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The Nutrition Assistance Landscape in Afterschool Programs: Understanding the Gap between Research, Policy, and Practice

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THE NUTRITION ASSISTANCE LANDSCAPE IN AFTERSCHOOL PROGRAMS: UNDERSTANDING THE GAP BETWEEN RESEARCH, POLICY, AND PRACTICE

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DEDICATION

This dissertation is dedicated to Elissa Ann Lockamy, whose memory is forever in my heart; guiding me, inspiring me, and reminding me to pursue life with determination and courage, making the most of every moment along the way.

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ABSTRACT

The Child and Adult Care Food Program (CACFP) aims to increase children's access to healthful foods in out-of-home care. Approximately half of the 10.2 million children enrolled in afterschool programs (ASPs) are eligible for nutrition assistance through programs like CACFP. Despite awareness of its potential impact on the nutritional status of millions of children, CACFP is underutilized among ASPs and notably understudied in comparison to other federal nutrition assistance programs.

This dissertation addresses key gaps in CACFP research and provides a deeper understanding of the nutrition assistance landscape in afterschool programs by (1) assessing the type of afterschool snacks served under CACFP guidance, (2) evaluating the nutrient content of snacks by ASPs' CACFP participation, and (3) examining the challenges and benefits to CACFP enrollment as perceived by ASP administrators. A cross-sectional, mixed methods design with stratified, purposeful sampling of ASPs based on CACFP eligibility and enrollment was employed to examine the three study aims. Thirty-five administrators, representing 60 ASPs based in South Carolina participated in studies 1 and 2. Participants completed phone interviews; providing sample snack menus and nutrition policy information. Study 3, a qualitative investigation of CACFP enrollment barriers, was conducted with a subsample of 22 administrators from CACFP-enrolled ASPs and those eligible, but not enrolled.

Study 1 assessed the relationship between the average weekly servings of food/beverage categories and ASPs grouped by their (1) CACFP eligibility/enrollment

status and (2) snack standards/guidelines utilized. ASPs enrolled in CACFP and adhering exclusively to their guidelines served significantly higher quantities of sugar-based snacks and fewer fresh fruits and vegetables than their peer ASPs.

For study 2, the energy and macro/micronutrient content of snacks, determined using the US Department of Agriculture's (USDA) Nutrient Database, was compared: (1) across CACFP-eligibility/enrollment groups and (2) to existing USDA and Institute of Medicine nutrition standards. Snacks served in CACFP-enrolled ASPs were of lower nutritional quality than those served in CACFP-non-enrolled ASPs; containing significantly more energy, carbohydrates, total sugar, and added sugar. Across CACFP-eligibility/enrollment groups, snacks failed to meet many nutrient guidelines indicative of a healthy diet.

Study 3 aimed to identify plausible explanations behind CACFP's underutilization among ASPs. Respondents participated in semi-structured qualitative interviews assessing their knowledge, experience, and perceptions surrounding nutrition assistance programs. CACFP-enrolled ASP administrators had a more favorable impression of nutrition assistance programs; however, both groups expressed similar CACFP-specific benefits and challenges. Both groups felt CACFP's greatest strengths were the program's monetary incentives and perceived impact on the nutritional quality of meals/snacks. Challenges include enrollment guidelines, paperwork demands, and lack of perceived administrator/sponsor support. Respondents provided suggestions for strengthening CACFP by addressing these key challenges.

This dissertation adds to the body of literature surrounding nutrition assistance programs and to our knowledge, is the first to provide empirical evidence regarding the

type and nutritional content of snacks served in CACFP ASPs, as well as the first to capture the benefits and barriers to CACFP enrollment from the perspective of ASP administrators. In summary, this dissertation provides insight into the current state of CACFP in ASPs. Understanding the program's strengths and weaknesses is crucial to developing effective strategies to increase participation within the afterschool setting and ensure that children are provided with nutritious snacks that support healthy growth and development.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

Childhood obesity is a pervasive problem across the United States; affecting over 12 million children and adolescents.[1] With children now suffering from chronic weight-related diseases previously seen only in adults, the need to address this problem is ugent.[2-4] Nutrition has long been considered one of the leading modifiable determinants of obesity. Despite public awareness of the importance of a healthy diet, children across the nation consume large quantities of energy-dense foods, such as cookies and chips and less than recommended amounts of fruits and vegetables.[5,6] Alarmingly, nearly 40% of children's daily energy intake comes from empty calories (ie, foods/beverages with little-to-no nutritional value); resulting in under-consumption of key vitamins and minerals.[7-9] These current trends are concerning, as unhealthy dietary habits not only interfere with a child's physical and cognitive development but also puts them at greater risk for chronic weight-related health conditions, such as type 2 diabetes and hypertension.[2,4] Fortunately, there is ample evidence that these adverse health outcomes can be prevented or alleviated by improving dietary habits.[2,10-12] Despite this evidence, generating abiding improvements in dietary habits across the population is challenging.[13] This is largely due to the complexity of eating behavior, which is influenced by a network of individual and environmental factors.[13-16] Specific to children, there is growing interest in the role of the physical environment on dietary habits. Children spend up to 35 hours each week away from home in various child care settings,[15,17] such as schools, day care centers, and

afterschool programs (ASPs). Because meals and snacks can be served in each of these settings, it is possible for children to consume their entire daily energy intake away from home.[9,15,18] Thus, facilitating improvements in the food environment (ie, system of food policy, procurement, distribution, and access) across these settings has the potential to generate a positive shift in the dietary habits of children across the nation.

Despite increased recognition of the important role ASPs play in combating obesity, studies on child food environments largely focus on schools and full-day child care centers.[14-16,19] This is a missed opportunity, because nearly half of the 10.2 million children attending ASPs come from low-income households;[20,21] putting them at greater risk for obesity.[1,22] While limited, existing research shows promise for improving the afterschool food environment using community-based, policy-level approaches.[23-28] The main modification to the afterschool food environment shared among these interventions was the implementation of snack policies and standards.[23-28] Although many ASP providers recognize the importance of providing healthy snacks and meals, they struggle to meet nutrition guidelines; citing cost as a major barrier.[29-31] To address these concerns, several studies facilitated partnerships between ASPs and local food stores who could help the programs procure healthy foods within their allotted snack budget.[23-26] While promising, this strategy alone may not be enough to counteract the severe financial constraints placed upon many ASPs.

Funding for ASPs has not risen to match the rapid increase in demand for their services.[32-37] As a result, many ASPs are forced to reduce staff, operate with inadequate resources, limit services, or even shutdown operation.[35-37] This is especially true for ASPs serving low-income communities, where demand is highest and funding is least

stable.[37] Generally, the majority of an ASP's budget comes from tuition fees.[36] However, ASPs serving low-income communities are less likely to receive tuition from parents and therefore, rely heavily upon other funding sources (eg, grants, businesses, individual donors).[36] As funding from these sources is far from adequate, ASPs face budgetary challenges.[36] Food cost is one of the highest budget items for child care programs;[38] and for financially strapped ASPs, making even minor adjustments in the foods and beverages served may result in an operating deficit.

For many ASPs, the ability to serve snacks and meals to children in their care is dependent on their utilization of nutrition assistance programs. The US Department of Agriculture's (USDA), Child and Adult Care Food Program (CACFP) is the leading nutrition assistance program for children outside of home and school (eg, family day care homes, preschool centers, ASPs). Unlike most federal nutrition assistance programs, which determine eligibility and distribute benefits at the individual level, CACFP operates at the program level.[39,40] ASPs located in a public school attendance area where at least 50 percent of students are eligible for the National School Lunch Program are considered 'area eligible' and can receive full reimbursement for snacks and meals served in accordance with CACFP guidelines.[40]

Similar to ASPs, the success of a nutrition assistance program is highly dependent on consistent and adequate funding. To secure funding, federal nutrition assistance programs undergo continuous evaluations of their program's reach, operation, and effectiveness. CACFP is considered one of the leading child nutrition programs with the potential to improve the nutritional status of millions of children; yet, it is one of the least studied federal nutrition assistance programs.[31,41,42] Awareness of the dearth of

information regarding CACFP arose after the Healthy Hunger Free Kids Act of 2010, which required CACFP to evaluate and revise their nutrition guidelines for the first time in over 20 years.[31,42] Nearly seven years later, while still in its infancy, CACFP research is growing. Evidence indicates an increase in program participation. The number of children served by the program rose to nearly three million in 2014; an 8% increase from the previous year.[43] Additionally, there has been an increase in studies evaluating the nutritional quality of CACFP approved foods and beverages in full-day child care centers.[44-46] This research undoubtedly represents a positive shift in focus on evaluating and improving CACFP, however, significant gaps in afterschool-specific CACFP research still exist. What we do know is that CACFP is failing to reach millions of children in ASPs. There are approximately 4.6 million children eligible for nutrition assistance in ASPs alone,[21] yet ASPs represent only a small fraction (5%) of facilities participating in CACFP.[31] Aside from awareness of the need to increase participation, little else is known about CACFP in ASPs. To date, the content and nutritional quality of meals and snacks served in CACFP-enrolled ASPs, how they compare to those served in non-enrolled ASPs, and their adherence to existing nutrition guidelines is unknown.

To address these gaps in research and expand the body of literature surrounding nutrition assistance programs, this three-study dissertation employed a mixed-method, cross-sectional approach to investigate the current state of CACFP in ASPs. Although meals and snacks can be served through CACFP, this dissertation focuses solely on snacks served in ASPs. The reason for this is twofold. First, evidence suggests that snacking may be a significant contributor overweight and obesity.[47-49] Over 97% of children consume snacks on a daily basis and these foods and beverages can contribute

over a quarter of a child's total daily energy and micronutrient intake.[9,47,50] Secondly, ASPs selected for study participation were stratified based on their program's eligibility and enrollment in CACFP. This allowed for comparisons between ASPs enrolled in CACFP, those who were CACFP-eligible but not enrolled, and those who were not eligible for CACFP. Although meal data was collected, few ASPs served meals; resulting in the inability to facilitate accurate comparisons between the three CACFP-eligibility/enrollment groups. Given the aforementioned financial burdens ASPs face, it is plausible that the programs most likely to serve meals are, in fact, those already enrolled in CACFP.

The purpose of study 1 was to evaluate the type of afterschool snacks served under CACFP guidance. Specifically, comparisons in the average weekly servings of ten different snack food and beverage categories were made between the three CACFP-eligibility/enrollment groups. A secondary objective of the study was to compare snacks served across ASPs grouped by snack guidelines utilized. Assessing how the various snack guidelines impact afterschool snack quality is a critical first step in developing a unified set of afterschool nutrition standards that supports healthy dietary habits among children. Fundamental to this study was the use of broad component-based categories (eg, fresh fruits, salty snacks, sugar-sweetened beverages) in evaluating snack content. This method improves upon those used in existing studies, where snacks served in full-day child care programs are compared to nutrition guidelines based off of Dietary Reference Intake values specific to meal occasions (ie, breakfast, lunch, and dinner).[9,46,51] Because no snack-specific Dietary Reference Intake values currently exist, the nutrient content of snacks cannot be directly compared to these meal-specific nutrition guidelines.

Further, at the time of this study, there were no nutrient-specific standards or established protocol for assessing the nutrient content of snacks served under CACFP guidance. By using broad component-based categories, this study evaluated the content of afterschool snacks in a manner consistent with CACFP guidelines.

To address the lack of established protocol for assessing the nutrient content of CACFP-approved snacks, study 2 drew upon existing nutrient analysis protocols and relevant literature to compile a set of snack-specific nutrient standards. Snack energy and macro/micronutrient content was compared across the three CACFP-eligibility/enrollment groups, as well as to the reference standards. This study holds significance for researchers, CACFP professionals, and ASP administrators. First, the evaluation of snack nutrient content between ASPs grouped according to CACFP eligibility and enrollment is of crucial importance, given that CACFP is premised on its ability to improve quality and healthfulness of snacks served to children through program enrollment.[52] To that end, ASPs who are enrolled in CACFP should, in theory, serve higher quality snacks than their counterparts; those ASPs who are eligible but not enrolled. Likewise, the snacks served in CACFP-enrolled ASPs should be comparable to those served in higher income ASPs who are not eligible for CACFP. Findings from this study establish evidence regarding the validity of this argument. Secondly, by utilizing snack-specific standards, we gain a better perspective of the nutritional quality of snacks served in the afterschool setting. This is significant, as ASPs have been called upon to serve nutritionally adequate snacks to children in their care.[53-56] While snack nutrition standards are sparse and often not specific to the afterschool setting, these guidelines can provide a frame of reference on what constitutes a nutritionally adequate snack.

Study 3 aimed to identify plausible explanations behind CACFP's underutilization among ASPs through a qualitative investigation of the factors influencing program uptake among ASP administrators. Specifically, administrators from CACFP-enrolled ASPs and those eligible but not enrolled participated in semi-structured interviews assessing their knowledge, experience, and perceptions surrounding nutrition assistance programs, as well as any perceived benefits or barriers specific to CACFP enrollment. By including administrators from both ASPs enrolled in CACFP and those who were eligible but not enrolled, this study offers insight into the similarities and differences between the two groups and brings awareness to other factors (eg, ASP setting, affiliation with umbrella organization) potentially mediating enrollment in CACFP. Additionally, this study provides a novel assessment of the barriers to CACFP enrollment because it is the first to include ASP administrators; whereas, previous research on afterschool-specific CACFP barriers used proxy reports from third party organizations (eg, nutrition coalitions, state level education agencies) not directly involved in the enrollment process.[57] Findings from this study can inform CACFP's governing body of the need to reevaluate existing dissemination methods within the afterschool community. Current efforts to increase ASP enrollment in CACFP can be strengthened by allocating resources to resolve the most pervasive barriers revealed within this study.

This dissertation represents an important step in bridging the gap between CACFP research, policy, and practice. Collectively, findings from the three studies provide novel insight into the current state of CACFP in ASPs. The evidence presented herein not only sheds light on the type and nutritional quality of snacks served under

CACFP guidance but also provides important information on how these snacks compare to those served in ASPs not enrolled in CACFP. This information can serve as catalyst for more in-depth evaluations of CACFP's snack guidelines. In turn, these evaluations can inform policy revisions; engendering improvements in the nutritional quality of snacks served through the program. Additionally, this dissertation provides a broader understanding of the barriers to CACFP enrollment from the unique perspective of ASP administrators. This is significant because identifying and addressing the challenges to CACFP enrollment ASP administrators experience is vital to the program's uptake and ultimate success within the afterschool community.

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CHAPTER II

AFTERSCHOOL SNACKS: A COMPARISON BY CHILD AND ADULT CARE FOOD PROGRAM ELIGIBILITY AND ENROLLMENT STATUS AND ADOPTED SNACK GUIDELINES[1]

[1] Tilley F, Beets MW, Turner-McGrievy G, Moore JB, Weaver RG. To be submitted to Childhood Obesity

Abstract

Objective: The Child and Adult Care Food Program (CACFP) assist afterschool programs (ASPs) in serving snacks to low-income children by easing budgetary constraints and providing nutrition guidance. Limited information exists on the nutritional quality of afterschool snacks served under CACFP guidance. The objective of this study was to compare the content of snacks served in ASPs by CACFP eligibility/enrollment status and snack standards/guidelines utilized.

