NUTRITION EDUCATION INTERVENTION TO IMPROVE NUTRITION RELATED KNOWLEDGE, ATTITUDES, AND BEHAVIORS FOR HISPANIC CHILDREN AGES 6-10

by

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(Under the Direction of Silvia Giraudo)

ABSTRACT

This study was performed to assess the impact of a nutrition education intervention upon the nutrition related knowledge, attitudes, and behaviors of Hispanic children between the ages of 6 and 10 years old in a local afterschool program. The intervention took place at the Garnet Ridge Boys and Girls Club in Athens, Ga. The intervention included 7 weekly lessons that lasted an average of 30 minutes each. Pre- and post-tests were used to evaluate the program. There was a statistically significant difference, $p < 0.04$, observed for the intervention group (n=7) between the pre- and post-test scores for knowledge. Additionally, the post-test scores for the intervention group were significantly higher, $p < 0.04$, than the control group (n = 3). Changes in nutrition related attitudes and behavior were not significant.

INDEX WORDS: Hispanic childhood obesity; nutrition education intervention; nutritional knowledge, attitudes, and behaviors

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CHAPTER 1

INTRODUCTION

Purpose of the Study

The purpose of this pilot study was to determine the effectiveness of a nutrition intervention for children that targeted an all Hispanic population by evaluating pre- and post-intervention scores for knowledge, attitudes, and behaviors related to healthy foods.

Rationale and Significance

Hispanic children make up 23% of all children under the age of 18 in the US (National Council of la Raza, NCLR 2011). They also exhibit the highest rate of childhood obesity among all racial/ethnic demographics at 41% (National Initiative for Children's Healthcare and Quality, NICHQ 2007). Overweight or obese children are more likely to remain overweight or obese throughout adolescence and into adulthood, which puts them at increased risk for obesity related diseases (Caprio et al 2008). Therefore, it is becoming increasingly important to target children for nutrition education as a prevention and/or intervention for childhood obesity.

Research Question

Will the nutrition education intervention prove to be a successful tool for improving knowledge, attitudes, and behaviors about nutritious foods among Hispanic children from 6 to 10 years of age?

Hypothesis

The nutrition intervention has a positive impact on the knowledge, attitudes, and behaviors of Hispanic children aged 6 to 10 in relation to nutritious foods, in particular selecting more fruits and vegetables in their diets.

Specific Aims

The overall hypothesis was tested in Hispanic boys and girls aged 6 to 10 at the Garnet Ridge Boys and Girls Club in Athens, Georgia. The specific aims are:

1. Determine the impact of the nutrition intervention on the children's knowledge related to nutritious foods, fruits, and vegetables.
2. Determine the impact of the nutrition intervention on the children's attitudes related to fruits and vegetables.
3. Determine the impact of the nutrition intervention on the children's behaviors related to selecting nutritious foods, fruits, and vegetables

CHAPTER 2

LITERATURE REVIEW

Hispanic Demographics

The term Hispanic is defined as a person of Mexican, Puerto Rican, Cuban, South or Central American, or any other Spanish culture or origin (Ramirez 2004). According to the 2010 Census, there are 50.5 million Hispanics living in the United States, who originate from the above listed countries, however a majority (62%) of Hispanics in the United States originate from Mexico. This is 16% of the total population (Ennis et al 2011), making them the largest minority group in the United States. In 2000, Hispanics made up 12.6% of the population, and the population has increased by 1.5% each year. At this rate, Hispanics are projected to account for 30%, or one third, of the total population by 2050 (Shrestha and Heisler 2011). The states with the highest percentage of Hispanics are New York, California, Texas, and Arizona (Ennis et al 2011). In Georgia, the Hispanic population makes up 8.8% of the total population (CDC 2011). Nationally, Hispanic children account for 23% of all individuals under the age of 18, which makes Hispanic children the most rapidly growing segment of the population compared to any other demographic group (NCLR 2011).

Childhood Obesity

Obesity in children is measured differently than in adults. The Centers for Disease Control and Prevention (CDC 2011) defines childhood obesity as a BMI at or above the 95^{th} percentile for children of the same age and sex. A child is considered overweight if they are between the 85^{th} and 95^{th} percentile for children of the same age and sex. Percentile charts serve

as an objective assessment of weight status and are developed by comparing a body mass index (BMI) of an individual child, which is a ratio of weight in kilograms to height in meters squared, to their same age- and sex-matched peers (Philippas and Lo 2005). According to the National Initiative for Children's Healthcare and Quality (NICHQ 2007), childhood obesity is an epidemic that effects more than 30% of children ages 10-17. The prevalence of childhood obesity in Georgia is even higher at about 37.3%, which ranks Georgia as one of the leading states for childhood obesity prevalence (NICHQ 2007). In fact, the states with the highest prevalence of childhood obesity are concentrated in the south, including Alabama, Mississippi, and Louisiana. The northwest and Midwest states have the lowest prevalence of childhood obesity, the most notable states being Washington, Utah, and Minnesota. Nationally, 41% of Hispanic children are overweight or obese, which is much higher than the prevalence of childhood obesity among any other race or ethnic group. The prevalence of obesity among Hispanic boys was 26.8% in 2008 and the prevalence among Hispanic girls was 17.4%. The prevalence of childhood obesity among African American boys and girls was 19.8% and 29.2% respectively. Non-Hispanic white children have the lowest prevalence of childhood obesity with 16.7% for boys and 14.5% for girls (Ogden and Carroll 2010).

