RESEARCH
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Decreases in High-Fat and/or High-Added-Sugar Food Group Intake Occur when a Hypocaloric, Low-Fat Diet Is Prescribed Within a Lifestyle Intervention: A Secondary Cohort Analysis

Vaishali Keshani Sheikh, MS, RD, LDN; Hollie A. Raynor, PhD, RD, LDN

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ABSTRACT

Background When a hypocaloric, low-fat diet is prescribed, intake of currently consumed foods can decrease, foods naturally low in fat and/or added sugar may increase, or fat- or sugar-modified foods may increase.

Objective To examine food group intake change and its relation to reductions in energy and fat intake and weight during a lifestyle intervention.

Design Secondary cohort analysis.

Participants One hundred sixty-nine participants (aged 52.0±8.6 years, body mass index 34.9±4.5, 92% white, 97.6% non-Hispanic, and 56.8% women) with complete data at 0 and 6 months collected in a research setting.

Main outcome measures From three 24-hour telephone dietary recalls, 165 food groups from Nutrition Data System for Research software were coded into 25 larger food groups assessing intake of higher-fat and/or added-sugar food groups vs naturally lower-fat and/or added-sugar food groups and into 17 larger food groups assessing intake of nonmodified vs fat- and/or sugar-modified food groups.

Statistical analyses performed Repeated measures analyses of covariance (intervention group: covariate) assessed changes from 0 to 6 months. Hierarchical regressions examined changes in food group intake and changes in energy intake, percent energy from fat intake, and weight from 0 to 6 months.

Results Significant reductions ($P<0.05$) in intake of high-fat and/or high-added-sugar food groups (Higher-Fat Dairy; Higher-Fat Eggs; Higher-Fat Fats; Higher-Fat Fruit; Higher-Fat Meat; Nonmodified Higher-Fat Fats, Oils, and Sweets; Nonmodified Higher-Fat Sugar-Sweetened Fats, Oils, and Sweets; Nonmodified Regular-Fat Dairy; and Nonmodified Regular-Fat Sugar-Sweetened Dairy) occurred. Decreases in the Higher-Fat Meat group were significantly ($P<0.05$) related to decreases in energy intake, percent energy from fat intake, and weight.

Conclusions When a hypocaloric, low-fat diet is prescribed, reductions in high-fat and/or high-added-sugar food groups occur. Targeting reductions in high-fat meats may improve outcomes.
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IN 2013, THE AMERICAN HEART ASSOCIATION, American College of Cardiology, and The Obesity Society released guidelines for the management of overweight and obesity for adults.[1] The guidelines recommended a lifestyle intervention that includes a diet that lowers energy intake, an increase in physical activity, and the use of behavior strategies to change diet and physical activity.[1]

One dietary strategy that has been shown to reduce energy intake within a lifestyle intervention, producing the recommended 5% of weight loss, is a hypocaloric (1,200 to 1,500 kcal/day), low-fat (<30% energy from fat) diet.[1] There are several ways to reduce energy and fat intake when a hypocaloric, low-fat diet is prescribed. For example, one can reduce intake of currently consumed foods that are higher in fat and added sugar, making few changes in the types of foods consumed. Foods naturally low in energy and fat and/or added sugar, such as fruits and vegetables, may be increased and replace foods naturally high in energy, fat,

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and/or added sugar, decreasing intake of these foods. Finally, fat- or sugar-modified foods may be used in place of full-fat or full-sugar counterparts.[2-9] Although a hypocaloric, low-fat diet is one of the dietary strategies currently recommended to assist with weight loss,[1] limited research has examined which of these strategies is used when this diet is prescribed. Therefore, this study investigated changes in food group servings consumed during the first 6 months of a lifestyle intervention—the active weight loss phase—when a hypocaloric, low-fat diet was prescribed to enhance understanding of how participants are reducing energy and fat intake. Furthermore, the relationship between changes in food group servings and reductions in energy and fat intake, and weight loss was also examined.

