Dietary Energy Density is Associated with Gestational Diabetes Status

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Abstract

The objective of this study was to determine the relationship between Gestational Diabetes (GD), and dietary energy density (ED) in a nationally representative sample of pregnant women residing in the US who participated in the 2009-2012 National Health and Nutrition Examination Surveys (NHANES). Dietary ED (kcal/gram) was calculated using multiple methods. Diet quality was assessed using HEI component scores, with FNDDS food codes.

Data regarding gestational diabetes (GD) status was provided by the NHANES. Women were categorized as having a positive diagnosis for GD, having a diagnosis of "borderline GD", or having no gestational diabetes. All data was analyzed using appropriate survey weights and procedures in SAS 9.3. Our results indicate dietary ED, calculated using food only, is positively associated with gestational diabetes.

Methods

• Study sample of 4,028 women >18 years who participated in the 2009-2012 NHANES who had previously been pregnant, including those who are currently pregnant

• Dietary intake was measured using 24-hour recalls.

• Specific survey procedures were used in the analysis to account for sample weights, unequal selection probability, and clustered design

• Dietary ED was calculated by dividing the energy content (in kcal) by weight of food (in g) consumed. Age- and sex-specific quintiles of ED were created to examine the relationship between dietary ED and makers for abdominal obesity

• The ED of each reported food was calculated and foods were categorized into ED groups. The proportion of total energy intake from each group was also quantified

• Women without gestational diabetes have a significantly lower dietary ED than those with gestational diabetes or those with borderline gestational diabetes (1.78 vs. 1.85 vs. 2.01, respectively; p-trend 0.01) after controlling for age, marital status, bordering gestational diabetes (1.78 vs. 1.85 vs. 2.00, respectively; p-trend 0.01) after controlling for age, marital status, race, and socioeconomic status.

• Interventions that lower dietary ED by increasing fruit and vegetable intake, and decreasing carbohydrates and other high-density food intake should be explored as strategies to target gestational diabetes.

Subject Characteristics

Introduction

• Gestational diabetes affects up to 16% of pregnant women, with that number increasing as trends of obesity and unhealthy lifestyles increase

• The risk for diabetes has a strong correlation with obesity, and can be responsible for 80-95% of the increase in diabetes

• The risks are not just short-term, but they are long-term as well and this applies to both the mothers and their children

• Long-term studies showed improvements in glycaemic control, as well as carbohydrate metabolism and insulin sensitivity as a direct result of physical activity and exercise

• Energy density (ED) is a ratio of the amount of energy per weight of food (kcal/g)

• The National Health and Nutrition Examination Survey (NHANES) is a large, cross-sectional survey conducted by the National Center for Health Statistics that is designed to assess the health and nutritional status of non-institutionalized civilians in the US

Results

• No differences found with intakes of grams of carbohydrates or grams of protein.

• Results also showed that for consumption of cookies/cake as well as consumption of 100% fruit juice, those diagnosed with borderline gestational diabetes had a significantly higher consumption amount than those with or without gestational diabetes, with p-values of .0086 and 0.0342, respectively.

Conclusions

• Women without gestational diabetes have a significantly lower dietary ED than those with borderline gestational diabetes (1.78 vs. 1.85, p=0.01).

• Interventions that lower dietary ED by increasing fruit and vegetable intake, and decreasing carbohydrates and other high-density food intake should be explored as strategies to target gestational diabetes.