Predictive Factors for Hypertensive Disorders of Pregnancy in a Pregnancy Cohort at Risk for Gestational Diabetes

Isabel R. Ortiz[1], Yuedi Yang[1], Aric Kotarski[1], Maha Aamir[2], Haley Schmidt[1], Rafael F. Guerrero[2], David M. Haas[1]

[1]Indiana University School of Medicine; [2]North Carolina State University

Background/Objective: Hypertensive disorders of pregnancy (HDP) are a leading cause of both maternal and neonatal morbidity and mortality worldwide. Predicting which pregnant patients will develop HDP, however, remains a challenge, as existing models often overlook the value of incorporating both behavioral and genetic factors. The objective of this study was to identify predictive factors for HDP, including behavioral, psychosocial, and genetic characteristics not typically included in other models.

Methods: We conducted a secondary analysis of the Hoosier Mom Cohort, a prospective observational study of pregnant individuals preferentially recruited to assess predictors for gestational diabetes. Participants completed detailed surveys on behavioral and psychosocial factors, as well as activity and sleep. Biospecimens including maternal blood, urine, and feces, placental biopsies, infant cord blood, and buccal swabs were collected. Genotyping was performed to calculate ancestry-adjusted polygenic risk scores (PRS) for preeclampsia. After identifying variables associated with HDP, a logistic regression was used to assess for independent HDP associations. Models were evaluated with and without PRS, to evaluate the added value of genetic risk in prediction.

Results: Among 399 participants with complete outcome data, 121 developed HDP (30.3%). Significant predictors included higher BMI, non-White race, nulliparity, and elevated snoring scores. Preeclampsia PRS tertiles showed no significant association with HDP and did not improve the performance of the regression model.

Conclusion and Potential Impact: In addition to high BMI, nulliparity, and self-reported race, snoring scores were independently associated with developing HDP. However, adding PRS did not improve the model. Multidimensional risk factor evaluation and clinical screening are needed to improve early intervention and care for patients with HDP.

Key words: polygenic risk score, pregnancy, hypertensive disorders of pregnancy, preeclampsia