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Effect of the Strong4Life School Nutrition Program on Cafeterias and on Manager and Staff Member Knowledge and Practice, Georgia, 2015

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Abstract

Objectives: The goal of the Strong4Life School Nutrition Program is to promote healthy eating in school cafeterias in Georgia by training school nutrition managers and staff members to implement changes in the cafeteria to nudge children to make healthier choices. The objective of our study was to evaluate program effect on (1) school nutrition manager and staff member knowledge of evidence-based strategies and their self-efficacy to make positive changes, (2) the school cafeteria environment, and (3) National School Lunch Program participation.

Methods: We assessed changes in participant knowledge, beliefs, and self-efficacy by administering a survey before and after training (February-July 2015); a follow-up survey (3 school months posttraining) assessed changes in the cafeteria. A total of 842 school nutrition managers and staff members were trained and completed pre- and posttraining surveys; 325 managers completed the follow-up survey. We used cafeteria records from a subsample of the first schools trained (40 intervention and 40 control) to assess National School Lunch Program participation.

Results: From pretraining to posttraining, we found a significant increase in manager and staff member ($n = 842$) knowledge of strategies for enhancing taste perception through the use of creative menu item names (from 78% to 95%, $P < .001$) and understanding that food placement in the lunch line influences food selection (from 78% to 95%, $P < .001$), and in their self-perceived ability to influence the cafeteria environment (from 91% to 96%, $P < .001$). From pretraining to 3-month follow-up, managers ($n = 325$) reported increased use of evidence-based serving strategies: visibility (from 84% to 96% for placing healthy options in >2 locations, $P < .001$), convenience (from 63% to 84% for placing plain milk in front of other beverages, $P < .001$), sell (from 25% to 38% for branding healthy items with stickers, $P < .001$), price (from 17% to 27% for using bundle pricing to encourage sales, $P < .001$), and taste (from 77% to 85% for signage demonstrating the benefits of healthy eating, $P = .01$). National School Lunch Program participation did not change significantly.

Conclusions: Training cafeteria managers and staff members in Smarter Lunchrooms Movement techniques may be an effective way to make changes in the school cafeteria environment to encourage healthier choices among students. Additional studies allowing time for more complex changes to be implemented are needed to assess the full effect of the program.

Keywords

National School Lunch Program, school nutrition, Smarter Lunchrooms Movement, behavioral economics, child nutrition

The National School Lunch Program serves millions of children in the United States each day (>31.6 million in 2012).[1] It is the second-largest food and nutrition assistance program in the country, second only to the Supplemental Nutrition Assistance Program. All US public school students can participate in the National School Lunch Program, and students from low-income families qualify for free or reduced-price lunches.[2] The Healthy, Hunger-Free Kids Act of 2010 is the most recent reauthorization and update of the National School Lunch Program legislation,[3] which was permanently authorized by public law in 1946.[4] Title II of the Healthy,

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Hunger-Free Kids Act, introduced in December 2010, focuses on reducing childhood obesity and improving the diets of children.[3] As such, the US Department of Agriculture developed new school nutrition standards to ensure availability of healthy foods by requiring that meals include more fruit, vegetables, and whole grains; fat-free and lowfat milk only; less sodium; and limits on calories by grade level.[5]

Initially, implementation of these new Healthy, Hunger-Free Kids Act standards created challenges for schools, including reduced participation in the National School Lunch Program and difficulty in meeting budget constraints[6,7] because of higher food costs and lower food sales. However, recent studies show that 95% of schools are now meeting the new standards, and some have even seen increases in school meal participation.[8] Although food left on plates (ie, plate waste) in schools is an issue, fears that plate waste would increase with adoption of the Healthy, Hunger-Free Kids Act have proven to be unfounded.[9]

Despite improvements from the Healthy, Hunger-Free Kids Act, many students choose alternatives to school-provided lunches. Well-meaning parents, regardless of income status, continue to send lunches from home, believing them to be healthier than the lunches provided through the National School Lunch Program.[10] Students bringing lunch from home raises concerns, because research shows that home-packed lunches are likely to be lower in nutrition value than those provided at school.[11] Furthermore, National School Lunch Program participants from low-income households with limited access to fresh fruit and vegetables might not have developed a preference for fresh fruit and vegetables.[12] These findings highlight the need for further school-based efforts to promote healthy eating among students at school, in part by increasing participation in the National School Lunch Program.

