
The Healthy Lifestyle Change Program

A Pilot of a Community-Based Health Promotion Intervention for Adults with Developmental Disabilities

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Background: Although adults with developmental disabilities are at high risk for obesity and its sequelae, few community-based lifestyle interventions targeting those with developmental disabilities exist.

Design: The study was a single group, community-based demonstration project with pre-post test evaluation conducted from December 2005 to June 2006.

Setting/participants: Eligible participants were 431 community-dwelling adults with developmental disabilities, aged 18–65 years, who were overweight/obese (BMI ≥ 25) with another risk factor for diabetes or metabolic syndrome or who had a diagnosis of diabetes, and received services from a community agency. Eighty-five signed up (20% of those eligible), 68 participated in an initial class, and 44 completed the program (35% attrition rate).

Intervention: The Healthy Lifestyle Change Program (HLCP) is a community-based health intervention developed and implemented using community-based participatory research methods by members of the developmental disabilities community, in collaboration with academic researchers. The HLCP was a 7-month, twice-weekly education and exercise program to increase knowledge, skills, and self-efficacy regarding health, nutrition, and fitness among adults with developmental disabilities. Peer mentors served as participant leaders and primary motivators.

Measures: Changes in weight, BMI, abdominal girth, access to care, and self-reported nutrition, physical activity, and life satisfaction were each measured.

Results: Two thirds of participants maintained or lost weight, with a mean weight loss of 2.6 pounds and a median weight loss of 7 lbs (range: 2–24 lbs). Average BMI decreased by 0.5 kg/m² ($p=0.04$). Abdominal girth decreased in 74% of participants (mean = -1.9 inches). Sixty-one percent of participants reported increased physical activity. Mean exercise frequency increased from 3.2 times to 3.9 times per week ($p=0.01$). Mean exercise duration increased from 133 minutes to 206.4 minutes per week ($p=0.02$). Significant improvements in nutritional habits and self-efficacy were reported. Over half (59%) of participants showed improvements in life satisfaction. Participants received 206 referrals for needed medical care. The HLCP and its dissemination increased participants' and peer mentors' ability to act as community advocates and partners in research.

Conclusions: The HLCP resulted in improved lifestyles, weight loss success, and increased community capacity, indicating that a community-based program with significant participation of those with developmental disabilities is feasible. This program should be expanded and evaluated with larger populations with developmental disabilities.

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Introduction

Obesity and inactivity are more common in people with developmental disabilities than in the general population.^{1–4} This health disparity may be due to individual and community factors including physical challenges; cognitive limitations; antipsychotic medication use; lack of accessible adaptive fitness facilities and developmentally appropriate community programs; and segregation from the community.^{5–10} Further, limited access to medical care may

result in lack of obesity screening, counseling, and management.^{8,9} People with developmental disabilities experience high rates of secondary conditions associated with obesity and inactivity, such as type 2 diabetes, cardiovascular disease, and metabolic syndrome,¹⁰ and have four to six times the preventable mortality of the general population.^{11,12}

Although promoting and sustaining weight loss is a challenge,¹³ health promotion programs including diet, exercise, and behavior modification can promote weight loss and reduce or prevent the chronic complications of obesity.^{14–17} Even modest weight loss can improve glucose and blood pressure control, lower cholesterol, and reduce risk for heart disease.^{18,19} However, few lifestyle interventions target adults with developmental disabilities. Programs designed for developmental disabilities have been modestly successful, but short in duration, narrow in focus, and designed and implemented in academic, rather than community, settings.

