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# Does the Kids Café Program's nutrition education improve children's dietary intake? A pilot evaluation study

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## Abstract

**Objective—**To evaluate the Kids Café Program (KCP) nutrition education and assess its impact on children's diet quality and Body Mass Index (BMI) percentile.

**Design—**An experimental design consisting of pretest-post-test comparison groups; using mixed methods for evaluation of a 6-session nutrition education intervention.

**Setting—**Four Boys and Girls Club sites

**Participants—**120 9–12 year old children in the KCP (60 intervention [I] and 60 comparison [C]). 89% completed post-test evaluations.

**Intervention—**Trained KCP site staff taught the nutrition education curriculum at I sites.

**Main outcome measures—**Healthy Eating Index (HEI-2010) using 24-hour dietary recall data (primary) and BMI percentile (secondary)

**Analysis—**Repeated measures mixed-effects modeling

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**Results—**Mean age of children was 10.2 years; mean BMI percentile was ~79; and 95% were from food insecure households. The total HEI-2010 score for both groups at baseline and post-test ranged from 50–60. At post-test, compared to baseline scores, children from both groups scored significantly lower for total vegetables, and greens and beans; I group children had significantly higher sodium scores. Process evaluation indicated that 60-minute lecture based sessions were too long after children were in school all day.

**Conclusion—**This pilot study suggest the KCP nutrition education curriculum needs improvement. Further research based on behavioral constructs is needed to refine the curriculum to encourage healthier food choices among children, and using the MyPlate and the 2015 Dietary Guidelines for Americans.

### Keywords

Kids Café; HEI-2010; food insecurity; dietary intake

## Introduction

Recent national data for the United States show that the rates of overweight and obesity were higher among children from low-income families, and they were more likely to have behavior-related risk factors for chronic diseases.[1] Children from low-income families are more likely to report food insecurity and poor diet; both increase the risk of obesity and related health conditions, compared with children from higher-income families.[1] Unfortunately, the majority of the children in the US do not meet the recommended intakes for fruits and vegetables, whole grain, beans and legumes, and dairy, and over-consume high energy-dense foods and sugar-sweetened beverages,[3–5] which are positively associated with increased body weight and obesity risk.[6]

Food insecurity and obesity share many of the underlying risk factors and often affect the same people.[7] Children tend to become obese if reared in a low-income household.[8] Because youth obesity tends to continue throughout life, efforts to maintain energy balance should begin in childhood. The increasing prevalence of obesity in youth may increase risk of chronic diseases in the future.[8] Thus, innovative intervention strategies are needed that target children and their dietary environment to reduce obesity rates. The Kids Café Program (KCP), sponsored by Feeding America, is a national program that provides snacks and nutrition education for low-income children.[9]

Feeding America is the nation’s largest hunger relief organization, serving all 50 states and Puerto Rico.[10] It networks with about 200 food banks and 60,000 food pantries and meal programs providing food and services to more than 46 million people each year. Launched nationally in 1993, there are currently more than 1,200 KCPs operating in the United States through Feeding America.[10] KCP uses federal funding from the Child and Adult Care Food Program and targets children in afterschool care settings who are at risk of hunger.[10] Eligible participants must qualify for the free or reduced-cost school lunch program.[10] KCP is one of the nation’s largest nutrition programs providing children with the nourishment they may not get at home, as well as nutrition education.[10,11]

In Southeast Texas, the KCP is administered by the Houston Food Bank (HFB).[11] The program is in collaboration of chefs, dietitians, students and volunteers.[11] KCP provides free meals and snacks to low-income children, ages 1–18 years, in a variety of community locations where children gather during the afterschool hours during the school year - such as Boys and Girls Clubs, YMCAs, churches or public schools.[11] In FY 2016, 26 percent of the children in the 18-county HFB service area were food insecure; 720,766 meals and 96,803 snacks were served to hungry children in 116 afterschool care sites in the Houston area.[11]

Evaluations of the KCP across the US have been conducted for compliance with federal food preparation safety standards and meal preparation guidelines, especially if the program is sponsored by a Child and Adult Care Food Program grant.[12] At the HFB, monitoring includes regular site visits to evaluate meals for nutritional quality, sanitation, food storage, and food handling practices.[11] In addition to food safety and nutritional issues, daily records are kept to track the number of children and meals served and any comments the children or parents may have about the program. Given the large amount of money that is spent on the KCP with no available data on its effectiveness, it is important to conduct a formal evaluation. This paper presents results from a pilot study that aimed to evaluate the impact of the KCP on children's diet quality (primary outcome), and Body Mass Index (BMI) percentile and self-efficacy (secondary outcomes).

