

☐ “Take Off 4-Health”: Nutrition Education Curriculum for a Healthy Lifestyle Camp for Overweight Youth.

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Abstract

There is evidence that residential summer weight loss camps can be effective to initiate or support the small change approach to address childhood obesity. This report describes the development and evaluation of nutrition education for overweight adolescents attending a three week healthy lifestyle camp. Campers were given a diet prescription based on MyPyramid and self-selected their meals and snacks that were served family style. The curriculum included eating strategies known to contribute to healthy weight in youth. Campers demonstrated improved ability to estimate portion sizes. Thirty-four campers completed the three week experience with a weight loss considered to be safe.

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INTRODUCTION

Residential weight loss and fitness camps are popular in the United States¹⁻². They typically feature exercise, healthy food selections, nutrition education, weight loss tips, self esteem building and fun activities. In the short term, residential weight loss programs, especially those that restrict calories, appear effective across a range of health indicators²⁻⁴. Unfortunately, there are no reports of long term success in treating established childhood obesity through large changes in diet and physical activity. This paper describes the nutrition education curriculum designed for *Take Off 4-Health (TO4H)*, a healthy lifestyle camp for overweight youth. We have adopted the small-change approach⁵, immersing overweight adolescents in an environment that allows them to learn how to make small changes in their energy intake and increases in physical activity. Also discussed are lessons learned from implementing the nutrition curriculum that may benefit other health professionals as they develop summer camp programs.

METHODS

The Camp.

TO4H was a three week residential camp experience for overweight youth. At camp, youth initiated weight loss, built self esteem, and learned multiple strategies for leading a healthy lifestyle. The rationale and description of a similar, earlier effort from this group to provide this type of camp are reported elsewhere⁶. *TO4H* was a collaborative effort of the Pediatric Healthy

Weight Research and Treatment Center at East Carolina University's Brody School of Medicine, the staff of the Eastern 4-H Center, a rural 4-H camp facility, and Family and Consumer Sciences Agents with the NC Cooperative Extension. The camp was priced about \$1,000 less than other weight loss camps described and also advertised on the web⁷. The daily schedule included physical activities, nutrition education classes, cognitive behavior therapy and traditional camp activities. Rather than plated calorie controlled meals typically found in weight loss camps, *TO4H* followed the 4-H camp tradition of providing family style meals.

The Participants.

In 2008, participants included 26 girls and 8 boys, ages 12–18 years. Most (70%) were African American. Most campers were economically disadvantaged and, if Medicaid eligible, qualified for scholarships provided by a local hospital foundation. IRB approval was obtained from the East Carolina University and Medical Center Institutional Review Board. At the beginning of camp, anthropometric data (height, weight, waist circumference) and assessments of quality of life, depression, health behaviors and body image were collected from the campers. Parents also completed the assessments. Those results are reported elsewhere⁸. The mean baseline body mass index (BMI) was 41.9. All except two campers lost weight; which averaged two pounds a week (an average of 6.7 pounds total weight loss over the three weeks or 2.5% of their initial weight), with a decline of greater than one BMI unit and greater than two inches in reduced waist circumference⁸. This weight loss is similar to that reported by Gately, et al² who provided moderate calorie restricted meals. About half of the campers are being case managed in their home community and have not experienced weight rebound⁸.

Nutrition Education Curriculum.

Six hours were allocated by the camp's medical director (DC) for nutrition education classes. An additional hour was used to explain the individualized diet prescription based on MyPyramid⁹. The objective was to provide the knowledge and skills campers would need to achieve a healthy weight when they returned home. For curriculum development, the authors conducted a literature review, explored relevant web sites, contacted professional list serves for camp-related menus and curricula, and reviewed the 4-H camp's current menu. The theory of planned behavior change guided the curriculum development. Nutrition education lessons focused on food choices participants would practice while at camp and continue upon their return home. The camp's menus reflected foods found in school meal programs and at home. They were familiar items in grocery store. The nutrition education curriculum included a modified camp menu; "camper meal cards" with a one hour introduction to the use of the card and portion size education; six, one-hour interactive nutrition classes; counselor training; and a family take-home packet.

Menu and Meal Camper Cards.

The camp's standard menu were modified by the researchers in cooperation with the camp's food service manager while ensuring the nutrient needs of growing adolescents were met. The Dietary Guidelines for American¹⁰ were followed. Meals were low in fat and sugar, and whole grains and fiber were adequately supplied. Some of the changes made to the current menu were adding a daily salad bar and fresh fruit, specifying the size of meat portions, and using skinless poultry, lower fat and sugar food preparation techniques. Modifications were made

within the camp's budgetary constraints and no "diet" or specialty products were included. Two small daily snacks were served in addition to the three meals.

