

# Changes in Energy Intake and Diet Quality during an 18-Month Weight-Management Randomized Controlled Trial in Adults with Intellectual and Developmental Disabilities



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## ARTICLE INFORMATION

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## ABSTRACT

**Background** Previous research indicates that individuals with intellectual and developmental disabilities (IDDs) are at risk for poor diet quality.

**Objective** The purpose of this secondary analysis was to determine whether two different weight-loss diets affect energy intake, macronutrient intake, and diet quality as measured by the Healthy Eating Index-2010 (HEI-2010) during a 6-month weight-loss period and 12-month weight-management period, and to examine differences in energy intake, macronutrient intake, and HEI-2010 between groups.

**Design** Overweight/obese adults with IDDs took part in an 18-month randomized controlled trial and were assigned to either an enhanced Stop Light Diet utilizing portion-controlled meals or a conventional diet consisting of reducing energy intake and following the 2010 Dietary Guidelines for Americans. Proxy-assisted 3-day food records were collected at baseline, 6 months, and 18 months, and were analyzed using Nutrition Data System for Research software. HEI-2010 was calculated using the data from Nutrition Data System for Research.

**Participants/setting** The study took place from June 2011 through May 2014 in the greater Kansas City metropolitan area.

**Main outcome measures** This was a secondary analysis of a weight-management intervention for adults with IDDs randomized to an enhanced Stop Light Diet or conventional diet, to examine differences in energy intake, macronutrient intake, and HEI-2010 across time and between groups.

**Statistical analyses performed** Independent- and paired-samples *t* tests and general mixed modeling for repeated measures were performed to examine group differences and changes at baseline, 6 months, and 18 months between the enhanced Stop Light Diet and conventional diet groups.

**Results** One hundred and forty six participants (57% female, mean±standard deviation age=36.2±12.0 years) were randomized to either the enhanced Stop Light Diet or conventional diet group (77 enhanced Stop Light Diet, 69 conventional diet) and provided data for analysis at baseline, 124 completed the 6-month weight-loss period, and 101 completed the 18-month study. Participants on the enhanced Stop Light Diet diet significantly reduced energy intake at 6 and 18 months (both  $P<0.001$ ), but those on the conventional diet did not (both  $P=0.13$ ). However, when accounting for age, sex, race, education level, and support level (mild vs moderate IDD), there was a significant decrease during the 18-month intervention in energy intake for the enhanced Stop Light Diet and conventional diet groups combined ( $P<0.01$  for time effect), but no significant group difference in this change ( $P=0.39$  for group-by-time interaction). There was no significant change in total HEI-2010 score at 6 and 18 months ( $P=0.05$  and  $P=0.38$  for the enhanced Stop Light Diet group;  $P=0.22$  and  $P=0.17$  for the conventional diet group), and no significant group difference at 6 and 18 months ( $P=0.08$  and  $P=0.42$ ). However, when participants' age, sex, race, education level, and support level were accounted for, mixed modeling indicated a significant increase in total HEI-2010 scores for the enhanced Stop Light Diet and conventional diet groups combined during the 18-month intervention ( $P=0.01$  for time effect).

**Conclusions** The results of this study found that after controlling for demographic factors, individuals with IDDs can decrease their energy intake and increase their diet quality, with no significant differences between the enhanced Stop Light Diet and conventional diet groups. *J Acad Nutr Diet.* 2018;118(6):1087-1096.

**A**PPROXIMATELY 1% TO 3% OF THE US POPULATION IS diagnosed with an intellectual or developmental disability (IDD).<sup>1</sup> IDD is defined as a disability characterized by significant limitations in both intellectual functioning (intelligence quotient <75) and limitations in two or more adaptive behaviors.<sup>2</sup> The obesity epidemic is of particular concern with this population because rates of overweight and obesity are higher in this group.<sup>3,4</sup> Elevated rates of obesity in conjunction with poor diet quality contribute to an increased risk of heart disease, diabetes, hypertension, liver or gallbladder problems, osteoporosis, and depression for individuals with IDD.<sup>5-8</sup>

As adults with IDD leave institutional care to live in group homes or supported living arrangements, they have more control over their food choices and often have some responsibilities for acquiring or preparing meals.<sup>9</sup> Subsequently, adults with IDD have developed many of the poor dietary characteristics of the general population.<sup>10-12</sup> In addition, they also can be highly selective eaters, with very restricted repertoires of food acceptance,<sup>13</sup> which may put them at a higher risk of inadequate nutrient intakes and poor diet quality.