## Methods

The study was conducted in Fall 2010 and was approved by Baylor College of Medicine's Institutional Review Board (H-35369).

### Participants and Recruitment

Parental informed consent and child assent were obtained for all participating children. A total of 120 9–12 year old children, were recruited from the four KCP sites. Children under 8 years of age were not included because of the difficulty in obtaining accurate 24-hour recalls from them. Children over 16 years of age were not included because of the reduced parental influence. Exclusion criteria also included children on prescription medications that affect weight and/or appetite or being homeless. A short screener was completed by parents at the time of consent to assess whether the children were in the required age range, if they were on any prescription medications, and their housing status (rented/owned apartment or home, shared living, or shelter).

### Design

A cluster randomized design consisting of pretest-post-test comparison group was used. Mixed methods were used to evaluate the KCP's impact on children's diet quality. Four afterschool programs were randomized into intervention and comparison groups, with two programs in each group. These sites were selected from different areas of Houston to prevent information contamination and were matched on ethnicity. After matching, sites were assigned to either the intervention or the comparison condition, with 2 sites in each condition (60 children/condition)

## Intervention

The existing KCP nutrition education curriculum has 6 sessions with lessons on MyPyramid, grains, fruits, vegetables, protein and calcium, and breakfast and healthy snacks. The lessons were lecture-based followed by a short group-activity. The participants were also given take-home challenge. In addition, children were encouraged to eat healthy foods and to request parents to make healthier foods available and accessible at home. An implementation manual was developed to help ensure that the curriculum was taught in a standardized way at all the sites participating in the study; consistent implementation would facilitate its evaluation by minimizing possible contamination associated with variable implementation. The manual was developed based on HFB and KCP staff's needs and skill level, and included a project overview, detailed time schedule, protocols and curriculum materials (topics, lesson plans, modules).

Two KCP staff from the HFB were assigned to each of the participating sites and completed an intensive one-day training to help ensure standardized implementation of the 6-session nutrition education curriculum. These staff members had nutrition education experience through the HFB prior to being trained for standardized implementation of the KCP. The classes were led by only one staff member. The other staff member was trained as a back-up, in case the lead staff member could not teach the class on any particular days. The training manual was provided to each KCP staff.

Trained intervention KCP site staff taught the KCP nutrition education curriculum using the standardized implementation protocol in addition to the KCP meals that were provided. The six one-hour weekly sessions were conducted over 6 weeks (one session per week). The sites in the comparison group continued with the regular KCP meals but did not provide the nutrition education component which was made available to them after the evaluation study was completed. All children at a particular site attended the sessions at the same time.

## Measures

24-hour food recalls, questionnaires (demographics and self-efficacy) and anthropometric measurements were conducted at baseline and post-test (starting the week after the 6th week session). All questionnaires were available in both English and Spanish. Each participant received a monetary incentive at each measurement point.

**24-hour food recalls—**To assess the diet quality, all participating children completed two in-person 24-hour food recalls at each measurement period, one weekday and one weekend day. These were performed by trained staff (bilingual for Spanish-speaking clients) using Nutrition Data System for Research (NDSR).[13] Participants were provided with 2-dimensional volume/measurement aids at the time of baseline measurements to assist with recall/portion size estimation. Two 24-hour recalls at each data collection period provided a more reliable estimate of intake.[15] The dietary recalls were analyzed for nutrients and food groups in order to calculate the Healthy Eating Index (HEI) - 2010.[15] The HEI-2010 is comprised of 12 component scores that measure the consumption of the following food and nutrients: total fruit, whole fruit, total vegetables, greens and beans, total grains, whole

grains, dairy, total protein foods, seafood and plant proteins, fatty acids, refined grains, sodium, and empty calories.[15]

### Questionnaires

**Demographic questionnaire (completed by participants' parents):** The variables on the demographic questionnaire included age, ethnicity, and National School Lunch Program participation of the child, parents' educational and marriage status, and food insecurity.[16]