Community-based interventions using community-based participatory research (CBPR) principles and methods are conducted in partnership with community members to produce more effective and sustainable interventions that address the community's needs and desires. Traditionally, research has been performed "on" those with developmental disabilities, with a focus on the disability, rather than "with" them, with a focus on their desires, which often relate more broadly to wellness, access to health care, and quality of life.²⁰ Community-based interventions for health promotion are ideal for those with developmental disabilities because they address developmental appropriateness, research mistrust, social inclusion, self-efficacy, and sustainability.²¹

During 2004–2005, staff in the Health and Medical Department at Westside Regional Center (WRC), a community organization serving people with developmental disabilities, noted an increase in obesity and type 2 diabetes diagnoses among adult clients. Options for these clients traditionally involved moving to a more restrictive environment, such as residential facilities with enhanced medical services or supervised adult daycare programs. Many clients who were high-functioning and living independently or in family homes did not want to move and requested assistance with health management and navigation of the medical system. Staff were concerned that these clients were the first of many to come. To address this dilemma, a collaboration was developed

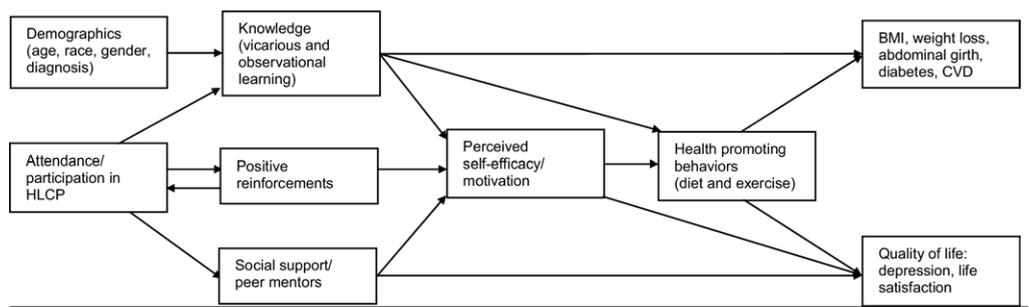


Figure 1. Conceptual model of the Healthy Lifestyle Change Program (HLCP)
CVD, cardiovascular disease

among members of the developmental disabilities community, including people with developmental disabilities, family members, care providers, WRC staff, and academic researchers. The goal was to create a community-based, comprehensive group health promotion program targeting adults with developmental disabilities who were overweight/obese (BMI ≥ 25) with another risk factor for diabetes or metabolic syndrome, or who had a diagnosis of diabetes. This collaboration resulted in the Healthy Lifestyle Change Program (HLCP).

The HLCP conceptual model (Figure 1) was based on Bandura's social cognitive theory of health behavior change.²² It was hypothesized that, in addition to demographic characteristics and program participation, social environment and individual cognitive factors would significantly impact outcomes. The model focuses on increasing participants' belief in their own ability to successfully perform a behavior (self-efficacy), through learning, positive reinforcement, and peer mentoring. This evaluation of the HLCP sought to determine whether the intervention could result in: (1) weight loss; (2) improved dietary habits; (3) increased exercise; (4) increased self-efficacy; (5) improved access to health care; (6) improved life-satisfaction; and (7) increased community capacity.

Methods

Community Setting and Participants

The HLCP was developed, implemented, and evaluated at WRC, a state- and federally funded, nonprofit agency mandated to provide services such as care coordination, health education, and provision of resources to all people with developmental disabilities living in western Los Angeles County. The WRC serves approximately 6000 clients, which include children and adults with developmental disabilities, which are defined as mental retardation, autism, epilepsy, cerebral palsy, or similar conditions (e.g., borderline intellectual functioning). The WRC Health and Medical Department Director drew together a project oversight team (hereafter referred to as "the team") composed of individuals with developmental disabilities, parents of individuals with developmental disabilities, WRC staff, academic researchers, and community-based professionals with extensive experience

working with developmental disabilities, including a behavioral psychologist, a dietician, fitness instructors, nurses, physicians, a physical therapist, an occupational therapist, a pharmacist, and public health professionals. This team met weekly to decide on all aspects of the program, including planning, curriculum development, implementation, evaluation, and dissemination. Academic researchers acted primarily as consultants providing information and facilitating discussion. Individuals with developmental disabilities also completed a series of leadership and health trainings to become peer mentors who collaborated to lead program activities.