The typical diet of adults with IDD is low in fruits, vegetables, fiber, folate, iron, calcium, potassium, and zinc, and excessive or high in saturated fat and refined grains.<sup>14-18</sup> Braunschweig and colleagues<sup>17</sup> reported that the mean± standard deviation intake of fruits and vegetables in 89 adults with IDD was 2.8±2.6 and 1.0±1.2 servings per day, respectively, and that no participants consumed the recommended minimum of 5 servings of fruits and vegetables per day. In addition, when using the Healthy Eating Index (HEI) 2005, overweight and obese adults with IDD were found to have a lower total HEI-2005 score (45.6) compared to the average American (58.2), with lower scores for fruits, vegetables, meat and beans, oils, and sodium.<sup>18,19</sup>

Healthy People 2020, The US Surgeon General, The Academy of Nutrition and Dietetics, and The World Health Organization recommend additional efforts to improve the diet quality and decrease the high prevalence of obesity among individuals with IDD.<sup>20-22</sup> However, there is limited evidence on which to base effective dietary interventions.<sup>23-27</sup> Furthermore, the impact of a weight-management (weight loss followed by maintenance) intervention on changes in energy intake and diet quality is unknown. Data from a recently completed 18-month weight-management intervention in adults with IDD afforded an opportunity to examine the effect of two different weight-loss diets on energy intake, macronutrient intake, and diet quality measured by the HEI-2010 during a 6-month weight-loss period and 12-month weight-management period, and to examine differences between these diets.

## METHODS

### Overview of Study Design

This study is a secondary analysis of the dietary outcome data obtained from a recently completed trial. Detailed descriptions of the rationale, design, and methods<sup>28</sup> and the main outcomes<sup>29</sup> have been published previously. Briefly, 150 overweight/obese adults with mild to moderate IDD and a

caregiver who agreed to be their study partner to support them during the intervention were enrolled into an 18-month effectiveness trial with 6 months of weight loss followed by 12 months of weight maintenance to compare two approaches for weight management. Participants were randomly assigned to either an enhanced Stop Light Diet or a conventional diet (conventional diet). After the 6-month weight-loss period, both groups were encouraged to continue following their diet at a level of energy intake estimated to result in weight maintenance.

### Participants

The study took place from June 2011 through May 2014 in the greater Kansas City metropolitan area. Participants were community-dwelling overweight and obese adults, 18 years of age or older, with a diagnosis of mild to moderate IDD as determined by a community service provider operating in the state of Kansas under the auspices of a community developmental disability organization. To be included in the study, participants had to be overweight or obese (body mass index [calculated as kg/m<sup>2</sup>] ≥25); reside in a supported living environment, either at home or with no more than four residents; and have a caregiver who agreed to support them during the program. Individuals were excluded if they had a diagnosis of any of the following conditions: uncontrolled hypertension, severe heart disease, cancer, human immunodeficiency virus, severe depression, or an eating disorder. Individuals were also excluded if they were on a special diet (eg, vegan, gluten-free) or had participated in a weight-reduction program within the past 6 months. Participants were required to reside within a 50-mile radius of the Kansas City metropolitan area.

Written informed consent, approved by the Institutional Review Board at the University of Kansas Medical Center, was obtained from either the participant (self as guardian) or their legal guardian and their study partner. This [ClinicalTrials.gov](http://ClinicalTrials.gov) registration number for this study is NCT01724905. Randomization, stratified by sex and by living arrangement (ie, number of participants in a residence), was completed after both written consent and written physician clearance were obtained. Treatment allocation sequences were generated by computer software using block randomization with equal allocation to the enhanced Stop Light Diet and conventional diet groups.

## INTERVENTION

### Overview

All participants were randomized to either the enhanced Stop Light Diet or conventional diet and were assigned a health educator to deliver the intervention via monthly visits. At baseline, the participant and study partner attended a 90-minute at-home diet orientation session conducted by their health educator. Participants were provided detailed instruction on dietary requirements and study protocol. Subsequent monthly follow-up education sessions were conducted during the 18-month intervention in the participants' home.

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