Design: Mixed methods design. Participants completed phone interviews; providing snack menus and nutrition policy information. Kruskal-Wallis tests were used to assess the relationship between the average weekly servings of food/beverage categories and ASPs grouped by their (1) CACFP eligibility/enrollment status and (2) snack standards/guidelines utilized.

Setting: ASPs operating in South Carolina.

Subjects: Thirty-five administrators, representing 60 ASPs.

Results: Non-eligible and eligible/non-enrolled ASPs served more fresh vegetables than CACFP-enrolled ASPs (median servings = 1 day/week vs. 0 days/week, $p < 0.001$). Non-eligible ASPs served more fresh fruits/vegetables than enrolled ASPs (median servings = 3 days/week vs. 1 day/week, $p < 0.05$). Enrolled ASPs served more sugary snacks than eligible/non-enrolled ASPs (median servings = 2 days/week vs. 0.5days/week, $p< 0.001$). ASPs exclusively following CACFP guidelines served fewer fresh fruits and vegetables and more sugary snacks than did ASPs following other guidelines.

Conclusions: ASPs enrolled in CACFP and adhering exclusively to their guidelines served higher quantities of sugar-based snacks and fewer fresh fruits and vegetables than their peers. It is recommended that CACFP ASPs adopt additional standards and recommended best practices to enhance the nutrient content of snacks.

Keywords: food assistance, child care, nutrition, afterschool snacks

Introduction

Children across the United States consume large quantities of energy-dense and nutrient-poor foods and beverages, such as cookies, chips, and soft drinks.[1] As such diets have been linked to increased risk for obesity, the public is urged to eat more healthfully.[2] Improving dietary habits can be difficult for children living in low-income communities, where the availability of energy-dense foods often exceeds nutrient-rich options.[3,4] Federal nutrition assistance programs, created by the United States Department of Agriculture (USDA), aim to assist low-income households in improving nutritional status.[5,6] Since their inception in the early 1930's, nutrition assistance programs have expanded to include meals served at schools, day cares, and outside-school-hours centers through the National School Lunch Program (NSLP) and the Child and Adult Care Food Program (CACFP).[6]

Afterschool programs (ASPs; typically operating from 3-6pm) are a vital resource for low-income communities, as they provide a supervised environment, [7-10] offer academic enrichment opportunities, [8-10] and, importantly, serve meals and/or snacks everyday.[8-10] Nearly half of the 10.2 million children enrolled in ASPs qualify for the NSLP.[10] National attention on the role ASPs play in the dietary intake of this high need

population led to the expansion of CACFP to include afterschool snacks.[6,11-13] To be eligible, ASPs must either meet the 25 percent threshold criteria (i.e., at least 25% of the children enrolled are eligible for the NSLP) or be considered area-eligible (i.e., program is located in attendance area of a public school where at least 50 percent of students are eligible for NSLP).[14] Qualifying programs offset cost by receiving reimbursement (i.e., 84 cents per snack) for snacks served that meet guidelines set forth by CACFP.[15]

CACFP guidelines are intended to improve the quality and healthfulness of snacks served to children attending CACFP-enrolled ASPs by providing broad, component-based nutrition standards and encouraging participating ASPs to incorporate fruits, vegetables, and whole grains in their snack menu.[16] In addition to CACFP, other national and state-level organizations have proposed their own guidelines to address the quality of snacks served in ASPs.[17-19] Unfortunately, the cost associated with serving healthful snacks is often cited as a major barrier to meeting these nutrition benchmarks.[20-22] If this premise is true, it stands to reason that ASPs enrolled in CACFP (i.e., receiving financial assistance) should serve more nutritious snacks than ASPs that are eligible but not enrolled. Likewise, the snacks served in CACFP-enrolled ASPs should be comparable to those served in ASPs who are not eligible for CACFP. Paradoxically, evidence suggest that meals and snacks purchased in accordance with nutrition assistance program guidelines are primarily energy-dense foods characterized as high in added sugars and fats.[3,23,24] As a result, there are growing concerns that enrollment in nutrition assistance programs may, in fact, be contributing to the high rates of obesity; particularly among low-income populations.[3,24-26]

These studies, albeit important, primarily focus on foods and beverages obtained through the Supplemental Nutrition Assistance Program and the National School Breakfast and Lunch Programs. Studies examining the nutritional quality of foods and beverages served through CACFP are limited to full-day child care centers. To date, the nutritional quality of afterschool snacks served under CACFP guidance and how they compare to non-eligible or eligible non-participating ASPs is unknown. Therefore, the purpose of this study was to compare the content of snacks across a sample of ASPs grouped by their (1) CACFP eligibility and enrollment status and (2) snack guidelines utilized. Given the aforementioned concerns of the healthfulness of CACFP approved foods and beverages; we hypothesized that the content of snacks served would be comparable across ASPs, regardless of CACFP eligibility/enrollment status.

Methods

Site Sampling Strategy

A stratified purposeful sampling method was used to select ASPs for this study, which stratified potential ASPs based on eligibility and enrollment in CACFP. This allowed for comparison between three CACFP eligibility and enrollment groups: (1) enrolled (i.e., ASPs currently enrolled in CACFP), (2) eligible/non-enrolled (i.e., ASPs eligible for CACFP but not enrolled), and (3) non-eligible (i.e., ASPs not eligible for CACFP). For programs not currently enrolled in CACFP, eligibility status was determined in accordance with the CACFP At-Risk Afterschool Handbook guidelines.[14] Free and reduced price meal eligibility data, located on the South Carolina Department of Education website, were reviewed to confirm if a program was considered 'area eligible'.[27] An a priori power analysis was conducted, using G*Power (v.3.0.10), to

determine sample size necessary to detect statistically significant effects. Being mindful of the feasibility in recruiting participants and conducting procedures within the study timeframe, a total sample size of 60 ASPs (20 ASPs per CACFP eligibility/enrollment group) was chosen; allowing for the detection of large effects (power = 0.80, f=.5).

ASP Site Leader Participants

ASP providers across the state of South Carolina were recruited to participate in the study from the fall of 2014 to summer 2015. Program contact information was obtained using documentation provided by the South Carolina Afterschool Alliance, the Department of Social Services Child Care Department and through meetings held by the South Carolina Department of Social Services CACFP. ASP site leaders, contacted by phone and/or email, were provided with an overview of study objectives and procedures. All site leaders interested in participating where asked questions to determine eligibility. To qualify for study inclusion site leaders had to: (1) have knowledge of snack procurement procedures, (2) be able to provide a sample snack menu (i.e. via snack recall and/or electronic copy), and (3) agree to participate in a phone interview.

Participant Interviews

Upon obtaining verbal consent, a trained researcher conducted a phone interview (lasting approximately 20 minutes) with program leaders to gather snack information. The semi-structured interview guide consisted of four sections: (1) program demographics, (2) snack policy and procedures, (3) snack recall, and (4) nutrition assistance program experience.

Program Demographics: Participants were asked to provide demographic information, including the number of ASPs they oversaw, program enrollment numbers,

age of children served, program setting (community center, school, church, private building), and program tax status (non-profit, government, faith-based, for-profit). Additionally, each participant was asked about their ASPs current involvement with any program providing nutritional guidance, such as licensing and accreditation programs, community based initiatives, school sponsored programs, and/or federally funded nutrition assistance programs.

Snack Policy and Procedures: Participants provided details on any snack specific policies and procedures followed by their ASPs. Specific to the procurement and distribution of snack, participants were asked questions regarding purchase location, budget, the number of snack occasions per day, and the number of food and beverage options per snack. Participants reporting the use of nutrition guidelines in their ASPs were asked to provide the name of the issuing organization and any snack specific guidelines.

Snack Survey: The snack survey portion of the interview guide was developed using previously validated tools for estimating the frequency and quantity of food and beverages consumed [28-30] and modified for the ASP setting. Specific to this study, using the food frequency questionnaire as a guide, the interviewer asked participants to provide the average number of days per week that specific categories of foods and beverages were served (10 broad food and beverage categories described in further detail below). To address concerns associated with reporter bias and the potential to over and/or under report, the interviewer also conducted a 1 week snack recall. Snack recalls were used to generate a sample snack menu. The participants were first asked to recall what was served for snack each day over the previous week. Then, using a multiple pass method,[29]

researchers asked clarifying questions to obtain detailed snack information, such as brands, snack components, and serving sizes. When available, participants were asked to submit an electronic copy of their snack menu.

Nutrition Assistance Program Experience: The final portion of the interview was used for a qualitative assessment of ASP leaders' knowledge, perception, and experiences surrounding nutrition assistance programs. Detailed methodology and findings from this study are reported elsewhere.[31]

Classification of Food and Beverage Items

Using existing afterschool snack policies and categorization methods as a guide,[17,18,32,33] the following categories were used for the classification of food and beverage items: fresh fruit; fresh vegetables; whole grain snacks; salty snacks, such as chips and crackers; sugar-based snacks, such as cookies and fruit gummies; sugar-sweetened beverages, such as flavored milk and powdered drink mixes; 100% fruit juice; plain milk (non-fat, 1%, 2%, and whole); and water. To account for the verbiage of some snack policies subsuming fruits and vegetables into one guideline, a fresh fruit and/or vegetable category was created. For the purposes of this study, whole grain snacks were classified in two ways. First, participants self-reported snacks as whole grain for the food frequency questionnaire. Secondly, product ingredient labels of each food item listed in the sample snack menus was reviewed. Food items with "whole grain" listed as the primary ingredient by weight were classified as a whole grain snack. The categories for grain-based foods were not mutually exclusive (i.e. 1 snack food item could be classified as both salty and whole-grain).

Statistical Analysis

Descriptive analyses were conducted at the ASP level. Agreement between the self-reported average weekly servings of the food and beverage categories and those derived from menu analyses was assessed. First, sample snack menus [i.e. obtained from either the snack recall (n=11) or an electronic copy (n=49)] were reviewed and each food and beverage item was placed into the predetermined categories. The average number of days each category of foods and beverages was served was calculated and standardized to represent a 5-day school week (i.e., some ASPs operated less than 5 days/week). Wilcoxon signed rank tests were used to compare each ASPs self-reported weekly average servings to those calculated from the sample menu data. Additionally, each food and beverage item reported in the sample menu was examined and assigned a CACFP creditability code (0, 1) (i.e., 1 = foods and beverages in adherence with CACFP guidelines). The average number of food and beverage items offered per snack and the percentage of snack components adhering to CACFP guidelines ([number of CACFP credible snack items/ total snack items offered] x 100) was calculated for each CACFP eligibility/enrollment status group.

An assessment of the distributions of all outcome variables (i.e., average weekly servings of each food and beverage category) revealed non-normality, warranting the need for a non-parametric procedure. The Kruskal-Wallis test, corrected for tied ranks, was used to evaluate differences in the outcome variables across the different CACFP eligibility/enrollment status groups and across the different snack guideline groups. For variables with a significant Kruskal-Wallis test, the Bonferroni adjusted Dunn's test for multiple comparisons was used to determine which of the groups were significantly

different from each other. All analyses were performed using STATA (v.14.0, 2015, StataCorp LP, College Station, TX). Effect sizes were calculated using eta-squared (η^2). Analysis groups (i.e., CACFP eligibility/enrollment groups and/or snack guideline groups) with no reported servings in a given food or beverage category (e.g., ASPs not eligible for CACFP never served sugar sweetened beverages) were excluded from the associated analysis. The appropriate analysis was conducted on the remaining groups (i.e., Kolmogorov-Smirnov test for 2 groups and the Kruskal-Wallis for 3+ groups). The Kolmogorov-Smirnov test was chosen for the 2 group comparison (i.e., comparison of the servings of sugar sweetened beverages between CACFP-enrolled ASPs and CACFP-eligible/not enrolled ASPs) because of the non-normality and heterogeneity of variances of the two groups.

Results

Sample Characteristics

A total of 40 interviews were conducted with ASP administrators, representing 71 ASPs (i.e., range of ASPs overseen by a single interviewee = 1- 12). Data from 2 interviews were excluded because the ASPs served meals in lieu of snacks and 3 additional interviews were excluded because participants were not able to provide either a 1 week snack recall during the interview or an electronic copy of the sample snack menu; resulting in a total of 35 interviews and a final analytic sample of 60 ASPs. Sample characteristics are presented in Table 2.1. Thirty one (51.6%) ASPs were enrolled at the time of the study, 16 (26.7%) were eligible/non-enrolled, and 13 (21.7%) were non-eligible. ASP administrators reported following three main snack guidelines; the CACFP Meal Patterns, the National Afterschool Association's Healthy Eating Standards, and the

South Carolina Department of Social Services ABC Standards.[18,33,34] Summaries of the snack guidelines are presented in Table 2.2. While some programs reported following one organization's snack guidelines exclusively, others indicated following multiple guidelines; resulting in a total of 6 groups. Out of the 60 ASPs, 24 (40.0%), 14 (23.3%), and 5 (8.3%) exclusively followed CACFP, ABC, and Healthy Eating guidelines, respectively. Of the remaining programs, 7 (11.7%) followed Healthy Eating and CACFP, 1 (1.7%) followed Healthy Eating and ABC, and 9 (15.0%) did not follow any guidelines (see Table 2.1).

Self-reported Versus Menu Derived Averages

Results of the Wilcoxon signed-ranks test indicated significant differences between self-reported and menu derived average weekly servings of fresh fruits, fresh fruits and/or vegetables, whole grain, sugary snacks, and milk. Participants self-reported serving higher weekly servings of fresh fruits, $Z = 2.6$, $p<.05$; fresh fruits and/or vegetables, $Z = 2.4$, $p<.05$; whole grain snacks, $Z = 2.4$, $p<.05$; and plain milk, $Z = 2.1$, $p<.05$ compared to menu derived estimates. Participants self-reported fewer average weekly servings of sugary snacks, $Z = 2.8$, $p<.05$ than derived from the ASP menu. These findings support those of a recent review of child dietary assessment methods, which found higher validity among food records and recall when compared to self-reported food frequency.[30] For this reason, only menu data were used for all subsequent analyses.

Food and Beverages across CACFP Eligibility/Enrollment Groups

The average number of snack foods and beverages offered are provided in Table 2.1. On average, children attending enrolled ASPs were offered a single beverage item

and 1.5 different food items per snack per day. Eligible/non-enrolled ASPs served an average of 1.9 different food items and 1.2 beverage item options per snack per day. A typical snack served in non-eligible ASPs consisted of 2.4 different food item options and 1.5 different beverage options. The majority of snacks served, irrespective of CACFP eligibility/enrollment grouping, met the CACFP reimbursement guidelines (range = 86% to 90%) (see Table 2.1). Table 2.3 shows the comparison of the servings of the food and beverage categories across CACFP eligibility/enrollment status groups. The most commonly served snacks in enrolled ASPs were sugar-based (e.g., graham crackers and pastries; mean serving = 2.5 days/week) and salty foods (e.g., chips and cheese flavored crackers; mean serving = 2.0 days/week) and 100% fruit juice (mean serving = 2.0 days/week). Those ASPs who were eligible/non-enrolled frequently served salty snacks (e.g., plain and cheese flavored crackers; mean serving = 2.6 days/week), fruits and/or vegetables (mean serving = 2.3 days/week), and water (mean serving = 2.4 days/week). The most commonly served snacks in ASPs who were non-eligible were fruits and/or vegetables (mean serving = 3.2 days/week), salty (e.g., popcorn and cheese flavored crackers; mean serving = 2.8 days/week), whole grain snacks (e.g.., cereal and crackers; mean serving = 2.7 days/week), 100% fruit juice (mean serving = 2.3 days/week) and plain milk (mean serving = 2.1 days/week).

