Participation in the Child and Adult Care Food Program Is Associated with More Nutritious Foods and Beverages in Child Care

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Abstract

Background: Nearly two million California children regularly spend time in child care. Surprisingly little is known about the nutrition environments of these settings. The aim of this study was to compare foods and beverages served to 2- to 5-year-olds by type of child care and participation in the federally funded Child and Adult Care Food Program (CACFP).

Methods: A statewide survey of child care providers (n = 429) was administered. Licensed child care was divided into six categories: Head Start centers, state preschools, centers that participate in CACFP, non-CACFP centers, homes that participate in CACFP, and non-CACFP homes.

Results: CACFP sites in general, and Head Start centers in particular, served more fruits, vegetables, milk, and meat/meat alternatives, and fewer sweetened beverages and other sweets and snack-type items than non-CACFP sites. Reported barriers to providing nutritious foods included high food costs and lack of training.

Conclusions: CACFP participation may be one means by which reimbursement for food can be increased and food offerings improved. Further research should investigate whether promoting CACFP participation can be used to provide healthier nutrition environments in child care and prevent obesity in young children.

Introduction

Since the 1970s, the prevalence of obesity among 2- to 5-year-olds in the United States has more than doubled.1,2 Nearly one-quarter of young children are already overweight or obese by the time they enter kindergarten.3 Much of the excess weight prior to puberty is gained before age 5.4 Therefore, early lifestyle behaviors are key to obesity prevention, and child care settings are a logical venue for intervention. The number of licensed child care facilities in the United States has increased more than four-fold in the past 3 decades.5 The majority (≈73%) of the nation’s 19.6 million children under 5 years of age participate in early childhood education programs,6 where they spend 10–40 hours per week and receive a considerable portion of their daily nutrition.7

Scant obesity research has focused on preschoolers,5 likely because the complexity of the child care landscape makes it a challenging environment to study. Licensed facilities can vary from small, family day care homes with a single provider and a few children, to large preschools with a director, multiple teachers, and over 100 children. Qualifying child care facilities can elect to participate in the federal Child and Adult Care Food Program (CACFP), which provides site training and reimbursement for meals and snacks served to nearly 3 million children nationally.8,9 Sites can be reimbursed for up to two meals and one snack per child per day. Meals and snacks

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provided through CACFP must follow a food component-based pattern; portions from the milk, fruit and vegetable, grains/breads, and meat/meat alternatives groups are specified by age and eating occasion.\textsuperscript{8,9} Although the Institute of Medicine\textsuperscript{10} has recently made recommendations to better align CACFP with the Dietary Guidelines for Americans,\textsuperscript{11} presently CACFP does not include nutrient-based standards (unlike the National School Lunch Program and School Breakfast Program) and has undergone only minor revisions since its inception in 1968.

The aim of this study was to compare foods and beverages served to 2- to 5-year-olds by type of child care and participation in CACFP. To our knowledge, this is the first large-scale study to compare the foods and beverages provided in different types of child care settings. We hypothesized that participation in CACFP would be associated with improved nutritional quality of food and beverage offerings.

Methods

Overview

A mailed survey on foods and beverages served was administered (May to September, 2008) to a statewide sample of child care providers. The study was reviewed and, because the data collected related to child care sites and were not connected to any personal identifying information of participants, was deemed exempt by the Committee for the Protection of Human Subjects at the University of California, Berkeley.

