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Evaluation of Best Practices in Child Nutrition at Child Care Centers in Mississippi

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EVALUATION OF BEST PRACTICES IN CHILD NUTRITION AT CHILD CARE CENTERS IN MISSISSIPPI

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ABSTRACT

Objective: To evaluate directors' perceived knowledge of best practices for nutrition at Mississippi child care centers who participate in the Child and Adult Care Food Program (CACFP).

Methods: A 38-question survey was developed to evaluate the knowledge of, skill at providing, and perception of relevance of CACFP best practices by Mississippi child care center directors by asking them to self-rate their use of CACFP best practices.

Results: Survey responses indicated that the majority of directors rated themselves as skilled at several key areas of best practices, especially in creating a clean, pleasant place for the children to eat and in using program nutrition requirements to ensure that food and nutrition needs of the children are met. Analysis of the center menus proved the latter to be true as the recommendations for Vitamin A, Vitamin C, calcium, and iron were either met or exceeded for females 4-8 years-old, and males 4-8 years-old. A need for more training was also indicated, especially in writing food and nutrition procedures for feeding children with special needs and involving parents in promoting new menus and foods offered in the child care center.

Conclusion: While child care center directors in the state of Mississippi are skilled in many best practices associated with early childhood nutrition, there is a perceived need to improve nutrition education training in some key areas.

DEDICATION

This thesis is dedicated to my husband, Adam, and my son, Mason. Without their unconditional love, support, and encouragement, I wouldn't have had the courage to pursue a graduate degree.

LIST OF ABBREVIATIONS

CACFP	Child and Adult Care Food Program
DGA	2015-2020 Dietary Guidelines for Americans
HS	Head Start
USDA	United States Departments of Agriculture
CDC	Center for Disease Control and Prevention
NHANES	National Health and Nutrition Examination Survey
NHES	National Household Education Surveys Program
HHS	United Stated Department of Health and Human Services
AND	Academy of Nutrition and Dietetics
RDN	Registered Dietitian Nutritionist
RDA	Recommended Dietary Allowance
DRI	Dietary Reference Intakes

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CHAPTER I

INTRODUCTION

Eating behaviors that are learned during childhood are typically carried into adolescence and adulthood (Leal et al., 2017), and recent food intake analyses reveal the diets of children today are dominated by processed food that is high in sugar, salt, and fat (Steele et. al, 2015). Children learn eating behaviors and the trying of new foods from adults, specifically parents and guardians (Silvia, Michela, & Cinzia, 2008), yet more than half of children who are not yet in elementary school will spend a significant amount of time at child care centers. Ensuring that child care centers are providing appetizing and nutritious meals and following regulations from the Child and Adult Care Food Program (CACFP) and guidelines the Dietary Guidelines for Americans (DGA), can help children establish healthy eating habits and possibly prevent obesogenic behaviors (Sisson, Krampe, Anundson, & Castle, 2016; Erinosho, Ball, Hanson, Vaughn, & Ward, 2013). Much of the current literature surrounding menus and eating behaviors at child care centers emphasizes the importance of federal programs in providing healthy nutrition environments (Erinosho et al., 2018; Korenman, Abner, Kaestner, & Gordon, 2013). Child care facilities with federally funded programs like CACFP and Head Start (HS), typically serve more nutrient-dense meals than centers who do not participate in these programs, possibly due to increased regulations and oversite or extra training employees may receive.

Training for employees is required for a child care center to participate in the CACFP, however menus at child care centers are currently not required to be planned by someone with any formal nutrition training, such as a registered dietitian nutritionist (RDN). Romaine, Mann, Kienapple, and Conrad (2007) reported that 63% of directors had formal education in childhood education, ranging from diploma to graduate studies, but only 54% were formally trained in menu planning. Only 49% of participants had nutrition and menu planning training specific to children. Furthermore, they found that there was a significant correlation between training and/or education and higher menu quality.

Two studies evaluated child care menus in the state of Mississippi. Oakley, Bomba, Knight, and Byrd (1995) surveyed child care centers to assess CACFP participation, who was planning the menus, and menu compliance with meal pattern requirements set by the CACFP. They found that while most centers were meeting CACFP meal pattern guidelines, there were some discrepancies between compliance with those CACFP meal pattern guidelines and specific nutrient recommendations as outlines in the Recommended Dietary Allowances (RDAs). Knight, Hickey, Aloia, Oakley, and Bomba (2015) used the U.S. Department of Agriculture (USDA) Nutrient Analysis Protocol to assess menus at child care centers in Mississippi. They found that the USDA Nutrient Analysis Protocol was easy to use and could help highlight areas of nutrient insufficiencies, including calories, protein, carbohydrates, fiber, and sodium.

While both of these studies look at nutrient adequacy among child care centers in Mississippi, only one specifically addresses centers participating in CACFP (Oakley et al, 1995). Furthermore, the CACFP had recent legislation changes, updating the nutrition standards in 2017

creating a need to update previous research. More research is also needed to assess the knowledge and skills of the menu compliance with the CACFP meal components.

CHAPTER II

LITERATURE REVIEW

Prevalence of childhood obesity

As reported by the Center for Disease Control and Prevention (CDC) (2018), the prevalence of childhood obesity is one of the leading health issues in the United States. The 2015-2016 National Health and Nutrition Examination Survey (NHANES), reported the prevalence of obesity among children aged 2-5 years-old, and 6-11 years-old, and 12-19 years-old was at 13.9%, 18.9%, and 20.6%, respectively, with a significant difference between children aged 2-5 years-old, and children aged 6-19 years-old (Hales, Carroll, Fryar, & Ogden, 2017). There was also a significant increase in the prevalence of obesity among 2-5-year-olds from the 2013-2014 NHANES data, at 9.4%, to the 2015-2016 NHANES, at 13.9%.

There are several established factors associated with childhood obesity including poor nutrition behaviors, lack of physical activity, physical and social environment, and genetic and hormonal imbalances (Gurnani, Birken, & Hamilton, 2015). Previous literature has established that eating behaviors, particularly healthier eating behaviors, developed during childhood are carried through adolescence and into adulthood (Leal et al., 2017; Movassagh, Baxter-Jones, Kontulainen, Whiting, & Vatanparast, 2017). This suggests that teaching younger children between the ages of 2-5 years-old to have healthier eating habits will promote their practicing the

healthy behaviors into adolescence and adulthood, which would reduce the risk of obesity. Therefore, focusing on early interventions, such as modifying the eating behaviors children develop at a young age, is one strategy to help prevent and manage childhood obesity.

Childhood obesity prevention barriers.

While there are many contributing factors to childhood obesity, there are also barriers to prevention that must be considered. Vittrup and McClure (2018) assessed eating and exercise habits of families with young children, parental knowledge about obesity risks, and parental attitudes towards intervention efforts. They found that parents and caregivers of children believe that they are responsible for addressing childhood obesity. However, major barriers to maintaining a healthy weight were the cost of healthy food, parents setting bad examples (in terms of diet quality and physical activity), lack of knowledge about healthy eating, lack of time to prepare healthy meals, and schools serving unhealthy lunches and cutting physical activity classes. There was high rate of support for obesity intervention efforts that involved no costs to parents and caregivers, especially those efforts that required schools to teach children about healthy eating and exercise habits.

Young children, not yet in school, require daily child care whether it be from parents/guardians, other private caregivers, or a center-based care arrangement. According to the National Household Education Surveys Program (NHES) from the National Center for Education Statistics, 32% of children aged 1 to 2 years old and 64% of children aged 3 to 5 years-old who were not yet in kindergarten were enrolled in nonrelative care outside of the home, including center-based care, for the 2012 data year. This means that the majority of children aged 3-5 are spending a portion of their day at center-based arrangement which includes

day care centers, pre-kindergartens, nursery schools, HS programs- a federally funded early education program for low-income families- and other early childhood education programs. There are several factors that a child care center could contribute to child eating behaviors, including proper and a pleasant and inviting eating environment. Federal and state nutrition and eating environment guidelines, and staff training and knowledge should help to promote these factors.

Child and Adult Care Food Program

Programs like the CACFP and HS are federally funded and help provide assistance to both child and adult care establishments. Although HS only provides services to children, and CACFP serves centers with both children and older adults, these programs are similar in that they both provide aid to establishments, and assist with specific areas of need. HS specifically focuses on children from infancy to 5-years-old from low income families, and supports the development of the child as a whole by promoting school readiness (Head Start Programs, 2019). This includes providing a positive environment to help foster and grow children's early learning, health, and family well-bring. Similarly, CACFP provides aid for providing nutritious foods in an effort to encourage healthy growth and development of children, as well as health and wellness to older adults or chronically impaired people with disabilities.