In 2014, Children's Healthcare of Atlanta, one of the largest pediatric clinical care providers in the United States, developed the Strong4Life School Nutrition Program (www.strong4life.com) in partnership with the Governor of Georgia's childhood obesity initiative, Georgia Shape (www.georgiashape.org). The purpose of the Strong4Life School Nutrition Program is to increase the use of evidence-based no-cost or low-cost strategies[13] to promote healthy food selection and consumption in school cafeterias in Georgia. Based in part on basic marketing principles, and built on work conducted by the Cornell Center for Behavioral Economics in Child Nutrition Programs' Smarter Lunchrooms Movement (www.smarterlunchrooms.org), the Strong4Life School Nutrition Program aims to increase school meal participation and consumption of healthier foods in Georgia school cafeterias by better equipping school nutrition managers and staff members with skills and resources to make positive and visible changes in the cafeteria. The Strong4Life School Nutrition Program packages the evidence-based techniques of the Smarter Lunchrooms Movement into 5 focus areas, called the Strong4Life Smart Serving Strategies:

1. Sell: Through promotions and signage, make healthy food selections more appealing to students and nudge students toward selecting healthier options.
2. Taste: Enhance students' taste expectations by ensuring that food items are presented in an attractive and visually appealing way.
3. Visibility: Make the healthiest choices the most visible.
4. Convenience: Make healthy choices quick and easy to reach and include grab-and-go options.
5. Price: Give healthy items an advantage by making them more affordable than less healthy options.

Between February and July 2015, Strong4Life registered dietitians conducted Strong4Life School Nutrition Program training sessions in person throughout Georgia at regional and district conferences and professional development days. Participants included school nutrition managers (including assistant managers) who oversee the daily operations in school cafeterias and school nutrition staff members who prepare and serve food. The training program included a 90-minute, in-person, interactive training session; 4 videos; a training manual; and a take-home toolkit including bright, colorful, and functional posters, floor decals, stickers, buttons, ceiling danglers, menu item labels, and fruit bowl stickers to help school nutrition staff members and managers enhance the school cafeteria environment. The 4 videos focused on childhood obesity awareness, verbal nudges that can be used to promote healthy food choices, the 5 Strong4Life Smart Serving Strategies in action, and use of the toolkit materials. The training manual provided suggestions for staff member engagement, partnerships, and promotions, along with all of the key strategies and messaging taught during the interactive training session. The videos and training manual were also made available online. A posttraining formal communication plan included monthly emails to participants offering suggestions for reinforcing the Strong4Life Smart Serving Strategies, sharing participant success stories, and providing important opportunities for recognition and grant funding available through partnering organizations.

The purpose of our study was to assess the effect of the Strong4Life School Nutrition Program on (1) participant knowledge of evidence-based strategies for improving school cafeteria and student school meal practices and self-confidence in their ability to make changes, (2) the school cafeteria environment, and (3) National School Lunch Program participation.

Methods

Data Collection

Between February and July 2015, 1011 school nutrition managers and staff members from 605 schools in 75 of 159 counties (47%) in Georgia participated in the Strong4Life School Nutrition Program training session. Training sessions

