BP patterns in the first half of pregnancy improve early prediction of preeclampsia and gestational hypertension

July 13 2023

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Routine blood pressure readings recorded in the first half of pregnancy can be divided into six distinct patterns that can effectively stratify

patients by their risk of developing preeclampsia and gestational hypertension later in pregnancy, Kaiser Permanente researchers found.

The study, published July 12 in the *Journal of the American Heart Association*, showed that six pregnancy blood pressure trajectories seen within the first 20 weeks of pregnancy along with clinical, social, and behavioral risk factors can accurately predict and stratify risk of preeclampsia and gestational hypertension in low- to moderate-risk patients. Three of the early pregnancy blood pressure trajectories identified 74% of the patients who went on to develop preeclampsia later in their pregnancy. The prediction model worked equally well in the white, Black, Hispanic, and Asian patients included in the study.

"The prediction models accurately classified the patients with an increased risk for developing preeclampsia and gestational hypertension based on early blood pressure patterns several months before the onset of disease," said lead author Erica P. Gunderson, Ph.D., MPH, a senior research scientist at the Kaiser Permanente Division of Research and a professor at the Kaiser Permanente Bernard J. Tyson School of Medicine.

The study used routine clinical blood pressure measurements and clinical data from the electronic medical records of close to 250,000 healthy pregnant patients. A previous study, identified the six distinct blood pressure trajectories. The new study used data from approximately 75,000 women not included in the prior study. The patients studied were considered to be low- to moderate-risk by current U.S. Preventive Services Task Force risk criteria—a group for whom it has been challenging to identify individual risk of preeclampsia.

"Hypertensive disorders in pregnancy are leading causes of morbidity and mortality, particularly in people of color," said Kari L. Carlson, MD, associate executive director for The Permanente Medical Group.

"Identifying risk factors and then implementing a risk stratification program and treatment plan could have a huge impact for both the pregnant person and infant, dramatically reducing the chances of adverse outcomes."

"The use of a simple measure—blood pressure—that is available as part of clinical care to fine tune clinical risk assessment and identify those at highest risk could allow modification of care and the use of preventive therapies to the most appropriate patients," said co-author James M. Roberts, MD, a professor of obstetrics, gynecology, and reproductive science at the University of Pittsburgh.

The researchers plan to develop an automated tool within the electronic health record system to identify patients in real time based on blood pressure patterns seen before 16 to 20 weeks of pregnancy. Care providers can then advise these patients of their higher risk for hypertensive disorders of pregnancy, offer available interventions, and provide additional monitoring.

  More information: Erica P. Gunderson et al, Early Pregnancy Systolic Blood Pressure Patterns Predict Early- and Later-Onset Preeclampsia and Gestational Hypertension Among Ostensibly Low-to-Moderate Risk Groups, *Journal of the American Heart Association* (2023). DOI: 10.1161/JAHA.123.029617

Provided by Kaiser Permanente