Adult clients of WRC, aged 18–65 years, were eligible for the program if they were higher-functioning (i.e., living with family, independently, or with supported services in the community), were overweight/obese ($BMI \geq 25$); and had an additional risk factor for developing diabetes or metabolic syndrome, or already had diabetes. Risk factors included hypertension, hyperlipidemia, family history of diabetes, history of heart problems, hyperglycemia, ethnicity (nonwhite), and being aged >45 years. Potential participants were identified through chart review, community presentations, flyers, referrals, and mailed invitations with follow-up phone calls.

Design

The HLCP was a small-scale, community-based demonstration project, with a single group intervention design and a pre-post test outcomes evaluation. Developmentally appropriate informed consent was obtained from all participants. This study was approved by the State of California Committee for the Protection of Human Subjects.

Intervention: The Healthy Lifestyle Change Program

The HLCP intervention was designed by the team. Members of the developmental disabilities community acted as equal partners with health professionals and academic researchers, shaping the intervention design and reviewing potential curricular materials. For example, based on insights from team members with developmental disabilities, the program's exercise component was not integrated into existing community health clubs because of concerns that participants would feel awkward or out-of-shape if surrounded by typical Los Angeles health club members.

Two focus groups were conducted initially with clients to clarify what type of program would be of interest; what the potential challenges might be; and how to address challenges (e.g., format, locations, community inclusion). Based on client feedback from the focus groups, core aspects of the final program included: (1) client peer mentoring; (2) interactive health education; (3) supervised physical activity; (4) behavioral modification; (5) one-on-one health management education and advocacy; (6) clinical support; and (7) a supportive social network.

Peer mentors. Eleven adults with developmental disabilities were hired as peer mentors. Clients, client rights advocates, and parents of individuals with developmental disabilities introduced the concept of peer mentors to the team, believing peers were better equipped than professionals to support others who face similar challenges, life experiences, and barriers to health. Peer mentors were recruited through flyers, job advertisements, community presentations, and

referrals from WRC case managers and community organizations serving individuals with developmental disabilities. All potential candidates underwent an application process and were interviewed by team members.

Peer mentors were selected based on leadership potential and enthusiasm and/or life experience regarding healthy lifestyles. Peer mentors collaborated on program planning, curriculum revision, and participant recruitment. The HLCP was piloted with the peer mentors, who provided recommendations on logistic issues (when and where to hold classes); educational topics; developmental level; need for repetition and visual tools; sensitivity; potential limitations; and ways to adapt the program for the larger group. Peer mentors suggested the program be conducted at WRC rather than at other locations in the community because it was familiar, accessible, and centrally located, with a bus stop nearby. Peer mentors received training on health and fitness, leadership, and motivational strategies so that they could serve as leaders, teachers, and role models for healthy behavior. They made reminder phone calls to participants, led physical activity sessions, prepared healthy snacks, and helped facilitate review sessions and evaluation assessments. Peer mentors also presented program results at community meetings and academic conferences alongside researchers.

Education and exercise sessions. The HLCP included twice-weekly 2-hour sessions conducted over 7 months at WRC and other community locations from December 2005 through June 2006. Each class included 50 minutes of interactive health education, a 10-minute healthy snack break, and 1 hour of supervised physical activity. The education sessions emphasized six topics: general health/self-care, nutrition, physical fitness, chronic conditions, medications, and behavior modification. Professionals with expertise in developmental disabilities taught sessions with assistance from peer mentors, who led interactive activities that supplemented didactic material. For example, peer mentors modeled effective interactions during a physician visit, and they demonstrated safe cooking techniques. Curricular materials were designed to be understandable for those with intellectual disabilities, and they included daily, weekly, and monthly information reviews. Peer mentors also assisted participants with comprehension. Exercise was integrated into the community through the use of local parks and a fitness facility. The HLCP also used an exercise video created by the peer mentors. Participants were rewarded with incentives for achievements such as attendance, weight loss, and program completion. All participants had continuous access to support from project staff and peer mentors. Participants' families and support staff were encouraged to attend.