CACFP, authorized at section 17 of the National School Lunch Act, as one of the Child Nutrition Programs funded by the United States Department of Agriculture (USDA), covers 5 different categories including at-risk afterschool care centers, adult day care centers, child care centers and homes, and emergency shelters. The focus of the CACFP is to provide aid to child and adult care facilities, as well as family or group day care homes, in an effort to

provide nutritious foods that contribute to the health and wellness of young children, older adults, and chronically disabled persons (USDA Child and Adult Care Food Program, 2018). CACFP reimburses child care centers at free, reduced price, or paid rates for eligible meals and snacks served to enrolled children, targeting benefits to children most in need (USDA Child and Adult Care Food Program, 2018). A variety of public or private nonprofit child care centers, HS programs, outside-school-hours care centers, and other institutions which are licensed or approved to provide child care services participate in CACFP. For-profit centers that serve lower income children may also be eligible (Child and Adult Care Food Program, 2018).

The CACFP and HS both require specific training to participate in their programs. As stated in the Department of Health and Human Services (HHS) Head Start Program Performance Standards, HS establishments must provide initial training for staff within three months of being hired, whether they have regular contact with children or not. They must also have ongoing training in all state, local, tribal, federal, and program-developed health, safety, and child care requirements to ensure the safety of all children attending. Meanwhile, CACFP regulations under 7 CFR part 226 says that child care centers participating in CACFP must require key staff to attend training prior to participation, and annually thereafter. These trainings must include instruction on the program's meal pattern, meal counts, claims submissions, and review procedures, recordkeeping, and reimbursement. However, it is important to note that key operational staff of child care centers is defined by each state agency. In the state of Mississippi, Regulations Governing Licensure of Child Care Facilities issued by the Mississippi State Department of Health states that appropriate training in nutrition, food preparation, and food service shall be given to all caregivers. All staff are required to complete 15 contact hours of

staff development, with some training to address nutrition. The owner/operator and the director must have both completed mandatory training on director's orientation, playground safety, and Regulations Governing Licensure of Child Care Facilities to obtain licensure for a child care center. However, there are no specific guidelines on nutrition training.

For meals, CACFP centers must meet specific meal pattern standards to qualify for reimbursement. These meal pattern standards are based on food components, including milk, meat and meat alternates, vegetables, fruits, and grains, and do not specify individual nutrient requirements. The requirements are separated by meal (breakfast, lunch/supper, and snacks) and age groups (ages 1-2, ages 3-5, ages 6-12 and 13-18, and adults). These meal pattern standards, which were updated in October 2017 for the first time since the program started in 1968, are listed below in Table 1. HS must also follow meal pattern requirements set by USDA for CACFP, as well as guidelines for National School Lunch Program and National Breakfast Program. HS centers must also ensure that children receive one-third to one-half of their daily nutritional needs for each center open for less than six hours a day, and one-half to two-thirds of their daily nutritional needs for centers open six or more hours a day (Head Start Performance Standards, 2016).

Child care centers can receive cash reimbursements for up to two meals and one snack that meet the nutrition guidelines. In order to receive reimbursement, claiming percentages, blended per meal rates, or actual meal count by type (snack, breakfast, lunch, or supper), as well as eligibility category (free, reduced, and paid) are computed. Method of reimbursement is determined by each state agency based on meals multiplied by rates, or the lesser of meals multiplied by rates versus actual documented costs. CACFP programs are also allowed donated

agricultural foods or cash in-lieu of donated foods from USDA. Centers may choose to charge separate fees for meals, or can charge a single fee for meals, tuition, and all other services. Eligibility for free and reduced price meals includes households with incomes at or below 130 percent of poverty level for free meals and households with incomes between 130 and 185 percent of poverty level for reduced price meals. (Child Nutrition Programs: Income Eligibility Guidelines, 2018) Income eligibility guidelines are updated yearly and are calculated by multiplying the previous year's federal income poverty level by 1.3 and 1.85 for free and reduced price meals respectfully. For the 2018-2019-year, income guidelines for a household size of four was $46,435 annual for reduced price meals, and $32,630 annual for free meals.

In 2017, changes to the CACFP meal patterns were made to include a greater variety of fruits and vegetables, more whole grain foods, less saturated fat, and less added sugar (Child and Adult Care Food Program: Meal Pattern Revisions Related to the Healthy, Hunger-Free Kids Act of 2010, 2016). Changes include separating the fruit and vegetable components, limiting juice to once per day , requiring at least one serving of grains per day be whole-grain rich, no longer allowing grain-based desserts to count towards the grain component, allowing meat and meat alternates to replace entire grain components during breakfast for a maximum of three times a week, allowing tofu to count as a meat alternate, including a new age group to address children aged 13 through 18-years-old, requiring yogurts to contain a maximum of 23 grams of sugar per 6 ounces, requiring breakfast cereals to contain a maximum of 6 grams of sugar per dry ounce, implementing restrictions on flavored milk and low-fat vs fat-free milk, allowing nutritionally equivalent non-dairy sources to replace milk when medically indicated in children and adults, allowing yogurt to replace milk once daily for adults, extending offer versus serve for at-risk

school programs, and excluding frying as a means of preparing foods on-site. These changes were made based on the DGA, scientific recommendations from the National Academy of Medicine, as well as stakeholder input, and were implemented on October 1, 2017 for all CACFP centers. One update, using ounce equivalents to determine the amount of credible grains, will go into effect on October 1, 2019.

In addition to the newly implemented menu changes, the USDA also established optional best practices that encourage child care center to take additional steps to improve the nutritional quality of meals. These best practices include encouraging and supporting breastfeeding by offering private areas for mothers to nurse in the center; making at least one of the required components during snack a fruit or vegetable; serving a variety of fruits and choosing whole fruit more often than juice; offering at least one serving of a dark green vegetable, red or orange vegetable, beans and peas, starchy vegetables, and other vegetables per week; offering two servings minimum of whole-grain rich grains daily; serving only lean protein sources; limiting processed meats to once per week; only serving cheeses that are natural, low-fat, or reduced-fat; only serving unflavored milk to all participates or serving flavored milk with the lowest amount of sugar for children greater than 6-years old and adults, and serving water as a beverage when yogurt is replacing milk. Other best practices include incorporating locally produced and seasonally foods, limiting pre-fried foods to once a week, avoiding non-credible foods that have added sugars, and making water available throughout the day at adult care centers. Although these best practices are not required, they are highly encouraged to ensure child and adult care centers are providing the most optimal meals and environments to the children and adults while in care.

Table 1: CACFP Updated and previous meal patterns, adapted from USDA.

		Ages 1-2		Ages 3-5		Ages 6-12 & 13-18		Adults	
		Previous	**Updated**	**Previous**	**Updated**	**Previous**	**Updated**	**Previous**	**Updated**
Breakfast Mel Patterns	*Milk*	½ cup	½ cup	¾ cup	¾ cup	1 cup	1 cup	1 cup	1 cup
	Vegetables, fruit, or both	¼ cup	¼ cup	½ cup	½ cup	½ cup	½ cup	½ cup	½ cup
	Grains	½ serving	½ oz eq*	½ serving	½ oz eq*	1 serving	½ oz eq*	2 servings	2 oz eq*
Lunch and supper Meal Patterns	*Milk*	½ cup	½ cup	¾ cup	¾ cup	1 cup	1 cup	1 cup	1 cup**
	Meat and meat alternates	1 oz	1 oz	1 ½ oz	1 ½ oz	2 oz	2 oz	2 oz	2 oz
	Vegetables	¼ cup	1/8 cup	½ cup	¼ cup	¾ cup	½ cup	1 cup	½ cup
	Fruits		1/8 cup		¼ cup		¼ cup		½ cup
	Grains	½ serving	½ oz eq	½ serving	½ oz eq	1 serving	1 oz eq	2 servings	2 oz eq
*Snack Meal Patterns****	*Milk*	½ cup	½ cup	½ cup	½ cup	1 cup	1 cup	1 cup	1 cup
	Meat and meat alternates	½ oz	½ oz	½ oz	½ oz	1 oz	1 oz	1 oz	1 oz
	Vegetables	½ cup	½ cup	½ cup	½ cup	¾ cup	¾ cup	½ cup	½ cup
	Fruits		½ cup		½ cup		¾ cup		½ cup
	Grains	½ serving	½ oz eq	½ serving	½ oz eq	1 serving	1 oz eq	1 serving	1 oz eq

*Meat and meat alternates may be used to substitute the entire grains component a maximum of three time per week.
**A serving of milk is not required at supper meals for adults
***Select 2 of the 5 components for snack
Oz eq= ounce equivalents

Nutrition in child care centers

The Dietary Reference Intakes (DRIs) are specific reference values that can be used to assess nutrition intake for children and adults (Institute of Medicine 2000, 2001, 2005, 2005, and

2011). These reference values include the Recommended Dietary Allowance (RDA), Adequate Intake (AI), Tolerable Upper Intake Limit (UL), and Acceptable Macronutrient Distribution Range (AMDR) to set a range for adequate nutrition needs. The DRIs correspond with daily nutritional goals set in the DGA recommendations. The DRIs for children are separated into two age groups, children 1-3 and 4-8 years-old. The DRIs can be found in Table 2 which shows the latest DRI. Although we only focused on aged 4-8 for this study, daily goals for ages 1-3 are in Table 2 for refence.