Each camper received a personalized nutrition prescription, presented as a camper meal card (Figure 1) to guide food choices and portion sizes at meals and snacks. To promote a safe weight loss while at camp, The MyPyramid calorie levels⁹ for age and gender were chosen at the sedentary activity level of activity. The daily amount of food from each food group was based on the MyPyramid food intake patterns for each calorie level⁹.

Nutrition Classes.

The nutrition content (Table 1) was selected based on eating strategies recognized as contributing to healthy weight in youth¹¹. The researchers adapted components from two existing programs: *Eat Smart Move More Weigh less (ESMM-WL)*¹² and Expanded Food and Nutrition Education Curriculum, *Families Eating Smart and Moving More*¹³. For example, the popular "Rethink Your Drink" graphic from the *ESMM-WL* was changed to reflect the timing and beverages consumed by teens (Figure 2). The interactive lessons matched the key messages and included a PowerPoint presentation, instructor guide, handout and hands-on activity. The materials (available at <http://www.ecu.edu/cs-dhs/pedsweightcenter/camp.cfm>.) were branded as *TO4H* with the logos of the partnering groups.

Family Take-Home Packet.

In addition to copies given to campers, each family received a magnet with healthy living tips; tear off shopping lists, an *ESMM-WL* magazine, an interactive CD to aid teens making healthy food choices, a meal planning white board, and a scale to monitor weight.

Implementation.

One author (NH) reviewed the menus and provided technical assistance so the food service staff could provide the appropriate sized portions of food and ensure the Dietary Guidelines¹⁰ were followed. Camp counselors and campers received training on use of camper meal cards. Camp counselors also received a two hour overview on childhood obesity that included a review of evidence based physical activity, nutrition and behavioral strategies for the prevention and treatment of childhood obesity from a physician and a registered dietitian (DC, KMK). A registered dietitian (NH) prepared the personal dietary prescription and instructed the campers in its use. The lessons were delivered by Family and Consumer Science agents previously trained in providing weight management programming and a dietitian (SH) who works exclusively with overweight youth.

Evaluation and Measures

Formative evaluation of the entire nutrition education curriculum described above was completed by professionals involved in *TO4H* through interview (VS), written reports, and conference call discussions and at a post-camp debriefing meeting. The effectiveness of the portion size education was assessed through pre and post surveys.

Portion Size Education and Practice.

Prior to any education on the camper meal card or portion size, campers completed a Portion Estimation Assessment (PEA) survey. In this assessment, which has been used in other settings with youth populations¹⁴, campers were shown a series of ten NASCO™ (Fort Atkinson, WI) food models: two starches (bread and popcorn), two vegetables (collards and carrots) two fruits (apple sauce and fruit juice), two dairy products (milk and cheese) and two meats (pork chop and roast beef). Each camper held and inspected each food model and then estimated in writing the amount of food (ounces or cups) the model represented. Following the PEA survey, a one-hour class was conducted that included a demonstration of the use of the meal card to guide choices, as well as the rationale for each individual's caloric prescription and the distribution of calories into servings from food groups. Each food group was discussed including food choices, portion sizes, and healthier choices within each food group. Campers were taught to use their hand as a visual reference to estimate portion sizes and were provided guided examples. At the conclusion of the class, and again at the end of camp, 29 of the campers repeated the PEA. All foods listed on the PEA survey were served during the three weeks of camp with the exception of collards.

For each time point (pre, post and follow-up) campers estimated portion size for each food item on the survey. Their estimates were subtracted from the actual portion size of the food item to determine error in estimation. Differences for all items were put into absolute values (level of error from 100% accuracy) and summed to provide a pre difference score, post difference score and follow up difference score. Paired t-tests were used to analyze for statistical differences between mean scores for each time point.

RESULTS AND DISCUSSION

The role of a summer residential camp as a strategy to initiate treatment for overweight and obese children is of interest to many. In this case, the 4-H summer camp program was a good partner for a not-for-profit weight loss camp that adopts the small changes approach. The 4-H mission is to empower youth to reach their full potential, working and learning in partnership with caring adults. While traditional camps focus on the outdoor experience, the 4-H pledge and its clover insignia denote 4-H's goal as the four-fold development of youth: Head, Heart, Hands and Health. This 4-H residential camp program accommodated a multi-component program, including nutrition education, to help youth achieve a healthy weight. Positive features of the nutrition education curriculum as well as areas for improvement were identified through the formative evaluation.

Nutrition Education.

The camp provided sufficient nutrition education in a “real life” environment for most campers to lose weight at a safe rate. Six hours of nutrition education was successfully incorporated into the camp day. The nutrition content for campers was appropriate for this age group. Although we did not objectively evaluate the entire nutrition education curriculum, we did test the camper's ability to estimate portion sizes. Their ability to do so significantly improved from pre to post assessments ($t(28) = 3.29, p < 0.05$) and pre to final assessments ($t(28) = 2.86, p < 0.05$). However, no significant differences were found between post to final assessments indicating portion estimation training was effective and changes in ability were retained. Although campers did improve their ability to recognize appropriate portion sizes, campers

might benefit from additional 2-5 minute nutrition tips regarding portion sizes specific to each meal or snack delivered at the time of food selection.