Evaluation. At the request of team members, researchers performed a literature review of published weight loss programs to guide development of outcome measures and program evaluation. The team reviewed all evaluation tools for developmental appropriateness, relevance to research questions, ease of administration, and acceptability to clients. All team members made decisions on outcome measures and tools using a democratic process. Outcomes were assessed at baseline and at 7 months (program completion). In addition to the outcomes described below, health knowledge questionnaires were self-administered with help from peer mentors

and project staff, and the Beck Depression Inventory®-II (BDI-II)²³ was administered by mental health professionals. Knowledge questionnaire results are not reported, because peer mentors and support staff mistakenly assisted participants with answers. The results of BDI-II are not reported due to participant difficulty in comprehending and completing the tool.

Weight, BMI, and abdominal girth. Weight, height, and abdominal girth were measured during a pre-post health assessment. Participants' BMI was calculated as kg/m². Weight was also measured monthly.

Nutrition assessment. A registered dietician administered a structured questionnaire that included dietary intake items, shopping and meal preparation skills, and nutritional self-confidence. Dietary intake items were guided by the NIH's Diet History Questionnaire, a validated food frequency questionnaire.²⁴ Items were tailored for participants' intellectual functioning. For example, questions involving frequency ranges, numbers of ounces, or fractions were simplified and included illustrative comparisons.

Physical fitness assessment. Fitness assessments were conducted by physical and occupational therapists and measured level of physical fitness (for safety purposes), ability and self-confidence to engage in exercise, and physical activity frequency and duration per week.

Life satisfaction. Participants completed the Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS).²⁵ The scale measures life satisfaction in five domains (family, friends, school, self, living environment), and overall life satisfaction. The BMSLSS was read aloud and explained by a project staff member if necessary.

Health assessment. A pertinent history, physical exam, and medical records review was performed by nurses and physicians. Referrals were made for needed primary care, preventive screenings, diagnostic tests, and specialty care. Preventive health screening recommendations were based on the U.S. Preventive Services Task Force *Guide to Clinical Preventive Services*,²⁶ and recommendations for acute problems were based on physician judgment. Nurses followed up on all referrals to ensure that appointments were made and kept.

Statistical analyses. Bivariate analyses were used to examine differences between pre- and post-assessments. Chi-squared tests and Fisher's exact tests were used for categorical variables, and one-tailed paired *t*-tests were used for continuous variables, given the expectation of reduced weight, BMI, and abdominal girth. Results were considered significant if $p < 0.05$ and were calculated in 2006–2007 using Stata 9.2.

Results

In all, 806 clients were screened for eligibility. Of 431 eligible clients, 85 signed up for the intervention, 68 attended at least an initial class, and 44 completed the 7-month intervention (35% attrition rate). Among those who completed the program, the attendance rates for 55 sessions ranged from 53% to

Table 1. Demographics of HLCP participants

| | <i>n</i> | Percentage |
|---|----------|------------|
| Developmental disability diagnosis^a | | |
| Autism | 7 | 15.9 |
| Cerebral palsy | 8 | 18.2 |
| Epilepsy | 6 | 13.6 |
| Mental retardation | 30 | 68.2 |
| Other | 11 | 25.0 |
| Gender | | |
| Female | 27 | 61.4 |
| Male | 17 | 38.6 |
| Ethnicity | | |
| African-American (non-Latino) | 28 | 20.5 |
| Caucasian (non-Latino) | 9 | 63.6 |
| Other ^b | 7 | 15.9 |
| Age (years) | | |
| 18–29 | 5 | 11.4 |
| 30–39 | 9 | 20.5 |
| 40–49 | 19 | 43.2 |
| 50–59 | 11 | 25.0 |

^aPercentages total more than 100% because many participants had more than one diagnosis

^bIncludes Asian, Latino, and multiple ethnicity
HLCP, Healthy Lifestyle Change Program

100%. The mean attendance rate was 82% (45/55 classes), and the median attendance rate was 84%. Almost all participants had some degree of intellectual disability, either mental retardation (68%) or conditions similar to mental retardation (25%). Cerebral palsy, epilepsy, and autism were each diagnosed in about 15%–20% of participants. Sixty-one percent of participants were female, 64% were white, and 43% were aged 40–49 years (Table 1). Clients who attended the initial session and underwent pre-assessments were similar in initial weight to participants who completed the program.