**Eating healthy self-efficacy (completed by the participating children):** The KCP curriculum is designed to encourage children to eat healthy. Eating healthy self-efficacy was assessed using a 12-item scale with a 3-point response scale (1=I strongly agree to 3=I do not agree)[17] to assess if the KCP helped improve children's self-efficacy to eat healthier. An example of an item from the scale is "I think I can add my favorite fruit to my favorite cereal." The scale has been validated among school children and has demonstrated good internal consistency ($\alpha$=0.90).[17]

**Asking self-efficacy (completed by the participating children):** The KCP curriculum is designed to encourage the children to request parents to help increase availability-accessibility of healthy foods at home, which will help develop children's asking skills for healthy foods. Asking self-efficacy was assessed using a 9-item scale with a 3-point response scale (1=I strongly agree to 3=I do not agree)[17] to assess whether the child asked "someone in their family" to increase availability or accessibility of healthy foods in the previous 2 weeks. An example of an item from the scale is "In the last two weeks, did you ask someone in your family to have fruit or vegetables at home for breakfast?" The scale has been validated among school children and has demonstrated good internal consistency ($\alpha$=0.78).[17]

**Anthropometric measurements—**Participants' heights and weights were measured during pre- and post-intervention data collection at the sites by trained research staff to compute BMI percentile.[18] Participant's height was measured to the nearest 0.1 cm twice using a stadiometer (Shorr Height Measuring Board; Olney, MD) and the mean of the two recordings calculated. Body weight was measured using a calibrated scale (Seca 770 Model scale; Vogel and Halke, Hamburg, Germany).

## Process evaluation

A thorough process evaluation was conducted both to monitor quality of implementation and to assess the process of change in behavior.[19,20] Much of the implementation and exposure assessments were documented using observation data and checklists completed by trained research staff. Process evaluation measures assessed fidelity (10-item checklist to assess the quality of delivery of the sessions, including the degree to which the sessions reflected what they were intended to teach, and the extent to which trained KCP staff used strategies to motivate, encourage, or support the children for eating healthy foods), dose delivered (observations and checklist) and dose received (participant attendance using records maintained by KCP staff) for the KCP. In addition, at post-test all participating children from

the two intervention sites were invited to participate in a brief group discussion. The research staff took hand-written notes of the discussions.

## Statistical Analysis

The SAS statistical software package version 9.4 [SAS Institute, Inc., Cary, NC, USA, 2003] was used for all data analyses. Significance was set at $p<0.05$. The study was powered to detect a moderate effect (ES = 0.52) in HEI score using independent sample t-tests. The effect sizes were calculated in G-Power (version 3.1.1.).[21] A total of 120 participants (60 participants in the intervention group, 60 participants in the comparison group) were needed to detect the moderate effect of 0.52 or a change of 6.1 units in HEI score.

T-tests for numerical variables and chi-square tests of independence for categorical variables were conducted to assess differences in demographic characteristics between the intervention and comparison groups at baseline. Normality and the distribution of the primary outcomes were assessed by calculating mean, standard deviation, skewness and kurtosis values and inspection of the graphical methods (i.e. histogram, box-plot) as visual aids.

BMI percentiles were computed from measured heights and weights to determine a child's BMI category based on data from other children of the same age and sex.[18] BMI percentile was a secondary outcome variable for this study.

Child diet quality was assessed using HEI-2010. Total daily per capita cup or ounce equivalents of the foods required to calculate quantities of the HEI-2010 components were obtained from the NDSR. The HEI-2010 score was calculated using SAS code and methods made available by the USDA.[15,22,23] To evaluate intervention effect on HEI-2010 outcomes (i.e total HEI-2010 score), and their changes from baseline to follow-up, a repeated measures mixed-effects model with a two-level between-subject factor (groups: intervention and comparison) and a two-level within-subject factor (time: baseline and follow-up) was used, where participants and time were treated as random effects, and groups, measurement times, potential interactions between group and time as fixed effects. Maximum likelihood estimate (MLE) method was applied to estimate variance components for estimating fixed effects. In each case of the significant F-test statistic for overall main effects of group, time, or the interaction of group x time, the post hoc analyses with Tukey HSD (Tukey-Kramer) adjustments were conducted to explore the statistical significance of differences between groups, changes in time, or group difference over time. All mixed-effects models were adjusted for child's gender, race/ethnicity, baseline age, site, parent education and household income.

