Fruit and Vegetable Weights or Pan Weight are Valid Methods to Estimate Elementary Student Self-Service Salad bar Portions

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Abstract

Objective: To assess the validity of weighing both individual fruit and vegetable (FV) pieces and salad bar pans of specific FV for estimating amounts taken from self-service salad bars.

Methods

Two methods to measure FV were tested at each school to determine which more accurately estimated salad bar FV portions taken compared to weighed portions. Salad bar FV waste and consumption were assessed with digital photography.

Plate Waste Assessment

• Digital photography used to photograph pre-consumption reference FV and post-consumption of 47 student trays.
• Trained evaluators compared reference photographs to post photographs to estimate waste of each FV item on student trays to the nearest 10%

Weighted FV Portions (gold standard)

• FV weighed before and after eating for every 3rd student who consented to participate
• Each student’s tray was numbered and each FV selected from the salad bar was recorded
• Amount FV consumed calculated from difference in pre/post weights

Pan Weight FV Portion Estimation

• Individual salad bar pans weighed before and after 4th grade lunch service;
• Number of students taking each FV from salad bar determined from plate waste photographs;
• Pre/post pan weight difference divided by number of students taking that FV to derive average weight of the amount taken in grams

Individual FV Weight Portion Estimation

• 3-5 pieces of each salad bar item offered were weighed and the average calculated
• Number of pieces each student took determined from plate waste photographs and tray tag cards
• To determine the portion weight taken, the average weight of the FV pieces was multiplied by the number of pieces taken by each student

Data Analysis

• Mean amount of each FV taken and consumed calculated for each portion estimation method
• Paired t test (SAS for Windows, 9.3) used to compare means of each method to each other
• Significance set at p < 0.05

Results

FV portions were measured by all three methods from 47, 4th-grade student lunch trays. Of these 47, 8 were from school A, 11 from school B, 14 from school C, and 14 from school D.

Conclusion and Implications:

• No significant difference in FV amount taken between individual FV item weight and weighed portions (p=0.39), or pan weight and weighed FV portions however, pan weight tended to be lower (p=0.09)
• No significant difference in FV amount consumed between individual FV item weight and weighed FV amounts (p=0.74) or between pan weight and weighed portions (p=0.14)

Background

• Most school-aged children do not meet US Dietary Guidelines for FV intake.
• Salad bars are proposed to increase students' FV intake.
• Most school-aged children do not meet US Dietary Guidelines for FV intake.

Participants

4th-grade students from 4 elementary schools in Fort Collins, Colorado participated in this cross-sectional study. Recruited students were participants in the pre-intervention cohort of the Fuel for Fun: Cooking with Kids Plus Parents and Play research project.

Table 1: Percent free/reduced price lunch eligibility; 4th-grade enrollment; 4th-grade NSLP participation by school

<table>
<thead>
<tr>
<th>School</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free/reduced price lunch eligibility</td>
<td>50%</td>
<td>24%</td>
<td>34%</td>
<td>47%</td>
</tr>
<tr>
<td>4th grade enrollment</td>
<td>42</td>
<td>87</td>
<td>56</td>
<td>73</td>
</tr>
<tr>
<td>4th-grade NSLP participation</td>
<td>57%</td>
<td>39%</td>
<td>68%</td>
<td>63%</td>
</tr>
</tbody>
</table>

References


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