Cooking for Kids: Culinary Training Program for Oklahoma School Child Nutrition Professionals Reduces Use of Convenience Foods Without Negatively Impacting Entrée, Grain or Fruit Consumption

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Abstract
Objective: Determine if Cooking for Kids culinary training affected 1) availability of freshly prepared foods in school meals, 2) the extent to which marketing strategies were implemented at post-intervention and 3) students’ meal component consumption before and after training.

Target Audience: School nutrition programs

Rationale: The 2010 Healthy Hunger-Free Kids Act improved the nutritional standards of school meals, but created implementation barriers for schools lacking in kitchen infrastructure, staff time and culinary skills to prepare meals. This study sought to determine if a culinary training program taught by professional chefs would change the consumption of the children.

Description: Cooking for Kids, developed under the principles of the Community Readiness Model, utilizes professional chefs to teach essential culinary skills and on-site consultations to address menu planning related practices specific to a school district.

Evaluation: A meal component consumption analysis was conducted in spring 2014 (681 matched trays) and fall 2016 (537 matched trays) in three pilot schools. Personal interviews were conducted with the Child Nutrition Director (CND) at each school to evaluate changes in use of convenience foods from pre-to-post-intervention and to determine the extent to which schools had incorporated marketing strategies. Schools used less convenience foods for entrees and offered more salad bars. There was no negative impact on entree consumption (p = 0.878), an increase in grain (p = 0.011) and fruit meal components (p = 0.000) and a decrease in vegetable consumption (p = 0.000).

Conclusions and Implications: If schools focus on preparing food from scratch and incorporate marketing strategies, students’ consumption of school meals may improve. Further use of marketing strategies, especially for vegetables, may be beneficial.

Background
The 2010 Healthy Hunger-Free Kids Act (HFFKA) authorized the United States Department of Agriculture (USDA) to align the National School Lunch Program (NSLP) and National School Breakfast Program (SBP) meal patterns and nutrition standards with the 2010 Dietary Guidelines for Americans (USDA FNS, 2012). Challenges for schools in implementing the updated regulations were related to food cost, lack of kitchen infrastructure, staff time and culinary skills to prepare meals using less convenience foods, and concerns that students will not accept new foods (USDA, 2016; The Pew Charitable Trusts, 2013; Blevins, 2015). The Smarter Lunchroom Movement focuses on marketing strategies that present foods in a way that nudges students to select healthier foods, while still preserving their freedom to choose (Hanks, Just & Wansink, 2013). Schools that have been successful in increasing student consumption utilize multiple strategies (The Pew Charitable Trusts, 2016). Some of these strategies include conveniently offering fruits and vegetables (i.e. salad bars, individualized portions) and more scratch prepared meals. Cooking for Kids, developed under the principles of the Community Readiness Model, utilizes professional chefs to teach essential culinary skills and marketing strategies to help address the challenges of meeting the updated NSLP standards and create meals that appeal to students.

Purpose
The primary goal of this study was to evaluate the effect of Cooking for Kids on students’ consumption of school meal components. Secondary goals were to determine if Cooking for Kids affected availability of newly prepared foods offered to students and to determine the extent to which marketing strategies were implemented in school nutrition programs.

Objectives
- Analyze meal component consumption (i.e. entrée, grain, vegetable and fruit) after implementing Cooking for Kids in 3 pilot schools and compare findings to the baseline study conducted since spring 2014.
- Conduct personal interviews with the CND at each school to quantify change in weekly menus from use of convenience preparation methods toward scratch cooking preparation of entrees offered before and after the implementation of Cooking for Kids.
- Conduct personal interviews with CND at each school to determine the extent Smarter Lunchroom marketing techniques were being implemented at post-intervention.

Methods
Three Cooking for Kids pilot schools participated in both pre and post intervention analyses (Table 1). This study was approved by the Oklahoma State University Institutional Review Board.

Meal Component Consumption Analysis
Data was collected on 2 consecutive school days at each school where the validated quarter-waste method was used at both pre and post data collection periods (Hanks et al, 2014; Carl, 2015). As students exited the lunch line, colored numbered cards were placed on the trays of consenting students and a photograph was taken. A second photo was taken before students disposed of their tray. Photos were matched to assess consumption of each component (see photos). Consumption of none (0.00), 0.25, 0.50, 0.75 or all (1.00) of each meal component (entrée, grain, vegetable, fruit) were recorded for each tray.

Meal Preparation & Smarter Lunchroom Analysis
Data was collected through personal interviews with the CND at each school. Using a 1 month cycle menu from pre and post intervention, entrees were classified as being prepared using a minimal preparation, almost scratch and scratch preparation method. The percentage of entrees in each category was calculated for each time period. (Woodward Lopez et al, 2016). The extent to which Smarter Lunchroom marketing strategies were implemented was based on fruit, vegetable, variety, entrée and reimbursable meals (Hanks, Just & Wansink, 2013).

Statistical Analysis
One-way ANOVA was used to compare changes in baseline of pre and post intervention. Descriptive statistics were used to analyze meal preparation methods at pre- and post-intervention. A cross-sectional analysis described Smarter Lunchroom implementation at post-intervention.