Descriptives were calculated for process evaluation (fidelity, dose delivered and dose received). For fidelity, a scoring system of 1–10 with 1 = no fidelity and 10 = high fidelity was used. A score of 1–4 was categorized as low, 5–7 as modest and 8–10 as high. For dose received, children were divided into two groups: high dose with attendance in >3 sessions, and low dose with attendance in ≤3 sessions. Data from the group discussions conducted at the two intervention sites were compiled together and reviewed systematically by two coders.[24,25] The primary coder first developed a list of codes, and the secondary coder then

used the list to independently code the group notes. Codes were refined through consensus. Main findings were reported.

## Results

All children (N = 120) whose parents provided informed consent were enrolled; 120 completed baseline questionnaires (60 children in intervention and 60 children in comparison group). About 88 percent of children in both groups completed the post-test (n=107; intervention=53; comparison=54).

Of the 107 children, 102 (95%) were from food insecure households; 68 percent reported low food security (reduced quality, variety, or desirability of diet; little or no indication of reduced food intake[16]) while the remaining reported very low food security (multiple indications of disrupted eating patterns and reduced food intake[16]). Descriptive characteristics of the study participants who completed baseline and post-test are presented based on their group assignment in Table 1. Mean child's age was 10.2±1.8 years old with a mean BMI percentile of 79. There were significant differences in ethnicity, average annual household income and parent's education status between the two groups.

The total overall HEI-2010 score for both the intervention and comparison group at baseline and post-test ranged from 50–60. At baseline, the average HEI-2010 score for the intervention and comparison group were 55.72±1.98 and 57.34±1.79, respectively, while at post-test the scores were 56.54±1.99 and 53.74±1.80, respectively. There was no significant group by time effect for total HEI-2010 score of children in the intervention group compared to the children in the comparison group (p=0.06).

There were significant differences found in child-reported individual HEI-2010 component score at post-test (Table 2). One significant group by time effect was found after controlling for demographics: Intervention group children scored significantly higher on sodium intake from baseline to post-test ($p<0.01$) than comparison group children. In addition, regardless of the group, children from both groups scored significantly lower at post-test for total vegetables, and greens and beans compared to baseline scores (p=0.002 and p=0.03, respectively).

No significant differences was found for group by time effect for the secondary outcomes: BMI percentile (79.7±1.3 vs. 78.9±1.6; p=0.91); healthy eating self-efficacy (39.5±0.6 vs. 39.2±0.5; p=0.64) or asking self-efficacy (40.6±0.3 vs. 39.5±0.6; p=0.31).

From the process evaluation, fidelity to the class session structure was modest with mean scores at 5.6±1.7 and 6.1±1.2 at the two intervention sites. The average completeness rate across sessions (dose delivered by the trained KCP staff) was 70 and 76 percent at the two intervention sites. The goal was 80 percent or higher, which the two sites did not attain. The average attendance rate (dose received) was about 90 percent at both intervention sites (n=27 each site). The only significant difference for dose received was that there was a lower HEI for high dose group vs. the low dose group (49.6 vs. 54.5) at post-test. A total of 23 children (10 from one site and 13 from the second site) participated in post-test group discussion. The group discussion findings revealed two important points. First, the children thought that the

sessions were very lecture-based and they would have enjoyed it better if they were more interactive. Second, having to sit through an hour long session after school, was not desired by the children.

## Discussion

Although the primary goal of the KCP is to help alleviate child hunger[10], it is also important that children consume a nutritious diet and receive helpful nutrition education. One important study finding was that the majority of the children participating in KCP were from food insecure households, with about a third being from very low food secure households. Thus, it was encouraging to learn that KCP is reaching its intended audience. However, based on the results outlined above, overall KCP did not seem to improve children's dietary behaviors.