Table 2: Daily Nutritional Goals for Age-Sex Groups Based on Dietary Reference Intakes and Dietary Guidelines Recommendations.

Nutrient	Source of Goals	Child 1-3 years-old	Female 4-8 years-old	Male 4-8 years-old
Calorie Level		1,000	1,200	1,400-1,600
Protein, g	RDA	13	19	19
Carbohydrate, g	RDA	130	130	130
Dietary Fiber, g	RDA	19	25	25
Added sugars, % kcal	DGA	<10%	<10%	<10%
Total Fat, % kcal	AMDR	30-40%	25-25%	25-35%
Saturated Fat, % kcal	DGA	<10%	<10%	<10%
Sodium, mg	UL	1500	1,900	1,900
Iron, mg	RDA	7	10	10
Calcium, mg	RDA	700	1,000	1,000
Vitamin A, mg RAE	RDA	300	400	400
Vitamin C, mg	RDA	15	25	25

RDA = Recommended Dietary Allowance, DGA = *2015-2020 Dietary Guidelines* recommended limit, AMDR = Acceptable Macronutrient Distribution Range, UL = Tolerable Upper Intake Level

The Academy of Nutrition and Dietetics (AND) recommends that children who attend part-time centers (4-7 hours a day) should receive at least one-third of their daily nutrient requirements from food and beverages, while children in full-time centers (8 hours or more) should receive at least one-half to two-thirds of their daily nutrient requirements from food and beverages (Benjamin-Neelon, 2018). For Mississippi, nutrition guidelines for licensed child care/early education programs are also outlined in the Annotated Mississippi Code, Title 43. Public Welfare, Chapter 20. Child Care Facilities, Mississippi Child Care Licensing Law. (Mississippi State Department of Health, Miss. Code Ann. §43-20-8, 2017). The guidelines must meet Minimum Standards for Nutritional Care in Child Care Centers. The standards include healthier practices and behaviors involving limiting processed pre-fried foods to one per week, including two fresh fruits and one fresh vegetable per week, providing water with all meals and snacks, serving meals at tables where children can sit together, and having designated meal and snacks times. The standards for nutritional care in child care centers in the state of Mississippi state that child care facilities open for nine or less hours must serve either two snacks and one meal, or one snacks and two meals, while facilities open more than nine hours must serve either two snacks and two meals, or three snacks and one meal. As there are suggestions for improving the menus to follow the recommendations for daily nutrients of children aged 1-3 and 4-8, including decreasing sodium intake for both age groups, increasing fiber intake for both age groups, and increase total calorie intake for children aged 4-8; a previous study found that most child care centers in North Mississippi did have menus that met the Dietary Reference Intakes (Knight, Hickey, Aloia, Oakley, & Bomba, 2015).

Child care centers who participate in the CACFP and HS typically serve more nutrient-dense foods that are appropriate for a preschool-aged child compared to their non-federal program counterparts (Erinosho et al., 2018; Korenman, Abner, Kaestner, & Gordon, 2013). However, research also shows that some CACFP centers are not fully compliant with guidelines and regulations set forth by the CACFP, and the recommendations by AND (Van Stan, Lessard, & Phillips, 2013; Dev, McBride, & The STRONG Kids Research Team, 2013). Although CACFP centers are only required to comply with guidelines set by the USDA, AND's *Benchmarks for Nutrition in Child Care* (Van Stan, Lessard, & Phillips, 2013; Dev, McBride, & The STRONG Kids Research Team, 2013) also reflect similar nutrition guidelines, as both set out to be nutritionally consistent with the DGA. However, AND's benchmarks are set standards that will instill positive and healthy eating behaviors in young children, that could be beneficial in preventing childhood obesity. Dev, McBride, & The STRONG Kids Research Team (2013) found that HS providers exceeded CACFP-only providers when assessing compliance with AND's 2011 *Benchmarks for Nutrition in Child Care*. They found that HS providers sat more frequently with children during meals, ate the same foods as children, served meals family style, received more nutrition-education opportunities, encouraged more balance and variety of foods, offered healthier foods, modeled healthy eating, and provided more nutrition education when compared to CACFP-only and non-CACFP providers. Results showed that greater compliance with AND's Benchmarks could possibly be due to the increased nutrition training opportunities provided for HS providers, parents, and children compared to the CACFP-only and non-CACFP counterparts.

Training and skill levels of child care directors

Much of the current research concludes that increased training could improve child care providers' knowledge, thus helping to improve the nutrition environment in child care centers. Cole, Vidgen, and Cleland (2016) found that many providers relied on their personal experiences or "common knowledge" rather than evidenced based guidelines when determining if the food provided was nutritionally adequate. Van Stan, Lessard, and Phillips (2013) found that offering a series of broad, in-person training sessions to child care providers was effective in increasing knowledge of statewide regulations. This study utilized a full-day training session for all centers in Delaware, where new licensing reforms had been enacted to improve nutrition, physical activity, and screen viewing-related environments in child care centers. They concluded that the trainings were effective and well received by the audience, and could be used to increase nutrition knowledge of child care providers. Similarly, Lanigan (2012) found provider knowledge improvement with the ENHANCE wellness project, which utilized a 7-hour wellness retreat with national experts in child obesity prevention, child feeding, and physical activity. This study found that an increase in feeding knowledge was correlated with changes in feeding practices, and improvements in nutrition education were correlated with changes in providers' efficacy, misconception, feeding knowledge, and priority. Understanding the child care provider's existing knowledge and providing training is essential in improving nutrition outcomes in child care centers.

Aside from the child care center provider's nutrition knowledge, training to improve the child care feeding environment could also benefit and encourage better feeding habit among small, child-care-aged children. A systematic review of behavior interventions among child care

centers found that interventions that incorporated the child care center environment, technical support, and trainings found positive results (Sisson et al., 2016). They noted that the interventions included creative and fun curriculums for children while focusing on improving the child care center environment, policies, practices, menus, and food preparation procedures. Blaine et al. (2015) also found that education on environments that promote healthy eating behaviors would be beneficial to providers, especially those who participate in CACFP. They found that CACFP centers provided healthier eating behaviors and environments, such as the provider sitting with children at meals, offering fruits and vegetables, and limiting fast foods, but still needed training on feeding infants and toddlers, especially when eating family style.

Training child care providers and staff at child care centers is one way to improve the meals and eating environment, but having someone with formal nutrition training, like a RDN could also be beneficial to improving child care menus. Some studies suggest that while menus appear to provide some adequate nutrients, like protein, zinc, vitamin A, and vitamin C, having a nutrition professional involved in the planning process can help bridge the gap in discrepancies with inadequate menus and ensure that key nutrients are provided that may otherwise be deficient. (Frampton, Sisson, Horm, Campbell, Lora, & Ladner, 2014; Erinosho, Dixon, Young, Brotman, & Hayman, 2011). Similarly, Benjamin, et al. (2009) found that only eight states required a nutrition professional, such as a RDN to review menus at child care centers, providing then with an opportunity to exert influence over foods and beverages served. Mississippi met five out of six standards set by the Caring For Our Children – National Health and Safety Performance Standard: Guidelines for Out-Of-Home Child Care Programs (CFOC), which is a collaboration between the American Academy of Pediatrics, the American Public Health

Association, and the US Department of Health and Human Services. The 5 standards met included posting menus, dating menus, menus reflecting food served, and menus kept on file. The state of Mississippi does require a nutrition professional to review child care menus, but does not require a RDN specifically. However, CACFP-participating centers in the state of Mississippi do have access and opportunities to work with RDNs as many RDNs currently work for the Mississippi State Department of Health conducting audits and on-site trainings for centers participating in CACFP.

There is limited previous research on the nutritional makeup of child care menus in Mississippi. Most recently, Erinosho et al. (2018b) studied food and beverages served, as well as nutrition practices at family child care homes in Mississippi, but did not include child care centers. They found that CACFP centers typically reported serving healthier beverages, healthful nutrition practices, and generally had more nutrition policies compared to their non-CACFP counterparts. They also found that 38% of CACFP centers very often or always encouraged professional development on healthy eating. Oakley, Bomba, Knight, and Byrd (1995) reported that while most centers were meeting meal pattern guidelines for child care nutrition programs, such as CACFP, there were still discrepancies with nutrition adequacy and compliance with RDA's. No study since has evaluated Mississippi child care centers' compliance with CACFP or collected information on who was planning the menus.

