

A Pilot Study Protocol: Glycemic Patterns in Obese Pregnancies Without Diabetes – Identifying Susceptible Periods for Intervention

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Objectives: Blood glucose concentrations, fasting, postprandial and in response to exercise, reflect a dynamic balance between β -cell function and tissue insulin sensitivity. Both are implicated to affect metabolic health in mother and fetus, with increased risk for new-onset hyperglycemia throughout gestation in mothers with obesity. Longitudinal data of glycemic patterns during obese pregnancies without diabetes could help: 1) identify specific periods when metabolic function shifts to meet gestational energy demands, 2) define more nuanced approaches to intervention timing. Yet, such data are lacking in the literature. To collect longitudinal data via continuous glucose monitoring technology in obese singleton pregnancies without diabetes during either a physical activity intervention or normal standard of care.

Methods: Ancillary to a randomized parallel-arm physical activity intervention study conducted at Arkansas Children's Nutrition Center (ACNC), we will conduct additional measures in 24 sedentary women with BMI ≥ 30 kg·m⁻², ≥ 18 years of age, recruited within weeks 11–13

of gestation; with obtained health care provider clearance to participate. Consented participants will have a CGM sensor (FreeStyle Libre Pro[®], Abbot Diabetes Care, Inc., Alameda, CA) applied and initialized, and will wear this monitor for the first 14 days into the study; allowing for CGM data of 7-day baseline and 7-day onset of physical activity in the intervention or continued sedentary lifestyle in the control group to incur. Additional CGM periods will be set for 2 weeks within the 2nd and 3rd trimester, respectively. CGM data will be collected in a single-blind manner to prevent participant reactivity and bias. Slopes for fasting and postprandial glucose values will be compared across randomization groups to test the immediate effect of PA onset. Fitted B-splines of temporal mean glucose values will model changes in glucose levels over time for each participant. Multivariable regression of modeled changes will assess the relationship between maternal glucose levels in intervention versus control at the 2nd and 3rd trimester.

Results: N/A

Conclusions: Data from this pilot study will help identify gestational periods susceptible to intervention. Optimally timed prevention efforts will protect offspring health in the future.

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