Etiology of Childhood Obesity

Weight gain occurs as a result of caloric intake that exceeds energy expenditure. Philippas and Lo (2005) point out that even a small amount of excess daily calories will add up over time. Therefore, even if a child is not overweight or obese at the present, if they are regularly eating more calories than they expend each day, they are setting themselves down a path to be obese in the future.

Obesity is the result of interactions between genes and the environment (Philippas and Lo 2005). In America, there is an obesogenic environment that promotes high-energy intake along with a sedentary lifestyle. Philippas and Lo (2005) provide a list of variables that factor into the epidemic of childhood obesity in the United States. They included increased portion sizes at meals; around the clock access to energy dense food, such as 24 hour fast food restaurants and vending machines in school; increased consumption of sugar sweetened beverages; fewer meals eaten as a family; decreased consumption of fruits and vegetables; sedentary lifestyles that rely on cars, buses and elevators; and decreased emphasis on physical education in public schools.

Matheson (2008) studied factors that specifically effect Hispanic households. She reported that household structure and availability of healthy foods is a strong determinant of children's food intake. However, children's access to food within the home is dependent upon socio economic factors, family attitudes toward healthy foods, and the social context of food messages (Matheson 2008). Children must rely on the food that is purchased by the parents; if parents cannot afford or do not emphasize healthy foods, then the children lack access, and do not even have the option of making healthier choices.

Consequences of Obesity

Many of the consequences of being overweight are not immediate; although we are seeing increased incidences of chronic diseases, such as type 2 diabetes, occurring in children (Caprio et al 2008). In many cases, the negative health impact will occur later in life. Sandeno et al (2000) note that eating patterns during childhood affect their health as an adult, and the eating behaviors they develop as children carry on into adolescence and adulthood. They stress the importance of early intervention to establish healthy habits, when children are less resistant to change and before behavioral patterns are set. To accomplish this, they suggest that a

nutrition education intervention occur before the 6th grade (Sandeno et al 2000). Indeed being overweight or obese as a child is a primary predictor of being an overweight or obese adult (Caprio et al 2008). Therefore the risk of developing comorbidities continues through adolescence and on into adulthood.

Obesity greatly increases the risk of developing many other diseases. Some of these chronic conditions include metabolic syndrome, hyper-insulinemia, impaired glucose tolerance, dyslipidemia, hypertension, cardiovascular disease, chronic inflammation, thrombosis, sleep apnea, and asthma. Many of these diseases were once exclusively thought to be adult onset conditions; however we are seeing more and more diagnoses among children (Philipas et al 2005).

Gross et al (2010) looked deeper into the role of parents/guardians in respect to dietary behaviors among fourth- and fifth-grade children. Children who received support and praise for eating fruits and vegetables at home from parents were significantly more likely to consume fruits and vegetables ($P < 0.01$). Another important finding was that children who were included in grocery shopping, and allowed to pick their favorite fruits and vegetables had a much higher daily average intake than those who did not participate in grocery shopping ($P < 0.001$). Children should be permitted to help in food purchasing and preparation whenever possible, and fresh fruits and vegetables should be easily accessed (within reach) at home for children (Gross et al 2010).

Socio Economic Status of Hispanic-Americans and Food Supply

Due to the economic downturn, the unemployment rate among Hispanics is 11.1%, and 35% of Hispanic children are living in poverty (Lopez and Velasco 2011). In fact, there are more impoverished Hispanic children than in any other demographic group. As a result, nearly

one third of Latino households are threatened with food insecurity (Lopez and Velasco 2011). Food insecurity is defined by Bickel et al (2000) as "Limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways." Consequently, food supplies within the household lack variety, and the supply of fruits and vegetables is negatively impacted due to the higher cost of fresh produce compared to processed foods, the risk of wasted money due to spoilage and limited shelf life, and the perception that these foods are simply not as filling nor satisfying as more calorically dense foods (Kaiser et al 2003).

Tiendas are Hispanic grocery stores, which are often located in communities that have a high Hispanic population. A study by Emond et al (2011) assessed the differences between American super markets and tiendas in low-income areas. Their objective was to determine discrepancies in availability, quality, and cost of food items in order to explain a possible barrier to purchasing healthy food. They found that despite the smaller scale of most tiendas, there was not a significant difference in the total number or quality of fresh fruits and vegetables between the stores. More importantly, tiendas were more likely to sell fresh produce at a reduced price per unit than super markets (Emond et al 2011). Therefore a lack of access to fresh produce is not likely a thorough explanation for the absence of fruits and vegetables in this population.

Decreased household income is also associated with an increase in fast food consumption (Thornton et al 2011). Fast food is cheap, quick, and convenient. It is also energy dense, so it provides a prolonged state of satiety. All of these factors make fast food a tempting meal for low-income families, plus it is appealing to the children. Additionally, Boutelle et al (2007) reported a positive association between home food availability of less nutritious food and the

number of fast food family meals eaten out. So families that frequently rely on fast food for family meals have equally non-nutritious food in the pantry at home.

