

**Research and Practice Innovations**

# LA Sprouts: A Gardening, Nutrition, and Cooking Intervention for Latino Youth Improves Diet and Reduces Obesity

JAIMIE N. DAVIS, PhD, RD; EMILY E. VENTURA, MPH, PhD; LAUREN T. COOK; LAUREN E. GYLLENHAMMER;  
NICOLE M. GATTO, MPH, PhD

**ABSTRACT**

Evidence demonstrates that a gardening and nutrition intervention improves dietary intake in children, although no study has evaluated the effect of this type of intervention on obesity measures. The objective of this pilot study was to develop and test the effects of a 12-week, after-school gardening, nutrition, and cooking program (called LA Sprouts) on dietary intake and obesity risk in Latino fourth- and fifth-grade students in Los Angeles, CA. One hundred four primarily Latino children (mean age  $9.8 \pm 0.7$  years), 52% boys and 59% overweight, completed the program ( $n=70$  controls,  $n=34$  LA Sprouts participants). Weight, height, body mass index, waist circumference, body fat (via bioelectrical impedance), blood pressure, and dietary intake (via food frequency screener) were obtained at baseline and postintervention. LA Sprouts participants received weekly 90-minute, culturally tailored, interactive classes for 12 consecutive weeks during spring 2010 at a nearby community garden, whereas control participants received an abbreviated delayed intervention. Compared to subjects in the control group, LA Sprouts participants had increased dietary fiber intake (+22% vs -12%;  $P=0.04$ ) and decreased diastolic blood pressure (-5% vs -3%;  $P=0.04$ ). For the overweight subsample, LA Sprouts participants had a significant change in dietary fiber intake (0% vs -29%;  $P=0.01$ ), reduction in body mass index (-1% vs +1%;  $P=0.04$ ) and less weight gain (+1% vs +4%;  $P=0.03$ ) compared to those in the control group. We conclude that a gardening, nutrition, and cooking intervention is a

promising approach to improve dietary intake and attenuate weight gain in Latino children, particularly in those who are overweight.

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Recently, the first-ever federal task force to address the epidemic of childhood obesity in the United States was formed, with one of the key pillars being making healthy foods more affordable and accessible for families. Although promoting gardening and farmer's markets are key vehicles of this initiative, to date, no gardening and nutrition intervention study has assessed whether such innovative approaches are in fact effective at reducing obesity and related risk factors. Given the growing momentum for gardening and cooking programs, there is an obvious research requisite to evaluate how a gardening and cooking intervention affects dietary behaviors and subsequent obesity risk.

Los Angeles is one of the few cities in the United States where foreign-born people constitute a majority, with 40% to 50% of residents being of Latino descent (1). The prevalence of obesity in Los Angeles varies markedly by ethnic/racial group, with Latinos having among the highest rates (2), which puts them at elevated risk for associated chronic diseases. Overweight Latino youth (aged 8 to 18 years) in Los Angeles have excessive visceral adiposity, are insulin resistant, and more than 30% have prediabetes and the metabolic syndrome (3-5). All these conditions are associated with increases in risk for type 2 diabetes and cardiovascular disease. Low intakes of dietary fiber, specifically from fruits and vegetables, coupled with high consumption of refined grains and added sugar (6-8), have been linked to obesity and related disorders in Latino populations.

A lack of access to healthy, affordable, high-quality foods characterizes so-called food desert areas of inner cities. A recent study in East Los Angeles, where the majority of residents were Latino and of low socioeconomic status (SES), reported that only 18% of grocery stores sold fresh fruits and vegetables of good quality (ie, not over-ripe or rotting) (9). Consequently, these geographic and financial barriers pose great challenges for low-income Latino families living in Los Angeles to maintain a healthy and balanced diet (10). Growing food in home, school, or community gardens is a means by which low-income families can increase access to nutritionally rich foods that may otherwise be unavailable to them (11).

*J. N. Davis is an assistant professor, E. E. Ventura is a postdoctoral fellow, L. T. Cook is project manager, and L. E. Gyllenhammer is a predoctoral student, Department of Preventive Medicine, Keck School of Medicine, University of Southern California, Los Angeles. N. M. Gatto is an assistant professor, Department of Epidemiology, School of Public Health, University of California Los Angeles.*

*Address correspondence to: Jaimie N. Davis, PhD, RD, 2250 Alcazar St, CSC 213, Los Angeles, CA 90033. E-mail: jaimieda@usc.edu*

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During the past 2 decades, school gardens have contributed to improved dietary intake and eating behaviors among children (12-16). However, to date, no study has assessed the effects of school gardens on childhood obesity measures, especially those in high-risk Latino youth. Thus, the overall goal of this project was to develop and test the effects of 12-week after-school, gardening, nutrition, and cooking program (LA Sprouts) on dietary intake, obesity parameters (ie, body mass index [BMI], waist circumference, percent body fat), and blood pressure in Latino fourth- and fifth-grade students living in Los Angeles. Researchers hypothesize that participants who complete the LA Sprouts program would increase their intake of dietary fiber, fruit, and vegetables and experience a reduction in clinical indicators for obesity.