Weight, Height, BMI, and Abdominal Girth

Two thirds of participants (29/44) maintained or lost weight. Half (22) of participants lost more than 1 lb and seven were within 1 lb of their original weight. Weight loss ranged from 2–24 lbs among participants who lost weight, with a median loss of 7 lbs. Average weight loss for all participants was 2.6 lbs ($p = 0.03$) (Table 2). Average BMI of all participants decreased by 0.5 kg/m² post-program ($p = 0.04$), with a significant shift from obese to overweight or overweight to normal weight ($p < 0.0001$). Among 39 participants with pre-post abdominal girth measurements, 74% decreased their abdominal girth with an average overall loss of 1.0 inch ($p = 0.005$). Among those who decreased abdominal girth, the average loss was 1.9 inches. No association was found between attendance rate or changes in self-efficacy and changes in weight, BMI, or abdominal girth.

Table 2. Pre- and post-intervention health measures and self-reported behavior

| | Pre-intervention | Post-intervention | <i>p</i> -value |
|---|------------------|-------------------|-----------------|
| HEALTH MEASURES | | | |
| Mean weight (lbs) | 194.0 | 191.4 | 0.03 |
| Mean BMI (kg/m ²) | 33.3 | 32.8 | 0.04 |
| Weight categories | | | |
| Normal (<25 kg/m ²) | 6.8 | 11.4 | <0.0001 |
| Overweight (≥25 to <30 kg/m ²) | 36.4 | 34.1 | |
| Obese (≥30 to <40 kg/m ²) | 38.6 | 36.4 | |
| Extremely obese (≥40 kg/m ²) | 18.2 | 18.2 | |
| Abdominal girth (mean inches) (<i>n</i> =39) | 41.3 | 40.4 | 0.005 |
| SELF-REPORTED BEHAVIOR | | | |
| Exercise | | | |
| Mean frequency (times per week) | 3.2 | 3.9 | 0.01 |
| Mean minutes per week | 133.0 | 206.4 | 0.002 |
| Eating habits | | | |
| Vegetable servings per day | 2.0 | 2.2 | 0.13 |
| Fruit servings per day | 1.7 | 2.0 | 0.03 |
| Meat | 2.0 | 1.9 | 0.20 |
| Bread | 3.1 | 1.4 | <0.0001 |
| Whole wheat bread | 0.1 | 0.2 | 0.16 |
| Dairy | 1.9 | 2.2 | 0.01 |
| Diet soda | 3.0 | 2.9 | 0.35 |
| Regular soda | 1.6 | 1.4 | 0.26 |
| ≥5 glasses of water per day | 19% | 41% | <0.0001 |
| KNOWLEDGE AND SELF-EFFICACY | | | |
| Exercise (%) | | | |
| Totally sure that can stretch | 36.6 | 68.3 | 0.06 |
| Totally sure that can exercise hard enough to sweat, breathe hard | 53.5 | 58.1 | 0.09 |
| Totally sure that can exercise three times per week | 51.2 | 72.1 | 0.04 |
| Eating habits (%) | | | |
| Totally sure that can choose healthy food at home | 46.5 | 62.8 | 0.11 |
| Totally sure that can choose healthy food when eat out | 26.2 | 54.8 | 0.37 |
| Healthy eating knowledge (%) | | | |
| Know how to cook healthy food | 80.5 | 87.8 | 0.003 |
| Know how to buy healthy food | 87.2 | 92.3 | 0.35 |
| Know how to order healthy food | 77.1 | 88.6 | 0.34 |
| Believe that fast food is easier to buy than healthy food | 48.6 | 29.7 | 0.06 |
| Totally sure that can make doctor's appointment (%) | 66.7 | 83.3 | 0.003 |

Physical Activity

Physical activity increased in 61% of participants. Before the program, 55% reported exercising at least three times a week compared to 75% post-program ($p<0.0001$). Exercise frequency increased from a mean of 3.2 times per week to 3.9 times per week ($p=0.01$; Table 2). Similarly, there was an increase in mean duration of exercise from 133.0 minutes to 206.4 minutes per week ($p=0.002$; Table 2). Participants' confidence in their exercise skills and ability to exercise increased after participation in the program (Table 2).

