Utility of childhood glucose homeostasis variables in predicting adult diabetes and related cardiometabolic risk factors: the Bogalusa Heart Study

Running title: Childhood glucose homeostasis variables and adulthood diabetes.

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ABSTRACT

This study examines the usefulness of childhood glucose homeostasis variables (glucose, insulin, and insulin resistance index (HOMA-IR)) in predicting pre-diabetes and type 2 diabetes, and related cardiometabolic risk factors in adulthood.

Methods: This retrospective cohort study consisted of normoglycemic (n=1058), pre-diabetic (n=37), and type 2 diabetic (n=25) adults aged 19-39 years who were followed on average for 17 years since childhood.

Results: At least 50% of the individuals who ranked highest (top quintile) in childhood for glucose homeostasis variables maintained their high rank by being above the 60th percentile in adulthood. In a multivariate model, the best predictors of adulthood glucose homeostasis variables were the change in body mass index (BMI) z-score from childhood to adulthood and childhood BMI z-score, followed by the corresponding childhood levels of glucose, insulin, and HOMA-IR. Further, children in the top decile vs the rest for insulin and HOMA-IR were 2.85 and 2.55 times, respectively, more likely to develop pre-diabetes; children in the top decile vs the rest for glucose, insulin, and HOMA-IR were 3.28, 5.54, and 5.84 times, respectively, more likely to develop diabetes, independent of change in BMI z-score, baseline BMI z-score, and total cholesterol/high-density lipoprotein cholesterol ratio. In addition, children with adverse levels (top quintile vs the rest) of glucose homeostasis variables displayed significantly higher prevalences of, among others, hyperglycemia, hypertriglyceridemia, and metabolic syndrome.

Conclusions: Adverse levels of glucose homeostasis variables in childhood not only persist into adulthood but also predict adult pre-diabetes and type 2 diabetes and relate to cardiometabolic risk factors.

Key Words: childhood; young adulthood; glucose; insulin; insulin resistance; tracking; pre-diabetes; type 2 diabetes; metabolic syndrome.