Therefore, the purpose of this research is to assess perceived knowledge of, skill at providing, and perception of relevance of CACFP best practices by center directors at Mississippi child care centers participating in CACFP. Knowing this information will help target specific needs for future training and may inform CACFP policy decisions. Training on the

current regulations in place for CACFP and how they are aligned with the nutrition recommendations for preschool children can help directors in CACFP facilities provide an optimal nutrition environment for children who attend these centers. This will not only help instill healthy eating behaviors at a young age, but could also help prevent obesity later in adolescence and adulthood.

CHAPTER III

METHODS

A 38-question survey was adapted from the Institute of Child Nutrition's (ICN) (formally The National Food Service Management Institute) (2003) *Steps to Nutrition Success Checklist for Child Care Centers* which centered around the CACFP best practices. *The Steps to Nutrition Success Checklist for Child Care Centers* was developed by the ICN as a resource for program self-assessment. Completing the *Steps to Nutrition Success Checklist* can help child care centers determine the quality of the nutrition program provided for the children. The *Steps to Nutrition Success Checklist* contains three main sections- 1) Administration and Operations; 2) Nutrition; and 3) Health, Safety, and Well-Being of Children. The survey used in this study was adapted to evaluate the knowledge, skills, and attitudes of child care center directors in Mississippi child care centers by asking them to self-rate their use of CACFP best practices. These optimal best practices were outlined by the USDA Food and Nutrition Services (FNS) so that child care centers and homes may choose to adopt to further improve the nutritional value of foods offered.

Although following CACFP best practices are not required, assessing execution of best practices and comparing that with current menu pattern standards may help facilitate areas of need for future training. Participants ranked their answers from "Skilled" if they were already doing a best practice well, "Some" if they have started working on a best practice, but need more

training, "Maybe" if they might work on a best practice in the future with training on how to begin, and "NA", or not applicable, if they did not think the best practice is needed. The survey responses were designed to evaluate each center's director's perceived knowledge and skill level for planning and providing meals. The survey was approved by the Institutional Review Board of the University of Mississippi (UM) and then was sent to 535 of the 1182 Mississippi child care centers that participate in the CACFP.

Along with a survey, the director of each center was sent a consent form and a cover letter that explained the study. Participants were also asked to send in a sample menu from their respective centers. This data was used to evaluate the compliance with CACFP meal pattern guidelines. If a center sent a menu spanning multiple weeks, the first week was selected to keep data consistent. The serving sizes were based on the CACFP's guidelines for minimum portion sizes for children ages 3-5, and are found in Table 3.

Subjects

To create the sample group, a Microsoft Excel document containing the names of all 1526 licensed child care centers in the state of Mississippi was obtained from the Mississippi State Department of Health (Child Care Provider Search, n.d.) and formatted to include the name, address, phone number, and maximum occupancy of each center. The list of centers was reviewed to identify missing phone numbers or addresses. An attempt was made to locate any missing information, but the addresses of some centers were listed as 'confidential' because they work with battered women and children, or other high-risk groups. These centers, along with child care homes who serve less than 10 children, were eliminated from the list of potential survey candidates to give a final list of 1182 child care centers.

A sample size formula was run to determine the sample size that would be needed to give a confidence interval of 95% (Suresh, 2011). Using the Andrew Hedges random number generator, a sample of 350 numbers between 1 and 1182 was generated. This list of numbers was applied to the child care center list, and a sample of 335 child care centers was selected. The researchers followed up with the centers who had not responded, and received two additional surveys, for a total of 39 surveys. In an attempt to garner more samples, another group of 225 child care centers was selected using the same process. After repeated numbers were eliminated, 200 centers were left in the second sample group, making the final number of the sample group 535. From the second sample, there were 18 responses making the total sample size 57.

CACFP Menu Compliance

For convenience and consistency, guidelines for children ages 3-5 year-old were used. The CACFP meal components guidelines require ¾ cup of unflavored low-fat or fat-free milk for lunch and supper, with 97% of child care centers compliant with this component. For meat and meat alternates, 1 ½ oz is required for lunch and supper, with 100% of child care centers compliant with this component. The updated guidelines required the fruit and vegetable components to be separated, with ¼ cup of each required for lunch. Child care centers also have the option of serving ¼ cup of two different vegetables in the place of a serving of vegetable and a fruit at lunch and supper.

Data Analysis

Data from returned surveys were entered into Microsoft Excel, and response percentages were then calculated. Menus were analyzed using *NutriKids*® Version 17Rochester,NY nutrient analysis software database which averaged each menu. As some centers only sent in menus for one or two days instead of an entire week, menu analysis is based off of one single meal (lunch) from each center. If a child care center director sent a menu spanning multiple weeks, the first week was selected to keep data consistent for each center. As lunch meals evaluated for the National School Lunch Program must demonstrate that they provide 1/3 to 1/2 of daily nutrient values for grades K-12 on average over a one-week period (Nutrition Standards in the National School Lunch and School Breakfast Programs, 2012), meal averages were compared to one-third of children's daily nutrition goals based on DGA using Dietary Reference Intakes (DRI).

It is worth noting that CACFP meal component guidelines are separated into age groups 1-2 years old and 3-5 years old, while the daily nutrient goals based on DGAs using DRI are separated into age groups 1-3 years old and 4-8 years old. Although the age groups reflected in these groups are not identical, the newly implemented CACFP meal component guidelines are based on the DGAs (Nutrition Standards for CACFP Meals and Snacks, 2013). The only way to compare nutritional adequacy for these age groups is with the DGAs that use RDIs even though CACFP meal component age groups are different. Among the CACFP age groups, the meal components are consistent throughout the groups, but the serving sizes may differ which can cause the nutrient content to differ. Menu analysis results, including age groups 1-3 years old and 4-8 years old for reference, can be found in Appendix 3, while daily nutritional goals based on

DRI and DGA recommendations Dietary Guidelines for Americans for 2015-2020, 2015) can be found in Table 2.

Table 3: CACFP meal pattern requirements for lunch and dinner for children age 3-5

Food Components	*Minimum Quantity*
Fluid Milk	6 fluid ounces
Meats/meat alternates	1 serving Examples
Lean meat, poultry, or fish	1 ½ ounce
Tofu, soy products, or alternate protein products	1 ½ ounce
Cheese	1 ½ ounce
Large egg	¾
Cooked dry beans or peas	3/8 cup
Peanut butter or soy nut butter or other nut or seed butter	3 Tbsp.
Yogurt, plain or flavored, unsweetened or sweetened	6 ounces or ¾ cup
Peanuts, soy nuts, tree nuts, or seeds	¾ ounce
Vegetables	¼ cup
Fruits	¼ cup
Grains	1 serving Examples
Whole grain-rich or enriched bread	½ slice
Whole grain-rich or enriched bread product, such as biscuit, roll, muffin	½ serving
Whole grain-rich, enriched, or fortified cooked breakfast cereal, cereal grain, and/or pasta	¼ cup

CHAPTER IV

RESULTS

The survey response rate was 12% the first mailing, 9% the second mailing, and 11% total. Percent responses can be found in Tables 4 and 5.

Best Practice Adherence

The responses from the survey were separated into two categories corresponding to the ICN's *The Steps to Nutrition Success Checklist for Child Care Centers* (2003)*:* Administration and Operations and Nutrition. Overall, the Administration and Operations section had a total response rate of 63% in the "Skilled", 23% for "Some", and 9% for "Maybe" suggesting that more than half of the child care center directors had previous training or experience in this area. In *The Steps to Nutrition Success Checklist*, the Administration and Operation section was further separated into several categories: Guidelines and Procedures, corresponding with questions 1-3 on the survey used in this study; Menu Planning and Food Preparation, corresponding with questions 4-10 and 12; Purchasing Food corresponding with question 13; Mealtime Considerations, corresponding with questions 14-18, and Food Safety, corresponding with questions 20-21.

For the questions under the Nutrition section, 58% felt "Skilled", with 23% selecting "Some", and 8% selecting "Maybe. The Nutrition section was further separated into several

categories in *The Steps to Nutrition Success Checklist:* Meal Requirements corresponding with questions 11 and 22-24; Nutrition Recommendations corresponding with questions 26-32; Special Foods and Nutrition Needs corresponding with questions 33-36; and Nutrition Education corresponding with questions 37-40.