Results
The following are meal component consumption (Table 2) findings:
- There were 681 and 537 matched trays at baseline and post intervention, respectively, for the three pilot schools.
- There was no negative impact on entrée consumption, a significant increase in grain and fruit meal component consumption and a significant decrease in consumption of the vegetable component.
- The following are meal preparation (Table 3) findings:
  - In terms of meal preparation, all schools decreased the use of convenience foods and increased the percentage of entrees requiring minimal preparation.
- The following are Smarter Lunchroom (Table 4) findings:
  - Schools used a variety of strategies to increase variety and convenience were utilized at the secondary schools. The secondary schools both had a salad bar which offered 2 or more self-serve fruit and vegetable options each day.
- The elementary school did not use very minimal Smarter Lunchroom strategies.
- Convenience names were not used for any meal component at any school.

Discussion
The chef-based training assisted schools in using less convenience prepared entrees, which is consistent with the Pew Charitable Trusts recommendation (2016). This change did not seem to negatively impact students’ consumption of the entrée. The amount of entrée consumed is comparable to a school meal component study conducted by Cohen et al. (2014). This study recorded an increase in students’ consumption of whole grain rich meal components. This increase reflects findings from a study reporting students’ preference for whole grain-rich, compared to refined grains, foods items in the school meal program (B urgess-Champoux et al, 2006). Students’ fruit consumption increased and may be a result of the use of Smarter Lunchroom strategies of adding variety, appeal and convenience. In contrast, there was an unexpected decrease in the amount of vegetable consumed. This may be due to a change in the variety of vegetables offered to students in 2016 (i.e. less potatoes, more red/orange and dark green vegetables). However, the quantity it is consistent with amount of vegetable consumed in a study of middle school students’ school meal consumption patterns (Cohen et al, 2013).

Conclusion & Implications for Practice
Decreasing use of convenience prepared entrees did not negatively impact students’ consumption of the entrée and improved consumption of the fruit and grain components, thus addressing SNP’s concern related to student acceptance of meals. Further use of scratch cooking methods, along with use of Smarter Lunchroom strategies, may lead to higher consumption of the school meal. Schools should focus on approaches to increase vegetable consumption by offering vegetables that are fresh or cooked and seasoned in a way that appeals to students. This may involve more taste testing. Further work is needed to identify strategies to limit convenience entrees and increase fresh fruit and vegetable choices in elementary schools, especially those using central/satellite kitchen operations. Future culinary training efforts should identify ways for child nutrition professionals to collaborate with each other to share techniques to prepare meals from scratch, recipes and ways to involve school nutrition stakeholders.

Table 1: Demographics of Pilot Schools (2015-2016)

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>High School</th>
<th>Elementary</th>
<th>Middle/High School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrollment</td>
<td>685</td>
<td>308</td>
<td>56</td>
</tr>
<tr>
<td>% Free/Reduced Meal Eligibility</td>
<td>33.29%</td>
<td>61.69%</td>
<td>64.28%</td>
</tr>
</tbody>
</table>

Table 2: Comparison of Mean Meal Component Consumption Between Baseline and Post Intervention

| Component | Pre (% | Post (%) | p-value | Mean ± Standard Deviation
|-----------|--------|----------|---------|--------------------------|
| Entrée     | 65.4   | 65.4     | 0.000   | 0.00 ± 0.00
| Grain      | 20.7   | 20.7     | 0.000   | 0.00 ± 0.00
| Vegetable  | 13.0   | 13.0     | 0.000   | 0.00 ± 0.00
| Fruit      | 1.0    | 1.0      | 0.000   | 0.00 ± 0.00

Table 3: Change in Preparation Method of the Entire Meal Component from Baseline to Post Intervention

<table>
<thead>
<tr>
<th>Component</th>
<th>Minimal Preparation</th>
<th>Almost Scratch</th>
<th>Scratch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit</td>
<td>65.4 ± 0.00</td>
<td>20.7 ± 0.00</td>
<td>13.0 ± 0.00</td>
</tr>
<tr>
<td>Vegetable</td>
<td>13.0 ± 0.00</td>
<td>13.0 ± 0.00</td>
<td>13.0 ± 0.00</td>
</tr>
<tr>
<td>Entrée</td>
<td>65.4 ± 0.00</td>
<td>20.7 ± 0.00</td>
<td>13.0 ± 0.00</td>
</tr>
</tbody>
</table>

Table 4: Mean Smarter Lunchroom Implementation Levels at Post-Intervention (2016)

<table>
<thead>
<tr>
<th>Component</th>
<th>Mean ± Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit</td>
<td>3.0 ± 1.0</td>
</tr>
<tr>
<td>Vegetable</td>
<td>2.0 ± 1.0</td>
</tr>
<tr>
<td>Entrée</td>
<td>4.0 ± 1.0</td>
</tr>
<tr>
<td>Reimbursable Meals</td>
<td>1.3 ± 0.7</td>
</tr>
</tbody>
</table>

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