For the survey, licensed child care settings were initially divided into six categories based on two factors hypothesized to influence diet quality: Type of facility (center or home) and participation in CACFP. The six categories were then combined into two groups: CACFP participants or non-CACFP sites. The six categories were:

1. Head Start programs (federally funded preschools for 2- to 5-year-old children, primarily from low-income families; CACFP participation required);
2. State preschools (state-funded preschools for 3- to 5-year-old children, primarily from low-income families; required to follow CACFP guidelines, but can choose whether to participate in CACFP or the National School Lunch Program);
3. CACFP-participating centers (excluding Head Start or state preschool programs and therefore not subject to certain federal and state regulations);
4. Non-CACFP centers (required by California regulation to follow CACFP guidelines but without CACFP reimbursement or training);
5. CACFP-participating homes (distinct from centers, which are usually located in commercial buildings and provide care to comparatively larger groups of children; child care homes provide care to children in a caregiver’s personal home);

Statewide Survey

Sample selection. The California database of licensed child care sites was merged with the state listing of CACFP sites. Facilities were grouped into the six categories of interest prior to random selection. Using a random number generator, \approx 1400 (for approximately equal representation from each category) were selected from over 50,000 facilities statewide.

Tool development. Adapting a child care instrument validated by Benjamin et al.,\textsuperscript{12} a frequency checklist of 21 foods and beverages (listed in Table 1) was developed for respondents to record what was served to children 2–5 years of age on the day preceding the survey. Respondents were instructed to include items provided by the site as well as those brought by parents (whether for service to one or many children), and to indicate whether items were served at a meal (breakfast, lunch, dinner) or a snack. Additional questions asked about the type of milk usually provided, the provision of drinking water at the table with meals or snacks, the availability of self-serve drinking water, and factors influencing food and beverages served. Prior to use, feedback on the format, wording, and length of the survey was gathered from sites participating in another research project. The final survey took approximately 20 minutes and is available at http://cwh.berkeley.edu/resources/2/37/50/14/.

Data collection. Materials mailed to child care homes were provided in both English and Spanish; centers received information in English only. Instructions were provided that a child care provider familiar with the foods served to 2- to 5-year-old children at each facility was to complete the survey and that more than one staff person could provide input. Upon survey return, each participant received a $5 gift card at a local retailer and entry into a raffle to receive a $200 grocery store coupon. Up to two additional contacts in the form of reminder postcards and repeat mailing of surveys were used to enhance participation rates.

Data analysis. To evaluate differences by the six child care categories, analysis of variance was used on means (and standard deviations) and logistic regression was used on proportions, with Tukey honestly significant differences applied as a follow-up test. Analyses were conducted using R (version 2.8.1, 2008, R Development Core Team, Vienna, Austria), software designed for statistical computing. Differences were considered significant at \( p < 0.05 \) (two-tailed).

Results

Participant Characteristics

A total of 432 surveys were completed for a response rate of 31%. Three surveys from CACFP homes were excluded because care was provided only to children under age 2 years. The resulting analytic sample included 66 Head Start centers, 68 state preschools, 104 CACFP
centers, 88 non-CACFP centers, 65 CACFP homes, and 38 non-CACFP homes. Of the 429 total sites, 303 participated in CACFP and 126 did not. On the basis of a reported mean number of 2- to 5-year-old children per site of 96 (±220) for centers and 6 (±4) for homes, the surveys represent data on approximately 32,000 California children. Almost all survey respondents (97.7%) were site supervisors/directors or owners; the remainder were

<table>
<thead>
<tr>
<th>Table 1. Foods and Beverages Provided to 2- to 5-Year-Olds by Categories of Child Care from Statewide Survey</th>
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<tbody>
<tr>
<td><strong>Food or beverage category</strong></td>
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<tr>
<td>Milk</td>
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<td>Sweetened drinks</td>
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<td>100% juice</td>
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<td>Fruit canned in syrup</td>
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<td>Fried potatoes</td>
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<td>Baked/broiled poultry or fish</td>
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<td>Nuts or seeds</td>
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<td>Cheese or yogurt</td>
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<td>Frozen desserts</td>
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<td>Sweet cereals</td>
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<td>Sweet baked goods</td>
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<td>Regular potato chips</td>
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<td>Other snack foods</td>
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<td>Whole grains</td>
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<td>White (not whole) grains</td>
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Number (mean±SD) served at snack-time the day before survey

| Sweet and snack-type foods                                    | 1.09±1.05            | 0.61±0.73 de               | 0.41±0.58 d                 | 1.07±0.95 bc               | 1.55±1.41 ab               | 1.42±1.31 de               | 1.54±1.46 ab | C < N** |