Nutrition

Overall, participants improved their eating habits (Table 2). Participants increased their intake of

nutrient-dense foods such as vegetables (2.0 servings per day pre-program vs 2.2 post-program servings, $p=0.13$) and fruit (1.7 servings per day pre-program vs 2.0 post-program servings, $p=0.03$) and decreased intake of energy-dense snacks, fast food, and soda. Water intake also increased significantly. There was a trend in improvement in nutrition self-efficacy. Participants also reported making more healthy choices when cooking, ordering, and buying foods.

Healthcare Access and Self-Efficacy

A total of 206 referrals were made for medical care. Half of participants were referred for primary care (22/44). Almost all participants were referred for screening blood tests, cancer screenings, and immunizations. Over half (23/44) required dental referrals. The most common specialty referrals were ophthalmology and podiatry. Participants had increased confidence in their ability to access health care, with an in-

crease from 67% of participants reporting they were totally sure they could make a doctor's appointment pre-program compared to 83% post-program ($p=0.003$).

Life Satisfaction

Based on a comparison of the BMSLSS before and after the program, there was no significant change in mean life satisfaction; however, 59% of participants showed improvements in their overall life satisfaction.

Community Outcomes, Program Sustainability, and Dissemination

Researchers and peer mentors presented results to the participants, staff, and WRC's board of directors, and at

the statewide developmental disabilities stakeholders' meeting. Peer mentors also presented results at client self-advocacy meetings. Participants were pleased with results and made suggestions for program improvement, including a greater focus on diabetes, a more interesting class format, and a greater number of physical activity days. Encouraged by program results, WRC continues to support a modified version of the HLCP, led by peer mentors, 2 years after the original demonstration project. Nineteen of the original clients and 37 newer clients continue to participate, form social networks, and experience improved health outcomes. The program enjoys buy-in from administrators, WRC staff, and individuals with developmental disabilities, who refer clients at a rate of approximately one per week.

Although the HLCP was intended to be a small-scale demonstration project, dissemination of the curriculum and exercise video to all 20 other regional centers in California and other community organizations serving individuals with developmental disabilities assisted in achieving the goal of sustaining the program. The program was well received by state policymakers, who continue to include peer-led health programs as a funding priority for individuals with developmental disabilities. Locally, the HLCP continues to partner with a local fitness center that provides an adaptive class for those with developmental disabilities. Peer mentors and community care providers have been equipped with tools to continue the program in the community. A self-sustaining, client-directed, nonprofit agency was generated in which peer mentors are employed as independent living service providers specializing in healthy lifestyle coaching. Finally, the program has been recognized by the California Department of Health as aligned with the goals of Governor Schwarzenegger's administration.

Discussion

The HLCP was associated with positive outcomes of significant weight loss, improved nutrition, increased exercise frequency, increased self-efficacy, and improved access to care for a group of adults with developmental disabilities. Two thirds of participants who completed the program lost or maintained weight, with statistically and clinically significant decreases in BMI and abdominal girth after 7 months. The program has been sustained and disseminated, and has spurred development of a new community-based, community-run organization. Moreover, this project demonstrates that a successful, community-based healthy lifestyle intervention can be designed and sustained with the participation of the developmental disabilities community.

The HLCP is one of only a few health promotion programs directed at those with developmental disabili-

ties. The University of South Carolina's *Steps to Your Health*, an 8-week health education program for adults with mental retardation,^{27,28} was successful at influencing exercise, nutrition, and stress but did not result in significant weight loss. The University of Illinois at Chicago's Health Promotion Program reported a modest but significant reduction in body weight, increased exercise self-efficacy, and improved life satisfaction.^{29,30} However, this program specifically targeted adults with Down syndrome and was academically based, making direct comparison difficult.