Camp Menus and Family Style Service.

The standard camp menus and recipes were able to be modified to improve the nutrient value and energy density of the meals and did not require the purchase of specialty food items. The healthfulness of the camp menu could be strengthened if the menus met the criteria outlined in the [*Eat Smart: North Carolina's Recommended Standards for All Foods Available in School*](#)¹⁵.

Campers used, although not consistently, their personalized camper meal cards. Some youth, unfamiliar with family style food service, needed additional coaching about appropriate manners when passing serving plates of food. Campers might also benefit from a formal session on the etiquette of family style meal service. Counselors appreciated the training provided but need additional training to assist campers in consistent use of their meal cards. Food service staff requested additional training to better understand recipe modifications, portion sizes and their role in helping campers select healthy meals and beverages. It was suggested that it may be important to find a way that is easy and fun to monitor individual food intake. The presence of a full time dietetic professional at camp was recommended to enhance the campers, counselors and food service staff's ability to make and guide healthy food and beverage choices at meal and snack times.

Staff and campers recommended additions such as more “real-world” opportunities to practice newly learned skills; to role play or develop skits about food; to incorporate popular

media such as videos and “You Tube” clips. These North Carolina Family and Consumer Science agents were familiar with the adult weight management¹² and the EFNEP curriculum¹³ and were confident in their teaching. Their availability in the rural area made them an especially valuable resource. The agents believe a registered dietitian should prepare the camper meal cards and teach campers how to use them. This curriculum could be used by others developing healthy lifestyle camps for overweight youth.

CONCLUSIONS

The nutrition education curriculum, developed for *TO4H* camp, was acceptably incorporated in the camp day and had several positive aspects. This nutrition curriculum appears unique to weight loss camps in that it provided a real world and small change approach to healthy eating and nutrition education. Campers not only lost weight at a safe and realistic rate, but were able to take home and try to implement this education at home after the camp experience. Informative evaluation areas for improvement were noted to make the curriculum more engaging and relevant to campers and other adolescent learners.

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Figure 1: Camper Meal Card

The Secret to Serving Size is in Your Hand

Take Off 4-Health

MyPyramid.gov
STEPS TO A HEALTHIER YOU

A fist or cupped hand = 1 cup
1 serving = 1 cup small cooked pasta or rice
1 cup of raw leafy green vegetables
1 cup of cooked or raw chopped vegetables or fruit

Palm = 3 oz. of meat
Two servings of 3 oz. of lean meat proteins and seafood should be a part of a daily diet. Choose the right amount with your palm. The palm size portion equals 3 oz. of raw weight.

A thumb = 1 oz. of cheese
Consider half a cheese in a good way to help you stick to the required amount of the milk, yogurt and cheese group. 1/2 oz. of low fat cheddar cheese is 1 of the 21 daily recommended servings.

Thumb tip = 1 teaspoon
Keep high fat foods such as peanut butter and margarine at a minimum by measuring. Do it right with your thumb. One teaspoon is equal to one milliliter. Use this measure again 1 teaspoon.

Handful = 1/2 oz. of nuts/seeds
Nuts and seeds are healthy. 1/2 oz. of nuts and seeds equals the size of a handful. 1/2 oz. of almonds equals 1 oz.

1 tennis ball = 1 serving of fruit
Healthy alternatives include 1/2 cantaloupe, 1/2 kiwi, 1/2 orange, 1/2 grapefruit, 1/2 apple, 1/2 banana, 1/2 peach, 1/2 pear, 1/2 plum, 1/2 strawberry, 1/2 watermelon.