Sites (%) reporting nutrition-related behaviors

| Whole milk usually served                                     | 21.4                  | 7.6 c                      | 10.3 c                      | 18.3 c                     | 21.4 bc                    | 44.4 a                      | 40.5 ab | C > N** |
| Water rarely or never served with meals or snacks            | 21.9                  | 31.3 ab                    | 43.9 c                      | 22.0 b                     | 13.3 b                      | 17.7 a                      | 8.3 c  | C > N*** |

Categories not sharing a common superscript across a row are significantly different by analysis of variance (ANOVA) with p < 0.001, except for 100% juice for which p < 0.01, and white grains for which p < 0.05. By ANOVA, significant differences between groups were also found for regular potato chips (p < 0.01), and sweetened drinks and candy (p < 0.05); however, multiple comparisons tests, which tend to be more conservative than ANOVA, did not reveal significantly different means. For CACFP sites (C) vs. non-CACFP sites (N) comparisons by ANOVA: *p < 0.05, **p < 0.01, ***p < 0.001. Included rice and soy milk. *Included soda and fruit drinks, but not diet drinks. *Included fresh, canned in water or own juice, dried, and frozen fruit. *Included fresh, tater tots, and hash browns. *Included fresh, frozen, and canned vegetables. *Included tofu or tempeh. *Included chicken nuggets, fish sticks, hot dogs, lunch meat, hamburger, sausage, and bacon. *Included nut butters. *Did not include frozen yogurt. *Included ice cream, popsicle, and frozen yogurt. *Included fruit roll-ups and gummies. *Included Frosted Flakes, Apple Jacks, Frost Loops, and Sugar Smacks, as examples. *Included cookies, cupcakes, muffins, and donuts. *Included corn chips, cheese puffs, and pork rinds. *Included crackers, pretzels, popcorn, and baked chips. *Included whole grain bread, oatmeal, brown rice, whole wheat tortillas, corn tortillas, and whole grain cereal. *Included white bread, white rice, pasta, rolls, pancakes, and waffles. *Included frozen desserts, candy, sweet cereals, other sweet baked goods, regular potato chips, and other snack foods.
child care teachers. Seventeen of the 103 child care home respondents completed the survey in Spanish. Approximately half of Head Start centers (51.5%) and 83.8% of state preschools offered child care for half-day only. Full-day care was an option provided by the majority of other sites (ranging from 81.8% for non-CACFP centers, to 96.9% for child care homes).

Breakfast was served by 75.1%, morning snack by 60.1%, lunch by 89.3%, and afternoon snack by 83.7% of sites. Dinner (17.7% of sites) and evening snack (21.4% of sites) were less frequently served. Meals and snacks were supplied by the majority of sites; parents usually brought lunch in 8%, morning snack in 2%, and other meals/snacks at <1% of sites. All but one home reported preparing food for children on site. Whereas on-site preparation was also the most common source of food for centers (51.7%), other centers obtained food from a school food service (25.4%) or a central kitchen (18.3%). School food service was the most common source for state preschools (55.9%); a central kitchen was most common for Head Start centers (45.5%). Only 4.6% of centers used an independent food service vendor. Menu planning was done by the site supervisor/director or owner (45.1%), a cook or chef (27.9%), or a dietitian (19.3%). Head Start centers were more likely to use a dietitian in menu planning (62.1%) compared to state preschools (19.1%), other centers (4.2%), and homes (0%) (p < 0.001).

Foods and Beverages Served

More CACFP sites served milk (97%) the day prior to the survey than non-CACFP sites (83.3%) (p < 0.001) (Table 1). Most sites (72%) usually served 1% or 2% milk, 21.4% usually served whole milk, 1.9% usually served nonfat milk; even fewer usually served other types of milk (1.2% rice or soy, 0.5% flavored). Head Start centers and state preschools were significantly less likely to typically serve whole milk than homes (p < 0.001). There was no difference by CACFP status in reported frequency of usually serving whole milk.