Dietary Acculturation among Hispanic-Americans

Acculturation is a unique barrier for immigrant populations. The term acculturation refers to the shift in cultural norms experienced by an individual, or a group of individuals, when they are placed into an environment with different social behaviors than their own. It has both positive and negative effects on the diets of Mexican-Americans. Batis et al (2011) looked at differences in the diets of Mexicans, Mexican-Americans, and non-Hispanic whites to determine the roll that acculturation plays in the obesity prevalence of this demographic group. They found increased intake of lean meat and fish, high fiber breads, and low fat milk to be beneficial practices that occurred due to acculturation. However, there was also an increased intake of saturated fats, sugar, dessert, salty snacks, pizza, and french-fries, which were harmful dietary behaviors adopted due to acculturation (Batis et al 2011). In fact, pizza is one of the primary contributors of energy dense, yet nutritionally poor, foods among children (Piernas and Popkin 2011).

The longer Hispanic families remain in the United States, the more acculturated they become. There is a generational effect, meaning that each generation is more acculturated than the previous. Liu et al (2012) reported that second and third generation Mexican-American adolescents had poorer diets than the first generation. The negative dietary implications included a decrease in fruit and dark green vegetables, with an increase in saturated fat, sugar sweetened beverages, and salty snacks. Highly acculturated Mexican-Americans have a significantly greater intake of fatty foods overall, and high acculturation is also related to a decrease in fruits and vegetable intake among Mexican Americans (Neuhouser 2004). Overall, acculturated

adolescents have a 2-4 times greater chance of being overweight or obese than those who are less acculturated (Liu et al 2012).

Precaution Adoption Process Model

The Precaution Adoption Process Model (PAPM) is a theoretical model used for developing educational curricula that focus on achieving behavioral change. Through this model, the learner advances through 7 individual stages in the process toward behavioral change. The first stage is characterized by ignorance, or being unaware that an issue exists. Advancing to the next stage requires becoming aware of an issue and subsequently deciding whether or not to act, which is stage 3. If the learner decides not to act, they detour to stage 4, where the process is halted until the individual decides to readdress the issue in the future. Assuming the learner decides to act, they move to stage 5. Stage 6 requires taking action to change, and stage 7 is maintaining that change (National Cancer Institute 2005). Since the last stage is maintenance, no one is ever simply done with the process, similar to altering one's diet: it has to be a lifelong change.

This model is applicable when designing a nutrition education program for Hispanic children. The children begin in stage 1, being unaware of the benefits of healthful eating. They are considered stage 2 once they become aware of these benefits and understand the consequences of choosing to eat poorly. In stage 3, they decide if the benefits to eating healthy outweigh the consequences, if so they move to stage 5. However if they do not perceive the consequences to be worth the dietary changes, they will move to stage 4, which ends their progress through the model. Once those who decided to change begin to implement behavioral and dietary changes, they enter stage 6. They must maintain these dietary changes and are thus perpetually in stage 7.

This model is best conceptualized as a linear path that the learner can travel in both directions. For instance, if the children neglect to maintain their healthy dietary changes in stage 7, they may digress as far back as stage 3 (deciding whether or not eating healthy is worth the consequence) until they deem it prudent to eat healthy again. It is important to note that they cannot return to a state of ignorance, so the learner would not be able to slide backward beyond the 2nd or 3rd stage (National Cancer Institute 2005).

Previous childhood Obesity Interventions

Researchers have implemented countless nutrition education programs in an attempt to improve the quality of children's diets, and certainly Hispanic children represent an audience that requires attention. However, there have been few studies that focus solely on Hispanic children, and Matheson (2008) expressed difficulty in locating interventions aimed at this population. The following are several studies whose methods proved successful, creative, or novel for educating children about nutritious foods, and specifically focused on fruits and vegetables.

Wall et al (2012) performed an education program to increase the attitudes, self-efficacy, preferences, and knowledge of vegetables among fourth-grade students. Their curriculum included 4 lesson plans focused on the food pyramid, learner focused activities, food tastings, and eating a variety of colorful veggies. They also developed a survey, which was tested for validity and reliability, with kid-friendly questions in order to accurately measure the change in base knowledge, attitudes, self-efficacy, and preferences of children related to vegetables. A separate survey was used for each of the four areas of interest. Both the intervention and the control groups received some manner of nutrition education, but only the intervention group focused on vegetables, receiving taste tests and performing interactive learning activities. Base-

line scores between intervention and control groups were not significantly different; however post-test scores varied significantly between the 2 groups for all 4 areas of interest ($P < 0.001$).

Dubinsky and Bodner (1991) also demonstrated the effectiveness of food tastings within a nutrition education program. Students were introduced to new, healthy foods, which they may not have been exposed to previously. As a result, more than 85% of the children discussed information from class with their parents and agreed that they would like to repeat or extend the program. Nicklaus (2009) attributes the success of interventions with taste tests among children to a repeated exposure of the food being tested. Nicklaus (2009) goes on to explain the concept of neophobia in children. Around the beginning of age 3, children start to become picky and apprehensive about new foods. Repeated exposure to a variety of foods, such as fruits and vegetables, is key to conquering their neophobic attitudes (Nicklaus 2009), which is why taste-testing foods is likely to reap positive results.

