



Associations between self-reported weight management methods with diet quality as measured by the Healthy Eating Index–2005



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ABSTRACT

Objective. We examine the relationship between weight management practices and diet quality.

Method. Regressions were used to analyze the associations between self-reported weight management methods and diet quality, as measured by the Healthy Eating Index–2005 (HEI-2005), of 1,933 respondents who tried to lose or not gain weight in the 2003–2004 National Health and Nutrition Examination Survey (NHANES). The regressions controlled for sociodemographics, lifestyle behaviors, and other health-related behaviors and perceptions.

Results. Including both switching to foods with lower calories and exercise in weight management was associated with better diet quality, i.e., a higher total HEI-2005 score and higher scores in eight of the twelve HEI-2005 components than including neither method. The eight components included six components on fruit, vegetables and grains, milk, and calories from solid fat, alcohol beverages, and added sugars. Similar but smaller associations were also found among those who reported including either switching to foods with lower calories or exercise.

Conclusions. Based on self-reported data, the findings suggest that including switching to lower calorie foods and exercise in weight management, as recommended by the Dietary Guidelines for Americans (DGA), is associated with diet quality that is more consistent with the key diet-related advice of the DGA.

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Introduction

The most recent data indicate that in the United States (U.S.), seven in ten adults are overweight or obese (CDC, 2012). Research shows that Americans use a variety of weight management strategies such as eating less food, exercising, eating less fat, and eating fewer calories (e.g., Kruger et al., 2004; Serdula et al., 1999; Weiss et al., 2006). Adults who try to control their weight, regardless of the methods used, generally have healthier dietary intakes than adults who do not (Neumark-Sztainer et al., 2000). Nevertheless, certain weight management methods may be associated with less healthy dietary intakes because the dietary patterns of these methods tend to be unbalanced, i.e., skewing toward certain dietary components, e.g., saturated fat, and lack adequate intakes of other components, e.g., folic acid, vitamin E, and zinc (Anderson et al., 2000; Freedman et al., 2001; Gardner et al., 2010). Thus, individuals who try to manage their weight should not ignore the quality of their diet, as both obesity (including overweight) and poor diet are associated with higher risk of chronic disease (Chiuve et al., 2012; IOM, 2012; Nicklas et al., 2012).

The Dietary Guidelines for Americans (DGA), the basis of nutrition policy and the foundation of nutrition guidance for the U.S. government, recommend weight management through improved eating, particularly consuming fewer calories from foods and beverages, and physical activity (USDA and USDHHS, 2011). When individuals try to manage their weight by using methods that are not consistent with the DGA recommendations and the methods are associated with poorer diet quality, then it is not clear if individuals are better off in terms of their overall health. From a public health perspective, it is also important that, given the high prevalence of obesity and overweight and the significant medical spending attributable to obesity (Finkelstein et al., 2009), those who try to manage weight do not trade the quality of their diet for the pursuit of weight control.

Although it is known that different weight management methods are associated with different patterns of dietary intakes (e.g., Neumark-Sztainer et al., 2000), there is less information about how weight management (maintaining current weight and preventing weight gain) methods are related to diet quality. In this study, we use data from a U.S. national survey to examine the associations between the diet quality of those who tried to control their weight (both to lose weight and to not gain weight) and their use of DGA-recommended weight control methods, controlling for covariates that may also affect diet quality. To measure diet quality, we use the Healthy Eating Index–2005 (HEI-2005), a tool

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designed to measure compliance with the key diet-related recommendations of the DGA 2005 (Guenther et al., 2007).

Materials and methods

Data

We used data from the 2003–2004 National Health and Nutrition Examination Survey (NHANES), a national survey designed to assess the health and nutritional status of adults and children in the U.S. (NCSH/CDC, 2011). The survey collected, among other things, dietary intake data in two 24-h recall periods, demographics, self-perceptions of health and nutrition status, and health related behaviors. We focused on participants who were 20 years or older, not pregnant or lactating women, reported trying to lose weight or to keep from gaining weight in the past year, and reported reliable dietary intake information. Among the 10,122 respondents in the survey, 5,041 were of ages 20 and older, of which 4,199 met our inclusion criteria and provided full information. Among these respondents, 1,933 who indicated that they had tried to lose weight or not to gain weight were included in our analytic sample.

Measures of weight control methods

Respondents were asked which of 14 weight control methods they used. The methods included eating less food, switching to foods with lower calories, eating less fat, exercising, skipping meals, eating diet foods or products, using a liquid diet formula such as Slimfast or Optifast, joining a weight loss program such as Weight Watchers, Jenny Craig, Tops, or Overeaters Anonymous, taking diet pills prescribed by a doctor, taking other pills, medicines, herbs, or supplements not needing a prescription, taking laxatives or vomiting, drinking a lot of water, following a special diet such as Dr. Atkins, other high protein or low carbohydrate diet, zone, grapefruit or Pritikin, and other. Respondents could select as many methods as were applicable. We considered switching to foods with lower calories and exercise as the methods that conceptually and linguistically resembled the DGA recommendations, i.e., consuming fewer calories from foods and beverages, and physical activity (USDA and USDHHS, 2011). Although eating less food could also contribute to fewer calories, we chose not to include that method because of the lack of information on the kinds of foods that were consumed. Eating less food could mean eating less nutrient dense foods, which would not contribute to a healthy diet.

