

Evaluation of meals served in state registered childcare settings

Abstract

The prevalence of obesity nationally among 2-5-year-old children declined from 14% in 2003–2004 to 9.4 percent in 2013-2014. However, low-income families and certain racial and ethnic groups continue to have higher rates of obesity above the national average. Past studies have indicated that children who participate in the Child and Adult Care Food Program (CACFP) are less likely to be overweight than those who do not participate in this kind of program.

The goal of this study was to determine compliance of meals offered in private childcare centers in Waller County and to evaluate the nutritional quality as well as content of meals served in state registered child care facilities against the 2015–2020 Dietary Guidelines. Nutritional adequacy of breakfast and lunch menus and the types of foods offered were assessed against the Dietary Guidelines 2015-2020. A cross-sectional descriptive study design was utilized to this aim. A convenience sample of 10 childcare centers was selected. Menus were collected from selected centers and three were visited for on-site meal observation. Menus were analyzed by nutrient content using Nutritionist Pro software (Axxya Systems, Stafford, Texas) and the Statistical Package for the Social Sciences (SPSS). The results showed significantly lower intakes between the 2015-2020 Dietary Guidelines for children between ages of 1-5 years old and the intake of protein ($P<0.00$), fat ($P<0.01$), calcium ($P<0.01$), and fiber ($P<0.04$). Thus, we concluded that children's dietary intakes did not meet dietary guidelines on some key nutrients necessary to support proper growth and development and prevention of disease.

Keywords: childhood obesity, nutrient intake, meal adequacy

Volume 8 Issue 5 - 2018

Beverly M Copeland, Sharon McWhinney, Adeze Osonkie

Department of Agriculture and Human Sciences, Prairie View A&M University, USA

Correspondence: Beverly Copeland, College of Agriculture and Human Sciences, Prairie View A&M University, PO, Box 519, USA, Tel + 936, 261, 5017 Email bacopeland@pvamu.edu

Received: September 16, 2018 | **Published:** October 15, 2018

Introduction

Obesity in adults and children has been a problem throughout modern history but only in the past 30 years has it increased to epidemic proportions. It is evident that during the past three decades the proportion of obese children became nearly tripled across all age groups. Estimation from the 2011-2012 National Health and Nutrition Examination Survey (NHANES) indicated that 17% of children and adolescents ages 2-19 years are overweight.¹

Elsewhere, the Centers for Disease Control and Prevention (CDC) in 2009 reported on a study conducted by the Pediatric Nutrition Surveillance System (PedNSS) that one in three low-income preschool children are overweight or obese before their 5th birthday. In regard to this the CDC stated that obese children are more likely to have obesity-related health conditions at an early age. These include high blood pressure, high level of cholesterol, and type 2 diabetes that all account for risk factors for cardiovascular disease.²

Therefore, it is important to consider what causes a child to be overweight. This can include environmental factors at which affect either food intake or energy expenditure. In this regard, analysts have tended to point to factors like the availability and consumption of calorie-rich fast foods. CDC stated behaviors that influence weight gain include high-calorie, low-nutrient foods, and beverages coupled with physical inactivity.³ Other research has pointed out the increase in the consumption of foods eaten away from home, fast foods, and snacks among young preschool-aged children. These aligned with development of poor eating patterns at an early age; have raised

concerns about diets and the risk of overweight among young children. Thus, with this high rate of obesity in younger children, it is imperative to identify food selection patterns associated with weight status in preschool-aged children.⁴ Even though CDC showed the prevalence of obesity decreasing among children aged 2 to 5 years from 13.9% in 2003-2004 to 9.4% in 2013-2014, this still suggests that far too many children are suffering from the obesity crisis today.²

Preschool children who consume the minimum recommended daily servings of fruits and vegetables generally have a lower body mass index (BMI). Furthermore, obese children are less likely to consume the recommended daily amounts of fruits and vegetables than children of normal weight.⁵ In addition, when children's fruit and vegetable intakes increase, decreases in fat and sugar intake have been noted.⁵ Therefore, exposing young children to taste low-fat foods with adequate intakes of fiber and whole grains would be an important component of early childhood and preschool obesity prevention programs. Fruits and vegetables are also essential in providing vitamins and minerals for growth and development.⁶

The United States Department of Agriculture (USDA) current regulations require schools to meet meal plan requirements for daily and weekly servings. Table 1 provides a summary of the USDA recommended guidelines for children Kindergarten to 5 years old.

The Dietary Guidelines for Americans 2015 to 2020⁷ recommends a total of 1000 calories for a child between 1 and 3 years old and 1200 calories for girls 4 to 8 years old and 1400 to 1600 calories for males 4 to 8 years old per day.