Grains	Veggies	Fruits	Milk	Meat & beans
<p>Make half your grains whole!</p> <p>Eat at least 3 oz. of whole grain cereals, breads, crackers, rice or pasta every day.</p> <p># Servings = 1 serving = 1 oz.</p> <p>Examples: 1 medium pancake 1/2 cup cooked cereal 3 cups of popcorn 1 slice of bread 1 cup dry cereal 1/2 cup cooked pasta 1/2 cup cooked rice 1 small biscuit 1 small muffin 1 small piece cornbread 1 small tortilla 1 mini bagel 1 taco shell</p>	<p>Vary your veggies!</p> <p>Eat more dark-green, veggie like broccoli, spinach and other dark leafy greens.</p> <p># Servings = 1 serving = 1 cup</p> <p>Examples: 1 cup of vegetables: - broccoli - greens - carrots - squash - green peas - corn - white potatoes</p> <p>1 cup of veggie juice 1 medium baked potato 1 large sweet potato</p>	<p>Focus on fruit!</p> <p>Eat a variety of fruit, choose fresh, frozen, canned or dried fruit, go easy on fruit juices.</p> <p># Servings = 1 serving = 1 cup</p> <p>Examples: 1 cup regular fruit - cantaloupe - banana - fruit cocktail - pineapple - pineapples 1 cup of dried fruit 1 small apple 1 cup apple sauce 32 seedless grapes 8 large strawberries 1 cup of fruit juice</p>	<p>Get your calcium rich foods!</p> <p>Go low-fat or fat-free when you choose milk, yogurt and other milk products.</p> <p># Servings = 1 serving = 1 cup</p> <p>Examples: 1 cup of milk 1 cup of yogurt 1.5 oz. cheese 1/3 cup shredded cheese 2 oz. processed cheese 1 cup frozen yogurt 1.5 cups ice cream</p>	<p>Go lean with protein!</p> <p>Choose low-fat or lean meats and poultry, bake it, broil it or grill it.</p> <p># Servings = 1 serving = 1 oz.</p> <p>Examples: 1 oz. cooked lean meat - fish - beef - pork - poultry 1/4 cup dry beans 1 egg 1 tbsp. peanut butter 1/2 oz. nuts/seeds 1/4 cup tofu 2 tbsp. hummus</p>
CALORIES				

Figure 2: Rethink Your Drink

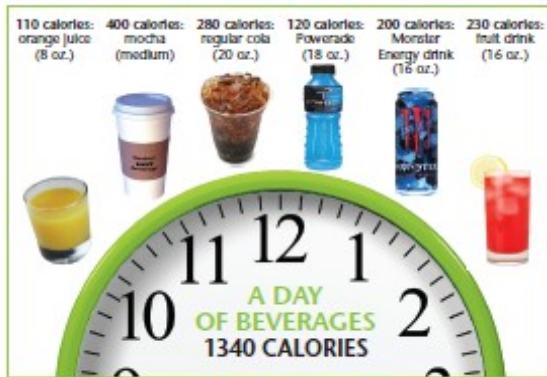


Table 1: Nutrition Content of TO4H Curriculum

Key Messages	Key Skills	Hands-On Activity
Lesson 1: Camper Cards	Explanation of personalized calorie target & appropriate servings per food group	Not used for this lesson.
Lesson 2: Right-Size Your Portions - Portion sizes have increased over the years - Large portions can lead to more calories than needed. - Portion control is key to a healthy weight - Food selection needs to be mindful	- Demonstrations of hand to estimate portion sizes and strategies to right-size portions. - Used stoplight method (rarely, sometimes, anytime) to teach variety & moderation.	- Participated in a “mindful” eating exercise and activity with stop light foods to “budget” what they eat.
Lesson 3: Re-Think Your Drink Calorie beverages can: - Contribute calories to overall diet but may not provide satiety - Be replaced with calorie-free drinks	- Strategies to choose calorie-free or lower calorie beverages. - Beverage clocks illustrated how to substitute calorie-free beverages (Figure 1)	- Analyzed labels of common drinks. - Made drinks from fruit juice and seltzer.
Lesson 4: Enjoy More Fruits & Veggies - Fruit and vegetables are naturally low in calories & fat - They are KEY to weight loss/maintenance - They make great snacks and meals	- Strategies to make fruits & vegetables more available for meals/snacks. - Snack clocks illustrated how to make healthier snack choices during the day.	- Analyzed food labels with “fruit” in the name & asked to “Find the Fruit” - Taste tests
Lesson 5: Eat Smart When You Eat Out - Eating out can increase weight due to serving size & food preparation - Might not be as healthy as meals at home - Choose healthy options when eating out	- Strategies to eat more meals at home - Strategies to choose healthier options when eating out including smaller portions	- Used an interactive CD to choose from fast food restaurants. A tote board indicated nutrients for the foods chosen.
Lesson 6: Reading Food Labels - Food labels are useful to compare foods & identify foods lower in fat and calories - They can help control portions	- Taught to use Nutrition Facts panel to compare foods and use ingredient list to see food contents - Defined common label terms	- Used information on the package label to make the healthier choice when given snack & beverage choices

Conflict of Interest Disclosure

Take Off 4-Health™: Nutrition Education Curriculum for a Healthy Lifestyle Camp for Overweight Youth.

Only one author, Kathryn Kolasa PhD, RD, LDN has a potential conflict of interest disclosure. None of the other authors do so.

Kathy Kolasa is a member of the Nutrition Advisory Panel for Burger King's *Positive Steps* Program. Since 2008, ten nutrition experts have served to advise Burger King on their corporate, ongoing efforts to promote balanced diets and active lifestyle choices.