METHODS

Study Design

This secondary data analysis was conducted using data collected from a previously published 18-month lifestyle intervention trial examining a reduced-variety dietary prescription.[10] This study was approved by the institutional review board at the University of Tennessee, Knoxville. In brief, 202 overweight and obese consented participants were randomly assigned to one of two conditions: Limited Variety (LV) and Lifestyle. Both conditions were given a standard hypocaloric, low-fat diet prescription (1,200 to 1,500 kcal/day, ≤30% energy from fat restriction), a physical activity prescription (200 minutes of moderate-intensity physical activity per week and 10,000 steps per day), and a cognitive behavioral intervention, delivered in weekly 60-minute group meetings for the first 6 months (weight loss phase) and bimonthly 60-minute group meetings for months 7 to 18 (weight loss maintenance phase). The LV condition was also provided with a diet prescription that was designed to decrease the number of different nonnutrient-dense, high-energy-dense foods (NND-EDFs) (eg, cookies, chips, and candy) consumed to only two types, which were selected by the participants.[10] Results of the study found that the LV group participants consumed less variety of NND-EDFs and less total energy daily at 6 months than the Lifestyle group. Percentage of weight at 6 months, −10.9% loss, was not different between the groups.[10]

Our study is a longitudinal cohort secondary data analysis, examining changes in dietary intake during the weight loss phase (0 to 6 months). Primary dependent variables were intake from food groups, energy, and percent energy from fat, and pounds of weight lost.

Participants

Participants were recruited from Providence, RI, and Knoxville, TN, between July 2006 and August 2008.[10] Eligibility criteria required participants to be aged 21 to 65 years with a body mass index (BMI) between 27 and 45.[10] Participants were excluded in cases where they were not able to walk at least two blocks; reported a heart condition, chest pain, or loss of consciousness; were taking weight-loss medication or participating in another weight loss program; had undergone bariatric surgery; were pregnant or lactating, <6 months postpartum, or planning to become pregnant during the study; or were consuming <5 different types of NND-EDFs.[10] Only participants with complete dietary, physical activity,

Table 1. Significant outcomes, both between conditions (Lifestyle and Limited Variety [LV]) at baseline and across 0 and 6 months[a] within the whole sample, in dietary intake (servings per day) from food groups naturally high or low in fat and/or added sugar and nonmodified or modified food groups in participants in a lifestyle intervention

	Servings Per Day	
Food group	0 mo	6 mo
	mean±standard deviation	
Food groups naturally high or low in fat and added sugar		
Higher-Fat Dairy		
Whole sample (n=169)	0.58±0.59	0.32±0.39[b]
LV (n=89)	0.66±0.61	
Lifestyle (n=80)	0.51±0.56	
Higher-Fat Eggs		
Whole sample (n=169)	0.44±0.50	0.31±0.47[b]
LV (n=89)	0.56±0.58[c]	
Lifestyle (n=80)	0.34±0.39[c]	
Higher-Fat Fats		
Whole sample (n=169)	1.95±1.61	0.70±0.85[b]
LV (n=89)	2.08±1.80	
Lifestyle (n=80)	1.83±1.42	
Higher-Fat Fruit		
Whole sample (n=169)	0.02±0.10	0.00±0.03[b]
LV (n=89)	0.03±0.13	
Lifestyle (n=80)	0.01±0.06	
Higher-Fat Meat		
Whole sample (n=169)	1.47±1.48	0.65±1.05[b]
LV (n=89)	1.55±1.63	
Lifestyle (n=80)	1.39±1.35	
Higher-Fat Nuts		
Whole sample (n=169)	0.60±0.96	0.31±0.78
LV (n=89)	0.33±0.61[c]	
Lifestyle (n=80)	0.84±1.14[c]	
Higher-Fat Other Vegetables		
Whole sample (n=169)	0.03±0.14	0.01±0.07
LV (n=89)	0.06±0.19[c]	
Lifestyle (n=80)	0.01±0.07[c]	
Lower-Fat Fruit		
Whole sample (n=169)	1.19±1.11	1.65±1.25[b]
LV (n=89)	1.19±1.11	
Lifestyle (n=80)	1.18±1.12	

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