Results of the Kruskal-Wallis test were statistically significant for 3 variables: the average weekly servings of fresh vegetables, fresh fruit and/or vegetables, and sugary snacks. Effect sizes for the global test are provided in Table 2.3. Pairwise comparisons showed that the weekly servings of fresh vegetables were significantly higher among non-eligible ASPs than enrolled ASPs (median serving = 1.0 day/week vs. 0 days/week,

$p < 0.001$). ASPs who were eligible/non-enrolled also served significantly higher amounts of fresh vegetables than that of enrolled ASPs (median serving = 1.0 day/week vs. 0 days/week, $p < 0.001$). Non-eligible programs served significantly more servings of items from the combined fruit and/or vegetable category than enrolled ASPs (median serving = 3.0 days/week vs. 1.0 day/week, $p < 0.05$). Lastly, significant differences were found between CACFP eligibility/enrollments status groups in the servings of sugary snacks. Enrolled ASPs served significantly higher amounts of sugary snacks than those ASPs who were eligible/non-enrolled (median serving = 2.0 days/week vs. 0.5 days/week, $p < 0.001$). Results of the Kolmogorov-Smirnov test showed no significant differences in the servings of sugar sweetened beverages between the enrolled ASPs and those who were eligible/non-enrolled ($D = 0.2$, $p=0.85$).

Food and Beverages across Snack Guideline Groups

There were a total of 5 snack guideline groups included in the analysis: South Carolina Department of Social Services ABC Standards; CACFP Meal Patterns; National Afterschool Association's Healthy Eating Standards; a combination of National Afterschool Association's Healthy Eating Standards and CACFP Meal Patterns; and no guidelines. The combined group, Healthy Eating and ABC Standards, was not included in the final analyses due to its low sample size (n=1). Results of the Kruskal-Wallis test indicated significant differences in the servings of multiple food and beverage categories according to the snack guidelines followed (see Table 2.4). Global effect sizes are provided in the table. Pairwise comparisons showed that ASPs who followed ABC guidelines served significantly more fresh vegetables than did programs following CACFP guidelines exclusively (median serving = 1.0 day/week vs. 0 days/week, $p <$

0.001). ASPs following ABC guidelines also served significantly higher amounts of fresh vegetables than did ASPs following Healthy Eating & CACFP guidelines (median serving = 1.0 day/week vs. 0 days/week, $p < 0.05$). Similarly, ASPs following Healthy Eating guidelines exclusively served significantly higher amounts of fresh vegetables than did ASPs following CACFP guidelines exclusively (median serving = 2.0 days/week vs. 0 days/week, $p < 0.001$) or those following Healthy Eating & CACFP (median serving = 2.0 days/week vs. 0 days/week, $p < 0.05$). For the combined category of fresh fruits and/or vegetables, significant differences were found between ASPs following CACFP and those following Healthy Eating guidelines, with the latter serving higher amounts (median serving = 0 days/week vs. 4.0 days/week, $p < 0.05$). The servings of salty snacks differed significantly between 2 groups, with ASPs not following any guidelines serving higher amounts than those ASPs following Healthy Eating guidelines exclusively (median serving = 3.8 days/week vs. 1.0 day/week, $p < 0.05$). ASPs following CACFP guidelines exclusively, served significantly higher amounts of sugary snacks than ASPs following ABC (median serving = 2.0 days/week vs. 1.0 day/week, $p < 0.001$) or those following Healthy Eating guidelines exclusively (median serving = 2.0 days/week vs. 1.0 day/week, $p < 0.05$). Significant differences were found in the servings of 100% fruit juice. ASPs not following any snack guidelines served higher amounts than those ASPs following ABC guidelines (median serving = 5.0 days/week vs. 1.0 day/week, $p < 0.05$). No other statistically significant differences were found in the servings of food and beverage categories across the snack guideline groups.

Discussion

ASPs are being tasked with the responsibility of promoting healthy lifestyles through serving foods and beverages that adhere to national nutrition guidelines.[35] Many ASPs serving low-income communities rely on the financial assistance provided through programs like the CACFP to meet these demands.[8,9] To our knowledge, this is the first study to assess how the foods and beverages served as snacks in ASPs under CACFP guidance compare to snacks served in ASPs eligible for CACFP but not currently enrolled and to ASPs not eligible.

Our findings, consistent with previous studies on the quality of foods and beverages served in full-day CACFP centers, revealed that enrollment and adherence to CACFP guidelines does not result in healthier meals and snacks.[36-38] Overall, enrolled ASPs served low-nutrient-dense sugar-based snacks more frequently than their peer ASPs who were eligible/non-enrolled (i.e., 1.5 more days/week). Additionally, enrolled ASPs served fewer fresh fruits and vegetables than either non-eligible or eligible/non-enrolled ASPs (i.e., 1-2 days fewer/week). When comparing snack content across specific snack guideline groups, those programs exclusively adhering to CACFP guidelines served more sugar-based snacks and less fresh fruits and vegetables than programs adhering to other guidelines. This highlights concerns over the leniency of CACFP guidelines, especially given that over 85 percent of the snacks served across all ASPs were deemed creditable and nutritious under current CACFP guidelines.

These findings are timely, as new CACFP meal and snack guidelines have recently been released. The new guidelines, informed by science-based recommendations, intend to improve the quality of CACFP approved foods and

beverages.[39] Regulations on the sugar content of reimbursable foods are among the most promising changes in the new guidelines. Programs participating in CACFP may no longer receive reimbursement for grain-based desserts, such as cookies, granola bars, and pastries.[39,40] This, coupled with new limits on sugar content of yogurt and cereal, has the potential to reduce the amount of low-nutrient-dense sugar-based foods currently being served among CACFP ASPs. Conversely, the new guidelines do not fully address issues uncovered in the present analyses; namely, the high prevalence of salty snacks and the lack of fresh fruits and vegetables observed in CACFP-enrolled ASPs. Under the new guidelines, all grains served for afterschool snack must be whole grain-rich; defined as foods containing a minimum of half whole grains and half enriched grains.[39] Though this definition is widely used to classify whole grain foods as healthful, it does not take into account nutrient content that should be limited, such as sodium. [41] Previous studies indicate that CACFP meals and snacks consistently exceed recommendations for sodium content set forth by the USDA's Dietary Guidelines for Americans and the Institute of Medicine.[37,38] While the new guidelines represent a positive shift toward whole-grain snacks, in the absence of limits on sodium content, it is plausible that CACFP approved snacks may continue to exceed sodium recommendations. Further, the new guidelines for fruits and vegetables are still fairly permissive, with 100% juice remaining as a creditable substitution for a fruit or vegetable component. Optional best practices recommend that at least 1 of the 2 snack components consist of a fruit or vegetable; however there are no mandates requiring ASPs to serve a fresh fruit or vegetable for snack. It is uncertain if the new guidelines will have any significant impact on the amount of fresh fruits or vegetables served in CACFP ASPs.

There are numerous strengths to this study. First, this study adds to the body of literature surrounding nutrition assistance programs and to our knowledge, is the first to provide empirical evidence regarding the type of snacks served in ASPs who follow CACFP guidelines. Moreover, previous studies compared CACFP meals and snacks to nutrient-based guidelines outlined in the Dietary Guidelines for Americans, in which the macronutrient and micronutrient content is compared to Dietary Reference Intake values specific to meal occasions (i.e. breakfast, lunch, dinner). Currently, no snack specific Dietary Reference Intake values exist, making it difficult to accurately compare the nutrient content of snacks to existing nutrient-based guidelines. This study evaluated the content of afterschool snacks in a manner consistent with CACFP guidelines; using broad component based categories. Additionally, this study contained a representative sample of ASPs who reflect the diverse organizational structures and settings within the afterschool community.

Several limitations of the current study need to be considered. First, the use of self-report measures of snack content introduces the possibility of response bias (i.e., inaccuracies in snack recall resulting in over/under-reporting of foods and beverages served). We attempted to minimize this bias and enhance the validity of findings through method triangulation, where multiple data sources were used to collect snack information (i.e., food frequency questionnaire, snack recall, and electronic copies of snack menu). While this method is consistent with existing research evaluating the foods and beverages served within nutrition assistance programs, [36,37,42-44] future studies should consider the use of objective measures of snack content to validate self-reported menu data. Further, the current study did not measure consumption; therefore the actual intake of foods and

beverages is unknown. However, we do not feel that this impacts the inferences made in this study since consumption has no bearing on snack reimbursement eligibility. An additional limitation was the inability to compare the cost of snacks between the three CACFP eligibility and enrollment status groups. Participants were asked to provide information on snack expenditures and reimbursement rates; however, inconsistencies in reporting (e.g., inability to derive snack cost when snacks were provided by a sponsor organization or purchased in conjunction with meals) resulted in a loss of viable cost data necessary to make comparisons. With cost often cited as a primary barrier to serving snacks that meet nutrition guidelines, [19,21,45] it is important to assess the relationship between the cost and healthfulness of CACFP approved foods and beverages. Studies exploring the impact of community partnerships on snack cost demonstrated that ASPs could serve a fresh fruit or vegetable daily while maintaining expenditures well below the $0.84 allotted for CACFP approved snacks ($0.25 to $0.38 per snack).[22,46,47] These findings suggest that it is possible for CACFP-enrolled ASPs to incorporate more fresh fruits and vegetables in snack while remaining on budget. Studies are needed to identify effective strategies to assist CACFP-enrolled ASPs in facilitating sustainable changes. Lastly, unbalanced sample sizes among the analysis groups can affect the homogeneity of variances and impact type I error rates, thus, weakening statistical inferences. To address this concern, we ran Monte Carlo simulations using our data (i.e., test runs an ordinary ANOVA and 5 000 simulated F test with given pattern of sample sizes and standard deviations and provides a simulated p-value).[48] Simulated p-values were consistent with those from our analyses, suggesting that the heterogeneity of variances did not impact the significance of our findings. Additionally, the combined Healthy Eating and ABC snack

guideline group was not included in the analysis due to its single occurrence. While comparison of snacks across guideline groups was not our primary outcome of interest, significant results warrant further exploration. Future studies are needed to gain a greater understanding of how the various snack guidelines available impact the foods and beverages served in ASPs.

In conclusion, this study revealed that CACFP-enrolled ASPs are not serving higher quality snacks than their fellow ASPs. Snacks largely consist of sugar-based and salty foods and 100% juice, with few fresh fruits and vegetables served. These findings have relevance for ASPs across the nation seeking assistance in serving healthier snacks. ASPs should consider adopting multiple snack guidelines and best practices to enhance the nutrient content of snacks served in their program.

Table 2.1 Characteristics of Afterschool Programs by Child and Adult Care Food Program Eligibility and Enrollment Status

	CACFP Status						
	Enrolled		Eligible/ Non- Enrolled		Non-Eligible		Total
Afterschool Program Characteristics							
Afterschool Programs [n, (%)]	31	(51.6)	16	(26.7)	13	(21.7)	60
Average Enrollment [mean no. of kids, (SD)]	63.6	(32.3)	50.9	(30.6)	100.1	(38.2)	-
Tax Status [no. of ASPs, (%)]							
Non Profit	16	(51.6)	5	(31.2)	3	(23.1)	24
Government	13	(41.9)	7	(43.8)	9	(69.2)	29
Faith Based	1	(3.2)	4	(25.0)	0	-	5
For Profit	1	(3.2)	0	-	1	(7.7)	2
ASP Location [no. of ASPs, (%)]							
Community Center	10	(32.3)	3	(18.7)	1	(7.7)	14
School	15	(48.4)	8	(50.0)	11	(84.6)	34
Church	4	(12.9)	4	(25.0)	0	-	8
Private Building	2	(6.4)	1	(6.3)	1	(7.7)	4
Grades Served [no. of ASPs, (%)]							
Elementary Only	16	(51.6)	11	(68.8)	12	(92.3)	39
Middle Only	2	(6.5)	0	-	0	-	2
High Only	1	(3.2)	0	-	0	-	1
Elementary, Middle	11	(35.5)	1	(6.2)	1	(7.7)	13
Elementary, Middle, High	1	(3.2)	3	(18.8)	0	-	4
Middle, High	0	-	1	(6.2)	0	-	1
Snack/Meal Occasions [no. of ASPs, (%)]							
Snacks Only	22	(71.0)	16	(100.0)	13	(100.0)	51
Snacks & Meals	9	(29.0)	0	-	0	-	9
Components Served Per Snack [mean no. of items, (SD)]							
Food Items Offered	1.5	(0.6)	1.9	(0.9)	2.4	(1.6)	-
Beverage Items Offered	1.0	(0.5)	1.2	(0.8)	1.5	(0.8)	-
CACFP Creditable Snack Components (%, SD)	90.3	(15.4)	86.5	(18.5)	85.9	(19.1)	-
Snack Guidelines Followed [no. of ASPs, (%)]							
ABC Only	0	-	8	(50.0)	6	(46.1)	14
CACFP Only	24	(77.4)	0	-	0	-	24
HE Only	0	-	3	(18.8)	2	(15.4)	5
HE & ABC	0	-	0	-	1	(7.7)	1
HE & CACFP	7	(22.6)	0	-	0	-	7
None	0	-	5	(31.2)	4	(30.8)	9

Table 2.2 National and State Organization Afterschool Snack Guidelines Reported

Organization	Snack Guidelines
U.S. Department of Agriculture, Child and Adult Care Food Program	**Snack Meal Pattern** Snacks must contain 2 of the following components: Milk Fruit, vegetable or 100% juice Grains/bread (whole grain or enriched) Meat or meat alternative
National Afterschool Association	**Healthy Eating Standards** On a daily basis, the afterschool program: Serves a fruit or vegetable Offers water at the table during snack Serves no beverages with added sweeteners Serves no candy or foods that are primarily sugar based
S.C. Department of Social Services, ABC Child Care Program	**Grow Healthy Nutrition Standards** For programs serving snack only: Fruit (not juice) is served at least 2 times per week A vegetable other than white potatoes is served at least 2 times per week Whole grain foods are served at least 2 times per week Sugar sweetened beverages shall not be served Sweet food items are served no more than 2 times per week

Table 2.3 Comparison of Average Weekly Servings of Food and Beverage Items by Child and Adult Care Food Program Eligibility and Enrollment Status

CACFP Status	**Enrolled** (n = 31)			**Eligible/Non-Enrolled** (n=16)			**Non-Eligible** (n=13)			**Effect Size**
	$\bar{x}$	Med	σ	$\bar{x}$	Med	σ	$\bar{x}$	Med	σ	η^2
Food Items										
Fresh Fruit	1.3	0	1.6	1.2	1.1	1.2	2.2	2.0	1.5	0.082
Fresh Vegetable	0.1	0 **a,b	0.3	1.1	1.0 **b	0.9	1.2	1.0 **a	0.8	0.468
Fruit and/or Vegetable	1.4	1.0 *a	1.6	2.3	2.8	1.9	3.2	3.0 *a	1.2	0.168
Whole Grain Snacks	1.7	1.0	1.2	1.8	1.5	1.6	2.7	3.0	1.3	0.093
Salty Snacks	2.0	2.0	1.2	2.6	2.8	1.6	2.8	3.0	1.1	0.067
Sugary Snacks	2.5	2.0 **a	1.5	0.8	0.5 **a	0.9	1.5	1.0	1.3	0.268
Beverage Items										
Sugar Sweetened	0.4	0	0.5	0.9	0	1.9	0	0	0	--
100% Fruit Juice	2.0	3.0	1.7	1.3	1.0	1.6	2.3	2.0	2.3	0.031
Plain Milk	1.5	2.0	1.3	1.2	0.5	1.7	2.1	2.0	1.8	0.065
Water	1.2	0	1.9	2.4	3.0	2.1	1.6	0	2.1	0.064

* Significant differences (p<.05) between median values of food/beverage items between CACFP groups, determined by Kruskal-Wallis Rank Test and Dunn's test with Bonferroni adjustments for multiple comparisons.