Katz et al (2011) developed a creative program for teaching elementary school aged children how to select healthy foods by reading food labels. They named their program "The Nutrition Detectives Program™," and children who participated in the program significantly increased their understanding of nutrition labels by as much as 23% ($P < 0.01$). Being able to read and understand food labels is a skill necessary to differentiate healthy versus less healthy food items. It is also a method to increase their self-efficacy to make a change toward healthier snack habits.

Cosper et al (1977) published one of the few studies that looks at the results of a nutrition education for children in a predominantly Hispanic, or more specifically Mexican-American, sample. They performed their program for fifth-graders, and nearly 90% of the sample was Mexican-American. Their curriculum consisted of 8 lesson plans that lasted 30 minutes and

discussed topics such as defining what a calorie is, weight management, meal planning, exercise, foods with empty calories, as well as food fads and fallacies. A significant change was not seen in dietary patterns after the program, but there was a significant ($P < 0.01$) increase in the individual scores of the post-test for knowledge based questions, and a paired t-test showed a significant ($P < 0.001$) difference between the intervention and the control group. It is an antiquated study, but remains one of the few, which specifically targets this population.

Rivera-Gonzáles (2011) also conducted a nutrition intervention program amongst a 100% Hispanic sample of children. The age range of her target audience was broad, between the ages of 5 and 11. The curriculum consisted of 4 lesson plans, and each lesson lasted about an hour. The topics discussed included the Spanish version of myplate (el plato del buen comer), healthy snack alternatives, fruits and vegetables, and how to pack a healthy lunchbox. Pre-, post-, and 4 month follow up questionnaires were administered to the children to evaluate the outcome of the program. The surveys were adapted for Hispanic children from several tools, which have previously been tested for validity and reliability. Changes in food knowledge and preference were measured via the Afterschool Student Questionnaire (ASSQ) which was originally developed by Kelder et al (2005) to evaluate the effects of the CATCH Kids Club pilot program. It measures the dietary intake for the previous day for selected foods, healthy behaviors and nutrition knowledge, and food intentions and knowledge (Kelder et al 2005). Actual food consumption was measured by the "My Food Choices" questionnaire, developed by Lane (2004). This questionnaire consists of 63 questions that are presented similar to a standard food frequency questionnaire format, and include commonly consumed healthy and unhealthy food items. The unique aspect to this tool, which makes it ideal for children, is the inclusion of pictures of familiar food items that are included with each question. It keeps the children

engaged, and helps to eliminate confusion due to varying reading levels. The validity and reproducibility of the questionnaire was tested in low socioeconomic status (SES) African American fourth-graders (Lane 2004). Rivera-Gonzáles (2011) measured changes in eating healthier foods, unhealthy foods, vegetable consumption, fruit consumption, knowledge about healthy foods, preferences toward healthy foods, and physical activity. Unfortunately there was not a significant difference in any of these measures for pre-test, post-test, nor 4-month recall.

Rivera-Gonzáles (2011) proposed several changes in the curriculum after her intervention. These suggestions included: decreasing the time of each lesson due to the attention span of the participants, including taste tests that would expose them to new and healthy foods, and providing more hands on activities during the lessons. The following study targeted a similar population and will take these changes into account when implementing the nutrition education program.

CHAPTER 3

NUTRITION EDUCATION INTERVENTION TO IMPROVE NUTRITION RELATED KNOWLEDGE, ATTITUDES, AND BEHAVIORS FOR HISPANIC CHILDREN AGES 6-10[1]

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Abstract

This pilot study was performed to assess the impact of a nutrition education intervention upon the nutrition related knowledge, attitudes, and behaviors of Hispanic children between the ages of 6 and 10 years old in a local afterschool program. The nutrition intervention took place at the Garnet Ridge Boys and Girls Club in Athens, Ga. The intervention included 7 weekly lessons that lasted an average of 30 minutes each. Pre- and post-tests were used to evaluate the program. There was a statistically significant difference, $p < 0.04$, observed for the intervention group (n=7) between the pre- and post-test scores for knowledge. Additionally, the post-test scores for the intervention group were significantly higher, $p < 0.04$, than the control group (n = 3). Changes in nutrition related attitudes and behavior were not significant.

Introduction

Due to the prevalence of childhood obesity, which is projected to increase in the years to come, children have become an important target audience for nutrition education as prevention and intervention for the obesity epidemic experienced in the Nation. Hispanic children are at greatest risk, but few nutrition education programs have been tailored to this particular demographic. Hispanics are currently the largest minority group (Pew Hispanic Center 2012), and Hispanic children comprise the largest subgroup of children under the age of 18 years old (NCLR 2011). Therefore, they are a population that needs greater focus.

The socio economic status of many Hispanic children furthers their plight. Many of them are living in poverty, which decreases the quality of food within the home and increases the risk for food insecurity (Lopez and Velasco 2011). Acculturation is another unique variable to the dietary behaviors of Hispanic children. As Hispanic families adopt the dietary practices of Americans, they tend to adopt the less healthy behaviors that result in an increase in fatty, sugary, and salty foods (Batis et al 2011).