The majority of center directors (82%, n=47) felt that they were skilled in using the nutrition requirements of the CACFP, HS, or licensure to ensure that the food and nutrition needs of the children are met, and 15% (n=9) responded that that they needed more training to continue using the best practice. Seventy-seven percent (n=44) responded that they were planning menus that meet CACFP meal pattern requirements for meals and snacks, with 12% (n=7) responding that they needed more training to continue the best practice and 1 center director responding that more training was needed to initiate the best practice in the future. Seventy-two percent (n=41) felt that they were serving the required amounts of food at meals and snacks, with 18% (n=10) responding that they needed more training to continue the best practice and 1 center director responded that they needed more training to initiate the best practice. Eighty-eight percent (n=50) felt that they were following all food safety and health regulations, licensure regulations and other rules, while 11% (n=6) needed more training to continue the best practice.

For the development of daily food production records, 70% (n=40) of center directors responded as being skilled, 16% (n=9) responded that they needed additional training to continue the best practice, 7% (n=4)) needed training to initiate the best practice, 5% (n=3) responded that it was unnecessary or did not apply to them. Although 49% (n=28) of centers felt skilled at using the *Food Buying Guide for Child Nutrition Programs* to determine amounts of food to purchase, 26% (n=15) felt they needed more training in the best practice to be skilled. 18% (n=10) needed

training in the future to initiate the best practice, and 7% (n=4) did not respond. Only 68% (n=39) of centers were developing work schedules for food preparation employees, while 16% (n=9) responded that they have started but need more training, 5% (n=3) needing more training in the future, and 11% (n=6) responding that the best practice is not needed or does not apply to them. Seventy-nine percent (n=45) of center directors/mu planners felt skilled at serving meals and snacks so that all foods are at peak freshness and quality, while 19% (n=11))responded that they could use more training to be skilled, and 1 center director responded needing training to initiate the best practice. Similarly, 84% (n=48) of center directors responded as being skilled at training other child care program staff members in proper hand washing and food safety procedures. Only 9% (n=5) responded that they needed more training, but had already started the best practice, and 7% (n=4) did not respond.

Ninety-one percent (n=52) of center directors responded that they were skilled at creating a clean and pleasant place for children to eat, with 7% (n=4) responding that they need more training to feel skilled, and 1 center director responding that future training is needed to initiate the best practice. Seventy-four percent (n=42) of center directors responded that they were skilled at arranging tables and seating areas to encourage conversation among children and with the teachers, while 21% (n=12) felt that they had started but needed more training, 1 center director needed more training to initiate the best practice, 1 center director responding that the best practice was unnecessary or did not apply to them. Sixty percent (n=34) were skilled at encouraging caregivers to sit with and eat the same meals and snacks as the children, 26% (n=15) needed more training but had started, 9% (n=)5 needed more training to initiate the best practice, and 4% (n=2) responding that the best practice was not needed or did not apply to

them. Forty-six percent (n=26) of center directors felt skilled at facilitating pleasant mealtime conversations related to the foods served, including telling stories, or using other activities to teach children about healthy foods. Thirty-seven percent of (n=21) center directors had started this best practice but needed more training to be skilled, while 9% (n=5) responded that they needed training to start the best practice in the future, 1 center director responding that it was not needed or did not apply to them, and 7% (n=) 4 not responding. Eighty-eight percent (n=50) of center directors felt skilled at giving the children enough time to eat without hurrying, while 12% (n=7) had started the best practice but needed more training to be skilled. Seventy-nine percent (n=45) of centers directors responded that they were skilled at providing the right amount of assistance to children during mealtime, while 21% (n=12) had started the best practice, but needed additional training.

Center directors did not respond as being as skilled at the best practices concerning the provision of healthy foods to special needs children. Only 18% (n=10) felt skilled at writing food and nutrition procedures for feeding children with special needs. Forty-six percent (n=26) had started the best practice but needed more training to be skilled, while 18% (n=10) felt they needed training to initiate the best practice. Eighteen percent (n=10) responded that the best practice was unnecessary or did not pertain to them. Fifty-three percent (n=30) of the respondents answered that children with special needs were included in mealtime activities as much as possible, while 14% (n=8) had started this but needed more training. Seven percent (n=4) felt that they needed more training to start the best practice in the future, with 19% (n=11) responding that the best practice is not needed or does not pertain to them, and 7% (n=4) not responding. Sixty-seven percent (n=38) of the center directors responded that they were skilled at

basing special nutrition needs on written recommendations of a recognized medical authority, while 16% (n=9) responded that they needed more training. Four percent (n=2) of center directors needed training to start the best practice in the future, while 7% (n=4) responded that the best practice was not necessary or did not apply to them and 7% (n=4) did not respond.

Sixty-five percent (n=37) of caregivers were skilled at adapting menus to meet the nutritional and feeding needs of children, while 18% (n=10) had started but needed more training, 7% (n=4) of centers felt that they needed training to initiate this practice, 4% (n=2) felt that is was not needed or did not pertain to them, and 7% (n=4) did not respond. While 67% (n=38) of center directors responded that they were skilled at making appropriate menu substitutions when necessary, 22% (n=13) responded that they had started but needed more training. One center director felt that they needed more training to start the best practice in the future and 9% (n=5) did not respond. Although 21% of participants (n=12) responded that they already have a plan in place for obtaining the services of a RDN for consultation on diet orders when meals needed to be modified, 21% (n=12) stated that they are just starting to implement a plan for an RDN and could use more training, and 32% (n=18) stated they would implement a plan in the future if they had more training. Meanwhile, 18% (n=10) felt that having a plan in place for a RDN was not needed.

For planning cycle menus, 68% (n=39) felt that they were accomplishing this best practice, with 23% (n=13) needing more training to continue the practice and 4% (n=2) needing more training to initiate. Fifty-six percent (n=32) responded that they were already using standardized recipes to assure the right amount of food was prepared and healthy food preparation methods are used, with 32% (n=18) needing more training to continue, 9% (n=5)

needing training to initiate this best practice, and 4% (n=2) responding that it is not needed or does not apply to them. Seventy-two percent (n=41) of centers are preparing foods using healthy cooking methods (such as steaming instead of boiling and roasting instead of frying), with 23% (n=13) needing more training to continue the best practice, 1 center director responding that future training is needed to initiate the best practice, and 1 center director responding that this practice is not necessary or does not pertain to them.

Forty-nine percent (n=28) of center directors note children's food choices and preferences to incorporate them into the menu, while 37% (n=21) need additional training to continue doing this, 9% (n=5) need training to initiate it, and 4% (n=2) of centers do not think it is needed. Thirty-three percent (n=19) of centers were planning nutrition education activities to help children accept new foods, with 37% (n=21) needing more training to continue the best practice, 25% (n=14) needing training to initiate, and 5% (n=3) finding the practice unnecessary or not applicable. Similarly, 37% (n=21) felt skilled at providing nutrition education as a component of the comprehensive child care curriculum, while 37% (n=21) felt skilled at having current age-appropriate nutrition education materials readily accessible to child care teachers. Respectively, 32% (n=18) and 33% (n=19) had started the best practices but needed more training, while 21% (n=12) and 18% (n=10) needed more training to initiate the best practice in the future. Interestingly, only 5% (n=3) of centers were already involving parents in promoting new menus and foods offered in the child care centers, with 47% (n=27) needing additional training to continue the best practice, 39% (n=22) needing training to initiate the best practice, and 9% (n=5) responding that this best practice was not needed or did not apply to them.

Only 30% (n=17) felt skilled at planning menus that considered the ethnic and cultural background of the children, with 33% (n=19) starting the best practice but identifying the need for more training. Twenty-five (n=14) percent of center directors responded that they need training to initiate the best practice in the future, 9% (n=5) felt the best practice was not needed or did not apply, and 4% (n=2) did not respond. However, 60% (n=34) of center directors felt skilled at providing meals and snacks that include foods familiar to the children and consistent with the cultures represented in the center. Twenty-five percent (n=14) had started this best practice but needed more training, 5% (n=3) responded that they needed training to initiate the best practice, 4% (n=2) responded that it was unnecessary or not applicable, and 7% (n=4) did not respond.

Sixty percent (n=34) of center directors responded that they were skilled at allowing children to decide how much to eat from the foods offered and decline unwanted foods. Twenty-one percent (n=12) had started doing this but identified the need further training. Sixty-eight percent (n=39) of center directors responded that they felt skilled at providing snacks that promote healthy eating habits, while 18% (n=10) had started the best practice but needed more training to be skilled. Similarly, 63% (n=35) felt skilled at planning menus around a wide variety of foods, especially fruits and vegetables. while 30% (n=17) had started the best practice but needed more training to be skilled.

Questions Related to Nutrition Standards

Forty-four percent (n=25) of center directors responded that they were skilled at providing the right amount of calories and fat, while 33% (n=19) responded that they need more training in this area, and 14% (n=8) responded that they needed training to begin to do this.