** Significant differences (p<.01) between median values of food/beverage items between CACFP groups, determined by Kruskal-Wallis Rank Test and Dunn's test with Bonferroni adjustments for multiple comparisons.

a and b indicate differences between groups.

Note: Within each row, medians with the same superscript letter and significance value indicate significant differences between the two groups

Table 2.4 Comparison of Average Weekly Servings of Food and Beverage Items by Snack Guidelines Followed

Guidelines	ABC (n=14)			CACFP (n=24)			HE (n=5)			HE & CACFP (n=7)			None (n=9)			Effect Size
	$\bar{x}$	Med	σ	$\bar{x}$	Med	σ	$\bar{x}$	Med	σ	$\bar{x}$	Med	σ	$\bar{x}$	Med	σ	η^2
Food Items																
Fresh Fruit	1.1	1.0	0.9	1.1	0	1.6	2.4	2.0	1.1	2.0	2.0	1.4	2.0	1.3	2.0	0.128
Fresh Vegetables	1.3	1.0 ^{**a,*a}	0.9	0	0 ^{**a,b}	0.2	1.6	2.0 ^{**b,*b}	0.6	0.1	0 ^{*a,b}	0.4	0.7	1.0	0.7	0.560
Fruit and/or Vegetable	2.4	3.0	1.5	1.1	0 ^{*a}	1.6	4.0	4.0 ^{*a}	0.7	2.1	2.0	1.3	2.5	2.5	2.1	0.230
Whole Grain Snacks	2.3	2.5	1.5	1.7	1.0	1.2	2.2	2.0	0.8	1.6	1.0	1.5	2.1	3.0	2.1	0.043
Salty Snacks	2.6	2.5	1.2	2.0	2.8	1.3	1.6	1.0 ^{*a}	0.9	2.0	2.0	0.8	3.3	3.8 ^{*a}	1.5	0.176
Sugary Snacks	0.8	1.0 ^{**a}	0.8	2.8	2.0 ^{**a,*a}	1.4	0.8	1.0 ^{*a}	0.8	1.6	1.0	1.1	1.9	2.5	1.6	0.366
Beverage Items																
Sugar Sweetened	0	0	0	0.5	0	0.5	0.2	0	0.5	0	0	0	1.5	0	2.3	0.027
100% Fruit Juice	1.2	1.0 ^{*a}	1.2	2.2	3.0	1.7	0	0	0	1.3	0	1.7	3.3	5.0 ^{*a}	2.3	0.155
Plain Milk	1.4	1.0	1.3	1.8	2.0	1.2	1.4	1.0	2.1	0.9	0	1.2	2.2	2.0	2.3	0.074
Water	2.6	3.0	1.8	1.2	0	1.9	0.8	0	1.8	1.3	0	2.2	2.2	0	2.6	0.118

* Significant differences ($p<.05$) between median values of food/beverage items between snack guideline groups, determined by Kruskal-Wallis Rank Test and Dunn's test with Bonferroni adjustments for multiple comparisons.

** Significant differences ($p<.001$) between median values of food/beverage items between snack guideline groups, determined by Kruskal-Wallis Rank Test and Dunn's test with Bonferroni adjustments for multiple comparisons.

a and b indicate differences between groups.

Note: Within each row, medians with the same superscript letter and significance value indicate significant differences between the two groups.

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CHAPTER III

NUTRITIONAL QUALITY OF SNACK OFFERINGS IN AFTERSCHOOL PROGRAMS: A COMPARISON BETWEEN CHILD AND ADULT CARE FOOD PROGRAM (CACFP) ELIGIBILITY AND ENROLLMENT GROUPS[2]

[2] Tilley F, Beets MW, Turner-McGrievy G, Moore JB, Weaver RG, Schisler L. To be submitted to Journal of Nutrition Education and Behavior

Abstract

Background: Approximately half of the 10.2 million children enrolled in afterschool programs (ASPs) are eligible for nutrition assistance through programs like the Child and Adult Care Food Program (CACFP). Information regarding the nutritional quality of snacks served in CACFP-ASPs relative to ASPs not enrolled in CACFP and the extent to which snacks meet existing nutrition standards is limited.

Objective: The aim of this study was to assess the nutrient content of snacks by ASPs' CACFP participation.

Design: A cross-sectional design with stratified, purposeful sampling of ASPs based on CACFP-eligibility/enrollment was employed.

Participants/Setting: Thirty-five administrators from 60 ASPs in South Carolina; 31 CACFP-enrolled, 16 CACFP-eligible/non-enrolled, and 13 CACFP-non-eligible ASPs.

Main Outcome Measures: Participants provided a sample snack menu; electronically or through a one week snack recall obtained during phone interviews.

Statistical Analysis Performed: Energy and macro/micronutrient content of snacks, determined using the US Department of Agriculture's (USDA) Nutrient Database, was compared: (1) across CACFP-eligibility/enrollment groups using nonparametric Kruskal-Wallis tests and (2) to existing USDA and Institute of Medicine nutrition standards.

Results: Nutrient outcomes are presented as medians. CACFP-enrolled ASP snacks contained more energy (113kcal vs. 89kcal, $p<0.05$), carbohydrates (19g vs. 15g, $p<0.05$), total sugar (11g vs. 9g, $p<0.05$), and added sugar (5g vs. 3g, $p<0.05$) than CACFP-eligible/non-enrolled ASP snacks. CACFP-non-eligible ASP snacks contained

more carbohydrates (18g vs. 15g, $p<0.05$) and total sugar (12g vs. 9g, $p<0.01$) than CACFP-eligible/non-enrolled ASP snacks, and more potassium than CACFP-enrolled ASP snacks (212mg vs. 150mg, $p<0.05$). None of the CACFP-eligibility/enrollment groups fully complied with nutrition standards.

Conclusions: Snacks served in CACFP-enrolled ASPs were of lower nutritional quality than those served in CACFP-non-enrolled ASPs. Across CACFP-eligibility/enrollment groups, snacks failed to meet many nutrient guidelines indicative of a healthy diet. Additional work is needed to unify afterschool nutrition standards to ensure that children are provided with nutritious snacks.

Introduction

Nearly 1 in 3 children are overweight or obese, with children living in low-income communities at greater risk for obesity.[1,2] The relationship between the food environment, dietary habits, and obesity is well documented.[2-7] Empty calories (ie, foods high in solid fats and added sugars) account for nearly 40% of children's total daily energy intake and, as a result, many children are not consuming sufficient amounts of vital nutrients.[8-10] Evidence suggest that snacking may be a significant contributor to these unhealthy dietary habits.[11-14] Snacks, consumed by over 97% of children, can contribute up to a quarter of their total daily energy intake.[10-12] Many snacks are consumed away from home after school.[14] Thus, snacks provided by afterschool programs (ASPs, typically operating 3-6pm) represent an important source of children's daily energy and nutrient intake.

ASPs have been called upon to provide foods and beverages that support the health of the children who attend.[15-17] To assist ASPs in identifying healthful snacks, national and state-level organizations have developed nutrition policies; providing guidance for the types of foods and beverages to serve, as well as nutrient specific targets.[15,16,18-21] To meet these demands, many ASPs serving low-income communities rely on financial supplements provided by nutrition assistance programs like the Child and Adult Care Food Program (CACFP). With over three million children served in 2014, CACFP is a key federal nutrition assistance program for children outside of school.[22] CACFP-enrolled ASPs have an unparalleled opportunity to positively influence the dietary habits of a vulnerable population at great risk for obesity.

While there is growing interest in the role CACFP plays in the afterschool nutrition landscape, little is known about the nutritional quality of snacks served under their guidance. Existing studies on the nutritional quality of CACFP foods/beverages have had conflicting results and largely focused on meals and snacks served in full-day child care centers.[23-25] Further, no information exists on the extent to which CACFP afterschool snacks meet the Dietary Guidelines for Americans (DGA), on which they are based. This study aimed to address these gaps and expand on the body of literature surrounding nutrition assistance programs. The purpose of this study was twofold: to compare the energy and macro/micronutrient content of snacks between ASPs who were enrolled in CACFP, those who were eligible but not enrolled, and those who were not eligible for CACFP participation; and to evaluate their compliance with existing nutrition standards set forth by the US Department of Agriculture (USDA) and the Institute of Medicine (IOM).

Methods

Participants and Setting

Recruitment took place from fall 2014 to summer 2015. ASP providers across South Carolina were identified through registries provided by the South Carolina's Afterschool Alliance and the Department of Social Services Child Care Department and through meetings held by the South Carolina Department of Social Services CACFP. To be eligible for participation, ASP providers had to have knowledge of snack procurement procedures and be able to provide a sample snack menu. Participants provided verbal consent to partake in recorded phone interviews. All procedures were approved by the University of South Carolina's Institutional Review Board.

Sampling Strategy

A stratified purposeful sampling method was used to facilitate comparisons between ASPs enrolled in CACFP, "enrolled;" those who were CACFP-eligible but not enrolled, "eligible/non-enrolled;" and those who were not eligible for CACFP, "non-eligible". Consistent with the methods outlined in the CACFP At-Risk Afterschool Handbook,[26] the South Carolina Department of Education's free and reduced meal eligibility data were reviewed to confirm if ASPs not currently enrolled in CACFP were considered 'area eligible'.[27] Sample size was determined a priori, using G*Power (v.3.0.10). Taking into account the allotted study timeframe, a total sample size of 60 ASPs was chosen; allowing for the detection of large effects (power = 0.80, f=.5).

Interview Procedures

Phone interviews, lasting approximately 20 minutes, were conducted by a trained researcher. Participants were asked to provide information for each ASP they

administered, including program demographics, a sample snack menu, nutrition policies/procedures, and any experiences with nutrition assistance programs. Methodology and results discussed herein are specific to information obtained through sample snack menus. The remaining study components are reported elsewhere.[28,29]

To obtain a sample snack menu, ASP leaders were asked to complete a one-week snack recall. Using a multiple-pass interview technique,[30] participants were asked to list what was served for snack each day over the previous week. The interviewer followed up with specific questions about snack components, brands, and serving sizes. Due to time constraints, some participants opted out of the snack recall portion of the interview. In these instances, participants were required to submit an electronic copy of a weekly snack menu; including brand and serving size details.

Snack Nutrition Standards

At the time of this study, CACFP guidelines provided only broad component-based (ie, specific to food/beverage groups) standards and, thus, there were no nutrient-specific standards or established protocol for assessing the nutrient content of snacks served under their guidance. To provide perspective on the nutritional quality of afterschool snacks, a comprehensive review of existing nutrient analysis protocols, relevant literature, and the DGA was conducted and a set of reference nutrient standards were established.[10,19-21,31-36] Three reference standards were chosen: the USDA Smart Snacks in School, the IOM's CACFP afterschool snack recommendations, and the 2015 DGA daily nutrition goals.[20,21,31] The USDA Smart Snack standards, while written for foods/beverages sold in schools, are applicable to snacks served across afterschool settings. The USDA recently released new CACFP snack standards that were guided by

the IOM's CACFP snack recommendations.[37] However, the new CACFP snack standards continue to be largely component-based; leaving out most of the IOM's nutrient specific recommendations. Therefore, the IOM's original snack recommendations were chosen as a reference standard as they are better suited for assessing the nutrient content of snacks. Lastly, the 2015 DGA daily nutrition goals for children 4-13 years of age were included as a reference standard. Under the Healthy, Hunger-Free Kids Act of 2010, snacks and meals served under CACFP guidance should align with the DGA.[15,37] The DGA do not provide snack-specific standards; rendering it impossible to directly compare the nutrient content of snack to the guidelines. Nonetheless, it is important to measure the extent to which snacks contribute to daily intake recommendations. Consistent with previous studies, snack nutrient outcomes are translated as their percent contribution to daily intake standards proposed within the DGA.[10,24,33,38] The nutrients and reference standards used for the assessment of snacks are presented in Table 3.1.

Menu Analysis

Prior to analyzing nutrient content, each menu item was classified according to existing snack categories (eg, salty snack, sugar-sweetened beverage) and the specific food/beverage item (eg, cheese crackers, lemonade).[19,39] Nutrient content for each food/beverage item was obtained through the USDA National Nutrient Database for Standard Reference, release 28 (September 2015).[40] Product labels were used to obtain nutrient information for food/beverage items not provided in the USDA Nutrient Database.

Calculations for the nutrient content of snacks were based off of the minimum serving size for each snack component stated within the CACFP meal pattern for children 6 to 12 years of age.[26,41] Serving sizes are provided as ounce and cup equivalents; with the exception of grain-based foods, which are determined using product weight. This method is used because the quantity necessary to equal one serving is dependent on the food's average grain content.[42] The CACFP Crediting Handbook separates grain-based foods into nine categories, grouped by average grain content.[41] Grain-based foods were assigned a serving size value that corresponded with their grouping. For example, a serving of a food item in grain Group A (eg, pretzels, saltine crackers) is equal to 20g and a serving of a Group B item (eg, tortilla chips, graham crackers) is 25g. For food/ beverage items that were not CACFP-creditable (ie, could not be placed into a creditable-component category), serving sizes were determined using the USDA Economic Research Service snack portion size dataset.[43]

For each ASP, snack nutrient content was averaged by day (ie, average nutrient content of all foods/beverages offered each day) and by week (ie, daily snack nutrient content average / number of days per week program operates). Weekly averages were used to represent the nutrient content of a standard snack served in the ASP. Kruskal-Wallis tests were conducted to investigate differences in the nutrient content of snacks between the three CACFP eligibility/enrollment groups. This method was used to account for the non-normal distribution of multiple nutrient variables. Significant Kruskal-Wallis tests were followed up with the Bonferroni adjusted Dunn's multiple comparison tests to determine which groups were different. Global effect sizes were calculated using eta-squared (η^2). Additionally, snack nutrient content for each CACFP

eligibility/enrollment group was compared to the reference standards (see Table 3.1). Analyses were conducted using STATA (v.14.0, 2015, StataCorp LP, College Station, TX).