Water was less frequently offered than milk. About one-quarter (27.7%) of sites reported always serving water at meals and snack times, while 21.9% rarely or never did so (Table 1). Non-CACFP sites more frequently reported serving water at meals and snacks than CACFP sites (83.3% vs. 69.3%, respectively; p < 0.001), but less frequently reported having water easily available inside for children to serve themselves (58.7% vs. 73.3%, respectively, p < 0.001).

Sweetened drinks were served by 7.5% of sites (Table 1). More non-CACFP sites (14.3%) served sweetened beverages as compared to CACFP sites (3%) (p < 0.001). Nearly two-thirds of sites (64.1%) served 100% juice, most commonly at snack time (51% of sites). Fewer CACFP sites served juice than non-CACFP sites (p < 0.05).

Nearly half (47.3%) of survey sites reported serving fruit canned in syrup, a practice reported by more CACFP sites (52.5%) than non-CACFP sites (34.9%) (p < 0.01) (Table 1). Nearly all (90.2%) reported serving other kinds of whole fruit (excluding fruit juice). About 4% of all sites served no whole fruit the day prior to the survey (ranging from 0% at Head Start centers to 8% for state preschools and non-CACFP homes). French fries and other fried potatoes were served by one-quarter (24%) and legumes were served by nearly half (46.9%) of sites. CACFP sites (90.4%) had higher rates of serving other fresh, frozen, or canned vegetables than non-CACFP sites (80.1%) (p < 0.01). Approximately 10% of all sites served no vegetables of any kind (including legumes) the day prior to the survey (ranging from 0% at Head Start centers to 23% at state preschools and 27% at non-CACFP centers).

Vegetarian meat substitutes were served by 17.2% of sites, baked/broiled poultry or fish by 47.3%, other meats by 58.7%, nuts/seeds by 44.1%, and cheese/yogurt by 73% (Table 1). On average, 14% of sites served none of these meats/alternatives the day prior to the survey (ranging from 3% for non-CACFP homes to 30% for non-CACFP centers).

Whole grains were served by 75.3% of sites, with fewer state preschools reporting this than other child care categories (p < 0.001) (Table 1). White bread, rice, pasta, and other non-whole grains were served by 63.4% of sites. Nearly half (47.1%) reported serving whole grains at lunch (ranging from 28% of state preschools and non-CACFP centers, to 62% of CACFP homes and 64% of Head Start centers).

Frozen treats were served by 23.8% and candy by 6.8% of sites (Table 1). Over one in five (21.2%) served sweetened cereals, and 23.7% served sweet baked goods. Snack time was the most typical eating episode (61.5% of sites) at which sweets and snack-type foods were served. Counting all sweets and snack-type foods consumed at snack-time (including frozen desserts, candy, sweet cereals, other sweet baked goods, regular potato chips, and other snack foods), non-CACFP sites served more (1.47 ±1.28) than CACFP sites (0.87 ± 0.97) (p < 0.05).

Survey respondents reported five key factors that influenced the nutritional quality of foods served: Money for food (36.8%), nutrition education for parents (36.6%), help from a dietitian with menu planning (16.6%), improved access to food (14.3%), and additional staff education (12.1%). Factors cited as most important in deciding which foods to provide to children in child care were nutritional content (79.7%), cost (20.3%), children’s preferences (14.2%), availability (12.4%), and convenience (8.9%).

Discussion

There is an urgent need to better understand the nutrition environment of child care settings. We hypothesized that CACFP sites—because of program requirements, monitoring, training, and reimbursement funds for meals
and snacks—would provide healthier foods and beverages (i.e., more consistent with the Dietary Guidelines for Americans\textsuperscript{11}) than non-CACFP sites. Although the results do not confirm this hypothesis in every comparison, there was a clear pattern suggesting that CACFP sites in general, and Head Start centers in particular, provide more nutritious options than non-CACFP sites. The CACFP meal pattern requires fruits and vegetables—regardless of form or preparation style (e.g., fat or sugar added)—to be served with meals, so it is not surprising that more CACFP sites than non-CACFP sites served fruits and vegetables. One recommendation to encourage even healthier practices in CACFP would be to limit (or prohibit) fruits and vegetables prepared with added fat, sugar, or salt and to provide education to sponsors and providers about choosing healthier options. Another recommendation is to improve child care access to locally grown fresh produce.