Obese children have a high likelihood of becoming obese adults, which in turn increases their risks of developing obesity related diseases, such as type 2 diabetes, hypertension, and heart disease. Most obesity related diseases were once considered adult onset diseases, but as childhood obesity continues to increase, so do the number of childhood diagnoses of these diseases (Philipas et al 2005).

According to the Precaution Adoption Process Model, behavior is the end results of knowledge and attitudes (National Cancer Institute 2005). Therefore, for a nutrition intervention to be successful, it needs to start by targeting these building blocks in the hopes of indirectly affecting behaviors toward choosing healthy foods.

Methods

Participants

The inclusion criteria for this study required that all participants turn in a signed consent form from their parents and sign one themselves. The participants had to be Hispanic, and they had to perform both the pre- and post-tests. The nutrition intervention program was conducted at a local branch of the Boys and Girls Club at The Garnet Ridge Community in Athens, Georgia. The children who participated in the study were between the ages of 6 and 10. This particular location was used because the children who attend this unique Boys and Girls Club are predominantly low-income Hispanic children. Seven children participated in the intervention and met all of the inclusion criteria. Three children from the test site met the inclusion criteria but never attended any of the lessons. Their pre- and post- test scores served as controls and were analyzed and compared to those who attended lessons.

IRB approval

The University of Georgia Institutional Review Board on Human Subjects approved this study before making contact with any of the participants or their parents.

Study design

The study design for this intervention was an experimental one group pre-test and post-test design that involves a pre-test, education intervention, and post-test. The education intervention was conducted over 7 consecutive weeks, starting Wednesday, September 12, 2012 and ending on Wednesday, October 24, 2012. Three children from the test site met the inclusion criteria but never attended any of the lessons. Their pre- and post- test scores served as controls and were analyzed and compared to those who attended lessons.

Informed Consent

Prior to starting the program, consent forms were sent home with the children to be signed by their parents and were subsequently collected for all participants included in the study. There was a separate consent form provided to each child who wanted to participate in the study, which they signed themselves after being informed of the purpose of the study. Each consent form was written in English, as well as Spanish to minimize confusion in households where English was not the primary language.

Pre and Post-Tests

Pre-tests were administered to collect base-line data on knowledge, attitudes, and behaviors related to healthy eating. The survey questions were adapted from Wall et al (2012) as well as Rivera-González et al (2011). A sample of the pre- and post-tests can be found in Appendix B. The pre-tests were conducted every day for a week at the Garnet Ridge Boys and Girls Club. All pretests were administered and evaluated be the primary researcher, in an attempt to minimize variables from multiple interviewers. Additionally, each participant took the pre-test individually to eliminate distractions and prevent the sharing of responses between one another. To minimize variables due to differing degrees of reading competencies, each question was read aloud as the participant made his/her way through the test, and pictures of food were included whenever appropriate.

The post-tests were conducted in the same manner as the pre-tests. They were administered every day for a week after the seventh and final lesson. Each participant took the test individually, and the questions were read aloud.

At the onset of the study, the intent was to conduct a 4-month follow up post-test, which would have been administered in March 2013 in order to assess the long-term affect of the

intervention. Unfortunately, The Garnet Ridge Boys and Girls Club closed due to lack of funds. Therefore, a 4-month follow up test was unable to be performed.

To assess change in knowledge about healthy eating, participants answered multiple-choice questions that were based upon the intervention curriculum. A matching section, where the participants matched the name of a fruit or vegetable to its picture, also measured change in knowledge. The final knowledge based portion of the survey was the "Eat This, Not That" section of the survey, where participants were instructed to select the healthier food out of a pair. The sum of the possible points for the knowledge section was 31.

To assess attitude change, questions were answered by selecting one of five faces, which ranged from frowning to smiling depending on the one that best describes how the participant feels toward a particular fruit or vegetable. The sum of the possible points for vegetable preference was 30, and the sum of the possible points for fruit preferences was 25.

To assess for behavioral change, the participants answered a food frequency questionnaire (FFQ), which was adapted from the FFQ used by Rivera-González et al (2011). Foods were divided into either a healthy or unhealthy category. The healthy foods were further categorized into fruit, vegetables, or other. The fruits included: bananas, apples, grapes, pears, oranges, raisins, pineapple, and peaches. The vegetables included: green beans, other beans (black, kidney, etc.), sweet potatoes, white potatoes, carrots, corn, celery, broccoli, salad, squash, and tomatoes. Healthy foods in the "other" category included: cereal, skim milk, yogurt, cheese, fruit juice, water, peanut butter, rice, and pretzels. Unhealthy foods included: potato chips, French fries, hamburger, pizza, fried chicken, macaroni and cheese, whole milk, soft drinks, biscuits, ice cream, candy, cookies, cake, empanadas, burritos, tacos, and quesadillas. Points were assigned according to how many times per week each food was consumed. Each item

could receive between 0 and 7 points. The total points for fruits, vegetables, healthy foods, and unhealthy foods are: 56, 77, 189, and 126 respectively.