Results

Sample Characteristics

Interviews were conducted with 40 ASP leaders. Five interviews were excluded from the study; two whose programs did not serve snack and an additional three who were unable to provide a sample snack menu (ie, electronically or through snack recall); resulting in a final analytic sample of 35 interviews, representing 60 ASPs. Program characteristics are provided in Table 3.2. Of the 60 ASPs, 31 were CACFP-enrolled, 16 were eligible/non-enrolled, and 13 were non-eligible. Enrolled ASPs were primarily non-profit school-based programs, while both eligible/non-enrolled and non-eligible ASPs were primarily government-run school-based programs. The majority of ASPs exclusively served elementary-aged children. With the exception of a small portion of enrolled ASPs that served an afterschool meal, the majority of ASPs across the eligibility/enrollment groups served only snack during the program.

Snack Nutrient Content across CACFP Eligibility/Enrollment Groups

Results of the Kruskal-Wallis tests are reported in Table 3.3. Significant differences were found in the nutrient content between CACFP eligibility/enrollment groups for energy, total carbohydrates, fiber, total sugar, added sugar and potassium. When compared to eligible/non-enrolled ASPs, snacks served in enrolled ASPs contained significantly more energy, total carbohydrates, total sugar, and added sugar. Similarly, snacks served in non-eligible ASPs contained significantly more total carbohydrates and

total sugar than those snacks served in eligible/non-enrolled ASPs. Compared to snacks served in enrolled ASPs, those in non-eligible ASPs contained more fiber and potassium.

Comparison of Snack Nutrient Content to Reference Standards

Macronutrient Contribution to 2015 Dietary Guidelines: The average nutrient content of snacks served across the three CACFP eligibility/enrollment groups is provided in Table 3.3. Snacks across the three CACFP eligibility/enrollment groups made comparable contributions to the 2015 DGA daily nutrition goals (data not shown). The average snack in enrolled ASPs provided 25% and 8% of calories from total fat and saturated fat, respectively. Eligible/non-enrolled and non-eligible ASP snacks provided 26% of calories from total fat and 9% of calories from saturated fat. All three groups were in compliance with the recommended levels of total fat (25-35% of kcal) and saturated fat (<10% of kcal) intake. Trans fats were not included in the analysis due to substantial amounts of missing data. Under FDA regulations, products containing less than 0.5g of trans fats and less than 0.5g of total fat are not required to report trans fats values.[44] Snacks in enrolled and non-eligible ASPs contributed 15% and those in eligible/non-enrolled ASPs contributed 14% of the daily carbohydrate recommendation (130g). Snack contributed 4% of the daily fiber recommendation (21g) in enrolled ASPs, 7% in eligible/non-enrolled, and 6% in non-eligible ASPs. The percentage of snack calories from added sugar was 18% in enrolled ASPs, 12% in eligible/non-enrolled ASPs, and 19% in non-eligible ASPs; all exceeding the recommendation for added sugar content (<10% kcal from added sugar). Protein content of snack for each of the three CACFP eligibility/enrollment accounted for 11% of the daily recommendation (26.5g).

Micronutrient Contribution to 2015 Dietary Guidelines: Regarding calcium content, enrolled ASP snack contributed 7%, eligible/non-enrolled ASP snack contributed 8%, and non-eligible ASP snack contributed 6% of the daily intake recommendation (1,150mg). The average snack in both enrolled and eligible/non-enrolled ASPs accounted for 4% of the daily potassium intake recommendation (4,150mg). Non-eligible ASP snack accounted for 5% of the daily potassium intake recommendation. Eligible/non-enrolled ASP snack contained the highest sodium content; contributing 8% to the daily recommendation (2,050mg). The sodium content of snacks in enrolled and eligible/non-enrolled ASPs was slightly lower; contributing 6% and 5% of the daily sodium recommendation, respectively. Snack in enrolled ASPs provided 4% and those in eligible/non-enrolled and non-eligible ASPs provided 3% of the daily Vitamin D recommendation (15µg).

Adherence to USDA Smart Snack and IOM CACFP snack recommendations: One or more of the CACFP eligibility/enrollment groups failed to meet snack standards for fiber, protein, calcium, potassium, and vitamin D content (see Table 3.3). Snacks across the CACFP eligibility/enrollment groups fell short of meeting fiber recommendations for both USDA Smart Snacks (2.1g) and the IOM CACFP snack recommendations (2.0g). Similarly, each groups snack provided less than half of the protein level proposed within the IOM CACFP snack recommendation (6.4g). Adherence to calcium recommendations varied across the CACFP eligibility/enrollment groups. None of the groups met the USDA Smart Snacks guidelines for calcium content (115mg). The eligible/non-enrolled group was the only one to meet the IOM CACFP snack recommendation for calcium (84mg); however the enrolled group was just shy of

meeting the benchmark. For all CACFP eligibility/enrollment groups, the potassium content was well below the USDA Smart Snacks (415mg) and the IOM CACFP snack (322mg) recommended levels. The three groups also fell short of meeting the USDA Smart Snacks vitamin D recommendation (1.5µg). While all CACFP eligibility/enrollment groups met sodium recommendations, it is important to note that the sodium content of snack in eligible/non-enrolled ASPs is on the cusp of exceeding the IOM CACFP snack recommendation (<159mg).

Discussion

This is the first study to provide a comprehensive evaluation of the nutrient content of snacks served in ASPs grouped by their eligibility and enrollment in CACFP. Our findings indicate that, on average, snacks served in CACFP-enrolled ASPs contain more calories, carbohydrates, and sugar, and less fiber and potassium than their peer ASPs. These findings, consistent with previous studies, raise concerns over the quality of nutrition assistance program approved foods and beverages.[25,45-48]

An important component of this study was the comparison of snack content to existing nutrient-based snack standards. Overall, the energy, fat, total sugar, and sodium content of snacks were in compliance with the USDA Smart Snack and IOM CACFP snack recommendations. However, snacks contained inadequate amounts of several nutrients, irrespective of CACFP eligibility/enrollment group. Snacks were deficient in fiber, calcium, potassium, and vitamin D; which are classified as nutrients of concern in the 2015 DGA due to the risk of adverse health outcomes associated with their continued under-consumption.[31] The high content of added sugar in snacks is also of concern, with all three groups exceeding the 2015 DGA's recommendation. Snacks across the three

CACFP eligibility/enrollment groups contained an average of 2 grams of added sugar over the recommended limit. While an excess of 2 grams may seem insignificant, it important to remember that snacks contribute only a quarter of a child's total daily energy intake,[11] and as studies have shown, children consume excess amounts sugar at other eating occasions as well.[10,49,50] A recent study found that ASPs working towards meeting the National Afterschool Association's Healthy Eating Standards saw improvements in many of these nutrition components.[51] While both are component-based, the National Afterschool Association's Healthy Eating Standards provide simplified guidelines that are more restrictive than those set forth by CACFP. Evidence suggests that these restrictions may have a positive impact on the nutritional quality of snacks.[51]

Numerous strengths are presented in this study. First, this study addresses the gap in literature on nutrition assistance programs in regards to the nutrient content of snacks served in CACFP-enrolled ASPs. Second, this study compares afterschool snack content to snack specific nutrient targets, in addition to, assessing their contribution to daily nutrient intake recommendations indicated in the 2015 DGA. Third, participants were selected through stratified purposeful sampling to ensure a sample representative of the diverse settings of ASPs.

The present study has several limitations. The first being the lack of objective measures of snack content. Self-reported measures were used to assess the foods/ beverages served as snack; potentially resulting in response bias (ie, misreporting and inaccurate recall). Further, snack consumption was not assessed; therefore, estimates of nutrient content represent what was served for snack and not what was consumed. Future

studies should explore implementing objective measures of snack content and consumption to facilitate comparisons between standards and actual nutrient intake. An additional limitation was the lack of comparison of snack nutrient content to the various snack guidelines utilized among ASPs (eg, comparison of snack nutrient content between ASPs following CACFP guidelines and those following the Healthy Eating Standards). While snack guideline information was collected, it was not a primary focus of the present study and therefore was not included in the stratification of ASPs; resulting in unbalanced sample sizes among the various snack guideline groups. A comparison of snack food/beverage categories across snack guideline groups suggest that ASPs following CACFP guidelines exclusively served more sugar-based foods and less fresh fruits and vegetables (results reported elsewhere).[29] These findings, while limited in generalizability, warrant further exploration into the nutrient content of snacks served across common afterschool snack guidelines.

Conclusions

In conclusion, this study found that snacks served to children attending CACFP-enrolled ASPs were energy-dense and of lower nutritional quality compared to those snacks served in peer ASPs. Additionally, snacks served across ASPs, regardless of CACFP eligibility or enrollment, failed to meet many nutrient guidelines indicative of a healthy diet. These findings have practical implications for ASPs across the nation. ASP leaders seeking the adoption of snack policies to improve the nutritional quality of snacks served in their program should evaluate the various snack guidelines to inform them of their differences and similarities and aid them in selecting the most appropriate guidelines for their program.

Implications for Further Research

The findings of this study support the need for ongoing evaluation of existing afterschool snack policies and practices. Additional work is needed to unify afterschool nutrition standards to ensure that children are provided with nutritious snacks that support healthy growth and development.

Table 3.1 Nutrition Standards for Assessing Afterschool Snack Quality

	Snack Intake Standards		Daily Intake Standards
	USDA Smart Snacks in School	**Institute of Medicine CACFP Snack Recommendations** [a]	**2015 Dietary Guidelines for Americans – Daily Nutrition Goals** [b]
Macronutrients			
Energy (kcal)	≤ 200	126	1,520
Total Fat (%kcal)	≤ 35	25-35	25-35
Saturated Fat (%kcal)	< 10	< 10	< 10
Trans Fat (g)	≤ 0.5	0	limit intake to as low as possible
Total Carbohydrates (g)	No guideline	No guideline	130
Fiber (g)	2.1[c]	2.0	21
Sugar	≤ 35% of weight from total sugars	No guideline [d]	<10 % kcal from added sugar
Protein (g)	No guideline	6.4	26.5
Micronutrients			
Calcium (mg)	115 [c]	84	1,150
Potassium (mg)	415 [c]	322	4,150
Sodium (mg)	≤200	<159	2,050
Vitamin D (µg)	1.5 [c]	No guideline	15

[a] Snack nutrient goals are averaged over a 5-day week for children 5-13 years of age.

[b] Guidelines are based off of age and sex specific Dietary Reference Intakes and Dietary Guidelines. Nutrient goals provided are average values for males and females 4-13 years of age.

[c] Guidelines specify that snack should contain 10% of the Daily Value (DV) of any one of the Dietary Guidelines nutrients of concern (fiber, calcium, potassium, vitamin D). Values provided in the table represent 10% of the DV based off of the 2015 Dietary Guidelines.

[d] Sugar recommendations are for specific food and beverage items. No overall snack recommendation is provided

Table 3.2 Descriptive Characteristics of Afterschool Programs stratified by Child and Adult Care Food Program Eligibility and Enrollment Status

	CACFP Status			
	Enrolled	**Eligible/Non-Enrolled**	**Non-Eligible**	**Total**
Afterschool Program Characteristics				
Afterschool Programs [n, (%)]	31 (51.6)	16 (26.7)	13 (21.7)	60
Average Enrollment (no. of kids, M, SD)	63.6 ± 32.3	50.9 ± 30.6	100.1 ± 38.2	
Tax Status [no. of ASPs, (%)]				
Non Profit	16 (51.6)	5 (31.2)	3 (23.1)	24
Government	13 (41.9)	7 (43.8)	9 (69.2)	29
Faith Based	1 (3.2)	4 (25.0)	0	5
For Profit	1 (3.2)	0	1 (7.7)	2
ASP Location [no. of ASPs, (%)]				
Community Center	10 (32.3)	3 (18.7)	1 (7.7)	14
School	15 (48.4)	8 (50.0)	11 (84.6)	34
Church	4 (12.9)	4 (25.0)	0	8
Private Building	2 (6.4)	1 (6.3)	1 (7.7)	4
Grades Served [no. of ASPs, (%)]				
Elementary Only	16 (51.6)	11 (68.8)	12 (92.3)	39
Middle Only	2 (6.5)	0	0	2
High Only	1 (3.2)	0	0	1
Elementary, Middle	11 (35.5)	1 (6.2)	1 (7.7)	13
Elementary, Middle, High	1 (3.2)	3 (18.8)	0	4
Middle, High	0	1 (6.2)	0	1
Snack/Meal Occasions [no. of ASPs, (%)]				
Snacks Only	22 (71.0)	16 (100.0)	13 (100.0)	51
Snacks & Meals	9 (29.0)	0	0	9

Table 3.3 Comparison of Snack Nutrient Content by Child and Adult Care Food Program Eligibility and Enrollment Status and Compliance to Reference Standards

CACFP Status	Enrolled (n=31)				Eligible/Non-Enrolled (n=16)						Non-Eligible (n=13)				Effect Size
	Mean ± SD[a]	Median (IQR[b])	SS[c]	IOM[d]	Mean	±	SD[a]	Median (IQR[b])	SS[c]	IOM[d]	Mean ± SD[a]	Median (IQR[b])	SS[c]	IOM[d]	η^2
Macronutrients															
Energy (kcal)	100 ± 23.5	113(98-113)*†	✓	✓	103	±	54.4	89(76-104)*†	✓	✓	106 ± 16.5	103(98-113)	✓	✓	0.133
Total Fat (g)	3 ± 0.7	3(2.5-2.9)	✓	✓	3	±	1.0	3(2-3)	✓	✓	3 ± 0.7	3(2.5-3.3)	✓	✓	0.010
Saturated Fat (g)	1 ± 0.3	1(0.7-0.9)	✓	✓	1	±	0.5	1(0.6-1.2)	✓	✓	1 ± 0.2	1(0.7-0.9)	✓	✓	0.012
Total Carbohydrates (g)	19 ± 5.5	19(16-19)*†	--	--	18	±	13.4	15(13-16)*†,‡	--	--	19 ± 3.8	18(17-20)*‡	--	--	0.151
Fiber (g)	0.9 ± 0.6	0.6(0.5-1.4)*†	×	×	1.5	±	1.3	1.1(0.7-1.4)	×	×	1.3 ± 0.4	1.3(1.0-1.6)*†	×	×	0.122
Total Sugar (g)	11 ± 2.4	11(10-11)*†	✓	--	10	±	5.1	9(8-10)*†,**†	✓	--	12 ± 4.0	12(10-14)**†	✓	--	0.157
Added Sugar (g)	5 ± 2.0	5(5-7)*†	--	--	3	±	2.4	3(1-4)*†	--	--	5 ± 3.7	5(2-7)	--	--	0.174
Protein (g)	3 ± 0.8	3(2-3)	--	×	3	±	1.6	3(2-3)	--	×	3 ± 0.6	3(2-3)	--	×	0.011
Micronutrients															
Calcium (mg)	81 ± 39.5	86(81-86)	×	×	86	±	60.4	77(47-95)	×	✓	67 ± 24.4	73(50-85)	×	×	0.013
Potassium (mg)	157 ± 38.2	150(122-176)*†	×	×	176	±	89.4	177(114-210)	×	×	199 ± 43.0	212(152-223)*†	×	×	0.110
Sodium (mg)	118 ± 60.9	125(82-125)	✓	✓	157	±	141.7	106(77-180)	✓	✓	96 ± 25.9	90(80-104)	✓	✓	0.037
Vitamin D (µg)	0.6 ± 0.5	0.6(0.3-1.0)	×	--	0.4	±	0.6	0.3(0-0.6)	×	--	0.4 ± 0.2	0.4(0.2-0.6)	×	--	0.059

[a] SD = standard deviation; [b] IQR = interquartile range; [c] SS = USDA Smart Snacks in School guidelines; [d] IOM = Institute of Medicine CACFP snack recommendations

* Significant differences (p<.05) between median values of nutrients among CACFP groups, determined by Kruskal-Wallis Rank Test and Dunn's test with Bonferroni adjustments for multiple comparisons.