## METHODS

### Participants

All fourth- and fifth-grade students at a local elementary school (approximately 135 children) were invited to participate in this pilot study, and a total of 104 agreed to participate. Thirty-four students enrolled in an existing after-school care program (LA's BEST) completed the 12-week LA Sprouts program (ie, attended at least 10 of the 12 sessions and completed all testing), whereas 70 fourth- and fifth-grade students who were not enrolled in LA's BEST served as the control group. The ethnic background and SES of students participating in the LA's BEST after-school care program reflects that of the entire school. The Institutional Review Board of the University of Southern California, Health Sciences Campus, and the Los Angeles Unified School District approved this study. Informed written consent from parents and assent from children were obtained before the study.

### Description of the Intervention Program

The LA Sprouts program was taught at the Milagro Allegro Community Garden located approximately 2 miles from the elementary school. The 10,000-sq ft garden includes 32 raised bed garden plots for cultivating fruits and vegetables, two of which were specifically devoted to LA Sprouts. The garden also has a central community gathering space with seating, a mobile cooking/grilling island, and room for tables needed to teach classes. Students were transported on the Metro light rail to and from the class each week, given the proximity of the Metro stations to both the garden and school (two blocks away at either end).

An overview of 12-week LA Sprouts intervention curriculum is presented in the Figure. LA Sprouts intervention classes were taught during 90-minute sessions once a week for 12 weeks during spring 2010. Sessions began with participants receiving a 45-minute interactive cooking and nutrition education lesson taught in English and led by a study staff member or graduate student trained in nutrition and supervised by a registered dietitian. Nutrition lessons focused on increasing fruit and vegetable intake, including culturally relevant foods such as cilantro, nopales, beans, corn, and squash. Preparation, cooking, and eating occurred outdoors in the garden. Students worked in small teams of five led by a teacher to

cook/prepare the sample recipe each week, which emphasized fruit and/or vegetable ingredients. The snack was eaten in a family-style manner (ie, together at a table, with a tablecloth and nondisposable plates and silverware). Following the cooking and nutrition component, participants received a 45-minute interactive gardening lesson, taught by a Latina Master Gardener from the University of California Cooperative Extension Common Ground Garden Program. The gardening curriculum used a hands-on approach where children learned and participated in planting, growing, maintaining, and harvesting organic fruits and vegetables. Gardening lessons also included identification of plants, square foot gardening, seasonal crops, transplanting, recycling, composting, irrigation, and mulching. Monthly visits to a local farmers market were integrated into the LA Sprouts program, and a five-to-one student:teacher ratio was maintained at all times.

Parents of LA Sprouts participants also received three separate 60-minute parental nutrition and gardening classes during the 12-week intervention that were held at the elementary school and timed for when parents typically picked up their children. The material covered in the parent classes essentially mirrored that in the student classes, but was taught primarily in Spanish. Parent classes were optional and not well attended (about 25% of parents participated).

### Description of the Control Group

Although not a randomized trial, all fourth- and fifth-grade students who were not enrolled in LA's BEST served as the control group. Control participants did not receive any nutrition, gardening, or cooking information between pre- and post-testing. After the post-testing was completed, the school hosted gardening/nutrition/cooking workshops for all fourth and fifth graders and their parents as a delayed intervention.

### Testing

Testing was performed by research faculty and staff 1 week before and 1 week after the 12-week intervention at the elementary school during the school day on all consented fourth and fifth grade students (both LA Sprouts and Control participants). Specific details of the testing measures are described below.

**Demographics.** Participants were asked basic demographic information, including their age and ethnicity. To ascertain family SES, participants were asked questions on whether their family uses a computer at home and whether their mother has her own car (17).

**Anthropometrics, Body Composition, and Blood Pressure.** Height was measured to the nearest 0.1 cm using a wall-mounted stadiometer (Perspective Enterprises, Portage, MI). Weight (in kilograms) and total body fat (%), via bioelectrical impedance) were measured with the Tanita Body Fat Analyzer (model TBF 300, Arlington Heights, IL). BMI and Centers for Disease Control and Prevention age and sex-specific BMI percentiles were determined using EpiInfo version 3.2 (2005, Centers for Disease Control and Prevention, Atlanta, GA). Students with a BMI percentage  $\geq 85$ th percentile were classified as being

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