

The Use of Technology for Delivering a Weight Loss Program for Adolescents with Intellectual and Developmental Disabilities



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ABSTRACT

Adolescents with intellectual and developmental disabilities (IDD) are at an increased risk of obesity, with up to 55% considered overweight and 31% obese. However, there has been minimal research on weight management strategies for adolescents with IDD. The purpose of this study was to compare the effectiveness of two weight loss diets, an enhanced Stop Light Diet (eSLD) and a conventional diet (CD), and to determine the feasibility of using tablet computers as a weight loss tool in overweight and obese adolescents with IDD. A 2-month pilot intervention was conducted. All participants were randomized to the eSLD or CD and were given a tablet computer that they used to track daily dietary intake and physical activity. Participants and parents met weekly with a registered dietitian nutritionist via video chat on the tablet computer to receive diet and physical activity feedback and education. Twenty participants (45% female, aged 14.9±2.2 years) were randomized and completed the intervention. Participants in both diets were able to lose weight, and there were no significant differences between the eSLD and CD (−3.89±2.66 kg vs −2.22±1.37 kg). Participants were able to use the tablet computer to track their dietary intake 83.4%±21.3% of possible days and to attend 80.0% of the video chat meetings. Both dietary interventions appear to promote weight loss in adolescents with IDD, and the use of tablet computers appears to be a feasible tool to deliver a weight loss intervention in adolescents with IDD.

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APPROXIMATELY 1% TO 3% OF THE US POPULATION IS diagnosed with an intellectual or developmental disability (IDD). IDD is defined as a disability originating before age 10 years, characterized by significant limitations in both intellectual functioning (intelligence quotient <75) and limitations in two or more adaptive behaviors.¹ Several hundred causes have been discovered, but for one-third of the population affected the cause remains unknown.² The most common cause of IDD is Down syndrome, which accounts for 15% to 20% of the population.³

The prevalence of obesity in adolescents with IDD is approximately two times greater than in the general population.⁴⁻⁸ Approximately 55% of adolescents with Down syndrome are overweight (body mass index [BMI] ≥85th percentile), with 31% of these adolescents considered obese (BMI ≥95th percentile).⁶ Healthy People 2020, The National Institute on Disability and Rehabilitation Research, The Academy of Nutrition and Dietetics, The World Health Organization, and the Surgeon General's Report on Health and Wellness of People with Disabilities all recommend additional efforts to decrease the high prevalence of obesity among adolescents with IDD.⁹⁻¹¹ However, there are limited data on which to base effective weight management interventions in any age group with IDD.¹²⁻¹⁶

A conventional reduced-energy diet (CD), with an energy deficit of 500 to 1,000 kcal/day, is recommended for healthy individuals by the Academy of Nutrition and Dietetics¹⁷ and the National Heart, Lung, and Blood Institute Guidelines.¹⁸ However, implementation of the CD may be problematic for individuals with IDD because it can require calorie counting and an ability to read and comprehend educational materials and nutrition labels.

Although the CD may not be the best strategy for individuals with IDD, there is minimal data on which to base weight management strategies for adults with IDD^{12,15,16,19} and no published data for adolescents. Most interventions in adults have shown minimal weight change, +0.7 kg to −3.4 kg (~1.5% to 2.8%), which is considerably less than the long-term weight loss necessary to achieve health benefits (5% to 10%) recommended by the National Heart, Lung, and Blood Institute Guidelines¹⁸ or the minimum 3% weight loss suggested as clinically relevant.²⁰

To date, there has only been one clinically successful weight loss study in individuals with IDD. Saunders and colleagues¹⁴ introduced a simplified approach to energy restriction for adults with IDD using an enhanced Stop Light Diet (eSLD). In this study, 73 adults with IDD who followed an eSLD, delivered by monthly in-person health education

meetings, for 6 months lost an average of 6.1 kg (6.3%), and the average weight loss after 12 months was 8.6 kg (9.1%). Although the eSLD appears to be successful in adults with IDD, it has not been reported in adolescents with IDD. As adolescents with IDD have some different barriers to weight loss than adults, such as school lunches and parent involvement, it is unknown whether the eSLD can promote significant weight loss in that population.

Adolescents with IDD frequently use computer technology for education and training.²¹⁻²⁵ Technology in the form of tablet computers may be an effective educational tool in weight management of adolescents with IDD. The use of tablet computers could allow for instant feedback, serve as a visual aid, and allow for frequent health educator feedback, which may reduce some of the limitations in conducting a weight loss program in individuals with IDD. However, there are currently no published reports that have explored the feasibility of using tablet computers as a weight loss tool in adolescents with IDD.