** Significant differences (p<.001) between median values of nutrients among CACFP groups, determined by Kruskal-Wallis Rank Test and Dunn's test with Bonferroni adjustments for multiple comparisons

† and ‡ Signifies differences between groups. Within each row, medians with the same superscript symbol and significance value indicate significant differences between the two groups

✓ indicates that average snack is in compliance with referenced standard for given nutrient

× indicates that average snack is not in compliance with referenced standard for given nutrient

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CHAPTER IV

NUTRITION ASSISTANCE IN AFTERSCHOOL PROGRAMS: A QUALITATIVE INVESTIGATION OF STAFF PERCEIVED BARRIERS AND BENEFITS TO PARTICIPATING IN THE CHILD AND ADULT CARE FOOD PROGRAM[3]

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Abstract

Objective: The Child and Adult Care Food Program (CACFP) aims to increase children's access to healthful foods in out-of-home care. As many as 4.6 million children attending afterschool programs (ASPs) are eligible for assistance through programs like CACFP. Despite its potential reach, CACFP is underutilized among ASPs. This study examined ASP leaders' perceived challenges and benefits to CACFP enrollment.

Design: Cross-sectional qualitative interviews.

Setting: Forty-eight ASPs across South Carolina; 33 CACFP-enrolled and 15 eligible, but not enrolled.

Participants: ASP leaders (n=22); including CEO's, directors, lead staff, nutrition specialist, and office administrators.

Phenomenon of Interest: Low CACFP participation among ASPs.

Analysis: Emerging themes were identified using qualitative content analysis.

Results: CACFP-enrolled ASP leaders had a more favorable impression of nutrition assistance programs; however, both groups expressed similar CACFP-specific challenges and benefits. Challenges include enrollment guidelines, paperwork demands, and lack of perceived administrator/sponsor support. Benefits include monetary incentives and improved meal/snack quality.

Conclusions and Implications: Despite differing impressions of nutrition assistance programs, leaders of enrolled and eligible/non-enrolled ASPs shared similar perspectives of the challenges and benefits of CACFP. Though further research is needed to identify effective strategies to overcome CACFP-enrollment barriers, existing outreach efforts can be strengthened based on this study's findings.

Introduction

Afterschool programs (ASPs, typically operating from 3-6 pm) provide a safe environment for over ten million children after the school day ends.[1] Nearly half of the children enrolled in ASPs live in low-income households,[1] where many parents struggle to provide adequate food after school.[2] As a result, there is an increased demand for ASPs that serve meals and snacks.[2] Despite increased social demands, federal funding for ASPs has remained stagnant, [1,3-7] leaving many programs struggling to provide children with nutritious foods and beverages.

The federal Child and Adult Care Food Program (CACFP) assists ASPs by providing reimbursement for foods and beverages served in accordance with their nutrition guidelines.[8] To qualify for reimbursement, at least 25 percent of the children enrolled in the program must be eligible for the National School Lunch Program or the ASP must be located in an eligible area (ie, located in a public school attendance area where at least 50 percent of students are eligible for the National School Lunch Program).[8] Enrollment in CACFP offsets operational cost, allowing participating programs to utilize other funds to improve quality care.[7] Through enrollment in CACFP, many ASPs are afforded a unique opportunity to provide nutritionally complete meals and snacks to those children with the greatest need. Despite this, CACFP is markedly underutilized;[9] thus, leaving millions of eligible children without access to the program's services. For instance; in 2014, nearly three million children across all child care centers received snacks and/or meals daily through CACFP.[10] This includes both full-day centers (ie, family day care, child care centers, nursery schools, preschools, and Head Start programs) and ASPs. There are approximately 4.6 million children eligible for

nutrition assistance in ASPs alone,[1] yet ASPs represent only a small portion of facilities participating in CACFP.[11]

Despite awareness of its potential impact on the nutritional status of millions of children, CACFP is notably understudied in comparison to other federal nutrition assistance programs.[9,12] The need for more research on CACFP has been acknowledged by government agencies and researchers alike.[9,11] Much of the existing CACFP research focuses on the program's impact on the nutritional quality of meals served in full-day child care centers.[9,13-15] Research on possible explanations behind the program's low enrollment rates is limited.[16,17] Moreover, to our knowledge, provider perceptions and experiences with nutrition assistance programs and how that impacts their decision to enroll in CACFP has yet to be explored. This study aimed to address these gaps in CACFP research and investigate factors influencing uptake of the program among ASP leaders and administrators. The purpose of this study was to examine the barriers and benefits to CACFP enrollment as perceived by ASP leaders.

Methods

Study Design

This study is nested within a larger mixed-method research study assessing the afterschool nutrition landscape among ASPs grouped by eligibility and enrollment in CACFP. The methods and results discussed herein pertain to the qualitative component of the study. Details of the remaining study components and associated findings are reported elsewhere.[18,19] The qualitative component of the study was guided by social constructionism and grounded theory, which acknowledges: (1) that numerous sociocultural factors shape a person's experiences and affect their perceptions and (2) the

integral role of the researcher in deriving meaningful interpretations of participant experiences.[20,21]

Participants and Recruitment

ASP leaders were invited to participate in the study from the fall of 2014 through summer 2015. Two methods were used to identify and recruit participants. First, ASP leaders, identified using registries provided by the South Carolina Afterschool Alliance and the Department of Social Services Child Care Department, were recruited through phone calls. Additional participants were recruited in person at events held by the South Carolina Department of Social Services CACFP and the South Carolina Afterschool Alliance. ASP leaders were asked to participate in a phone interview assessing their experiences with nutrition assistance programs. Using a stratified purposive sampling method, interview respondents were classified as either enrolled (ie, ASP currently enrolled in CACFP) or eligible/non-enrolled (ie, ASP is eligible for CACFP but not currently enrolled). Leaders of ASPs ineligible for CACFP were excluded from the qualitative interviews. Respondents provided verbal consent to participate and have interviews recorded. All study procedures were approved by the University of South Carolina Institutional Review Board.

Interview Procedures

A semi-structured interview (lasting approximately 20 minutes) was conducted; exploring ASP leaders' knowledge, experience, and perceptions surrounding nutrition assistance programs. The interview guide was developed by the principal investigator using previous instruments (eg, surveys, interview/focus group questions) used to assess stakeholder perceptions of nutrition assistance program /polices across multiple sectors

(eg, food industry, non-profit organization, health care).[22,23] Face validity of the interview guide was obtained from members of the research team who reviewed each question; checking for clarity and relevance to the study objectives. All respondents were asked about their experiences with CACFP and/or other nutrition programs (eg, summer feeding programs, accreditation programs). Respondents were asked to discuss how these experiences influenced their overall perception of nutrition assistance programs. The remaining questions, targeting the challenges and benefits of CACFP, were modified according to CACFP enrollment status. For example, enrolled ASP respondents were asked to discuss current benefits their program has experienced through enrollment in CACFP, as well as any suggested improvements to the program. Respondents of eligible/non-enrolled ASPs were asked to discuss anticipated benefits that would motivate them to seek enrollment in CACFP. Some respondents were unsure of their ASP's CACFP eligibility status. In these instances, the interview guide for eligible/non-enrolled ASPs was used and eligibility status was determined post hoc, using CACFP guidelines.[8] One interview was excluded after the ASP was determined to be ineligible for CACFP.

Data Analysis

Recorded interviews (n = 22) were transcribed verbatim by two independent researchers and analyzed using NVivo (v. 11.2, 2016, QSR International Pty Ltd). All interview transcripts were reviewed by the principal investigator to ensure accuracy of transcription. Analysis occurred in two phases. In the first phase; using a deductive analysis approach,[24] organizational categories were developed from interview guide topics (ie, perceived challenges/barriers to CACFP enrollment and perceived benefits to

CACFP enrollment). These categories guided the second phase of analysis, where themes were identified using qualitative content analysis.[25,26] Transcripts, first reviewed in entirety and then line-by-line, were coded for key concepts associated with the organizational categories (eg, codes created for each challenge described by respondent). Next, this initial coding scheme was reviewed and similar concepts were combined to create a refined list of main and sub-themes. Themes from each interview were entered into a saturation grid (ie, table where each row represents an interview and each column represents an emerging theme).[27,28] Data saturation was reached when no new themes emerged from interviews.

Results

Characteristics of interview respondents and their associated ASPs are presented in Table 4.1. A total of 22 interviews were conducted, representing 48 ASPs. Interviews were conducted with leaders of CACFP-eligible/non-enrolled (9 interviews, representing 15 ASPs) and CACFP-enrolled (13 interviews, representing 33 ASPs) ASPs. The majority of respondents identified their role as ASP director (67% eligible/non-enrolled ASPs, 46% enrolled ASPs). Over half of enrolled ASPs were run by non-profit agencies (55%) located within schools (52%). Eligible/non-enrolled ASPs were primarily government operated (47%); school based (47%) programs. Approximately half of enrolled ASPs operated under an umbrella organization (ie, larger childcare/ASP agency that governs multiple smaller ASPs); while none of the eligible/non-enrolled ASPs reported guidance by an umbrella organization. The majority of enrolled (67%) and eligible/non-enrolled ASPs (74%) received sponsor support (ie, organization ASP is affiliated with that may provide resources, services, and/or financial support). Most of

the sponsoring organizations provided meals and/or snacks to the ASPs (64% of sponsors in eligible/non-enrolled ASPs, 91% of sponsors in enrolled ASPs).

Eligible/non-enrolled ASP respondents' awareness and experiences with nutrition assistance programs is reported in Table 4.2. The majority of the leaders of eligible/non-enrolled ASPs reported that they were aware of nutrition assistance programs specific to afterschool settings (89%) and over half acknowledged that they were aware of their ASP's eligibility for CACFP (56%) prior to the interview. Nearly all leaders of eligible/non-enrolled ASPs reported having prior experience with nutrition assistance programs; six respondents with afterschool specific experience (eg, CACFP, National School Lunch Program Afterschool Snack Program) and two with broad experience (ie, previous professional experience in other settings). Only a single program leader reported having no prior experience with a nutrition assistance program (see Table 4.2). Perceptions of nutrition assistance programs varied greatly between the two CACFP eligibility/enrollment groups. The majority of eligible/non-enrolled ASP respondents reported having a negative impression (78%), while all respondents from enrolled ASPs held favorable opinions.

From the interviews four main themes emerged for both challenges and benefits associated with CACFP enrollment: (1) guidelines and regulations, (2) CACFP administrator/sponsor support, (3) child level outcomes, and (4) financial factors. There was considerable overlap in the sub-themes expressed by both respondent groups (ie, enrolled and eligible/non-enrolled ASPs). Results, arranged by organizational categories, summarize the main and sub-themes identified by each of the respondent groups (see Table 4.3). Illustrative quotations are provided that highlight common sub-themes.

Challenges and Barriers to CACFP Enrollment

Guidelines and Regulations: Respondents from both enrolled and eligible/non-enrolled ASPs expressed challenges in satisfying prerequisites to qualify for CACFP:

> It [challenges to enrollment] just depends on what the criteria is…kids who meet certain poverty guidelines or families that meet certain poverty guidelines. Sometimes that can be a barrier because you may have kids that are just about that [poverty guideline level] and they still need that resource. I hate to have a program where I can only get ten children in the program... If somebody doesn't meet their guidelines do you then have to kick in those resources when they may be just a hair above a poverty guideline? (Eligible/non-enrolled ASP)

> We tried to do the meal last year because there's a training you can attend to become your own meal provider, but of course we don't have a commercial kitchen in our center, so we approached the school district to try to contract through them to do the same thing the CACFP sponsor program is doing but they said that the reimbursement cost couldn't cover their staff and the labor so it just didn't work out. So, we were trying to get the meals for quite some time. I think that's another reason that we decided to transfer with the CACFP sponsor program, so that we could make sure that we get the meals. (Enrolled ASP)

Additionally, both groups identified administrative regulations as a major challenge to CACFP. Respondents expressed the difficulties associated with the paperwork requirements:

> I think it is a very good program overall. It is just the weekly requirements and keeping up with all the paperwork; especially when you have multiple sites under one organization like we do, it can get a little tough. (Enrolled ASP)

> Well the thing with it was there was a program that I did my homework and went to some of the classes and everything. We had to serve certain things each day and had to provide a menu, but the paperwork…and then you had to hire a person to run the operation because that's another program to have to put staff on, which was going to cost money. (Eligible/non-enrolled ASP)

> The particular one [food program] that we did, there was a lot of paperwork. I mean it was so confusing. It took our administrator hours and days just to figure out how to get enrolled in it. We had to get information for all the parents and nobody wants to give that information to get on a

> food program. So, it's just so much paperwork. (Eligible/non-enrolled ASP)

CACFP Administrator/Sponsor Support: Accessibility of CACFP administrators (ie, state level CACFP representatives) and sponsors (ie, organizations who facilitate CACFP operations for ASPs) was identified as another key challenge to CACFP by respondents from both eligibility/enrollment groups. Respondents from eligible/non-enrolled ASPs expressed challenges initiating contact, while respondents from enrolled ASPs discussed concerns with existing program support:

> I know there is a website [CACFP] but when you try to call people you can't get them on the phone and when you try to get into a program it's very hard to make contact.(Eligible/non-enrolled ASP)

> The trainings are really good and they're helpful, it's just coming back…I think one thing they could do is, before you get started on the program, have somebody to come and sit down and walk you through it. Our girl [CACFP administrator] who's over us actually kind of came and did that for her first visit. She did cite a couple of things but it was more of a review than a help. (Enrolled ASP)

Respondents from eligible/non-enrolled ASPs also revealed a perception of inadequate support as it relates to program training:

> I went to the nutrition payback program that and the notebook is about three inches thick and you have to be there for the training in order to receive it. I asked if they could come to our town because I had several sites [ASPs] and the training was an hour and a half away. I said "could you come to our town and do this for my staff and help them fill out this half inch thick of papers?" They said "nope, nope, we only train here". (Eligible/non-enrolled ASPs)