Menu analysis found that on average, meals from these centers were providing 498 calories per meal, which met one-third of daily needs for males 4-8 years old (500 calories) but exceeded one-third of daily calories needs for females aged 4-8 years-old (400 calories). Total fat percent per meal was 27%, which was within the recommended range for males and females 4-8 years-old (25-35% per day).

Similarly, 60% (n=34) of center directors responded that they were skilled at planning meals and snacks that are low in sodium and sugar, while 65% (n=37) felt skilled at planning meals and snacks to include whole grains, fruits, and vegetables for plenty of fiber. Twenty-five percent (n=14) responded that they could use more training to plan meals and snacks that are low in sodium and sugar, while 23% (n=13) of center directors responded that they could use more training to include whole grains, fruits, vegetables, and fiber when planning meals. All the child care center menus (n=35) were compliant with vegetable and meat/meat alternative guidelines. Ninety-seven percent (n=34) of the child care center menus were compliant with fruit and milk guidelines. Grains had the lowest compliance rate at 23% (n=9). Grains were only counted as compliant if the menus specifically listed the food item as “whole grain” or “whole wheat” and occurred at least 50% of the time.

In addition to the grain compliance of only 23%, menu analysis found that meals from these centers were providing a mean of 764 mg of sodium, 17.52% of calories as added sugar, and 5.72 g of dietary fiber per meal. The sodium and added sugar exceeded one-third of daily needs for males 4-8 years-old (633.34mg sodium and <10% added sugar), and females 4-8 years-old (633.34 mg sodium and <10% added sugar). However, menu analysis showed that the

dietary fiber per average meal met the daily recommendation for females 4-8 years-old (5.6 g), and almost met the recommendation for males 4-8 years-old (6.5 g).

Seventy-seven percent (n=44)of center directors/menu planners responded that they were skilled at planning meals that included foods rich in Vitamins A and C (fruits and vegetables), iron (meat, poultry, green vegetables, and enriched breads and cereals), and calcium (milk, cheese, yogurt, and fortified orange juice). Only 14% (n=7)responded that they had started the best practice but needed additional training. Menu analysis found that on average, meals from these centers were providing 4140.06 IU of Vitamin A, 29.07 mg of Vitamin C, 3.22 mg of iron, and 459.92 mg of calcium. Vitamin A averages per meal was exceeding one-third of daily nutrients for both groups (females 4-8 years-old, and males 4-8 years-old) which were 100 mcg, 133.3 mcg, and 133.3 mcg respectively. Vitamin C averages per meal was exceeding one-third of daily nutrients for both groups (females 4-8 years-old, and males 4-8 years-old) which were 5 mg, 8.3 mg, and 8.3 mg respectively. Calcium averages per meal was also exceeding one-third of daily nutrients for both groups (females 4-8 years-old, and males 4-8 years-old) which were 233.34 mg, 333.34 mg, and 333.34 mg, respectively. The meal average for iron met one-third daily needs of males and females 4-8 years-old (both at 3.34 mg, respectively).

Menu analysis also showed that the mean daily total protein (g) and energy (calories) for one week of lunches exceeded one-third of the daily nutrient needs for both age groups. The average total protein was 28.09 g per meal, while one-third of daily needs for females 4-8 years-old, and males 4-8 years-old were 4.3 g, 6.3 g, and 6.3 g respectively. The mean total carbohydrate per meal was 63.83 g, while one-third of daily needs for females and male 4-8 years old was 43.34 g respectfully. However, mean total saturated fat percentage per meal was

9.97%, which fall at the upper limit but still within recommended ranges for both age groups at <10% respectively.

Table 4: Child care centers' response to performing suggested Administration and Operations best practices.

Best Practice		Skilled	Some	Maybe	NA	Unanswered
Guidelines and Procedures	1. Use the nutrition requirements of the CACFP, Head Start, or licensure to ensure that the food and nutrition needs of the children are met.	82%	16%	15%	0%	2%
	2. Writing food and nutrition procedures for feeding children with specialty needs.	18%	46%	18%	18%	2%
	3. Completing daily food production records.	70%	16%	7%	5%	2%
Menu Planning and Food Preparation	4. Developing work schedules for food preparation employees.	68%	16%	5%	11%	0%
	5. Serving meals and snacks so that all foods are at their peak of freshness and quality is at its best.	79%	19%	2%	0%	0%
	6. Noting children's food choices/preferences and incorporating them into the menu.	49%	37%	9%	4%	2%
	7. Planning nutrition education activities to help children accept new foods.	33%	37%	25%	5%	0%
	8. Involving parents in promoting new menus and foods offered in the center.	5%	47%	39%	9%	0%
	9. Planning menus that child care consider the ethnic and cultural backgrounds of the children.	30%	33%	25%	9%	4%
	10. Planning cycle menus.	68%	23%	4%	0%	5%
	12. Preparing foods using healthy cooking methods such as steaming instead of boiling and roasting or grilling instead of frying.	72%	23%	2%	2%	2%
Purchasing Food	13. Using the *Food Buying Guide for Child Nutrition Programs* to determine amounts of food to purchase.	49%	26%	18%	7%	0%
Mealtime Considerations	14. Creating a clean, pleasant place for children to eat.	91%	7%	2%	0%	0%
	15. Arranging tables and seating areas to encourage conversation among children and with teachers.	74%	21%	2%	2%	2%
	16. Encouraging caregivers to sit with and eat the same meals and snacks as the children.	60%	26%	9%	4%	2%
	17. Giving children enough time to eat without hurrying.	88%	12%	0%	0%	0%
	18. Providing the right amount of assistance to children during mealtime.	79%	21%	0%	0%	0%
Food Safety	20. All food safety and health regulations, licensure registration, or other rules are followed.	88%	11%	0%	0%	2%
	21. Training all child care program staff members in proper hand washing and food safety procedures.	84%	9%	0%	0%	7%

Table 5: Child care centers' response to performing suggested Nutrition best practices.

Best Practice		Skilled	Some	Maybe	NA	Unanswered
Meal Requirements	11. Using standardized recipes to assure the right amount of food is prepared and healthy food preparation methods are used.	56%	32%	9%	4%	0%
	22. Planning menus to meet the CACFP meal pattern requirements for meals and snacks.	77%	12%	2%	2%	7%
	24. Making appropriate menu substitutions when necessary.	67%	23%	2%	0%	9%
	25. Serving required amounts of food at meals and snacks.	72%	18%	2%	0%	9%
Nutrition Recommendations	26. Planning meals to include foods rich in Vitamins A and C (fruits and vegetables), iron (meat, poultry, green vegetables and enriched breads and cereals), and calcium (milk, cheese, yogurt, and fortified orange juice).	77%	12%	2%	0%	9%
	27. Planning meals and snacks that provide the right amounts of calories and fat.	44%	33%	14%	2%	7%
	28. Planning meals and snacks to include whole grains and fruits and vegetables for plenty of fiber.	65%	23%	5%	0%	7%
	29. Planning meals and snacks that are low in sodium and sugar.	60%	25%	7%	2%	7%
	30. Planning menus around a wide variety to foods, especially fruits and vegetables.	63%	30%	0%	0%	7%
	31. Children can decide how much to eat from the foods offered, and are allowed to decline unwanted foods.	60%	21%	4%	7%	9%
	32. Meals and snacks include foods familiar o children and consistent with the cultures represented in the center.	60%	25%	5%	4%	7%
Nutrition Needs	33. Special nutrition needs are based on written recommendations of a recognized medical authority.	67%	16%	4%	7%	7%
	34. Menus are adapted to meet the nutrition and feeding needs of children.	65%	18%	7%	4%	7%
	35. A plan is in place for obtaining the services of a registered dietitian for consultation on diet orders when meals are to be modified.	21%	21%	32%	18%	9%
	36. Children with special needs are included in mealtime activities as much as possible.	53%	14%	7%	19%	7%
Nutrition Education	37. Nutrition education is provided as a component of the comprehensive child care curriculum.	37%	32%	21%	2%	9%
	38. Current age-appropriate nutrition education materials readily accessible to child care teachers.	37%	33%	18%	5%	7%
	39. The child care program staff facilitate pleasant conversations at mealtimes related to the foods served, tell stories, and use other activities that teach children about healthy foods.	46%	37%	9%	2%	7%
	40. Snacks provided by the facility promote healthy eating habits.	68%	18%	5%	2%	7%

CHAPTER V

DISCUSSION

The percentages of survey responses indicate that directors at CACFP participating child care centers perceive themselves as 'skilled' in a variety of best practices. Participants felt most skilled at providing a clean, pleasant place for the children to eat, and food safety and health regulation. This may be because employees at child care centers are receiving optimal training in food safety and hygiene. This contradicts Enke, Briley, Curtis, Greninger, and Staskel (2007) who found that there is a need for continual food safety training for child care staff.