were offered at 3 regional Georgia Department of Education conferences (in Athens, Cordele, and Helen), at 6 district back-to-school professional development training days, at the request of the district (Barrow, Cobb, Fulton, Gwinnett, Habersham, and Jackson counties), and at 1 training for the Georgia School Nutrition Association's 8th region (Appling, Atkinson, Bacon, Berrien, Brantley, Camden, Coffee, Cook, Echols, Glynn, Jeff Davis, Lanier, Lowndes, Pierce, Valdosta City, Ware, and Wayne counties). Nutrition managers were selected by district to attend the regional Georgia Department of Education trainings, and districts often required nutrition managers and staff members to attend the back-to-school trainings. Each participant completed a questionnaire, immediately before and at the conclusion of the Strong4Life School Nutrition Program 90-minute training session. Three months posttraining, we emailed a follow-up questionnaire to school nutrition manager participants only, to assess the program's longer-term effect. We offered incentives (lunch menu board, Strong4Life hat) to encourage completion of the follow-up questionnaire and sent weekly email reminders (up to 3) to managers who had not yet completed it. We included data only for those participants for whom we were able to match pre- and posttraining questionnaires in these analyses (n = 842). The study did not meet the definition of research with human subjects or a clinical investigation and, as such, did not require institutional review board approval.

The pretraining questionnaire collected data on participants' demographic characteristics (race/ethnicity), participation on the school's wellness council (yes or no), and role in the school cafeteria (manager, assistant manager, staff member), as well as school type (public, private, charter; primary, elementary, middle, high) and location (rural, suburban, urban). We created a unique identifier to match pretraining questionnaire responses with posttraining and follow-up questionnaire responses without using personally identifiable information. The pre- and posttraining questionnaires contained the same 10 multiple-choice and true-or-false questions and statements that assessed level of agreement or disagreement with belief and self-efficacy statements using a 5-point Likert-type scale (where 1 = strongly disagree and 5 = strongly agree). The questionnaires assessed knowledge and beliefs about strategies to promote healthy food choices and self-confidence to make changes, such as implementing improved food display strategies (eg, give food and menu items creative names; place different color foods on the lunch line; use decorative bowls or serving trays to serve the food). We used the response option "place older (non-fresh) foods in front so they sell faster" as a negative control. We also asked participants to select a scenario that would be most likely to increase the likelihood of students consuming instead of wasting their fruit or vegetable serving: (1) tell students to take a fruit or vegetable, (2) ask students if they would like a fruit or vegetable, or (3) ask students to choose between 2 fruits or vegetables to complete the meal.

A separate pretraining questionnaire asked managers to assess their cafeteria environment, including practices and strategies categorized under the 5 training focus areas (sell, taste, visibility, convenience, and price). We repeated this exercise in the 3-month posttraining follow-up questionnaire.

We conducted a preliminary assessment of National School Lunch Program participation using unpublished data provided by the Georgia Department of Education from a stratified random sample of 80 of the first schools to participate in the Strong4Life School Nutrition Program. The sample included 40 schools whose school nutrition managers participated in the Strong4Life School Nutrition Program training during February-March 2015 and 40 schools from which no one participated in the training. Half of the randomly selected schools in both groups (trained and untrained) represented schools with >50% of students receiving free and reduced-price lunch through the National School Lunch Program. In addition, each sample contained 20 primary or elementary schools, 10 middle schools, and 10 high schools. The participation data included average National School Lunch Program participation by month (proportion), calculated as the number of meals sold per month divided by the average daily attendance for each month, for March and April 2014 compared with March and April 2015.

Data Analysis

We compared participant beliefs, self-efficacy, and confidence in their ability to promote change before and after training and tested for significant changes using McNemar's test for dichotomous response from matched participants. We considered $P < .05$ to be significant. We combined strongly agree and agree responses from the 5-point Likert-type scale data to form a dichotomous response (agree or disagree) and treated the remaining 3 response options (neither agree nor disagree, disagree, and strongly disagree) as a negative response. We also compared changes in the cafeteria environment from pretraining to follow-up using McNemar's test. We used a repeated-measures linear mixed model[14] to conduct a preliminary test of the effect of training on National School Lunch Program participation. The model assessed the main effect of training (1 = trained, 0 = untrained) on average daily lunch participation, controlling for school level (elementary, middle, high). We collected and managed data using REDCap electronic data capture tools hosted at Children's Healthcare of Atlanta.[15] We conducted descriptive analysis using SPSS version 22.0 and participation data analysis using SAS version 9.4.[16,17]