Regardless of the group, across the overall sample of low-income urban children in this study, HEI scores reflected suboptimal diet quality. The HEI-2010 total score for both the groups indicated a diet that "needs improvement", with a score of less than 50.[26,27] This is similar to findings from another study using HEI-2005, wherein scores for children in the intervention and comparison groups were in "needs improvement" category.[27] In addition, all children consumed fewer than recommended amounts of the HEI components. As shown in previous studies, the dietary intake of children falls far short of national recommendations.[27,28] Findings from this study are consistent with other studies with low-income, urban children, illustrating that many of the dietary patterns associated with disparities in chronic disease risk are prevalent among children.[29] These findings underscore the need to improve KCP's nutrition education to encourage healthier food choices among children. In addition, KCP nutrition education does not target parents. It is important to involve parents since they play a central role in development of children's dietary behaviors.[30–31]

BMI percentile and self-efficacy were secondary outcomes for the pilot study, and the study was not powered to detect changes in either BMI percentile or self-efficacy. The KCP curriculum also did not have any impact on the BMI percentile among the participants. This could be due to the short duration of the intervention (six weeks), or that the intervention was not of sufficient intensity to modify energy balance. Intervention duration and intensity could also be responsible for the finding that self-efficacy for eating healthy or for asking for healthy foods did not improve. In addition, the curriculum was not based on behavioral theory and did not target any psychosocial mediators of behavior change. The Social Cognitive Theory (SCT), which emphasizes the dynamic interaction between people (personal factors), their behavior, and their environments, is the most widely used theory for interventions targeting change in dietary behavior.[32] The constructs from SCT, such as self-efficacy, social support, self-regulation, and outcome expectations can be incorporated into the KCP nutrition education to potentially make it more effective. One important component of a nutrition education program for children is taste-testing. The KCP curriculum did not include any taste-testing which engages children in experiential learning and helps change food preferences.[33,34] More research is warranted in helping revise the current KCP

nutrition education curriculum based on behavioral theories which would better help alter children's dietary behaviors.

Process evaluation indicated that the staff delivered the program with modest fidelity. However, it was also found that children were not able to focus with another hour of class after attending school, especially since they were lecture-based. Thus, it is imperative that the KCP program revisions consider shortening the sessions and making them more interactive to retain children's attention and interest. Other research with children have supported the importance of including briefer, more interactive sessions.[35,36] In addition, a 6-week intervention with one sessions per week may be too short of a time period to see any behavioral changes.

Methodological limitations should be considered when interpreting these findings. First, the participants were all children living in one geographic location, limiting generalizability. Second, the data collection design may have biased estimates of consumption due to the possibility of recall error when using self-report dietary recall. However, dietary consumption in the recent study was similar to adolescent consumption patterns in a recent national study using NHANES which reported HEI-2010 score of about 47 among children 9–13 years.[37] Children in our study fared slightly better than the national average. There is a possibility that the significant differences between groups at baseline in ethnicity, income, and education could have impacted the results. However, all analysis were controlled for demographics. In addition, there were not enough programs within the design to adequately account for the cluster effect. However, this was a small evaluation study to assess if the nutrition education components of the KCP led to changes in the HEI in the expected direction.

## Implications for Research and Practice

KCP is a national program that provides snacks and nutrition education for low-income children. This small evaluation study demonstrates that the KCP nutrition education needs improvement to be able to be effective in helping improve children's diet quality. A possible explanation for the program not being able to demonstrate improvements in children's diets could be that the program was not designed based on any theories of behavior change. Another reason could be that the children were not able to focus during the hour-long after-school sessions. Further research is warranted to 1) refine the KCP curriculum based on behavioral theories such as the SCT which is the most widely used theory for interventions targeting improvements in diet quality and should target specific psychosocial aspects such as self-efficacy, social support, self-regulation, and outcome expectations that are required for helping children make the desired dietary changes; 2) involving parents in nutrition education programing through active participation and information exchange in relation to their child's nutrition needs and habits, and sharing nutrition education materials with parents so that they can reinforce the information at home for good nutrition practice and healthy habits; 3) making the sessions more desirable with shorter and interactive sessions, while keeping them interesting; and 4) update and evaluate the KCP curriculum that reflect MyPlate and current dietary guidance (2015 Dietary Guidelines for Americans).

