Research Article

An Experiential Cooking and Nutrition Education Program Increases Cooking Self-Efficacy and Vegetable Consumption in Children in Grades 3–8

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ABSTRACT

Objective: Evaluate the effect of a community-based, experiential cooking and nutrition education program on consumption of fruits and vegetables and associated intermediate outcomes in students from low-income families.

Design: Quasi-experimental program evaluation by pre–post survey of participating students and their parents.

Setting: Underserved elementary and middle schools in Chicago.

Participants: Students (n = 271; 65% girls, 44% Hispanic, 32% African American; 94% eligible for free/reduced price lunch) in grades 3–8 selected by school staff to participate by variable inclusion criteria. 59% of students who applied returned both pre- and post-surveys.

Intervention(s): Ten-week (2 h/wk) chef-instructor–led program held in cafeteria kitchens after school.

Main Outcome Measure(s): Changes in student nutrition knowledge, cooking self-efficacy, fruit and vegetable liking and consumption, and communication to family about healthy eating.

Analysis: Changes from beginning to end of program were analyzed with paired *t* test. Results were considered significant at $P < .05$.

Results: Increased nutrition knowledge score from 0.6 to 0.8, cooking self-efficacy score from 3.2 to 3.6, and vegetable consumption score from 2.2 to 2.4 (all $P < .05$). Increased score for communication about healthy eating (4.1 to 4.4; $P < .05$) 6 months after the end of the course.

Conclusions and Implications: Experiential cooking and nutrition education programs led by chef-instructors may be effective ways to improve nutrition in low-income communities.

Key Words: elementary school, middle school, vegetable preference, vegetable liking, food preference, cooking (*J Nutr Educ Behav*. 2016;48:697-705.)

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INTRODUCTION

The epidemic of pediatric obesity has focused both research and policy attention on determinants of energy balance and diet quality in children.[1,2] Dietary patterns that are energy- and fat-dense but depleted of high-fiber foods may be predictive of later obesity in children.[3] Healthier dietary patterns result when children consume recommended amounts of fruits, vegetables, and whole grains. However, poor compliance with dietary guidelines for these foods has been well documented in children.[4] Despite numerous campaigns to promote fruit and vegetable consumption, there was no improvement in vegetable consumption in US children on a national level from 2003 to 2010.[5] In addition, vegetable consumption decreased slightly but significantly during that period in African American and Hispanic children.[5] Fruit intake increased slightly in children from 2003 to 2010, except in children from relatively low-income families (income < 130% of the poverty level).[5] It was reported that on a given day only 11% of children aged 6–11 years eat dark green vegetables and only 36% consume citrus, melons, or berries.[6]

Frequent family meals increase children's intake of fruits, vegetables, grains, and calcium-rich foods, reduce children's intake of foods with high

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caloric but low nutrient density,[7] and may protect against obesity later in life.[8] This latter effect may be mediated in part by cooking at home because vegetables prepared at home are lower in sodium and calories than those prepared away from home[9] and meals prepared at home contain fewer calories, a lower proportion of fat calories, and more fiber, calcium, and iron per calorie than foods prepared away from home.[10] Nevertheless, Centers for Disease Control and Prevention statistics showed that a significant proportion of children (eg, 35% in Illinois) do not eat family meals on ≥ 4 days of the week.[11]

The home food environment, as measured by the availability and accessibility of fruits and vegetables, predicts the diet quality of children.[12-14] Parents can have a strong positive influence on their child's eating habits by making fruits and vegetables available, modeling consumption, and voicing support for healthy behaviors.[15] Children also contribute to the healthy home environment by requesting fruits and vegetables in the home, grocery shopping with parents, and asking to have their favorite fruits and vegetables within reach.[15,16] These studies[12-16] indicated that children and parents interact to create the family food environment and that cooking meals at home may improve diet quality.