Significant community participation occurred during many but not all phases of the HLCP. More community participation could have occurred through use of the focus groups to direct solutions rather than only identifying problems, and through community participation with analyses. Areas of strength included a process in which all collaboration members shared decision making equally, and a strong sense of ownership of the intervention by the peer mentors. Peer mentors were especially effective in supporting individuals with developmental disabilities in making changes and building community capacity.³¹ People with developmental disabilities have traditionally been excluded from decisions about their health care and self-management, as well as research, because of assumptions about cognitive limitations. The HLCP demonstrated that with open communication at a developmentally appropriate level, and minimal encouragement, those with developmental disabilities can participate in designing, implementing, and sustaining health interventions.

The intervention and evaluation methodology reflects the rewards and challenges of community-based research. The use of a small-scale demonstration project design allowed the program to be flexible and minimally disruptive to WRC staff and facilities, and favored administrative buy-in. A concurrent control group design was not acceptable to community members, who valued the idea that everyone who is eligible should participate. Because of initial fiscal constraints, a delayed intervention control group could not be offered. Randomization was also not possible because of community members' concerns of fairness to those who signed up first. Thus, results may be due to factors other than the program, including participation in other weight loss interventions, changes in personal health or medications, or whole community changes, such as increased media attention to weight loss and health. Selection bias may also be present, as those who were motivated to participate were also more likely to be motivated to lose weight. Additional limitations include the small sample size, which limited the study's power, as well as a relatively low rate of participation and follow-up. However, the HLCP was designed as a demonstration project to determine feasibility of such a program and to prepare for larger, more methodolog-

ically rigorous studies that would incorporate lessons learned from this initial pilot study.

The screening process revealed that over 50% of community-dwelling adults with developmental disabilities are overweight/obese or have diabetes. As a result of limited resources, our project was a small-scale demonstration project and could not serve the 400+ individuals who would benefit. Nonetheless, recruitment was targeted broadly with the expectation of a low uptake rate and attrition resulting from a lack of motivation, similar to other weight loss programs.¹⁵ Clients cited many barriers to recruitment and retention, including lack of motivation to exercise, transportation, childcare, conflicting work schedules, and language translation needs. Several of these barriers may be addressed in the future by including more schedule flexibility and accessible transportation. Still, two thirds of participants completed the program, and session attendance rates were very high, a favorable result as compared to other studies.²⁹

Weight loss was modest, though substantial and sustained. Clinicians recommend a modest weight loss of 5% of body weight as being achievable and maintainable, resulting in decreased hyperlipidemia, hypertension, and glucose intolerance.³² Even without weight loss, the decreased abdominal girth experienced by our participants may be predictive of reduction in cardiovascular risk factors.³² Unfortunately, some participants did not have control over food choices, as some clients reported that support staff accompanied them to fast food restaurants (even following the class) and prepared calorie-dense foods for them. Better results may have occurred if the program had included more active participation by families and support staff.

Validated measures of diet and exercise habits and self-efficacy were not available for those with developmental disabilities, and self-report questions may be subject to misunderstanding or recall bias. Nonetheless, weight loss, and BMI and abdominal girth improvements were consistent with reported changes in diet and exercise. In addition, participants had difficulty understanding concepts of the life-satisfaction scale, such as the difference between "happy" and "pleased." Other measures may better capture how the program affects quality of life.

Weight loss and other measures were not formally evaluated for the peer mentors because these individuals were regarded as staff of the program rather than participants. However, evaluation of peer mentors would have been useful for documenting program effects on individuals taking on leadership roles. Despite challenges, the HLCP succeeded in its goals to produce an effective, sustainable, community-based intervention for those with developmental disabilities. The program was unique because it arose from community need as recognized by a community organization, which sought the collaboration of academic

researchers. The community-based approach also emphasized the developmental appropriateness of the intervention, long-term sustainability, and improvements in health through capacity-building.^{31,33} Future studies should consider using this type of community-based, peer mentor-led approach to design, implement, and examine larger, randomized controlled studies of health promotion interventions, with longer-term outcomes for those with developmental disabilities. The lessons of this pilot for such a study include using a community-based approach to inform recruitment and retention methods, increasing family and support staff participation, and developing outcome measures that can be validated in adults with developmental disabilities.

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