The results from our survey also found that many directors felt as though they were skilled at providing and compliant with nutrition standards set by the CACFP. This is supported by the fact that 100% of centers were compliant with providing a meat or meat alternate, 100% were compliant with providing a vegetable, and 97% were compliant with providing milk and a fruit. Previous literature is inconsistent on this issue as many studies found that many child care centers are not fully compliant with nutrition guidelines and regulations set by the CACFP (Van Stan, Lessard, & Phillips, 2013; Dev, McBride, & The STRONG Kids Research Team, 2013). However, Oakley, Bomba, Knight, and Byrd (1995) found that many child care centers in the state of Mississippi were meeting the CACFP meal pattern guidelines, there were still some nutritional inadequacies found when they conducted a menu analysis.

Neymotin (2013) stated that positive parental involvement promoted better behavioral outcomes, but Dev et al. (2017) found that many child care centers face barriers with communication with many parents. Five percent of the respondents in this study involve parents in promoting new menus and foods offered in their child care centers, and 47% have started involving parents but feel they could benefit from more training. In a study of day-care homes in Rhode Island, Tovar, Risica, Mena, Lawson, Ankoma, and Glans (2015) found that more Hispanic than non-Hispanic providers strongly agreed with the following statements: "I believe it is important to communicate with parents and families regarding nutrition" (87.8% vs 46.9%) and "I discuss with parents/families if lunches or snacks sent in are not healthy" (66.7% vs 20.4%). Hispanic family child care homes, providers also felt more comfortable than non-Hispanic providers in passing information on to parents and families about good nutrition practices (70.0% vs 45.2%). Also, more Hispanic than non-Hispanic providers strongly agreed that they were comfortable discussing a child's weight problem with parents and families (56.4% vs 22.8%).

Over half (68%) of the questions under the Administration and Operations section had a response of "Skilled" for at least 60% of the participants. This may suggest that much of the training and/or previous experience of directors is in administration. This is similar to the findings of Larson, Loth, and Nanney (2019) and Byington and Tannock (2011) which state that child care providers were interested in training involving CACFP administration related training (paperwork, time management, and meal pattern compliance) as well as creative menu planning with new recipes.

Analysis of the center menus showed that the recommendations for Vitamin A, Vitamin C, calcium, and iron are either being met or exceeded for females 4-8 years-old, and males 4-8 years-old. Furthermore, children who attend non-CACFP participating centers are at an increased risk of exposure to not meeting daily nutrition goals, specifically with milk and vegetables (Korenman, Abner, Kaestner, & Gordon, 2013). This is of concern because eating behaviors learned during childhood are often carried through adolescence and into adulthood (Leal et al., 2017). This means that if children are not being exposed to healthier eating behaviors at a young age, like eating a variety of fruits, vegetables, whole grains, lean proteins, and dairy, they are less likely to execute those eating behaviors later in life, which could increase their likelihood of health issues such as obesity.

Only 44% of directors responded that they were skilled in planning meals and snacks that provide the right amount of calories and fats, and results from the menu analysis revealed that meals from the child care centers were providing 498 calories per meal on average, which met one-third of daily needs for males 4-8 years old, but exceeded one-third of daily calories needs for females aged 4-8 years-old. This is consistent with the findings from Maalouf, Evers, Griffin, and Lyn (2013), who analyzed 24 menus at child care centers in Georgia found that they were providing one half to two-thirds of the DRI for energy. Although Maalouf, Evers, Griffin, and Lyn (2013) found that menus were high in saturated fat, the average saturated fat per meal in this study (9.95%) was within the daily recommendation for all children.

Sixty percent of directors considered themselves skilled at planning meals and snacks that are low in sodium and sugar. While the menu analysis revealed that the sodium and added sugar exceeded one-third of daily needs for males 4-8 years-old, and females 4-8 years-old, the mean

amount of sodium (763.8 mg) was less than the amounts of this nutrient reported by Oakley et al. (1995) and Knight et al.(2015) who both previously studied menus at child care centers in Mississippi and found average sodium per meal was 789 mg and 1049 mg, respectfully. The lower sodium level seen in this study may be due to the 2017 revisions to the CACFP meal component regulations which include serving a greater variety of fruits and vegetables which contain less sodium than many processed foods.

Mean dietary fiber per meal met daily needs of females 4-8 years-old. This is more positive than the finding from Maalouf et al. (2013), Frampton et al. (2014), and Knight et al. (2015), who all found the child care menus analyzed in their studies to be high in sodium, high in sugar, low in fiber, and not meeting the recommended amount of fruits, vegetables, or whole grains. As the components were met by most of the centers in this study for fruits (97%) and vegetables (100%), this improvement may also be due to the CACFP meal pattern changes made in 2017.

Although several studies have shown that having a nutritional professional, such as an RDN, review and assist with menu planning can help increase the nutritional adequacies of menus (Frampton, Sisson, Horm, Campbell, Lora, & Ladner, 2014; Erinosho, Dixon, Young, Brotman, & Hayman, 2011), previous literature has shown that few states require RDNs to review child care center menus (Benjamin et al., 2009). While some centers in this study are already utilizing the services of a RDN for consultation on diet orders when meals require modification, more than half stated that they needed more training or knowledge for this to happen, and 18% felt that having a plan in place for a RDN is not needed. The state of Mississippi currently does not require RDNs to review and approve menus, although there are

several RDNs working with the Mississippi State Department of Health conducting audits and on-site trainings for centers participating in CACFP. These RDNs are also available for consultation with individual centers, but it is likely that most child care centers are unaware of these opportunities (Child Nutrition Staff, n.d.).

The results from this study found three best practices with ten or more responses for "not applicable". As previously mentioned, 18% of center directors (n=10) do not feel having the services of a RDN for consultation as necessary. Eighteen percent of center directors (n=10) also responded that writing food and nutrition procedures for feeding children with specialty needs was necessary for their center, while 19% (n=11) responded that including children with special needs in mealtime activities as much as possible was not needed at their center. It is possible that these child care centers did not have special needs children in attendance at the time the survey was taken. However, privately-run child care centers, including child care centers provided by government agencies like HS and CACFP, must be in compliance with Title III of the Americans with Disabilities Act (ADA) (Commonly asked questions about child care centers and the Americans with Disabilities Act, 2017).

Along with adequate nutrition served during meals, the overall nutrition environment can play a role in molding positive eating behaviors. Recent literature shows that positive feeding practices and opinions of early educators can improve consumption of nutrient-dense foods, such as vegetables (Lehto et al., 2019). The results from the current study show that many center directors are skilled in providing a positive eating environment with practices such as creating clean, pleasant place for children to eat (91%), arranging tables and seating to encourage conversation among children and teachers (74%), giving children enough time to eat without

hurrying (88%), and serving foods when they are at their peak freshness and quality at its best (79%).

Implications

Although training is currently required to participate in the CACFP, these trainings can vary at the state level. The state of Mississippi does require all child care staff members to complete 15 hours of staff development, which includes addressing nutrition on a broad level. However, there are currently no specific guidelines or regulations concerning nutrition training and meal planning. This can leave room for open interpretation or confusion about specific nutritional guidelines and, in turn, contribute to nutritional inadequacies. There are several approved trainings given by credible centers, including The Institute of Child Nutrition who also provides a plethora of educational materials on many child nutrition topics. The results from this study show that child care center directors felt they were lacking in training for utilizing the services of a RDN. This was probably a factor in the finding that directors also felt they were lacking in training addressing the needs of special needs children, which could also be improved by the use of a RDN. The results indicate that child care center directors could use more in-depth training in nutrition covering topics such as the procurement of the services of an RDN, appropriate energy consumption, reducing sodium and added sugar, and the provision of nutrition education

Limitations

Because the surveys were returned anonymously, there was no way to know if the responses were evenly distributed throughout the state of Mississippi. Although focusing on one specific state could potentially help improve future state policies and regulations, it may decrease

generalizability across the county. Another limitation is the small sample of 57 centers and response rate of 11%, which may increase the potential for non-response bias. Because the knowledge of best practices was self-reported, the chance of biased results being biased is increased, as questions may have been interpreted differently. Finally, the current study only analyzed child care centers, leaving out child care homes and limiting the results to a specific population.

CHAPTER VI

CONCLUSION

The findings from this study indicated that the majority of child care center directors that participated in this study believed themselves to be skilled at several key areas of best practices, especially in using the nutrition requirements of the CACFP, HS, or licensure to ensure that the food and nutrition needs of the children are met and creating a clean, pleasant place for the children to eat. Center directors also indicated a need for more training in some areas, especially writing food and nutrition procedures for feeding children with specialty needs and involving parents in promoting new menus and foods offered in the child care center. This could help instill healthier eating behaviors among young children who attend child care, which could theoretically help decrease the risk of developing obesity. Although most of the meal components are being met at child care centers, some nutritional inadequacies are still occurring. This also indicates a need for improvement in the nutritional content of the foods served at child care center with possible training needed. Overall, the findings from this study show that while child care center directors in the state of Mississippi are skilled in many best practices associated with early childhood nutrition, there is a perceived need to improve nutrition education training in some key areas.