The purpose of this study was to determine the feasibility of using tablet computers as a weight loss tool and to compare the effectiveness of two weight loss diets, an eSLD and a CD, in overweight and obese adolescents with IDD.

METHODS

Participants and Enrollment

An 8-week pilot investigation for adolescents with mild to moderate IDD was conducted. To participate, individuals had to be aged 11 to 18 years with an intelligence quotient 50 to 69 (mild) or 35 to 49 (moderate),¹ overweight or obese (BMI >85th percentile on Centers for Disease Control and Prevention growth charts), living at home with a parent, and have access to a wireless Internet connection. Individuals were excluded from the study if they had insulin-dependent diabetes, had participated in a weight reduction program during the past 6 months, were being treated for major depression or eating disorders, were consuming special diets, had a diagnosis of Prader-Willi syndrome, or were pregnant or became pregnant during the study. Participants were recruited through local community programs and advertisements in the target area using flyers and e-mail. All recruitment materials included investigators' contact information (toll-free telephone, e-mail). Questions from interested parents were addressed, and initial eligibility screenings were completed via telephone or e-mail. Home visits were scheduled with interested parents and potential participants to explain the project, answer questions, and obtain parental consent and adolescent assent. All parents or legal guardians signed a university-approved consent form, and all participants gave oral assent to participant in the study.

Intervention Components

Overview. All participants were randomized to either the eSLD or CD, and participants were given a tablet computer (iPad2, Apple Inc) that they used to track dietary intake and physical activity and that was returned at the end of the study. At baseline, the participant and a parent attended a 90-minute, at-home diet orientation session conducted by a registered dietitian nutritionist (RDN), and subsequently participated in weekly at-home education sessions that were conducted over video chat (FaceTime, Apple, Inc) on the iPad.

One parent was identified as a study helper, and was asked to be present at the orientation; attend all weekly education sessions; help track diet intake and physical activity on the tablet computer, if needed; and provide encouragement for the program by helping with meal preparation and encouraging physical activity. All participants completed outcome assessments at baseline and at the end of Month 2.

eSLD. The original Stop Light Diet developed by Epstein²⁶ for use in children was enhanced with the addition of fruits and vegetables (≥ 5 servings/day) and high-volume, low-energy portion controlled meals (PCMs) consisting of two entrées and two shakes per day. The original Stop Light Diet is easy for children and individuals with IDD to understand, especially with added assistance from parents,^{14,26} and was given a Grade 1 for its effectiveness in weight management for children by the Academy of Nutrition and Dietetics Evidence Analysis Library.²⁷ PCMs designed for weight loss are any prepackaged, preportioned food product that is low in calories, high in nutritional content, and intended to take the place of regular meals or snacks. PCMs are an effective weight loss tool because they are decision-free, so there is no guesswork or measuring of portion size, and they received a Grade 1 rating for their effectiveness in weight management from the Academy of Nutrition and Dietetics Evidence Analysis Library.²⁸ Noncaloric beverages were allowed ad libitum. All PCMs were provided to participants and were delivered to the participants' homes on a monthly basis. Participants were instructed to consume two entrées and two shakes per day, and if they were still hungry or were unable to consume an entrée or shake, they could pick foods from the Stop Light Diet picture guide, which was uploaded onto the tablet computer. Participants were instructed to choose green or yellow category foods and to avoid red category foods. PCMs were selected by participants during the health education session and shipped to participants' homes weekly.

CD. Participants in the CD group were educated to consume a nutritionally balanced, high-volume, lower fat (20% to 30% energy) diet as recommended by the US Department of Agriculture MyPlate approach.²⁹ Participants' energy needs were estimated using the Dietary Reference Intake total energy equation for overweight boys/girls.³⁰ A deficit of 500 to 700 kcal/day was prescribed; however, prescriptions never recommended <1,200 kcal/day. Consumption of five servings of fruits and vegetables per day was recommended. Participants were provided examples of meal plans consisting of suggested servings of grains, proteins, fruits and vegetables, dairy, and fats based on their energy needs, and they were counseled on appropriate portion sizes using 3-dimensional food models.

Physical Activity. All participants were instructed to engage in moderate intensity physical activity to gradually accumulate a total of 60 minutes per day at least 5 days per week as recommended by the American College of Sports Medicine.³¹ During the first week of the intervention, participants were instructed to engage in 10 minutes per day of physical activity, and every week another 10 minutes were added until a total of 60 minutes per day was obtained. Participants were encouraged to try a variety of different activities, such as walking, bike riding, and dancing. Because adolescents with

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