Results

Participant Characteristics

A total of 842 participants attended the training and completed both the pre- and posttraining questionnaires; 683 (81.1%) were cafeteria managers or assistant managers

Table 1. Demographic and school characteristics of school nutrition managers and staff members participating in the Strong4Life School Nutrition Program training (February-July 2015) and school nutrition managers who completed a 3-month follow-up questionnaire (August, October 2015), Georgia[a]

Characteristic	Total (N = 842)	Managers[b] (n = 683)	Staff Members (n = 159)	Managers[b] Who Completed 3-Month Follow-Up Questionnaire (n = 325)
Role				
Cafeteria manager	504 (59.9)	504 (73.8)	NA	282 (86.8)
Cafeteria assistant manager	179 (21.3)	179 (26.2)	NA	43 (13.2)
Cafeteria staff member	159 (18.9)	NA	159 (100.0)	NA
Race/ethnicity				
White	606 (74.9)	455 (69.9)	150 (95.5)	224 (70.7)
African American/black	150 (18.5)	146 (22.4)	4 (2.5)	62 (19.6)
Hispanic or Latino	30 (3.7)	29 (4.5)	1 (0.6)	16 (5.0)
Other	23 (2.8)	21 (3.2)	2 (1.3)	15 (4.7)
Not reported[c]	33	32	2	8
Part of a school wellness council				
Yes	231 (33.0)	221 (39.0)	10 (7.5)	137 (47.6)
No	345 (49.4)	245 (43.3)	101 (75.4)	106 (36.8)
My school does not have a wellness council	123 (17.6)	100 (17.7)	23 (17.2)	45 (15.6)
Not reported[c]	143	117	25	37
School type[d]				
Public	662 (96.8)	549 (97.3)	112 (94.1)	234 (96.3)
Private	2 (0.3)	2 (0.4)	0 (0.0)	2 (0.8)
Charter	23 (3.4)	16 (2.8)	7 (5.9)	10 (4.1)
Not reported[c]	158	119	40	82
School grade level[d,e]				
Primary school	25 (3.7)	22 (4.0)	3 (2.3)	6 (2.5)
Elementary school	388 (56.8)	326 (59.0)	62 (47.7)	147 (60.2)
Middle school	158 (23.1)	130 (23.5)	28 (21.5)	62 (25.4)
High school	148 (21.7)	111 (20.1)	37 (28.5)	45 (18.4)
Not reported[c]	159	130	29	81
School setting				
Rural	121 (39.7)	67 (27.9)	54 (83.1)	32 (30.2)
Suburban	162 (53.1)	152 (63.3)	10 (15.4)	65 (61.3)
Urban	22 (7.2)	21 (8.8)	1 (1.5)	9 (8.5)
Not reported[c]	537	443	94	219

Abbreviation: NA, not applicable.

[a]The Strong4Life School Nutrition Program (www.strong4life.com) training teaches school nutrition managers and staff members to use evidence-based techniques (Strong4Life Smart Serving Strategies) to encourage school meal participation and consumption of healthier foods; 605 schools in 75 Georgia counties participated in the training. Data are given as No. (%). Percentages may not total to 100 because of rounding.

[b]Managers refers to cafeteria managers and assistant managers.

[c]Missing values are not included in percentage calculations.

[d]Participants were allowed to select multiple responses; therefore, percentages may total >100.

[e]Grade levels for schools are as follows: primary school = kindergarten to grade 2; elementary school = kindergarten to grade 5 or grades 3-5 (in districts with separate primary schools); middle school = grades 6-8; high school = grades 9-12.

(hereinafter, managers), and 159 (18.9%) were cafeteria staff members. Of the 683 managers, 325 (47.6%) completed the 3-month follow-up questionnaire (Table 1). Respondents primarily came from elementary schools (n = 388/683, 56.8%), followed by middle (n = 158/683, 23.1%), high (n = 148/683, 21.7%), and primary (n = 25/683, 3.7%) schools. Most respondents were from public (n = 662/684, 96.8%) rather than private or charter (n = 25/684, 3.7%) schools and from suburban (n = 162/305, 53.1%) or rural (n = 121/305, 39.7%) schools rather than urban schools (n = 22/305, 7.2%). Nearly one-third (n = 231/699, 33.0%) of respondents were part of a school wellness council. Most respondents were white (n = 606/809, 74.9%) followed by African American/black (n = 150/809, 18.5%), Hispanic/Latino (n = 30/809, 3.7%), and other (n = 23/809, 2.8%). Participation in the follow-up questionnaire followed a similar trend.