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Appendix A

Child Care Center Consent

And

Cover Letter

Appendix A.1 Child Care Center Consent

Study Title: Revue of Menus & Production Activities in Mississippi Child Care Facilities

Investigator
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Lenoir Hall
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University, MS 38677
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☐ By checking this box I certify that I am 18 years of age or older.

The purpose of this study is to revue cycle menus and details about food production in Mississippi child care centers to in order to help us design training that will help food service directors and workers do their jobs better.

If you agree to participate, we would ask that you please:

1. Fill out the enclosed survey of questions about the preparation of food in your food facility.
2. Put the completed survey and **a copy of your cycle menus** in the enclosed stamped, return-addressed envelope and mail it to us.
3. Please do not put your name or the name of your facility on the survey or the cycle menus.

This will take about 1 hour of your time.

Possible risks and benefits from your participation.

We do not anticipate any risks associated with your participation in this study. You will also not receive any benefits. However, you might experience satisfaction from contributing to knowledge that may improve training for childcare facilities. Also, answering the survey questions might make you more aware of things that you would like to change or continue – sometimes this can help lead to improved food production.

Confidentiality
All information in the study will be collected from you anonymously: it will not be possible for anyone, even the researchers, to associate you or your facility with your responses.

Right to Withdraw
You do not have to participate, and there is no penalty if you refuse. You also do not have to answer any questions that you prefer not to answer.

IRB Approval
This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). If you have any questions, concerns, or reports regarding your rights as a participant of research, please contact the IRB at (662) 915-7482 or irb@olemiss.edu.

Statement of Consent
I have read and understand the above information. By completing the survey/interview I consent to participate in the study.

Appendix A.2 Cover Letter

THE UNIVERSITY of MISSISSIPPI

DEPARTMENT OF NUTRITION AND HOSPITALITY MANAGEMENT

March 13, 2017

Dear Director,

As you well know, running a food service for childcare is not easy. We at the University of Mississippi are trying to develop good educational materials for childcare food service directors and workers, but we need your help.

Could you please fill out the enclosed consent form and survey and then send them back to us, along with a copy of your cycle menus? We would really appreciate it, and it would help us know what we need to do to develop the kind of training that will really help you to do your jobs better.

Thank you so much for your help.

Sincerely,

Kathy Knight

Kathy B. Knight, PhD, RD, LD
Associate Professor

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Appendix B

Child Care Survey

Appendix B. Child Care Survey

CACFP Best Practice Checklist

(Adapted from the Institute of Child Nutrition's Steps to Nutrition Success Checklist for Childcare Centers.

Please rate your knowledge of each of the Best Practices below. Check "Skilled" if you are already doing a Best Practice well. Check "Some" if you have started working on a Best Practice, but need more training. Check "Maybe" if you might work on a Best Practice in the future, but need training on how to begin. Check "NA" (Not Applicable) if you do not think the Best Practice is something you need to be doing.

Best Practices	Skilled	Some	Maybe	NA
1. Use the nutrition requirements of the CACFP, Head Start, or licensure to ensure that the food and nutrition needs of the children are met.				
2. Writing food and nutrition procedures for feeding children with special needs				
3. Completing daily food production records.				
4. Developing work schedules for food preparation employees.				
5. Serving meals and snacks so that all foods are at their peak of freshness and quality is at its best.				
6. Noting children's food choices/preferences and incorporating them into the menu.				
7. Planning nutrition education activities to help children accept new foods.				
8. Involving parents in promoting new menus and foods offered in the childcare center.				
9. Planning menus that consider the ethnic and cultural backgrounds of the children.				
10. Planning cycle menus.				
11. Using standardized recipes to assure the right amount of food is prepared and healthy food preparation methods are used.				
12. Preparing foods using healthy cooking methods such as steaming instead of boiling and roasting or grilling instead of frying.				
13. Using the *Food Buying Guide for Child Nutrition Programs* to determine amounts of food to purchase.				
14. Creating a clean, pleasant place for children to eat.				
15. Arranging tables and seating areas to encourage conversation among children and with teachers.				
16. Encouraging caregivers to sit with and eat the same meals and snacks as the children.				
17. Giving children enough time to eat without hurrying.				
18. Providing the right amount of assistance to children during mealtime.				
20. All food safety and health regulations, licensure registration, or other rules are followed.				

21. Training all child care program staff members in proper hand washing and food safety procedures.				
22. Planning menus to meet the CACFP meal pattern requirements for meals and snacks.				
24. Making appropriate menu substitutions when necessary.				
25. Serving required amounts of food at meals and snacks.				
26. Planning meals to include foods rich in Vitamins A and C (fruits and vegetables), iron (meat, poultry, green vegetables and enriched breads and cereals), and calcium (milk, cheese, yogurt, and fortified orange juice).				
27. Planning meals and snacks that provide the right amounts of calories and fat.				
28. Planning meals and snacks to include whole grains and fruits and vegetables for plenty of fiber.				
29. Planning meals and snacks that are low in sodium and sugar.				
30. Planning menus around a wide variety to foods, especially fruits and vegetables.				
31. Children can decide how much to eat from the foods offered, and are allowed to decline unwanted foods.				
32. Meals and snacks include foods familiar to children and consistent with the cultures represented in the center.				
33. Special nutrition needs are based on written recommendations of a recognized medical authority.				
34. Menus are adapted to meet the nutrition and feeding needs of children.				
35. A plan is in place for obtaining the services of a registered dietitian for consultation on diet orders when meals are to be modified.				
36. Children with special needs are included in mealtime activities as much as possible.				
37. Nutrition education is provided as a component of the comprehensive child care curriculum.				
38. Current age-appropriate nutrition education materials readily accessible to child care teachers.				
39. The child care program staff facilitate pleasant conversation at mealtimes related to the foods served, tell stories, and use other activities that teach children about healthy foods.				
40. Snacks provided by the facility promote healthy eating habits.				

Appendix C

Menu Analysis

Appendix C. Menu analysis

Menu nutrient average based off of one meal and recommended daily nutrient intakes as suggested by the Academy of Nutrition and Dietetics

Daily nutrient intake*	1 meal average	Child, 1-3 years-old 1/3	Female, 4-8 years-old 1/3	Male, 4-8 years-old 1/3
Calories	497.83	334	400	467-534
PRO (g)	28.09	4.3	6.3	6.3
Carbohydrate (g)	63.83	43.34	43.34	43.34
Dietary Fiber (g)	5.72	4.67	5.6	6.5
Added Sugar (%)	17.52%	<10%	<10%	<10%
Total Fat (%)	27%	30-40%	25-35%	25-35%
Saturated Fat (%)	9.97%	<10%	<10%	<10%
Sodium (mg)	763.8	500	633.34	633.34
Iron (mg)	3.22	2.34	3.34	3.34
Calcium (mg)	459.92	233.34	333.34	333.34
Vitamin A (IU)	4140.06 (1242.02 mcg)	(333.34 IU (100 mcg)	444.34 IU (133.3 mcg)	444.3 IU (133.3 mcg)
Vitamin C (mg)	29.07	5	8.3	8.3

* The Academy of Nutrition and Dietetics (AND) recommends that children who attend part-time programs (4-7 hours a day) should receive at least one-third of their daily nutrient requirements from food and beverages, while children in full-time programs (8 hours or more) should receive at least one-half to two-thirds of their daily nutrient requirements from food and beverages.

VITA

Education

- Associate of Arts | December 2014 | Itawamba Community College, Fulton, Mississippi
    - Major: Nutrition
    - Phi Theta Kappa Honor Society
    - GPA: 3.77
- Bachelor of Science | Didactic Program in Dietetics| May 2017 | The University of Mississippi, Oxford, MS
    - Major: Nutrition and Dietetics
    - Gamma Beta Phi Honor Society
    - GPA: 3.67

Skills & Abilities

- Mississippi Academy of Nutrition and Dietetics Outstanding Dietetic Student-Coordinated Program Nominee
- ServSafe Instructor; ServSafe Certified

Experience

- Graduate Assistant/Student Worker | RebelWell, University, MS | 9/2016-5/2018

- Assisted registered dietitian nutritionist with various health and wellness projects around University campus and Oxford community
- Contributed to research and data analysis within the nutrition landscape
- Created and updated various presentations and new course materials as directed by the registered dietitian nutritionist