According to Natale et al.⁸ reporting on findings from Aud et al.⁹ the time that young children spend in childcare setting has increased over the years and stands about 52% in the recent economic recession.¹⁰ Due to the amount of time spent in out-of-home care, the environment that the child is in can influence dietary intake and health behaviors.¹¹ Dev & McBride¹¹ reported on an article written by Health and Human Services (2012) more than 12million preschool children attend childcare in America where they consume half to three-quarters of their food energy on a daily basis. Due to the long hours spent in these childcare centers, early nutritional behaviors can be formed and transferred into adulthood.¹¹ The increased in time with weight gain has drawn attention from policymakers and other groups in focusing on preschools and childcare centers, and homes as an important access point for nutritional programs for young children, especially those in underserved populations.

Table 1 USDA's National school breakfast and lunch programs

Breakfast meal pattern	One day	Amount per week
Fruits(cups)	1	5
Grains	1	10-Jul
Milk	1	5
Min-Max calories (kcal)	350-500	
Saturated Fat % of total calories	<10	
Sodium (mg)	≤430	
Lunch Meal Pattern		
Fruits (cups)	0.5	2.5
Vegetables	0.75	3.75
Additional veg to reach total	1	1
Grains (oz eq)	1	09-Aug
Meat /Meat Alternate (oz eq)	1	10-Aug
Fluid Milk (cups)	1	5
Min-Max calories (kcal)	550-650	
Saturated fat % of total calories)	<10	
Sodium (mg)	640	

The Child and Adult Care food program (CACFP), administered by the U.S. Department of Agriculture and designated state agencies, spend over 2billion annually to reimburse child providers for meals and snacks served children in their care.¹² CACFP standards require proper portion sizes and recommended food component to be served if reimbursement is to be claimed for meals. Breakfast should provide milk, fruit/vegetables, and grain, lunch should provide milk, fruit/vegetables, one grain/bread, one meat or meat alternate, and snacks consist of two components from milk and fruit/vegetables, meat or meat alternate or grain/bread. In addition, meals served in a family setting, with the appropriate portions of food for the children and caregiver(s) available at the table.

Even though CACFP provides valuable services to low-income children and their families, it fails to reach many children, including children needing help because of program rules that prevent some childcare providers from participating in the program.¹²

With the increase in childhood obesity among preschool children, and the long hours they are spending in childcare in America nowadays this study seeks to determine the compliance of meals offered in private childcares centers in comparison with recommended governmental standards.

Methodology

The utilized research design in this study was the cross-sectional descriptive survey. Internet search to find state registered childcare centers in Waller County was done by a student assistant. A convenience sample of 10 childcare facilities was selected. A letter explaining the purpose of the project and the information sought to collect was sent to the childcare centers to seek permission to evaluate their facility to observe lunch meal service. No names, addresses or any other identifying information were collected.

To determine the compliance of meals offered in private childcare centers in comparison with recommended Government standards and to determine the nutritional adequacy of the meals served and the types of foods offered to children in childcare centers, three weeks cycle menus were collected from each childcare center, and observation of a lunch meal service accomplished. The menus were compared to the U.S. Dietary Guideline 2015-2020 and USDA/CACFP standards.¹³ Nutritionist Pro software (Axxya Systems, Richmond, WA) was used to calculate food energy and nutrient content of center menus.

Center menus are public information and, no permission is required to collect menus from the centers. However, we obtained permission to observe the lunch meals before visiting the centers. Childcare centers that granted permission were visited once during lunch, and meal service proceedings were observed.

Results

Table 2 results showed the Childcare Centers in Waller County. There were 36 States registered childcare centers found, out of which only 12 were found to be in operation. Of the 12 that were in operations, eight responded to our request and provided menus. Of the eight that responded and provided menus, only three granted permission for onsite lunch observation.

Table 3 results showed the macronutrients of center menus. Proteins and Fats were statistically lower than the dietary recommendations from the Dietary Guidelines. There was no difference noted between the Dietary Guidelines for calories and carbohydrates among center menus.

Table 4 results showed the micronutrients in the center menus. Calcium, Vitamin A and fiber were statistically lower than the recommendations from the Dietary Guidelines. Other nutrients such as Vitamin C were higher than recommended intakes and sugar was lower than the recommended intakes. No difference was noted for Sodium intakes.