Intervention

The curriculum itself consisted of 7 lesson plans, which were each about 30 minutes long, and were held once per week at the same time on Wednesdays. Each session consisted of a discussion, interactive activity, and most importantly a taste testing activity. The curriculum was adapted primarily from Wall et al (2012), but also includes elements from Katz et al (2011), Dubinsky and Bodner (1991), as well as Gross et al (2010) and Rivera-González et al (2011). A detailed sample of each lesson plan is provided in Appendix A. The topics discussed were as follows:

Lesson 1: MyPlate – The participants were introduced to MyPlate. They received a placemat-sized version of MyPlate, which they colored and labeled. Throughout the following lessons they collected healthy food stickers to be placed in the corresponding section of the plate. Stickers were incentives for attending the lessons and taste testing the healthy food provided.

Lesson 2: Colorful Fruits and Veggies – The children received a coloring sheet with various fruits and vegetables to help visualize the rainbow of colors that can be found in fruits and vegetables and the lesson focused on the health benefits of fitting each color into the diet.

Lesson 3: Make Your Own Healthy Snack – During this lesson, the participants got to create the healthy snack and taste test for the day. They were given a recipe to follow and the various measuring equipment, utensils, and ingredients required to create it. The purpose of this lesson was to show them how easy it is to make a healthy snack and give them hands on experience doing simple tasks that they might perform at home in the kitchen.

Lesson 4: Fruit and Veggie Processing – The participants learned that fruits and vegetables can be purchased in a variety of ways, including fresh, frozen, or canned. The taste test for this lesson allowed them to taste and compare fruit in each form.

Lesson 5: Food Label Sleuths – The participants were provided with a variety of healthy and unhealthy food labels. They learned how to identify key information on the food label in order to find out what foods are healthy.

Lesson 6: Sugar Sweetened Beverages – The participants were given empty bottles of popular beverages, and they measured out the amount of sugar in each beverage and funneled it into the empty bottles in order to visually compare the sugar content in each one.

Lesson 7: Putting It All Together – Eating healthy is about balancing everything one knows about nutritious foods. This lesson served primarily as a review session to highlight the important information participants learned throughout the various lessons.

Power Analysis

A meaningful increase in fruit and vegetable consumption is 0.5-1 servings/day. The level of statistical significance was defined at $p < 0.05$ with a power of 80%. According to the online power analysis calculator provided by DSS research (www.dssresearch.com) in order to show that this increase is significant, a sample size of at least 22 children with pre- and post-tests was required.

Statistical Analysis

Descriptive statistics: means, medians, standard deviations and errors, and confidence intervals were calculated with SPSS (IBM Corp, 2011). Paired t-tests were performed to compare pre- and post-test scores. In addition, *t*-tests were performed to compare the differences between the control and intervention group. The level of statistical significance was defined at

$p < 0.05$.

Results

Nutrition Related Knowledge

The highest value any participant could receive on the knowledge portion of the questionnaire was 31 points. There was no significant difference in pre-test scores between the intervention and control group (25.1 ± 0.79 and 25.3 ± 0.33, respectively). There was a statistically significant difference between the post-test scores for the intervention group and the control group, $p < 0.039$ (28.5 ± 0.85 and 24.5 ± 1.5, respectively). Additionally, there was a significant difference, $p < 0.042$, between the pre-test (25.1 ± 0.8) and post-test (28.5 ± 0.9) scores for the intervention group. The change in scores for the control group between the pre- and post-tests were not significantly different.

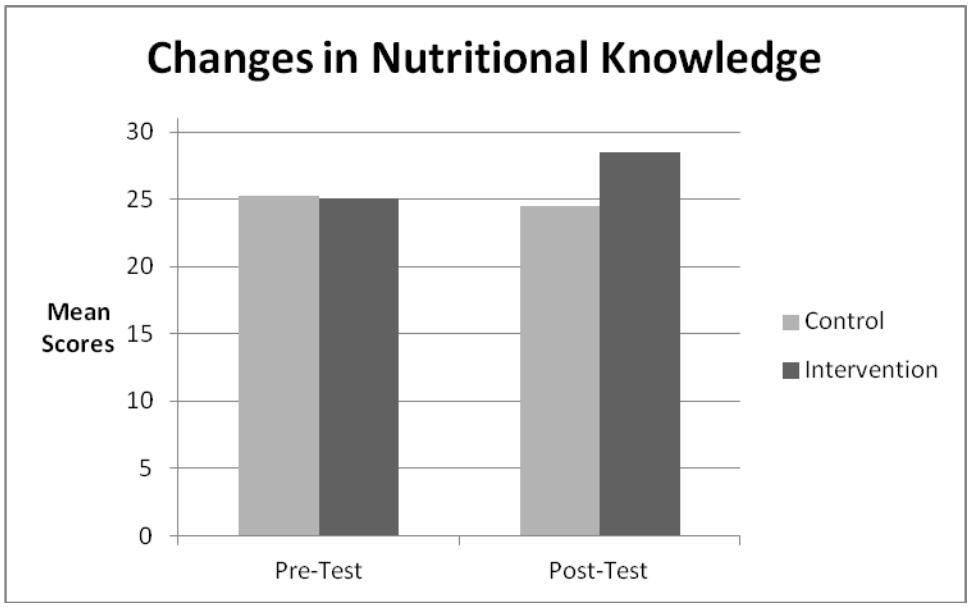

Figure 3.1 *Mean changes in nutrition related knowledge from pre-test to post-test for control (n=3) and intervention (n=7) groups of Hispanic children ages 6 to 10 involved in a seven week intervention program.*

Attitude Toward Fruits and Vegetables

The highest value a single participant could score for attitude toward fruits and vegetables is 25 and 30 respectively. For attitudes toward both the fruits and the vegetables, there was not a significant difference between the intervention and control groups for the pre- and post-tests. Similarly, there was not a significant difference between the pre-test and post-test scores for the intervention or control group.