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## Table 1

Demographic characteristics of the participating children enrolled in the Kid's Café Program

| Participant Characteristic | Total | Intervention | Control |
|---|---|---|---|
| | N=107 | n=53 (percent) | n=54 (percent) |
| Child age (Mean±SE) | 10.2 ± 1.8 | 10.1 ± 1.0 | 9.9 ± 1.0 |
| BMI percentile (Mean±SE) | 79.1 ± 1.5 | 78.5 ± 1.4 | 79.6 ± 1.5 |
| Child gender | | | |
| Male | 49 | 23 (47) | 26 (53) |
| Female | 58 | 30 (52) | 28 (48) |
| Child Ethnicity * | | | |
| Hispanic | 96 | 49 (51) | 47 (49) |
| Non-Hispanic | 11 | 4 (36) | 7 (64) |
| Child's NSLP participation | | | |
| Free/reduced-price lunch | 99 | 49 (49) | 50 (51) |
| Full price lunch | 6 | 4 (67) | 2 (33) |
| None | 2 | 2 (100) | 0 (0) |
| Parents' Average annual household income ** | | | |
| <$21,000 | 55 | 27 (49) | 28 (51) |
| $21,000 – $41,000 | 42 | 24 (57) | 18 (43) |
| $42,000 – $61,000 | 8 | 2 (25) | 6 (75) |
| >$61,000 | 2 | 0 (0) | 2 (100) |
| Parent's educational status ** | | | |
| <high school | 39 | 20 (51) | 19 (49) |
| high school graduate | 31 | 16 (52) | 15 (48) |
| > high school | 37 | 21(57) | 16 (43) |
| Parent's marital status | | | |
| Married/living with significant other | 41 | 20 (49) | 21 (51) |
| Single never married | 35 | 17 (49) | 18 (51) |
| Divorced/separated/widowed | 30 | 17 (57) | 13 (43) |

t-tests for numerical variables and chi-square tests of independence for categorical variables were conducted to assess differences in demographic characteristics between the groups at baseline. Normality and the distribution were assessed by calculating mean, standard deviation, skewness and kurtosis values and inspection of the graphical methods (i.e. histogram, box-plot).

* $p<0.05$;

** $p<0.01$;

significant difference between groups

**Table 2**

Adjusted means and standard errors (SE)[1] for Health Eating Index -2010, stratified by group and time

| | Range of score | Intervention (n=53) | | Comparison (n=54) | |
|---|---|---|---|---|---|
| | | Pre | Post | Pre | Post |
| | | Mean ± SE | Mean ± SE | Mean ± SE | Mean ± SE |
| **Total HEI-2010 Score** | 0–100 | 55.7±2.0 | 56.5±2.0 | 57.3±1.8 | 53.7±1.8 |
| **Adequacy (Higher score indicates higher consumption)** | | | | | |
| Total Fruit | 0–5 | 3.3±0.4 | 3.5±0.4 | 3.3±0.3 | 2.8±0.3 |
| Whole Fruit | 0–5 | 3.3±0.4 | 3.4±0.4 | 3.7±0.4 | 3.1±0.4 |
| Total Vegetables[a**] | 0–5 | 1.8±0.3 | 1.4±0.3 | 1.7±0.2 | 1.2±0.2 |
| Greens and Beans[a*] | 0–5 | 1.0±0.3 | 0.7±0.3 | 0.9±0.3 | 0.5±0.3 |
| Whole Grains | 0–10 | 3.8±0.7 | 4.0±0.7 | 4.1±0.6 | 4.3±0.6 |
| Dairy | 0–10 | 9.0±0.4 | 9.1±0.4 | 8.8±0.4 | 8.4±0.4 |
| Total Protein Foods | 0–5 | 4.6±0.2 | 4.5±0.2 | 4.4±0.1 | 4.6±0.2 |
| Seafood and Plant Proteins | 0–5 | 1.9±0.3 | 1.5±0.3 | 1.5±0.3 | 1.0±0.3 |
| Fatty Acids | 0–10 | 3.2±0.6 | 4.0±0.6 | 3.8±0.6 | 4.2±0.6 |
| **Moderation (higher score indicate lower consumption)** | | | | | |
| Refined Grains | 0–10 | 5.2±0.6 | 5.2±0.6 | 6.2±0.6 | 6.1±0.6 |
| Sodium[b**] | 0–10 | 2.9±0.6 | 4.1±0.6 | 3.8±0.5 | 3.1±0.5 |
| Empty Calories | 0–20 | 15.7±0.8 | 15.3±0.8 | 15.1±0.7 | 14.4±0.7 |

[1] Linear mixed-effect model with group, time, group, and group*time interaction as fixed effects with adjusted for child gender, race/ethnic group, parent's age, parent's race/ethnicity, education.

[a] significant time effect;

[b] significant group*time effect;

* p<0.05;

** p<0.01;

*** p< 0.001