Participant Knowledge of Smart Serving Strategies

Participant knowledge of Strong4Life Smart Serving Strategies increased with training (Table 2). The proportion of participants who were knowledgeable about effective ways to present foods to enhance taste expectation increased

Table 2. School nutrition manager and staff member knowledge of strategies to promote healthy choices (Strong4Life Smart Serving Strategies), before and after Strong4Life School Nutrition Program training, Georgia, February-July 2015[a]

	Total (N = 842)				Managers[b] (n = 683)				Staff Members (n = 159)			
Knowledge of Strong4Life Smart Serving Strategies	**Pretraining, No. (%)**	**Posttraining, No. (%)**	**% Change**	***P* Value[c]**	**Pretraining, No. (%)**	**Posttraining, No. (%)**	**% Change**	***P* Value[c]**	**Pretraining, No. (%)**	**Posttraining, No. (%)**	**% Change**	***P* Value[c]**
Ways to present food to enhance taste expectation												
Give food and menu items creative names	657 (78)	800 (95)	17	<.001	570 (83)	650 (95)	12	<.001	129 (81)	147 (92)	11	.004
Place different color foods on the lunch line	758 (90)	766 (91)	1	.83	623 (91)	635 (93)	2	.16	139 (87)	130 (82)	–5	.11
Use decorative bowls or serving trays to serve the food	589 (70)	733 (87)	17	<.001	499 (73)	602 (88)	15	<.001	93 (58)	126 (79)	21	<.001
Order of food placed on the serving line affects student food choice												
True	657 (78)	800 (95)	17	<.001	561 (82)	649 (95)	13	<.001	126 (79)	152 (96)	17	<.001
Effective ways to promote consumption vs waste												
Offering choice increases the likelihood of the selected item being eaten	581 (69)	598 (71)	2	.13	509 (75)	486 (71)	–4	.07	109 (69)	109 (69)	0	.99

[a]The Strong4Life School Nutrition Program (www.strong4life.com) training teaches school nutrition managers and staff members to use evidence-based techniques (Strong4Life Smart Serving Strategies) to encourage school meal participation and consumption of healthier foods; 605 schools in 75 Georgia counties participated in the training. The Strong4Life Smart Serving Strategies package the evidence-based techniques of Cornell University's Smarter Lunchrooms Movement (www.smarterlunchrooms.org) into 5 focus areas: sell, taste, visibility, convenience, and price.

[b]Managers refers to cafeteria managers and assistant managers.

[c]McNemar's test for paired samples; $P < .05$ is significant.

significantly from pretraining to posttraining for 2 measures: (1) giving foods and menu items creative names (from 78% to 95%; $P < .001$) and (2) using decorative bowls or serving trays to serve food (from 70% to 87%; $P < .001$). Participant knowledge of placing different color foods on the lunch line to enhance taste expectation did not change significantly. The proportion of participants responding that the order of food placed on the serving line affected food choice also increased significantly from pre- to posttraining (from 78% to 95%; $P < .001$). However, the proportion of respondents who agreed that offering choices was a strategy for increasing consumption and reducing waste did not change significantly.

Participant Beliefs, Self-Efficacy, and Confidence

Participation in training had a significant effect on the beliefs and self-efficacy of school cafeteria managers and staff members (Table 3). The largest pre- to posttraining increase was in the proportion of participants who agreed that meals served in school cafeterias play an important role in childhood obesity prevention (from 72% to 85%; $P < .001$). Pre- to posttraining awareness that childhood overweight and obesity is a serious problem in Georgia changed from 84% to 93% ($P < .001$). Pre- to posttraining changes in the proportion of participants who believed they would like to encourage changes in the cafeteria that promote healthy choices (from 87% to 95%) and who felt confident that they could encourage students to make healthy eating choices (from 87% to 96%) were also significant ($P < .001$). All changes were significant except the use of verbal encouragement among staff members.

