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Food desert severity mediates the association between socioeconomic status and metabolic state during pregnancy in a prospective longitudinal cohort

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Abstract

Poor metabolic health during pregnancy is associated with serious long-term health outcomes for pregnant individuals and their offspring. Lower socioeconomic status (SES) is one risk factor for poor metabolic health and identifying factors that contribute to the relationship between SES and metabolic health is critical for optimizing intervention strategies and for reducing the burden of poor metabolic health on pregnant individuals and their offspring. To that end, we investigated whether reduced access to healthful and affordable foods (e.g., living in a food desert) mediated the relationships between variation in SES and pregnancy metabolic health. The food desert severity of 302 pregnant individuals was determined using the United States Department of Agriculture Food Access Research Atlas. SES was measured using total household income, years of education, and amount of reserve savings. Glucose regulation during pregnancy was extracted from medical records and adiposity was assessed using air displacement plethysmography. Information about the pro-inflammatory quality of participants' diets was also obtained. After adjusting for the interdependence of adiposity, glucose regulation, and diet, and for participant age, parity, and race/ethnicity, structural equation models showed that food desert severity mediated the relationship between lower SES and higher adiposity during pregnancy ($ß_{indirect}$=-.05, p=.03). Higher food desert severity predicted higher plasma glucose during an oral glucose tolerance test ($ß$=.15, p=.04). Lower SES predicted higher food desert severity and consumption of a pro-inflammatory diet ($ß$s range from -.19 to -.25, ps<.01). These results highlight one pathway by which variation in SES impacts metabolic health during pregnancy, with lower SES associated with higher food desert severity and higher food desert severity associated with higher adiposity during pregnancy. These findings further elucidate the importance of access to healthful and affordable foods on metabolic health during pregnancy and inform which interventions may improve the relationship between SES and pregnancy metabolic health.