



Garden-enhanced nutrition education improves nutrition knowledge and behavior in second-grade students

Anna Jones¹, Carole Ly¹, Karrie Heneman¹, Lisa Wasilewski², and Sheri Zidenberg-Cherr¹

¹University of California, Davis, Center for Nutrition in Schools, Department of Nutrition, and ²Get Healthy San Mateo County

Abstract

This study assessed the impact of the *Healthy Eating Active Living (HEAL)* nutrition curriculum on improving the nutrition and health knowledge and vegetable preferences of second grade children. Second graders and their parents in three schools in San Mateo County, California, participated in the study. Children received 21 weekly garden-enhanced nutrition education lessons and participated in active games twice weekly during lunchtime. Knowledge and behavior surveys were administered to children pre- and post-intervention, and a behavior survey was completed by parents, pre- and post-intervention. Mean nutrition knowledge increased among students ($p < 0.001$). Out of the five vegetables tasted by students, only zucchini preference increased ($p = 0.016$). Parents reported their child increased consumption of other fruits ($p = 0.006$), and decreased consumption of cookies ($p < 0.001$). They also reported an increase in their child's enjoyment of active games after intervention ($p = 0.001$). In summary, 21 weeks of exposure to the *HEAL* curriculum increased nutrition knowledge, improved preference for zucchini, increased consumption of fruit, and decreased consumption of cookies. The *HEAL* curriculum is an effective way to improve knowledge and behavior and is popular with students.

Objective

To determine the efficacy of the *Healthy Eating Active Living (HEAL)* curriculum at improving the nutrition and health knowledge, vegetable preferences, and behaviors of second grade children.

Methods

- Second graders and their parents in three schools in San Mateo County in California participated in the study.
- At baseline, a pre-test and vegetable preference survey were administered to children and a pre-survey was administered to parents.
- Children received 21 weeks of garden-enhanced nutrition education with one lesson per week, and participated in twice-weekly active games during lunchtime.
- Following the intervention, a post-test and vegetable preference survey were administered to children, and a follow-up survey was administered to parents.

Data Analysis

- Statistically significant differences in the pre- and post-intervention mean scores for ordinal variables were detected using paired t-tests.
- McNemar's Test was used to analyze dependent, non-parametric data in the pre- and post-surveys.
- All data were analyzed using SPSS Version 16.0 (SPSS, Inc., Chicago, IL, USA).

Results

- The sample consisted of 113 students, with 45 at Hatch Elementary School, 43 at Farallone View Elementary, and 25 at El Granada Elementary.
- Fifty percent of the children were female ($n = 57$), 47% were male ($n = 53$). Three percent ($n = 3$) of parents declined to state the gender of their child.
- The ethnic make-up of the sample was 56% Caucasian/white ($n = 63$), 35% Latino/Hispanic ($n = 40$), 2% Asian/Pacific Islander ($n = 2$), 1% Chicano ($n = 1$), and 4% Other ($n = 5$). Two percent of parents declined to state ($n = 2$).
- Students at all three schools significantly increased mean nutrition knowledge scores following the intervention (Figure 1).
- Out of the five vegetables tasted by students, only mean zucchini preference increased significantly (Table 1).
- There was a significant increase in consumption of fruits other than apples and oranges and a decrease in consumption of cookies, as reported by parents (Figure 2).
- Parents reported a significant increase in their child's participation in active games after intervention (Table 2).

Table 1: Mean vegetable preference scores pre- and post-intervention

	n	Pre (Mean ± SEM)	Post (Mean ± SEM)	t	p-value
Broccoli	37	4.5 ± 0.158	4.7 ± 0.102	1.39	0.173
Zucchini	35	4.1 ± 0.147	4.5 ± 0.144	2.528	0.016
Spinach	41	4.5 ± 0.148	4.1 ± 0.198	1.601	0.117
Radish	36	4.1 ± 0.180	3.8 ± 0.250	0.867	0.392
Peas	46	4.9 ± 0.067	4.9 ± 0.068	0.467	0.642

Table 2: Children's activity pre- and post-intervention

	n	Pre (Mean±SEM)	Post (Mean±SEM)	t	p-value
Playing active games (times/week)	94	3.3 ± 0.086	3.6 ± 0.078	-3.375	0.001
TV time (hrs/day)	88	1.5 ± 0.079	1.3 ± 0.079	-1.752	0.083
Computer/Video game time (hrs/day)	88	0.8 ± 0.084	0.7 ± 0.073	-0.928	0.356

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Figure 1: Mean nutrition knowledge scores pre- and post-intervention, by school

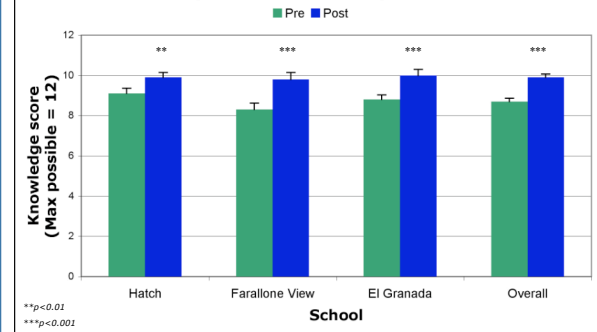
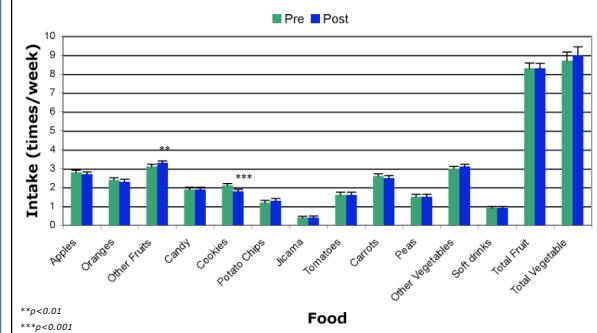


Figure 2: Child intake pre- and post-intervention, as reported by parents



Conclusion

- Exposure to 21 weeks of the *Healthy Eating Active Living (HEAL)* curriculum was effective in increasing nutrition knowledge, improving preference for zucchini, increasing consumption of fruit (other than apples and oranges), and decreasing consumption of cookies.
- Parents reported an increase in number of days their children played active games per week.
- The *HEAL* curriculum is an effective way to improve knowledge and behavior.