Cafeteria Environment

We found significant improvements in the 5 areas of Strong4Life Smart Serving Strategies from pretraining to the 3-month follow-up (Table 4). Only data for managers who completed both a pretraining and 3-month follow-up questionnaire are presented here (n = 325). For use of visibility strategies, the proportion of participants who reported having healthy options available in ≥2 locations on each service line increased from 84% to 96% ($P < .001$) and placing healthy foods in the first spots on the line increased from 55% to 67% ($P < .001$). For the convenience strategy, the proportion of participants reporting that they placed plain milk in front of flavored milk, juice, and sports drinks also increased significantly from 63% to 84% ($P < .001$). For strategies related to taste perception, the proportion of participants who reported using signs, posters, or decals showing the benefits of healthy eating increased from 77% to 85% ($P = .01$). The proportion of participants who reported having ≥2 different colors of fruit and vegetables available daily increased from 92% to 98% ($P < .001$). In the sell focus area, participants using signage and/or floor decals to direct students toward service areas increased from 58% to 69% ($P = .01$).

We also found significant increases in the proportion of participants branding healthy items with stickers (from 25% to 38%; $P < .001$) and writing daily options on menu boards (from 69% to 77%; $P = .02$). In the price focus area, we found significant increases in participant use of bundled pricing for healthy items to encourage sales (from 17% to 27%; $P < .001$) and pricing less healthy items higher than healthy items (from 18% to 32%; $P < .001$).

National School Lunch Program Participation

We found no significant effect on school lunch participation rates in the month following training. Before training (March 2015), the National School Lunch Program participation rate was 69.3% among the selected trained schools (n = 40) and 64.0% among the selected untrained schools (n = 40). Among both trained and untrained schools, there was virtually no change in participation from March 2015 to April 2015 (1 month posttraining) (trained: change = –0.2%, $P = .30$; untrained: change = –0.5%, $P = .36$).

Discussion

Results suggest that the Strong4Life School Nutrition Program improved staff member beliefs and self-efficacy about the school cafeteria environment and healthy nutrition promotion. The successful changes in knowledge, beliefs, self-efficacy, and confidence suggest that the Strong4Life School Nutrition Program training may help address challenges that cafeterias face in promoting healthy food choices to students. Such trainings are in line with the US Department of Agriculture Team Up for School Nutrition Success initiative. This nationwide initiative, which was originally pilot tested in Mississippi, provides tailored training to school nutrition personnel, covering such topics as menu planning, financial management, and procurement.[18]

This study contributes to a gap in the literature concerning knowledge of effective school food service training interventions.[19] Results from the 3-month follow-up questionnaire indicate that many positive changes were made in school cafeterias after the Strong4Life School Nutrition Program training. However, the reported changes tended to be easily implemented, environmental changes that managers and staff members could do on their own (eg, placing plain milk in front of other beverages or using signage and/or floor decals to direct students toward service areas). Managers and staff members were less likely to implement strategies that took more time and resources or that required greater behavior change. For example, participants reported improvement in hanging posters showing people eating healthy foods and an increase in promoting choice in the serving line but not in providing grab-and-go meals that included bundled, reimbursable meal components. The latter change can be costly and more complex or timely to implement than environmental changes (eg, food placement, hanging posters) because schools may require district-level approval and

Table 3. Proportion of school nutrition managers and staff members who agreed or strongly agreed with statements about beliefs and self-efficacy in school lunchroom environments and healthy nutrition promotion, before and after Strong4Life School Nutrition Program training, Georgia, February-July 2015[a]