Child Level Outcomes: Some respondents among eligible/non-enrolled ASPs discussed concerns over children not eating the snacks provided if they were to enroll in CACFP:

> Financial would be the biggest reason that we would seek that [CACFP enrollment] out because we are a non-profit and snacks are very expensive but if we have to serve them foods that I am just going to throw in the

> trash can…it's going to kill me to do that. That would be why I would not do it [enroll in CACFP]. (Eligible/non-enrolled ASP)

Financial Factors: Another barrier to CACFP enrollment by eligible/non-enrolled ASPs is the perceived cost to implement the program:

> We were about to do it [enroll in CACFP], then we decided it didn't benefit us financially. We had to put things in the building to make it come up to code. We would have to upgrade too many things. It just cost too much money to do what they wanted. (Eligible/non-enrolled ASP)

> You can't serve them [children not eligible for CACFP] so you have to bend into your budget and make sure that everything is adequately provided for them. (Eligible/non-enrolled ASP)

Current Benefits and Suggested Improvements to CACFP

Guidelines and Regulations: The positive impact of CACFP guidelines on afterschool snacks and meals was a consistent theme among respondents in both enrolled and eligible/non-enrolled ASP groups. The ability to serve meals was frequently discussed as major benefit to CACFP by respondents in enrolled ASPs:

> One of the main reasons [for enrolling] was that they offered the meal. Students eat very early during the school day here. So we were thinking if we could provide a meal that would be excellent. (Enrolled ASP)

> We are ecstatic that these children are getting fed an extra meal every day. We know that sometimes it's not their only meal, but for some kids it is…and if there is only one [child] per program and we are feeding them, I can sleep better at night. (Enrolled ASP)

Several respondents of eligible/non-enrolled ASPs anticipated that enrollment in CACFP would lead to improved nutritional quality of foods and beverages served in the program. Respondents of enrolled ASPs also felt that CACFP guidelines led to improved nutritional quality; particularly in the meals served through the program:

> To be able to enroll in a food assistance program would allow our afterschool kids to have a better nutritional diet. (Eligible/non-enrolled ASP)

> It's [CACFP] a really big plus for my center because I'm able to provide very good meals. I've heard about other centers [ASPs] that aren't on the food program and I hear about some of the things they're serving and it's like they're serving the bare minimum because of finances. They aren't able to provide overly good health snacks. (Enrolled ASP)

Suggested improvements to CACFP administrative guidelines were frequently discussed among both CACFP eligibility/enrollment groups. Many respondents felt that the program could be drastically improved by lessening paperwork demands:

> Being electronic and computerized and doing it on line…that would be a big help. The program [another food program] shifted from doing paper forms. Now it's all electronic. It is seamless. It is pretty easy as far as tracking attendance and stuff. So I think that is a big thing. And the paperwork...you don't have to turn in so much. Nobody wants more paperwork. (Eligible/non-enrolled ASP)

CACFP Administrator/Sponsor Support: Many respondents from eligible/non-enrolled ASPs felt that CACFP administrators/sponsors who provided ongoing trainings, administrative support, and access to resources would be one of the biggest incentives to enrolling in CACFP:

> If food services for the district would jump on board on this and provide for us so that we would not have to be 12 standalone schools trying to come up with this. If they could do the menu and you [ASPs] get it through them. (Eligible/non-enrolled ASPs)

> I think it would be helpful if there was some type of initial training. It would benefit either the person who is coordinating it [CACFP in ASP] or the people who would be involved like the staff. Sometimes just knowing the type of nutritional needs of the children that they're serving might help them to encourage kids to eat certain things. Train the staff to encourage the kids to eat the more nutritious foods and when they are not eating them to identify a reason why and then to change it up so that it will make it a little more palatable for them. (Eligible/non-enrolled ASP)

> I wish there would be a little more openness to come visit [ASP locations], especially when it would involve several school sites. It seems like if I could provide you [CACFP] will six people at six schools that could utilize this program that you [CACFP] would be willing to come to me and say "let me do this training for you." (Eligible/non-enrolled ASPs)

Several respondents from enrolled ASPs provided similar suggestions for improving CACFP sponsor support:

> If somebody from the program could come…especially when you're first getting on the program and you're trying to understand stuff. I know you are able to call and contact but actually having that one on one and somebody taking the time, it makes a difference if you can take the time and have somebody sit and work with you, not necessarily to get your things in order, but to show you how to do things. When you're sitting in the meeting [CACFP training] you kind of get it and then when you're sitting in the office you're trying to recall and look through your notes and go through and fix this and do that and sometimes it's good to have somebody to walk you through the process. (Enrolled ASP)

Child Level Outcomes: Enrolled ASP leaders identified increased variety and exposure to foods as a current benefit to CACFP:

> We used to feed the kids based on what they would eat. Now we see that they will eat more if you give them something different. They may not eat it but if you can get them to try it they may think "this isn't that bad just because it is green or orange, I will at least taste it." (Enrolled ASP)

> It's a good program and it allows the children to be exposed to different types of foods. (Enrolled ASP)

Financial Factors: Monetary incentives were among the most prevailing themes regarding benefits to CACFP enrollment. Enrolled ASP respondents discussed how their programs had benefited financially from participation in CACFP and eligible/non-enrolled ASP respondents frequently discussed monetary incentives as one of the biggest motivating factors to seeking enrollment in CACFP:

> I really love the program [CACFP], I appreciate them because they allow us, especially a small non-profit like us, to be able to do some things they we wouldn't ordinarily be able to do due to funding. We try to make our program affordable through grants that we've written to be able to service some students at no cost, so any assistance that we can have to help with that portion…we enjoy that a great deal. (Enrolled ASP)

> The program has helped immensely. We all worry about how we are going to pay for programs; it sort of pays for itself. We buy what we need, we feed the kids and we send for the reimbursement and they pay what we spend on meals. (Enrolled ASP)

> I think its [CACFP] great because food is one of our biggest budget items after staff salaries and it just keeps going up and it's harder and harder to provide nutritious things for the kids or things that aren't really bad. So, I think it's really good, especially for those programs that maybe can't afford to do it without it [CACFP]. (Eligible/non-enrolled)

> It [CACFP] would help our budget in terms of purchasing food items. The summer feeding program helps us offset some of the cost for our summer enrichment program so we realize that those types of programs are important. They're beneficial resources for us and nutritious for the kids. They help us offset some of the cost that we have. (Eligible/non-enrolled)

Discussion

With nearly half of all children in attendance eligible for nutrition assistance, ASPs have immense potential to impact the dietary patterns of millions of children through enrollment in CACFP; however, ASPs represent only a small portion of the facilities utilizing the program.[1,11] Understanding the strengths and weaknesses of CACFP, from the perspective of ASP staff directly responsible for providing affordable, healthy meals and snacks, is of paramount importance in order to effectively develop strategies that close the gap between the program's dissemination at the national level and its utilization within the afterschool setting. To our knowledge, this is the first study to assess ASP leaders' knowledge, experiences, and perceptions of nutrition assistance programs.

Results from this study highlight the discord among afterschool leaders in the perception of nutrition assistance programs. Leaders of ASPs currently participating in CACFP had a more favorable impression of nutrition assistance programs than did leaders of ASPs who were eligible for CACFP, but not enrolled. The majority of eligible/non-enrolled ASP respondents had prior experience with afterschool-specific nutrition assistance programs, and despite awareness of their ASP's eligibility for CACFP, many elected not to enroll in the program; perceiving that the challenges

outweighed its benefits. Although the two groups' overall opinion of nutrition assistance programs differed, there was considerable overlap in the perceived CACFP-specific challenges: the program's enrollment guidelines, paperwork demands, and the perceived lack of CACFP sponsor support. First, while respondents found the idea of serving afterschool meals to be an appealing component of CACFP, many perceived the health and safety requirements (eg, food facility required to have commercial kitchen) to be unattainable. Unlicensed ASPs and those located outside of schools have to meet state-specific health and safety requirements to be eligible for CACFP. Research organizations have acknowledged health and safety requirements as a potential barrier to CACFP enrollment and suggest that state agencies and advocacy organizations work to create sensible and cost effective standards.[17] While this is a promising strategy, it does not provide an immediate resolve for the many community-based ASPs wanting to serve meals to children in their care. Secondly, both groups felt that CACFP would be more appealing if the program reduced paperwork. These findings substantiate previous theories that many eligible programs do not enroll in nutrition assistance programs because of the perceived burden associated with administrative requirements.[17] ASPs can mitigate many of these barriers by partnering with a CACFP sponsor organization that is responsible for operating the program and handling the majority of the administrative demands.[12,17,29] However, despite their intended benefits, respondents from both enrolled and eligible/non-enrolled groups were dissatisfied with the existing support provided by CACFP administrators and sponsors. For leaders of eligible/non-enrolled ASPs in particular, difficulties locating a willing sponsor organization and continued unsuccessful

attempts to contact state level CACFP administrators discouraged some from seeking enrollment.

When discussing the benefits of CACFP, respondents from both groups agreed that monetary incentives were one of the program's greatest strengths. Enrollment in CACFP offsets operational cost allowing ASPs to enroll more children and provide ancillary programs. Additionally, respondents currently participating in CACFP believed that through enrollment in the program, children were exposed to a broader and more healthful diet. While these findings suggest that ASP leaders generally consider CACFP-approved foods and beverages healthful, evidence from existing studies reveal that enrollment in CACFP does not ensure healthier meals and snacks.[18,19,30,31] Though not explicitly stated by respondents, it is important to consider the benefits ASPs may receive through affiliation with an umbrella organization, such as the Boys and Girls Clubs of America and 21st Century Learning Centers. Approximately half of enrolled ASPs were operated by an umbrella organization, while none of the eligible/non-enrolled ASPs had such affiliations. These findings support those of a previous quantitative study that found preschool child care centers were more likely to be enrolled in CACFP if they had relationships with umbrella organizations, as well as licensing/accreditation programs, local child-care networks, and/or school sponsors.[12] It is conceivable that larger childcare agencies can provide individual ASPs with the organizational infrastructure and resources necessary to overcome the major barriers to CACFP enrollment.

There are numerous strengths of this study. To our knowledge, this is the first study to capture the benefits and barriers to CACFP enrollment from the perspective of ASP leaders. ASP leaders are a crucial link between the dissemination of CACFP and its

utilization within the afterschool community; however, existing research on barriers to CACFP enrollment primarily relies upon reports from third party organizations (eg, nutrition coalitions, state level education agencies) not directly involved in the enrollment process. Moreover, this study included a representative sample of CACFP eligible ASPs. By including both enrolled and eligible/non-enrolled ASPs, a broader understanding of the barriers and benefits to CACFP was obtained.

Limitations need to be considered when interpreting results of the current study. One limitation of the study was that all interviews were conducted and coded by a single researcher. Appropriate steps were taken throughout the research process to address potential reflexivity concerns. To limit the influence of personal bias during the interview, the researcher followed an interview guide that was developed using pilot tested instruments.[22,23] Additionally, the researcher made an effort to orally confirm responses to key interview questions (ie, questions assessing perceived barriers/benefits) to ensure accurate interpretation during the coding phase. Alternately, having one researcher conduct and code all interviews enhanced theoretic sensitivity, which resulted in a deeper understanding of the material. A foundation within grounded theory research, theoretic sensitivity can be obtained through the analysis phase; where, through continued interaction with the data (eg, interview transcripts, codes, and theoretical frameworks) the researcher experiences increased sensitivity to concepts, their meanings, and relationships.[32]

Implications for Future Research

Findings from the current study have implications for researchers and practitioners alike. First, despite being aware of the program's benefits, some leaders of

eligible ASPs chose not to enroll in CACFP. Interestingly, leaders of CACFP-eligible/non-enrolled and enrolled ASPs cited similar barriers to utilizing the program. This suggests other potential factors that may contribute to non-enrollment among eligible ASPs. Future studies are needed to explore the association between ASP characteristics (eg, program setting, affiliation with umbrella organization) and CACFP enrollment. Secondly, the findings of this study provide a starting point in identifying current barriers faced by ASP leaders. States across the nation have already begun piloting programs aimed at increasing CACFP enrollment.[7,9,17] Outreach efforts can be strengthened based on this study's findings and allocated resources can target and resolve the most pervasive barriers to CACFP enrollment within the afterschool community.

Table 4.1 Respondent and Afterschool Program Characteristics Stratified by Child and Adult Care Food Program Eligibility and Enrollment Status

	CACFP Status		
	Eligible/Non-Enrolled	**Enrolled**	**Total**
Interviews [n, (%)]	9 (40.9)	13 (59.1)	22
Respondent Characteristics			
Title [n, (%)]			
CEO	1 (11.1)	3 (23.1)	4
Director	6 (66.7)	6 (46.1)	12
Lead Staff	1 (11.1)	1 (7.7)	2
Nutrition Specialist	0	1 (7.7)	1
Office Administrator	1 (11.1)	2 (15.4)	3
Afterschool Program Characteristics			
Afterschool Programs [n, (%)]	15 (28.3)	33 (62.3)	48
Average Enrollment (no. of kids, M, SD)	56.5 ± 27.7	59.4 ± 31.4	
Tax Status [no. of ASPs, (%)]			
Non Profit	3 (20.0)	18 (54.5)	21
Government	7 (46.7)	12 (36.4)	19
Faith Based	5 (33.3)	2 (6.1)	7
For Profit	0	1 (3.0)	1
ASP Location [no. of ASPs, (%)]			
Community Center	1 (6.7)	10 (30.3)	11
School	7 (46.7)	17 (51.5)	24
Church	5 (33.3)	4 (12.1)	9
Private Building	2 (13.3)	2 (6.1)	4
Operate Under Umbrella Organization [no. of ASPs, (%)]			
Yes	0	16 (48.5)	16
No	15 (100.0)	17 (51.5)	32
ASP Supported by Sponsor Organization [no. of ASPs, (%)]			
Yes	11 (73.3)	22 (66.7)	33
No	4 (26.7)	11 (33.3)	15
Sponsor Provides Afterschool Snack/Meal [no. of ASPs, (%)]			
Yes	7 (63.6)	20 (90.9)	27
No	4 (36.4)	2 (9.1)	6

ASP indicates afterschool program

CACFP indicates Child and Adult Care Food Program

Table 4.2 Reported Awareness and Experience Surrounding Nutrition Assistance Programs by Eligible/Non-Enrolled Program Respondents

	n	%
Knowledge/Awareness		
Nutrition Assistance Programs for ASPs [no. of respondents, (%)]		
Aware	8	88.9
Not Aware	1	11.1
ASP's CACFP Eligibility Status [no. of respondents, (%)]		
Aware	5	55.6
Not Aware	4	44.4
Nutrition Assistance Program Experience [no. of respondents, (%)]		
No Experience	1	11.1
Prior NAP Experience Specific to ASP setting	6	66.7
Prior NAP Experience NOT Specific to ASP setting	2	22.2

ASP indicates afterschool program

CACFP indicates Child and Adult Care Food Program

NAP indicates nutrition assistance program

Table 4.3 Afterschool Program Leader Perceived Barriers and Benefits to CACFP Enrollment

Main Theme	Sub-Themes	Eligible/Non-enrolled ASP References[a], n	Enrolled ASP References[a], n	Total References[b]
Challenges/Barriers				
Guidelines & Regulations	enrollment guidelines/prerequisites; administrative requirements	5	6	26
CACFP Administrator/Sponsor Support	accessibility; training	2	3	8
Child Level Outcomes	snack consumption	2	1	4
Financial Factors	CACFP associated cost	2	-	4
Current Benefits/Suggested Improvements				
Guidelines & Regulations	ability to serve meals; improved nutritional quality of meals/snacks; improvements to administrative requirements	6	9	29
CACFP Administrator/Sponsor Support	trainings; administrative support; access to resources	5	5	13
Child Level Outcomes	food exposure	4	6	18
Financial Factors	eases budgetary constraints; ability to serve more children	5	5	14

ASP indicates afterschool program

CACFP indicates Child and Adult Care Food Program

[a] Indicates the number of interview respondents that referenced given main theme

[b] Total references indicates the number of times a main theme was referenced across all interviews

Note: Total references may exceed the total number of interviews; meaning a theme was referenced more than once per interview

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CHAPTER V

SUMMARY AND CONCLUSIONS

Significance

ASPs have been recognized for their potential to positively impact the dietary habits of children across the nation. The foods and beverages served in ASPs are especially important for children served in low-income communities, where families may struggle to provide adequate nutrition after school.[1] National attention on the role ASPs play in the dietary intake of this high need population led to the expansion of CACFP to include afterschool meals and snacks.[2] Despite being acknowledged as a key federal child nutrition program, research on CACFP is still in its infancy and afterschool-specific CACFP research is almost non-existent.

