasonal and H1N1 flu vaccinations.

Christian's study appears online and is scheduled for print publication later in the journal *Brain, Behavior, and Immunity*.

She and colleagues also recently published a study in the same journal indicating that pregnant women experiencing depressive symptoms and certain stressors had higher levels of inflammatory markers in their blood than did pregnant women with lower depression and stress levels.

Though this mind-body connection is well established in people with chronic stress, Christian said few studies have examined the effects of depression and stress during pregnancy. Research has shown that pregnancy suppresses certain functions of the immune system to prevent rejection of the fetus and to protect the fetus from inflammation that accompanies fevers and other illnesses.

"Our basic starting question was, do those same relationships between depression and immune function hold during pregnancy?" said Christian, also an investigator in Ohio State's Institute for Behavioral Medicine Research. "And these studies suggest that they do. We see immune

dysregulation during pregnancy due to stress and depression."

In the flu vaccine study, 22 pregnant women completed questionnaires about their depressive symptoms and gave blood samples before they received a seasonal influenza shot. Between six and nine days later, a second round of blood samples was collected.

Researchers assessed the women's depressive symptoms using the Center for Epidemiologic Studies Depression Scale, a series of 20 questions about physical, emotional and cognitive symptoms. The women were classified in three groups: having either no or minimal depression; mild or moderate depressive symptoms; and significant depressive symptoms. A diagnosis of depression can be made only after an interview with a doctor.

The scientists analyzed the post-vaccination blood samples for the presence of macrophage migration inhibitory factor, or MIF, a protein that promotes inflammation by suppressing other substances in the blood that fight inflammation.

A week after receiving the flu shots, the women with the highest scores on the depression scale had about twice as much MIF in their blood as did women reporting minimal symptoms.

"The more depressive symptoms the women had, the more MIF they had after vaccination," Christian said. "In the context of an actual illness, the response would be expected to be much more robust and more extended. And then we might have concerns about whether women who show an exaggerated inflammatory response would be more susceptible to complications."

Christian's previous study on inflammatory markers in the blood during pregnancy involved 60 women, including the 22 who participated in the

flu study.

In this study, researchers assessed the women using a variety of measures: the depressive symptom scale, a perceived stress scale measuring experiences of stress and coping with stress in the past month; a questionnaire gauging how much social support the women had; tests for frequency of stressful social interactions; and a short survey of how happy the women and their partners were about the pregnancy.

Blood samples were taken to measure levels of two proteins, interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF-a). Both are proinflammatory cytokines, chemical messengers that are mobilized when the body is injured or has an infection, and they cause inflammation in their effort to make repairs in the body.

When these proteins circulate without an infection to fight, the body experiences excess inflammation, which is associated with a variety of diseases depending on which cells are producing the proteins. Previous studies have shown that such inflammation during pregnancy can increase the risk of preterm birth and preeclampsia, a high blood pressure condition that can occur during the last half of pregnancy.

Depressive symptoms were associated with perceived stress, and women who were unhappy about their pregnancies had significantly more depressive symptoms than women who reported being happy that they were pregnant. In addition, women with less social support and more frequent hostile social interactions also had more depressive symptoms than did women with better support and more positive social interactions.

Overall, the women reporting more depressive symptoms had significantly higher levels of IL-6 in their blood than did women with fewer symptoms. The association between depressive symptoms and

TNF-a was not as strong, but was still considered significant.

In both studies, the researchers assessed a variety of health behaviors and measures, such as body mass index, cigarette smoking, prenatal vitamin use and physical activity, to gauge whether these factors might affect the presence of inflammation markers. None of the measures had a significant effect, Christian said.

"This way, we took into account the potential for two different pathways. Stress can certainly affect health behaviors, which can affect immune function," she said. "That's why we assessed different health behaviors, to be sure the effects we see aren't better explained by something else. But here, we are seeing a physiological effect of stress and depression."

The next step will be to follow more women, for longer, to see if psychological factors during pregnancy can be linked directly to birth outcomes.

Source: The Ohio State University (news : web)