Table 2 Childcare centers in Waller country

Childcare centers in waller county	
State Registered	36
Operational	12
Granted Permission	8
Allowed Visitation and meal observation	3

Table 5 results showed the average intakes of fruits and vegetables served as calculated from center menus. An average of 2 servings of fruits and 1.25 servings of vegetables were calculated from center menus using Nutrition Pro Computer analysis software. Intakes of fruits were found to have met the 2 cup-equivalents of the Dietary equivalent per servings as stated by the Dietary Guideline 2015-2020.

Table 3 Macro nutrients of center menus
P<0.05 Significant **

	Dietary standard	Mean	Std. deviation	Std. error mean	P value
KCAL	825	771.4	222	48.5	0.283
Protein (g)	41.5	29.4	11.9	2.6	.000**
CHO (g)	103.5	107.2	0	0	0.655
FAT (g)	27.5	23.5	6.44	1.405	.010**

Table 4 Micro nutrients of center menus
p< 0.05 Significant **

	Dietary standard	Mean	Std. deviation	Std. error mean	P value
Vitamin A (iu)	873333	3499.1	2963.8	646.7	.000**
Vitamin C (mg)	15	53.96	58.653	12.8	.006**
Calcium (mg)	637.5	512.6	206.5	45	.012**
Sodium (mg)	1275	1152.3	441.5	96.3	0.217
Fiber (g)	11.5	8.9	5.5	1.2	.042**
Sugar (g)	81.5	62.8	21.2	4.74	.001**

Table 5 Average fruits and vegetable intakes by childcare centers

Childcare centers	Average fruits intake per cup equivalent	Average vegetable intake per cup equivalent
1	2	1.67
2	2.5	1
3	1.67	0.67
4	1.5	0.75
5	4.17	2.34
6	1.67	0.5
7	2	2.5
8	1.67	0.67
Average	2.02	1.25

Discussion

Adequate consumption of fruits and vegetables have been reported to be protective against overweight/obesity and can provide dietary fiber that is linked to lower incidence of cardiovascular disease and better weight control in adulthood.¹⁴ In this study, the average serving of fruits and vegetables were below the recommendations set forth by the 2015-2020 Dietary Guidelines for Americans and by CACFP standards. This finding is in line with the 2015-2020 Dietary Guidelines that stated that over 80% of the US, population was not consuming the recommended servings of vegetables, and over 70% consume under the amount of fruit when considering the recommendation. The recommended intakes for fruits were adequate in this study; however, the intakes for vegetables did not meet the recommendations. Analysis of the center menus showed inadequate amounts of vegetables were being offered to the children.¹⁵

Chu et al.¹⁵ reported that poor dietary intake is associated with a myriad of chronic diseases that include in part obesity. In this study, some key nutrients, namely calcium and fiber were being under-consumed. Consumptions were below the recommended guidelines. Continuous under intakes of these nutrients, especially calcium can have lasting effects into adulthood. Milk is a good contributor of calcium in children's diet, but in our observation of the school menus and meal service, adequate servings of dairy was not being served, and

other foods such as dark green leafy vegetables that would provide some amount of calcium to the diet were not observed in the menus or meal service. Hence, the results of these findings reflect significantly low calcium intakes. The Dietary Guidelines reported that the average intake of dairy for most age and sex falls far below the average recommended intakes. They stated that the average intakes for most 1 to 3years old may the requirement, but all other age groups fall below the recommendations. Dietary observation and analysis of center menus in this research found servings to be below recommendations among all age groups.

The Dietary Guidelines recommends the focus to be on nutrient density, and the amount by choosing foods from a variety of nutrient-dense foods across all food groups. Variety and nutrient density were lacking in both the menus analyzed and the lunch meal the observed. Some of the food items served to the children were of inferior nutrient quality such as cheese balls and fruits jelly snacks for lunch, which was inappropriate food intake.

The site observation also showed that the posted menus and the actual food items served on the day of the site visit were not consistent, which leads one to believe that the menus were mostly there for show up and not a true depiction of the foods that are being served to the children.

Of the 8 childcare centers where data were collected and analyzed, only one was being funded by CACFP and was therefore required to follow their standards. Among the others, even though they are not mandated to follow the 2015-2020 Dietary Guidelines or CACFP standard requirements, the children would be better served by centers with good practice, maintaining personal accountability in providing meals to children that meet their daily requirements while under their care. According to past research, childcare centers that practice family style meal service experience more pleasant meal times with reduced stress and more open communication, all of which lends itself to the child development and the child being able to regulate his or her eating. The family style also provides an opportunity for modeling eating behavior with childcare providers sitting at the table and eating the same meal with the children.¹⁶ The consumption of some key nutrients needed for proper growth and development were found to be inadequate in these findings, namely calcium, vitamin A, and fiber. Continuous inadequacies of these nutrients can lead to negative health in the end. Past research has suggested that the consumption of fruits are normally higher than vegetable intake, with that pattern found to be consistent with these findings.¹⁷ Vegetable intake did not meet the recommendations set forth by the Dietary Guidelines 2015-2020 and fell short of the required 2½ cup-equivalent per servings. While fruit intakes were found to be adequate according to the recommendations of the Dietary Guidelines, intakes were mostly met by fruit juice consumption.