	Total (N = 842)				Managers[b] (n = 683)				Staff Members (n = 159)			
Beliefs and Self-Efficacy	**Pretraining, No. (%)**	**Posttraining, No. (%)**	**% Change**	***P* Value[c]**	**Pretraining, No. (%)**	**Posttraining, No. (%)**	**% Change**	***P* Value[c]**	**Pretraining, No. (%)**	**Posttraining, No. (%)**	**% Change**	***P* Value[c]**
Beliefs												
Childhood overweight and obesity is a serious problem in Georgia.	707 (84)	783 (93)	9	<.001	581 (85)	642 (94)	9	<.001	121 (76)	143 (90)	14	<.001
The meals served in school cafeterias play an important role in childhood obesity prevention.	606 (72)	716 (85)	13	<.001	499 (73)	587 (86)	13	<.001	97 (61)	126 (79)	18	<.001
The school cafeteria environment influences the choices students make when purchasing food.	716 (85)	791 (94)	9	<.001	587 (86)	649 (95)	9	<.001	124 (78)	143 (90)	12	.001
Verbal encouragement is important when helping kids choose fruit, vegetables, and other healthy options.	775 (92)	808 (96)	4	<.001	628 (92)	656 (96)	4	<.001	148 (93)	151 (95)	2	.45
I would like to encourage changes in the cafeteria that promote healthy choices.	733 (87)	800 (95)	8	<.001	609 (89)	656 (96)	7	<.001	126 (79)	146 (92)	13	<.001
Self-efficacy												
I am confident that I can encourage students to make healthy eating choices.	733 (87)	808 (96)	9	<.001	609 (89)	656 (96)	7	<.001	126 (79)	149 (94)	15	<.001
I am confident in my ability to provide guidance to staff members on making changes in the cafeteria environment.	766 (91)	808 (96)	5	<.001	621 (91)	656 (96)	5	<.001	NA	NA	NA	NA

Abbreviation: NA, not applicable.

[a]The Strong4Life School Nutrition Program (www.strong4life.com) training teaches school nutrition managers and staff members to use evidence-based techniques (Strong4Life Smart Serving Strategies) to encourage school meal participation and consumption of healthier foods; 605 schools in 75 Georgia counties participated in the training.

[b]Managers refers to cafeteria managers and assistant managers.

[c]McNemar's test for paired samples; $P < .05$ is significant.

Table 4. Proportion of school nutrition managers who reported practicing each Strong4Life Smart Serving Strategy, before Strong4Life School Nutrition Program training and at 3-month follow-up, Georgia, February-July 2015[a]

	All Managers[b] (N = 683)	Managers[b] Who Completed the 3-Month Follow-Up Questionnaire (n = 325)			
Strong4Life Smart Serving Strategies	**Pretraining, No. (%)**	**Pretraining, No. (%)**	**3-Month Follow-Up, No. (%)**	**% Change**	***P* Value[c]**
Visibility					
Healthy options are available in ≥2 locations on each service line.	552 (81)	274 (84)	311 (96)	12	<.001
Healthy foods are in the first spots on the line.	373 (55)	179 (55)	217 (67)	12	<.001
We have ≥1 daily fruit option near all registers.	465 (68)	217 (67)	215 (66)	–1	.99
Convenience					
Plain milk is in front of flavored milk, juice, and sports drinks.	441 (65)	206 (63)	274 (84)	21	<.001
Fruit bowls are placed within easy reach of children.	421 (62)	188 (58)	179 (55)	–3	.55
We offer grab-and-go meals that include all reimbursable meal components bundled.	352 (52)	174 (54)	159 (49)	–5	.18
Taste					
Signs, posters, or decals showing the benefits of healthy eating are hung in the cafeteria.	546 (80)	250 (77)	277 (85)	8	.01
Signs, posters, or decals of happy people eating healthy food are hung in the cafeteria.	476 (70)	224 (69)	227 (70)	1	.83
Daily options have creative or descriptive names.	351 (51)	173 (53)	173 (53)	0	.99
Whole fruit options are on display in attractive bowls.	346 (51)	147 (45)	154 (47)	2	.60
Two colors of fruit and vegetables are available daily.	630 (92)	299 (92)	319 (98)	6	<.001
We use attractive packaging and/or decorative plating.	429 (63)	204 (63)	216 (66)	3	.33
We host taste tests for students to try nutritious samples.	460 (67)	221 (68)	216 (66)	–2	.73
Sell					
Staff members reward students who choose healthy items or try new menu items with stickers.	198 (29)	95 (29)	101 (31)	2	.65
Signage and/or floor decals are used to direct students.	381 (56)	187 (58)	225 (69)	11	.01
Signs promoting the lunchroom and featured menu items appear in other areas of the school.	371 (54)	175 (54)	156 (48)	–6	.13
Staff members prompt students to choose fruit and vegetables.	658 (96)	311 (96)	306 (94)	–2	.54
When staff members prompt students, they verbally list available options to encourage student choice.	503 (74)	241 (74)	241 (74)	0	.99
Staff members compliment students when they make healthy choices.	583 (85)	288 (89)	290 (89)	0	.87
Healthy items are positively branded with stickers.	210 (31)	82 (25)	125 (38)	13	<.001
Daily options are written legibly on menu boards in service and dining areas.	482 (71)	224 (69)	250 (77)	8	.02
We offer and promote reimbursable combination meal pairings.	316 (46)	141 (43)	166 (51)	8	.05
Price					
We use bundle pricing for healthy items to encourage sales.	130 (19)	54 (17)	88 (27)	10	<.001
Less healthy items cost more than healthy items.	136 (20)	58 (18)	103 (32)	14	<.001