	Control		**Intervention**	
	Pre-Test	**Post-Test**	**Pre-Test**	**Post-Test**
Fruit	20.3 ± 4	17.3 ± 4.9	22.7 ± 0.8	23.0 ± 1.1
Vegetables	22.0 ± 4.6	21.0 ± 5.9	19.3 ± 1.6	19.6 ± 1.2

Table 3.1 Change in Attitude Toward Fruits and Vegetables: *Mean ± Standard Error for attitude towards fruits and vegetables for control (n=3) and intervention (n=7) groups of Hispanic children ages 6 to 10 involved in a seven week intervention program.*

Behavior (FFQ)

The highest values a single participant could receive for fruits, vegetables, healthier foods, and less healthy foods were: 56, 77, 189, and 126 respectively. Although positive trends were observed in the means of the intervention group, there was not a statistically significant change observed for any of the categories in either the intervention or the control group. Additionally, there was no significant difference between the intervention and control group for either the pre- or post-test scores.

	Control		Intervention	
	Pre-Test	**Post-Test**	**Pre-Test**	**Post-Test**
Healthier Food	55.0 ± 2.5	53.0 ± 5.5	52.6 ± 10.3	59.4 ±14.0
Less Healthy Food	20.3 ± 8.3	19.6 ± 4.9	21.0 ± 6.2	19.7 ± 6.3
Fruit	18.3 ± 3.5	15.3 ± 2.8	16.4 ± 4.3	21.1 ± 5.6
Vegetables	12.3 ± 6.8	18.7 ± 5.5	14.7 ± 4	16.4 ± 5.8

Table 3.2 Change in Behavior for Selecting Foods: *Mean ± Standard Error for average servings of healthy foods, less healthy foods, fruits, and vegetables consumed in a week for control (n=3) and intervention (n=7) group of Hispanic children ages 6 to 10 involved in a 7 week intervention program.*

Discussion

The purpose of this pilot study was to evaluate the effectiveness of a nutrition education intervention targeting Hispanic children, which focused on the nutrition related knowledge, attitudes and behavior of the participants. The hypothesis was that the nutrition education program would have a positive impact on their knowledge, attitudes, and behavior.

Knowledge was the only measure that showed a statistically significant improvement. These results were similar to those seen in the study by Rivera-Gonzáles (2011), who studied the same population, but with a different sample. She too observed an increase in the post-test scores for knowledge in those who participated in her education program.

Scores for attitude toward fruits and vegetables showed a marginal improvement in the intervention group, and they actually decreased in the control group, although these changes were not significant. Baseline scores for fruits and vegetables in each group were high and left little room for improvement. Since the questions were subjective, there is likely to be response bias due the children intuitively answering the questions with healthier responses.

Scores for behavior were similar to the results observed in the attitudes section. Although the results were not significant, minor improvements were observed in the intervention group with a tendency toward increasing in healthy food, fruit, and vegetable consumption, and a tendency toward decreasing in the consumption of less healthy foods. The same tendencies were not seen in the control group. Again, response bias may explain some of the results in the pre- or post-tests as the participants could have exaggerated the amount of healthy foods eaten and under estimated the amount of less healthy foods.

That being said, there should be little bias concerning the responses on the questionnaires. One of the strengths of this study was the administration of the questionnaires in

an attempt to minimize biases. The researcher administered all the pre- and post-tests and read each question aloud to every participant as they made their way through the questionnaire. Additionally, only one participant at a time took the pre- and post-test, which allowed the researcher to focus on them, answer questions, and address any confusions that they encountered.

Limitations

The greatest limitation was the inability to include the parents/guardians of the children. Studies, such as the one performed by Gross et al (2010), have proven the importance of including parents in nutrition interventions, since they are responsible for purchasing household food items. However, it was beyond the scope of this study to include the parents, but it is certainly an item to be addressed in future studies.

Another limitation is that of sample size and a reliance on continual attendance of the children. The Garnet Ridge branch of The Boys and Girls Club is small in comparison to most. Additionally, most of the children do not attend the Boys and Girls Club every day. This limitation was alleviated to some degree by performing the intervention on the same day each week, so the children could prepare to be there those days. Pre- and post-tests were administered every day for a week to ensure most children had the opportunity to take the tests, however, it did not prevent attrition due to some children lacking one or the other.

Another limitation is the self-reporting of information on the pre- and post-test, particularly the questions related to attitudes and behavior. Response bias is possible since the children may simply have answered questions with the most nutritious responses available, since that is what they expect us to be looking for. It is also important to note that the questionnaires, from which the pre- and post-tests were adapted, were pilot tested in fourth-grade children, and have not been tested for reliability and reproducibility in younger age groups.

