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The association between Vitamin D deficiency and risk of pre-diabetes among older adults

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Abstract

Introduction

Type 2 Diabetes Mellitus is one of the most common conditions affecting older adults, and is one of few diseases with a distinct liminal stage: prediabetes. Dietitians and healthcare practitioners currently recognize prediabetes as a lifestyle disease, and “reversing” it relies largely on dietary modifications and increased exercise. Some research suggests that vitamin D may also be a target since its deficiency has been tentatively linked to many chronic conditions,⁵ and a high prevalence has been observed among subjects with prediabetes and type 2 diabetes.^{6, 7} The purpose of this study was to examine the association between vitamin D deficiency and risk of pre-diabetes in people 50+ years of age living in the United States.

Materials and Methods

This was a cross-sectional analysis of the US National Health and Nutrition Examination Survey (2007–2012) subjects, ages 50+ years, free of kidney/liver diseases and diabetes. *Outcome:* Prediabetes, was defined as: HbA1c level 5.7–6.5%, or fasting plasma glucose level 100–125 mg/dL, or Oral Glucose Tolerance Test result 140–199 mg/dL, with no laboratory value in the diabetic range. Those with normal glucose tolerance (NGT) with no marker in the prediabetes/diabetes range were the comparison group. Exposure: subjects’ vitamin D status was classified based on total serum 25(OH)D levels as follows: deficient = < 50 nmol/L, insufficient = 50–75 nmol/L, and sufficient = > 75 nmol/L. The final sample (n = 2,286) was sufficient to detect a 7% difference in odds of prediabetes (the average difference observed in the literature) with 80% power and 95% confidence. Multivariate logistic regression analysis included strata, cluster and weight variables. Models were adjusted for BMI, ethnicity, age and gender.

Results

The final sample was 2,286 subjects, predominantly white (80.4%) and female (56.6%), with a mean age of 62.3 years; 1,387 had prediabetes (59.1%) and 899 were NGT (40.9%). Vitamin D status was associated with pre-diabetes (p = 0.03). Those with vitamin D deficiency were more likely to have prediabetes compared to vitamin D sufficient individuals (crude OR = 1.48 95%CI 1.15–1.91), which remained significant after adjustment for ethnicity, BMI, age and gender (aOR = 1.39 95%CI 1.02–1.89). There was no effect modification by BMI, gender or ethnicity.

Discussion

Our results contributed to this existing literature by demonstrating that vitamin D status is associated with pre-diabetes in a nationally representative sample of older US adults. Vitamin D status was significantly associated with risk of prediabetes in Americans 50+ years of age. Prevention efforts should incorporate awareness of vitamin D.

Conflict of Interest

There is no conflict of interest