[a]The Strong4Life School Nutrition Program (www.strong4life.com) training teaches school nutrition managers and staff members to use evidence-based techniques (Strong4Life Smart Serving Strategies) to encourage school meal participation and consumption of healthier foods; 605 schools in 75 Georgia counties participated in the training. The Strong4Life Smart Serving Strategies package the evidence-based techniques of Cornell University's Smarter Lunchrooms Movement (www.smarterlunchrooms.org) into 5 focus areas: sell, taste, visibility, convenience, and price.
[b]Managers refers to cafeteria managers and assistant managers.
[c]McNemar's test for paired samples; $P < .05$ is significant.

involvement from suppliers.[13] Further study will be needed to assess the effect of the training on changes that require additional time, resources, and/or input and involvement from others. To understand the effect of this program on National School Lunch Program participation, a follow-up evaluation will be needed, including data for the 2015-2016 school year and subsequent years. Additional technical assistance and resources may be needed to guide school nutrition staff members in addressing the barriers to making more complex changes in the cafeteria environment.

Strengths and Limitations

The Strong4Life School Nutrition Program, which was designed to promote low- to no-cost evidence-based changes in school cafeterias in Georgia, reached large numbers of

nutrition managers and staff members. Strengths of this study included the use of multiple assessment methods, the use of data from a large sample representing a variety of schools, and the use of program-specific survey instruments. The survey instruments were developed based on the results of a program pilot test and were pretested for cognitive validity. Study limitations included the use of self-reported data and the lack of a control group to help determine if the observed changes were attributable to the overall program (training and toolkit) or to other factors unrelated to the program. In addition, the characteristics of managers who completed the 3-month follow-up questionnaire differed from those who completed the pretraining questionnaire. For example, a higher proportion of managers than assistant managers, and a higher proportion of managers who were part of a school wellness council, completed the follow-up questionnaire. Therefore, the long-term changes observed among the subsample from whom follow-up data were available may not accurately reflect the changes made by all training participants. However, this study is a first step in an ongoing evaluation of the Strong4Life School Nutrition Program. An assessment of program effect on National School Lunch Program participation is also underway.

Conclusions

The Strong4Life School Nutrition Program training increased school nutrition manager and staff member knowledge of the Strong4Life Smart Serving Strategies, as well as their beliefs, self-efficacy, and confidence in their ability to make positive behavioral and environmental changes in the school cafeteria. However, more time is needed to assess the effect of the training program on practices that are more difficult to change and to thoroughly assess the program's effect on National School Lunch Program participation and the sale of individual healthy school food items.

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