We grouped the self-reported weight control approaches into four categories: (1) approaches that include neither switching to foods with lower calories nor exercise (the reference group), (2) approaches that include switching to foods with lower calories but not exercise, (3) approaches that include exercise but not switching to foods with lower calories, and (4) approaches that include both switching to foods with lower calories and exercise. We hypothesized that, compared to including neither of the DGA-recommended methods, including any one of the methods or both methods is associated with better diet quality.

Measure of diet quality

To measure diet quality, we used the Healthy Eating Index–2005 (HEI-2005), a measure developed by the U.S. Department of Agriculture to assess diet's conformance to Federal dietary guidelines (USDA/CNPP, 2012). The HEI-2005 uses a nutrient density approach, i.e., foods and nutrients are expressed as amounts per 1,000 calorie of intake (Guenther et al., 2007). The index includes 12 components: total fruit, whole fruit, total vegetables, dark, green and orange vegetables and legumes, total grains, whole grains, milk, meat and beans, oils, saturated fats, sodium, and calories from solid fats, alcoholic beverages, and added sugars (SoFAAS) (USDA/CNPP, 2012). The score for each component ranges from a minimum of zero to a maximum of 5, 10, or 20, depending on the component; the highest total score for an individual is 100. Table 1 shows the scoring standard for each component. We analyzed both the total score and the scores of individual components.

Measures of covariates

In analyzing the relationship between diet quality and weight control methods, we controlled for non-weight control factors that the literature suggests may be associated with dietary intakes or diet quality. These factors include income, gender, marital status, race/ethnicity, education (Darmon and Drewnowski, 2008; Kim et al., 2000), consumption of breakfast (Ruxton and

Table 1
Healthy Eating Index–2005 components and standards for scoring^a.

Component	Maximum points	Standard for maximum score	Standard for minimum score of zero
Total fruit (includes 100% juice)	5	≥ 0.8 cup equiv. per 1,000 kcal	No fruit
Whole fruit (not juice)	5	≥ 0.4 cup equiv. per 1,000 kcal	No whole fruit
Total vegetables	5	≥ 1.1 cup equiv. per 1,000 kcal	No vegetables
Dark green and orange vegetables and legumes	5	≥ 0.4 cup equiv. per 1,000 kcal	No dark green or orange Vegetables or legumes
Total grains	5	≥ 3.0 oz equiv. per 1,000 kcal	No grains
Whole grains	5	≥ 1.5 oz equiv. per 1,000 kcal	No whole grains
Milk	10	≥ 1.3 cup equiv. per 1,000 kcal	No milk
Meat and beans	10	≥ 2.5 oz equiv. per 1,000 kcal	No meat or beans
Oils	10	≥ 12 grams per 1,000 kcal	No oil
Saturated fat	10	≤ 7% of energy	≥ 15% of energy
Sodium	10	≤ 0.7 gram per 1,000 kcal	≥ 2.0 grams per 1,000 kcal
Calories from solid fats, alcoholic beverages, and added sugars (SoFAAS)	20	≤ 20% of energy	≥ 50% of energy

^a See Guenther et al. (2007) for foods included in the components, scoring algorithms, and other information.

Kirk, 1997), consumption of dietary supplements (Guenther et al., 2004; Lyle et al., 1998), frequency of eating at restaurants (Guthrie et al., 2002; Lyle et al., 1998), participation in food assistance programs such as the Food Stamp program (currently “the Supplemental Nutrition Assistance Program”) or the Special Supplemental Nutrition Program for Women, Infants, and Children program (WIC) (LeBlanc et al., 2006; Wilde et al., 1999), food security or the degree to which an individual has enough to eat (Kropf et al., 2007; Nord et al., 2010; Olson and Holben, 2002), lifestyle behaviors such as smoking (Fryar et al., 2006; Schuit et al., 2002), alcohol consumption (Breslow et al., 2006; Schuit et al., 2002), extent of physical activity (Gillman et al., 2001; Yngve et al., 1999), sedentary behaviors such as hours of watching television and using computers (Bowman, 2006; Gillman et al., 2001; Stroebele and de Castro, 2004; Yngve et al., 1999), discrepancy between perceived and measured weight status (Atlantis et al., 2008; Kuchler and Variyam, 2003), and self-rated health status (Watters and Satia, 2009). Table 2 shows the definitions and codes of these variables.

Statistical analysis

We used the ordinary least squares regression to estimate the relationship between the total HEI-2005 scores (0–100) and weight control methods and the two-limit Tobit regression (Maddala, 1983) to estimate the relationship between each of the 12 component scores and weight control methods, because these component scores are truncated between 0 and 5, 10, or 20 (Guenther et al., 2007). We report results as estimated differences in the HEI-2005 and its component scores between each of three categories of weight control practices (switching to foods with fewer calories, exercise, and both switching to foods with fewer calories and exercise) and using neither of the two recommended methods. We used STATA (version 10.1; StataCorp, College Station, TX, USA) to generate the descriptive statistics and to perform the regression analyses.

Results

Sample statistics are reported in Table 2. The average total HEI-2005 score is 54.54, about half of the maximum possible score (100). Many of the average HEI-2005 component scores are lower than half of their respective maximum possible scores, particularly dark green and orange vegetables and legumes (1.39 on the 0-to-5 scale), whole grains (1.22 on the 0-to-5 scale), and sodium (3.87 on

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