Predictors of Weight Loss in African Americans with Prediabetes or Early Diabetes

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Purpose: This analysis was undertaken to describe healthcare seeking, weight loss efforts and predictors of weight loss among African Americans recently identified with prediabetes or early diabetes.

Methods: A secondary analysis was conducted on data collected from 89 participants who completed a previously published 12-week randomized placebo-controlled trial testing the benefit of vitamin D supplementation on blood measures predictive of diabetes risk. Information about care seeking, weight loss strategies and weight loss effort was collected by questionnaire at three data collection visits. Weight was measured by trained staff at each visit.

Results: More than half of the participants saw a healthcare provider during the study, but few recalled receiving advice about diet, physical activity or other strategies for weight loss. Thirty-seven % of participants maintained their weight within 1 kg of their baseline weight. Of the remaining participants, half gained >1 kg and half lost >1 kg during the study period. Age-adjusted independent predictors of weight loss included a visit to a healthcare provider for preventive care, dietary restrictions, and consistent weight loss effort. Vitamin D supplementation had no effect on weight change.

Conclusions: This study reinforces the importance of preventive healthcare and sustainable changes in diet and physical activity. It also suggests that physicians need better tools for motivating and supporting their patients to adopt behaviors that can reduce diabetes risk. For the millions of Americans who are trying to lose weight to reduce their risk for chronic disease, this study reinforces the importance of sustained effort.

Key Words: weight loss ■ diabetes ■ African American ■ healthcare providers ■ vitamin D

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INTRODUCTION

In 2010, nearly 20% of non-Hispanic black Americans aged 20 and older had diabetes, whether diagnosed or not diagnosed.[1] Only about 26% of diabetes risk is genetically determined,[2] leaving a substantial proportion that may be reduced through lifestyle and medical interventions. Weight loss and increased physical activity are among the most effective methods for reducing risk, but can be challenging to undertake and maintain[3]. We recently completed a small clinical trial of vitamin D supplementation to reduce diabetes risk in overweight and obese African-American adults aged 40 and older who had prediabetes or previously undiagnosed early diabetes.[4] After a screening visit for the study, we provided participants with letters indicating any abnormal values in their fasting plasma glucose, hemoglobin A1c (HbA1c) or other screening measurements, and advised them to discuss these results with their healthcare provider (HCP). In this secondary analysis of the parent data, we describe the participants' subsequent visits to their HCP, their weight loss efforts, their diet and physical activity changes, and the effects of these actions on body weight changes over the 12-week study. We also examined the effect of the parent study intervention, 4000 IU/d of vitamin D_3, on weight changes over 12 weeks.

METHODS

Study Design and Participants

The 89 participants in this analysis completed a small randomized, double-masked, placebo-controlled clinical trial of 4000 IU/d vitamin D supplementation to improve insulin sensitivity, insulin secretion, and glycemia in overweight and obese African Americans with prediabetes. Although supplementation effectively increased blood concentrations of 25-hydroxyvitamin D to desirable levels, and modestly increased insulin secretion, no effect of supplementation on glycemia was observed.[4]

Study participation involved a screening visit followed by three data collection visits (baseline, 6 weeks, and twelve weeks). One-hundred participants were enrolled in the parent study which was approved by the Institutional Review Board at Tufts University. All participants provided written informed consent. Eligibility criteria included age of 40 years or older, BMI from 25.0 to 39.9 kg/m^2 and prediabetes status as indicated by a screening fasting plasma glucose ≥100 mg/dl or HbA1c ≥5.8% and <7% and an absence of physician-diagnosed diabetes. Although none of the participants had diabetes according to the clinical practice guidelines in effect during the enrollment period, according to guidelines revised in 2011,[5] 26.9% of the participants had early diabetes. Exclusion criteria included medical conditions and medications known to influence vitamin D status or metabolism, conditions that contraindicated vitamin D or calcium supplementation, and consumption of more than 14 alcoholic drinks per week.

Eligibility was determined by the study physician based on the screening interview and measurements. Eligible participants

were then sent a letter informing them of their eligibility. The letter also included the results of their screening laboratory tests. Abnormal values were flagged on the laboratory test report and participants were advised to share their results with their own HCP. For ethical reasons, the study protocol placed no restrictions on participants with respect to weight loss efforts, dietary changes or physical activity during the study.

MEASUREMENTS

Type of HCP visit was determined from questions asked at baseline, 6-week and 12-week data collection visits. At each of these visits, participants were asked if they had seen an HCP since their last visit (at baseline, this referred to the screening visit). If yes, the reason for the visit was recorded along with any advice received about habits and medications. The purpose of the visits were characterized into either "preventive care" or "acute care" visits by one of us (SSH). Preventive care was defined by responses such as "for a physical" or "for a checkup". Acute care visits were those made specifically for treatment of an illness or injury. Participants who reported at least one visit for preventive care were classified as having had a preventive care visit. Participants who reported only visits for acute care were classified as having had acute care visits only. Participants who saw an HCP for any reason during the study were asked if the HCP had recommended any changes in habits, and answers were recorded.

At each of three study visits, participants were asked if they were making a conscious effort to lose weight. Effort to lose weight was classified as "none" for participants who answered "no" at all visits, as "inconsistent" for participants who answered "yes" at one or two visits only and as "consistent" for participants who answered "yes" at all three visits. Participants who reported trying to lose weight were asked what means they were using and responded to choices that included dietary changes, physical activity changes and use of over-the-counter or prescription diet aids. No participants reported using diet aids.

Height was measured with a wall-mounted stadiometer, and weight was measured with a digital scale. Weight change was calculated by subtracting weight at baseline from weight at the 12-week study visit. Body mass index (BMI) was calculated as height (m) divided by weight (kg) squared. Additional information collected by questionnaire at baseline included education, smoking history, and family history of diabetes.

Statistical analysis

Baseline and within-study characteristics were compared across types of HCP visits by analysis of variance (ANOVA) for continuous variables and by Chi-squared test for categorical variables. Mean and median weight changes during the study were compared across risk factor categories by ANOVA and nonparametric median testing respectively. General linear modeling was used to conduct multivariate analysis of weight changes. Differences were considered statistically significant when P values were lower than 0.05. All analyses were conducted using SPSS Version 19.

RESULTS

Care seeking and medical intervention

Fifty participants (56% of the study group) had at least one HCP visit during the study. Of these, 22 reported that at least one visit was for preventive care. The remaining 28

Table 1: Baseline characteristics (mean ± sd or %) according to type of healthcare provider visits during the study

	Visits and Purpose of Visits			P
	No Visits	Visit(s) for Acute Care Only	At Least One Visit for Checkup or Preventive Care	
n	39	28	22	
Age, years	53.2 ± 9.6	59.1 ± 13.6	59.4 ± 10.0	0.044
Height, cm	170 ± 9	167 ± 9	168 ± 8	0.393
Weight, kg	92.5 ± 11.5	89.1 ± 13.6	94.5 ± 17.1	0.363
BMI, kg/m^2	32.0 ± 3.6	31.8 ± 4.5	33.2 ± 4.2	0.411
% Female	48.7	67.9	77.3	0.064
% Postsecondary education ≥ 2 years	53.8	57.1	77.3	0.178
% Postsecondary education	66.7	75.0	81.8	0.423
% Current smoker	25.6	17.9	22.7	0.753
% Family history of diabetes	53.8	57.1	72.7	0.336