The trends for foods served in the protein food group were similar to the trend for fruits and vegetables. Because the CACFP meal pattern requires a serving from the meat/meat alternative food component but does not mandate particular options, CACFP sites serve more foods from this category. Recommendations to limit the higher-fat protein sources and provide education to providers on improved choices could improve dietary quality.

While cereals and breads are the most popular whole grains among U.S. preschoolers, whole grain intakes remain inadequate.\textsuperscript{13} Because other studies have shown that accurate identification of whole grains is challenging,\textsuperscript{14,15} it is likely that child care providers overestimated the number of grains served that were whole grains. Replacing refined grains and grains with added sugar (e.g., cookies, cupcakes, muffins, and donuts) with whole grains with reduced or no added sugar is an appropriate policy goal in child care, but one that will likely require improved recognition of whole grain foods.

Head Start centers ranked superior on a number of food categories (e.g., serving fewer sweetened cereals and sweet baked goods). Head Start centers reported using dietitians in menu planning more often than other child care categories. The U.S. Department of Health and Human Services also enforces Head Start regulations on child nutrition (e.g., to implement a nutrition program that meets the nutritional needs and feeding requirements of each child).\textsuperscript{16} Although a logical assumption, additional research is needed to confirm whether involvement of a dietitian in meal planning is a factor in the superiority of Head Start menus.

Non-CACFP sites reported serving more sweetened beverages than CACFP sites. CACFP does not reimburse for beverages that are not 100\% juice or milk. Although more CACFP sites served milk than non-CACFP sites, there remains room for improvement, because more than one in five sites reported usually serving whole milk, despite recommendations that children 2 years old and above drink milk that is lower in fat.\textsuperscript{11} Likewise, regardless of CACFP participation, all sites reported relatively low rates of serving water. Encouraging water consumption throughout the day, assuring providers that water should not be viewed as competing with caloric beverages such as milk, and making water easily available to young children may help improve water provision in child care.

Limitations

Only child care sites in California were included in the survey. However, California represents a substantial portion of the U.S. preschool-age population; one in eight of the nation’s children under 5 years of age\textsuperscript{17} and nearly one in ten of the nation’s children in child care\textsuperscript{18} reside in California. Although child care sites were randomly selected, response was voluntary, resulting in potential response bias and unequal representation from different types of sites. The response rate was relatively low (31\%), and it is possible that sites with higher quality nutrition were more likely to complete the survey than lower-quality sites. The survey involved self-reported measures of the foods and beverages served, introducing the possibility of reporting bias (e.g., over-reporting of practices considered favorable) and misreporting (e.g., reporting errors due to faulty recall or knowledge). Furthermore, the survey assessed what was served rather than what was actually consumed by children. Although this method is not likely to affect category comparisons within the study, it does limit comparison to actual intakes reported in other studies.

Conclusions

CACFP sites in general, and Head Start centers in particular, served more fruits, vegetables, milk, and meat/meat alternatives, and fewer sweets and snack-type items than non-CACFP sites. Furthermore, while it is possible to serve healthy foods and beverages per the CACFP guidelines, our study confirmed findings from others\textsuperscript{19-24} that the CACFP guidelines are so broad as to allow many foods that do not comply with the Dietary Guidelines for Americans.\textsuperscript{11} Further research is needed to determine if there are differences in the foods and beverages consumed by children according to child care type and whether increasing CACFP participation and improving CACFP meal patterns will improve nutrition in child care and prevent obesity in young children.

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Author Disclosure Statement

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