Purpose

The purpose of this dissertation was to increase understanding of the nutrition assistance landscape in the afterschool community by addressing significant gaps in CACFP research. Specifically, the research discussed herein aimed to: (1) assess the type of afterschool snacks served under CACFP guidance, (2) evaluate the nutrient content of snacks by ASPs' CACFP participation and the extent to which snacks met existing nutrient standards, and (3) examine the challenges and benefits to CACFP enrollment as perceived by ASP administrators.

Major Findings

The first study, titled "Afterschool Snacks: A Comparison by Child and Adult Care Food Program Eligibility and Enrollment Status and Adopted Snack Guidelines" found that ASPs enrolled in CACFP and adhering exclusively to their guidelines served significantly higher quantities of low-nutrient-dense sugar-based snacks and fewer fresh fruits and vegetables than their peer ASPs. Specifically, in one week, CACFP-enrolled ASPs served sugar-based snacks one-and-a-half days more than did eligible/non-enrolled ASPs and served fresh fruits and vegetables one to two days fewer than either eligible/non-enrolled or non-eligible ASPs. When compared to ASPs following ABC guidelines or HE Standards, ASPs exclusively adhering to CACFP guidelines served sugar-based snacks nearly two days more and fresh fruits and vegetables up to four days less per week (range 1-4 days). These findings, coupled with the fact that over 85percent of snacks served across all eligibility/enrollment groups were considered CACFP-creditable, raise concerns over the leniency of CACFP guidelines.

Consistent with the first study's findings, the second study, titled "Nutritional Quality of Snack Offering in Afterschool Programs: A Comparison Between Child and Adult Care Food Program (CACFP) Eligibility and Enrollment Groups" found snacks served in CACFP-enrolled ASPs to be of lower nutritional quality than those served in CACFP-non-enrolled ASPs. CACFP-enrolled ASP snacks contained significantly more energy, carbohydrates, and sugar, and less fiber and potassium than those served in their peer ASPs. Snacks across the three CACFP-eligibility/enrollment groups were in compliance with the USDA Smart Snack and IOM CACFP snack recommendations for energy, fat, total sugar, and sodium content. Interestingly, all three groups' snacks

contained inadequate amounts of fiber, calcium, potassium, and vitamin D, which are classified as nutrients of concern in the 2015 Dietary Guidelines for Americans due to health risk associated with low intake levels.[3]

Study three, titled "Nutrition Assistance in Afterschool Programs: A Qualitative Investigation of Staff Perceived Barriers and Benefits to Participating in the Child and Adult Care Food Program" brings awareness to the discord among afterschool leaders in the perception of nutrition assistance programs. All leaders of CACFP-enrolled ASPs reflected positively upon nutrition assistance programs; where in contrast, the same programs were viewed unfavorably by over three-fourths of CACFP-eligible/non-enrolled ASP leaders. Despite opposing views of nutrition assistance programs in general, the two groups largely agreed on the benefits and barriers specific to CACFP enrollment. It is not surprising that ASP leaders found the program's monetary incentives to be the most appealing benefit of CACFP enrollment. The perceived impact of CACFP guidelines on snack quality was considered the second largest benefit of program enrollment. Findings of this study corroborate two preexisting theories regarding barriers to CACFP enrollment; namely, the program's challenging enrollment guidelines and arduous paperwork demands. Additionally, this study revealed that leaders of ASPs were dissatisfied with the existing level of support from CACFP administrators and sponsors.

Limitations

Several limitations need to be taken into consideration when interpreting the results of this dissertation. In the first two studies, the use of self-reported measures of snack content introduces the possibility of response bias, thus, raising concerns over the

validity of findings. Self-reported measures were chosen given their feasibility and widespread use within existing nutrition assistance program research.[4-8] To enhance the validity of findings for each study, data were collected using a triangulated approach (ie, use of multiple data sources to collect similar information).[9] In study 1, snack information was obtained via food frequency questionnaire and snack recall. In comparing results obtained through the two methods, participants over-reported the frequency of "healthy" snacks (eg, fresh fruits/vegetables, whole grain snacks, plain milk) served while under-reporting the frequency of sugar-based snacks served. A recent review found food records and recalls to be a more valid dietary assessment method in comparison to self-reported food frequency.[10] For this reason, only snack recall data was used for all subsequent analyses in the first study. Study 2 aimed to collect snack menu data from two sources; first, through the snack recall portion of the interview and secondly, through electronic copies of snack menus. The reason for this was twofold: (1) in instances of inaccurate or incomplete snack recall, electronic menu copies may provide additional details, thus increasing accuracy of snack menu data and (2) electronic copies of snack menus could be used to validate snack recall data. Unfortunately, we were not able to collect snack menu data using both methods for all participants. Some participants were unable to complete the snack recall portion of the interview due to time constraints and others were not able to provide an electronic copy of their snack menu; thwarting attempts to compare the two methods. Future studies should consider the use of objective measures of snack content to validate self-report data.

Additionally, the relatively small and unbalanced sample sizes among the analysis groups in studies 1 and 2 weaken their statistical inferences. Following an apriori power

analysis, a total sample size of 60 ASPs was chosen, which allowed for the detection of large effects (power = 0.80, f=.5). Had a larger sample size been used, it is likely that more significant differences would have been observed between CACFP-eligibility/enrollment groups (ie, larger sample size increases ability to detect smaller differences between groups).

The main limitation of study 3 was that all interviews were conducted and coded by one researcher. The creditability of research findings is often called into question when a qualitative study is conducted by a single investigator. Due to limited study resources, we were unable to employ multiple investigators to conduct and analyze interviews; however, steps were taken to limit the influence of researcher bias. The interview guide, developed using pilot-tested instruments, [11,12] was reviewed by members of the research team to ensure clarity, relevance, and face validity. Moreover, to ensure accurate interpretation, the researcher orally confirmed responses to interview questions regarding program benefits and barriers. Alternatively, the use of a single investigator can enhance theoretic sensitivity, where, a researcher gains a deeper understanding of concepts, meanings, and relationships through continued interaction with the data; resulting in greater insight of the phenomenon of interest.

Considerations for Future Research

Government agencies and researchers have called for the expansion of CACFP research.[13,14] This dissertation serves as foundation of afterschool-specific CACFP research. It is among the first studies providing empirical evidence on the type and nutritional content of CACFP-approved snacks. These timely findings coincide with the recent release of new CACFP nutrition guidelines.[15] The new guidelines reflect a

positive shift in focus towards improving the nutritional quality of foods and beverages served under CACFP guidance. Based on issues revealed in this dissertation related to snack content, the new guidelines removal of grain-based desserts as a creditable item has the greatest potential to improve the quality of CACFP afterschool snacks. On the other hand, it is uncertain if the new guidelines will have any significant impact on the amount of fresh fruits and vegetables served in CACFP ASPs, given that ASPs can continue to serve 100% juice in lieu of a fresh fruit or vegetable. Based on this evidence, CACFP ASP leaders seeking to improve the nutritional quality of snacks should consider adopting multiple standards and recommended best practices. The findings of this dissertation support the need for ongoing evaluation and unification of existing afterschool snack standards to ensure children are provided with snacks that adequately contribute to their nutritional needs.

This dissertation also represents a novel approach to assessing low CACFP participation among ASPs by investigating the benefits and barriers to CACFP enrollment from the perspective of the ASP administrators directly responsible for serving healthy and affordable snacks. Despite being aware of the program's benefits and experiencing barriers similar to CACFP-enrolled ASPs, many eligible ASP leaders chose not to enroll in CACFP. This suggests that there are other factors mediating ASPs' enrollment in CACFP. Future studies should investigate the association between ASP characteristics and CACFP enrollment.

Conclusion

This dissertation provides a meaningful contribution to nutrition assistance literature by addressing gaps in afterschool-specific CACFP research. Results of this

dissertation provide insight into the current state of CACFP in ASPs. In conclusion, nutrition assistance programs like CACFP are a valuable resource for ASPs and have the potential to reach millions of children in need of their services. However, without continued evaluations and evidence-based modifications to the program, CACFP will continue to have limited success in the afterschool community.

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APPENDIX A

INTERVIEW GUIDE

Introduction:

Thank you for participating in this phone interview. The goal of this interview is to gather information about your afterschool program's procedures for purchasing and serving snacks. We would also like to hear about any previous experiences that you have had with food assistance programs in child care settings.

Your feedback today will help us learn more about the use of food assistance programs by afterschool program providers. I will record our session to make sure we don't miss any of your comments. The audio recording will only be shared with research team members directly involved in this study. Do you agree to be recorded?

You are free to opt out of any questions you may not want to answer and have the right to stop participation at any time. Neither your name nor your afterschool programs name will be included in anything we do with the information from your interview. Your comments will remain anonymous.

I expect today's interview to last approximately thirty minutes. Do you have any questions before we start the interview?

ASP Snack Procedure Interview

Date:

Interview #:

Interviewer: _____

Interviewee: _____ **Title:** _____

Section I. Background Information

ASP Organization: _____

Site Name: _____ Address: _____

Site Location: _____ _____

Days Operation: _____

Children Served: _____

Serve: (circle all that apply) Snacks Meals

Enrolled in FAP? Yes Name of FAP: _____

No Eligible for FAP? Yes No Don't Know

Section II. Snack Procurement

All Interviewees

1. Who decides what is offered for snack?

2. Where do you purchase snacks for the program?

3. Why do you choose to shop at _____?

   - Prompt: Cost, convenience, store preference, vendor contract

4. How often do you purchase snack?

5. How much do you typically spend on snack?

   - Prompt: per month, week, snack

Section III. Snacks Served

A. Recall – All Interviewees

The next few questions are to help us get a better understanding of snacks served in ASPs. Thinking back to last week, could you tell us what was served on _____ (Monday – Friday)?

* First pass: allow interviewee to run through snack for each day uninterrupted
* Multiple pass: guide interviewee through questions to obtain specifics on: brands, serving size, number of snack offerings.

Monday		**Tuesday**		**Wednesday**		**Thursday**		**Friday**	
F/B Item	Serving	F/B Item	Serving	F/B Item	Serving	F/B Item	Serving	F/B Item	Serving
# Snacks Offered/Child									
Notes:									

B. Food Frequency – All Interviewees

To make sure that we haven't overlooked anything, the final questions in this section are about the number of times certain snacks are offered each week.

How many days a week do you serve:	1	2	3	4	5	6
Fresh Fruit						
Fresh Vegetables						
Whole Grains *advertised as whole grain*						
Salty Snacks *chips, goldfish, flavored crackers, hot dogs, pizza*						
Sugary Snacks *cookies, pastries, fruit gummies, ice cream, candy*						
Sugar Sweetened Drinks *non-100% fruit juice, powdered drink mix, soda*						
100% Juice						
Milk						
Water						

Section IV. Food Assistance Programs

A. Enrolled ASPs

1. How did you hear about the _____ program?

2. Can you tell me about the enrollment process?

   - Prompt: Clear, easy to follow instructions? Receive any trainings or assistance with process?

3. Now that you are enrolled in _____, what are your thoughts about the program?

4. Tell me about any guidelines that your program follows regarding the type of snacks served?

   - Prompt: Describe the guidelines, how did you hear about them?, are you required to follow them? If not, why did you choose to implement them into your program?

5. Can you tell me how the snacks served now compare to those served before you enrolled in _____?

6. What is your program being reimbursed for snack?

B. Eligible – Non-participating ASPs: *See subsequent pages for qualitative interview guide*

Section V. Qualitative Interview Guide

Target: Program leaders of ASPs who are eligible and NOT enrolled in a FAP

Objective:

1. To explore site leader knowledge, perception and prior experiences with FAPs.

2. Assess site leader perceived value of providing nutritious snacks in their ASP.

3. Identify barriers to FAP enrollment among eligible ASPs.

Network Communication

1. Can you tell me about the organizational structure of your ASP?
    - Prompt: are you the sole owner?, who oversees operations? How is information communicated throughout the site/organization?
2. How do you feel about the support you receive from your organization? Community?
3. How satisfied are you with this current structure?
    - Prompt: feel that receive adequate and up-to-date information and resources?

Knowledge

4. What extent of knowledge would you currently say you have regarding nutrition assistance programs?
    - Prompt: overall (all federal programs) and programs specific to afterschool
5. How did you hear about these programs?
    - Prompt: media, organization directors, school officials, community alliances

Experience

6. Can you describe any prior experiences you have had with FAPs?
    - Prompt: attempts at enrollment, prior jobs

<u>If interviewee has no prior experience with FAPs continue to next section (Perception)</u>

7. How have these prior experiences influenced your likelihood to use available FAPs in the future?
8. What did you like about the FAP?
9. Can you describe any challenges you experienced in participating in the FAP?

Perception (<u>Participants with or without prior experience</u>)

10. Based off of your current knowledge, what is your overall impression of FAPs?
11. What would the benefits of FAPs look like for your program?
    - Prompt: what would you want to get out of participating in a FAP?
12. Can you provide suggestions for improving FAPs for ASPs?
    - Prompt: what would make these programs more appealing to ASP providers like you?
13. What would you consider to be the biggest barriers/difficulties you would foresee in enrolling for a FAP?
    - Prompt: do you feel FAP would benefit your program? If so, what has stopped you from seeking enrollment?, FAP oversight? Feasibility of daily record keeping?

Closing:

Lastly, do you have any other feedback that I haven't captured in these questions?

Thank you for your time. Your feedback is extremely valuable to us.