To improve the home food environment and childhood nutrition, nutrition education programs aim to increase child liking for fruits and vegetables, cooking at home, and communication from the child to the family about healthy eating. Fruit and vegetable liking is important because preference for vegetables predicted lower body mass index (BMI) in African American children.[17] The relevance of cooking at home was established by the finding that among participants in the *Supplemental Nutrition Assistance Program*, frequent cooking at home predicted greater vegetable consumption,[18] which suggests that increasing the frequency of cooking at home may improve nutritional status. Ideally, nutrition education programs will teach children how to identify and select appropriate amounts of healthy foods and include opportunities for participants to taste and enjoy healthy foods.[19] Combined hands-on cooking and nutrition education programs have been demonstrated to improve children's preference for fruits and vegetables[20,21] and feelings of cooking self-efficacy[22] and increase the frequency with which children help make dinner at home.[23] It was hypothesized that a school-based, integrated cooking and nutrition education program facilitated by trained chef-instructors paired with technical support from program managers would be an effective method to improve students' fruit and vegetable exposure, liking, and consumption and that effects would be accompanied by increases in nutrition knowledge, cooking self-efficacy, and communication to the family about healthy eating. They also hypothesized that parents would confirm these changes in the home food environment, and that the effects would persist for at least 6 months after the end of the program.

METHODS

Study Design

This was a 1-year (school year 2011–2012) evaluation of a community-based nutrition and cooking education program (Common Threads) that has been offered continuously since 2003.[24]

Participants and Recruitment

The evaluation included 17 elementary schools and 1 middle school in Chicago. High-poverty schools (at least 80% of students eligible for free or reduced-price lunch) were enrolled if they were willing and able to accept the program. School staff selected students to apply to participate in the program using their own criteria (variable inclusion criteria). Some schools allowed students to participate as a reward for good behavior whereas others chose students in need of a hands-on, active program. Application packets were distributed to selected students to take home to parents for review and signature. Application packets contained program consent forms, survey consent forms, media release forms, and the parent pre-survey. A total of 462 students applied to participate in the study; 271 students who completed the application, program, and pre- and post-surveys were included in the analysis. Students were excluded from the analysis if they did not complete both a pre-survey and post-survey. Surveys were missing if students missed the first or last class. Attendance data were not collected. A subset of students' parents (n = 257) participated in the evaluation. The study was approved by Chicago Public Schools Research Review Board and the University of Chicago Institutional Review Board.

Intervention

Students participated in a 10-week after-school cooking and nutrition education course taught at each of the 17 schools in the school kitchen by professional chef-instructors who went through standardized training (2 hours) by Common Threads staff and were issued the printed curriculum upon completion of training. The course was designed to focus primarily on cooking skills; it used culinary instruction to impart lessons in nutrition and cultural awareness. Because of this focus on cooking, chef-instructors were considered to be best qualified to teach and model professional cooking skills and instill enthusiasm for cooking and fresh food. Chef-instructors were supported by Common Threads program managers who facilitated interactions and scheduling with the schools, advised chef-instructors on management of volunteers and schoolchildren, and reviewed recipe adjustments necessitated by varying availability of ingredients to ensure that they were aligned with principles of good nutrition. With rare exceptions, each chef-instructor taught at only 1 school. Chef-instructors were assisted by volunteers (teachers or other school staff) to achieve a maximum student to adult ratio of 5:1. The course consisted of 10 2-hour sessions taught after school in a single semester. The detailed, standardized course curriculum, including materials for both chef-instructors and students, was written by Common Threads staff members, 1 of whom was a certified teacher; the other was a trained chef. The curriculum was reviewed by a registered dietitian. Each lesson consisted of 30 minutes of lecture and discussion of nutrition principles and cultural awareness, 75 minutes of instruction in culinary skills and hands-on meal preparation, and 15 minutes of meal sharing and conversation. Every lesson presented content and exercises designed to teach the recommended composition of a healthy meal, ie, that half of the plate should contain