According to past research, it is understood that schools alone cannot combat the obesity problem, but it can play a vital role and can serve as a medium for change.¹⁸ With research suggesting that 12 million preschool children attend childcare in America where they consume half to three-quarters of their food energy on a daily basis, sound nutrition policy is needed to ensure that children are given balance and nutritious meals when they are in a daycare setting.¹¹

Conclusion

The researchers concluded that children's dietary intakes did not meet dietary guidelines on some key nutrients necessary to support proper growth and development and prevention of disease. Moreover, continuous inadequacies of these nutrients can lead to negative health effects that can persist into adulthood.

Acknowledgements

Prairie View A&M University provided grant funding for this research. We would like to thank Adaeze Osonkie, a graduate research assistant who worked on this project. The views expressed are solely those of the authors and should not be attributed to Prairie View A&M University.

Conflict of interest

Authors declare that there is no conflict of interest.

References

- Ogden CL, Carroll MD, Kit BK, et al. Prevalence of obesity in the United States, 2011-2011. *JAMA*. 2014;311(8):806-814.
- Center for Disease Control and Prevention. *Childhood Obesity Causes & Consequences*. 2017.
- Center for Disease Control and Prevention. *Prevalence of Childhood Obesity in the United States, 2011-2014*. 2017.
- Raynor HA, Jelalian E, Vivier PM, et al. Parent-reported eating and leisure-time activity selection patterns related to energy balance in preschool-and school aged children. *J Nutr Educ Behav*. 2009;41(1):19-26.
- Hudson CE, Cherry DJ, Ratcliffe SJ, et al. Head Start children's lifestyle behaviors, parental perceptions of weight, and body mass index. *J Pediatr Nurs*. 2009;24(4):292-301.
- Miller P, Moore RH, Kral TV. Children's daily fruit and vegetable intake: associations with maternal intake and child weight status. *J Nutr Educ Behav*. 2011;43(5):396-400.
- USDA Dietary Guidelines For Americans 2015-2020. 8th ed. USA; 2015.
- Ruby Natale, Monica Page, Lee Sanders. Nutrition and Physical Activity Practices in Childcare Centers Versus Family Childcare Homes. *Early Childhood Education Journal*. 2014;42(5):327-334.
- Aud S, Hussar W, Kena G et al. *The condition of education 2011*. National Center for Education Statistics, US Government Printing Office, USA: Washington; 2011. 410 p.
- Kim J, Shim JE, Wiley AR, et al. M. Is There a Difference Between Center and Home Care Providers' Training, Perceptions, and Practices Related to Obesity Prevention? *Matern Child Health J*. 2012;16(8):1559-1566.
- Dev DA, McBride BA. Academy of Nutrition and Dietetics Benchmarks for Nutrition in Child Care 2011 Are Child-Care Providers across Contexts Meeting Recommendations? *J Acad Nutr Diet*. 2013;113(10):1346-1353.
- Korenman S, Abner KS, Kaestner R, et al. The Child and Adult Care Food Program and the Nutrition of Preschoolers. *Early Child Res Q*. 2013;28(2):325-336.
- <https://www.nutritionistpro.com/>
- Slavin JL, Lloyd B. Health Benefits of Fruits and Vegetables. *Adv Nutr*. 2012;3(4):506-516.
- Chu YL, Storey KE, Veugelers PJ. Involvement in Meal Preparation at Home Is Associated With Better Diet Quality Among Canadian Children. *J Nutr Educ Behav*. 2014;46(4):304-308.
- Dipti AD, Sperirs KE, McBride BA, et al. Head Start and child care providers' motivators, barriers, and facilitators to practicing family-style meal service. *Early Childhood Research Quarterly*. 2014;29(4):649-659.
- Anastasia Snelling, Constance Newman, Erin Watts, et al. Paring fruits and vegetables to promote consumption in elementary school cafeterias. *Journal of Child Nutrition & Management*. 2017;41(1):1-13.
- Story M, Nannery MS, Schwartz MB. Schools and Obesity Prevention: Creating School Environments and Policies to Promote Healthy Eating and Physical Activity. *Milbank Q*. 2009;87(1):71-100.