CHAPTER 4

SUMMARY AND CONCLUSIONS

This study built upon the study by Rivera-Gonzáles (2011) by taking a similar population and adjusting the curriculum based on her suggested changes, which resulted from her observations after the intervention. The current study produced similar findings with a significant change in knowledge and notable trends toward a positive change in attitudes and behavior. Such trends suggest that significant changes might be possible in these areas if various shortcomings in the study are corrected.

Future Directions

Although knowledge was the only measure that showed significant improvement, there were positive trends observed in the means of the intervention group for attitudes and behavior. The best way to improve upon the current study is by looking at the limitations and alleviating them wherever possible.

As previously stated, the greatest limiter was the inability to include parents of the participants in the education. Parents are responsible for the food stocked and the meals prepared within the home. Therefore, if there is only less healthy food in the pantry, the children do not even have the option to make healthier decisions. Also, this is a lower income demographic, and healthier foods tend to be more expensive than the less healthy, calorie dense options. The parents would not only benefit from nutrition lessons, but also money saving lessons that would increase their self efficacy to purchase and afford healthier options.

Attendance was a difficult obstacle to account for. Infrequent or sporadic attendance resulted in a decreased sample size due to a lack of participants meeting the minimum criteria, which required completed pre-and post-tests and a signed parental consent form. Greater attendance would have been ideal, as only one of the participants achieved perfect attendance and participated in all 7 of the lessons. The atmosphere at the Garnet Ridge Boys and Girls Club was very unstructured, not to mention the children were energetic due to having sat at school all day. Therefore, it would be interesting to see the results of the nutrition program if it took place in a classroom setting within normal school hours. The study by Wall et al (2012) took place in such a setting and resulted in statistically significant improvements in all the areas they observed. The classroom setting is much more structured, and the children are in an environment that they associate with learning, whereas the Garnet Ridge Boys and Girls Club provided an atmosphere of socialization and outdoor play.

Response bias would be difficult to eliminate. However, if the parents were included in the study, they might be able to provide a more accurate portrayal of their child's daily diet during the FFQ.

Finally, it would have been interesting to measure the long term effects of the education via the 4 month follow up, which was intended to take place in March 2013, however this was not possible due to the abrupt and untimely closure of the Garnet Ridge Boys and Girls Club.

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APPENDICES

APPENDIX A

LESSON PLANS

Lesson 1: My Plate Introduction

Goal
The children will gain an understanding of My Plate and be able to label a blank My Plate sheet

Objectives
- List the 5 groups represented on My Plate
- Identify food sources for each of the 5 My Plate group
- Identify important sources for accurate nutrition information, such as myplate.gov

Description
The first lesson plan involves introducing the children to My Plate. They will learn the various categories of food: fruit, vegetables, carbohydrates, protein, and dairy; and they will learn various foods which fit into each category. This also includes introducing them to the website myplate.gov and the various items for kids they have on the site.

Learning Activity: Create your own My Plate
Each child will be given a large sheet of paper (large enough to serve as a dining place matt) with a blank my plate. They will label each section, and they may decorate it as they please. Throughout the nutrition education, they will receive various food stickers as rewards for participating each week and performing the fruit and veggie taste tests at each lesson. They will be responsible for placing the food sticker in its respective category. I will keep up with the place mats between sessions. After the final lesson, they can keep them to use as place mats at home.

Taste Test: Carrot Raisin Salad
Since this is the first lesson; we will ease them into taste testing with a mild vegetable that they are familiar with: carrots! To prepare this, whole carrots can be shredded on site in order for them see what a fully developed carrot looks like (as opposed to baby carrots), and a learning opportunity to discuss where carrots and raisins come from. The children will be given the recipe to take home.
Remember, all well behaved taste testers receive a sticker to place on their My Plate
Recipe from University of Georgia Extension Services

Materials
- ✓ My Plate print outs
- ✓ Markers
- ✓ Crayons
- ✓ Stickers
- ✓ Plastic forks
- ✓ Bowls
- ✓ 3 large carrots
- ✓ ½ cup Raisins
- ✓ ½ cup no fat vanilla yogurt
- ✓ 2 tsp Lemon Juice

USDA Center for Nutrition Policy and Promotion

Foods & Nutrition EDUCATION

The University of Georgia Cooperative Extension Service

Carrot-Raisin Salad

2 cups shredded carrots
1/2 cup seedless raisins
1/2 cup plain or vanilla low-fat yogurt
2 teaspoons lemon juice
1/8 teaspoon salt, if desired

Shred *clean* carrots. Combine with raisins. Mix yogurt, lemon juice, and salt. Pour over salad and mix well.

Nutrition Facts

Servings Per Recipe 6
Amount Per Serving (using salt)

Calories 67	2% of total calories from fat
Total Fat .1g	Sodium 69mg
*Vitamin A 103%	*Vitamin C 8%
*Calcium 5%	*Iron 2%

*Percentage Daily Values

Released by Gail M. Hanula, MS, RD, LD, Family Nutrition Program Specialist
November 2002
Publication Number: FDNS-NE 852

Lesson 2: Colorful Fruits and Veggies

Goal
The children will be able to identify at least one fruit or vegetable from each of the following color groups: red, orange/yellow, green, blue/purple, and white.

Objectives
- List the various color groups of fruits and veggies as well as fruits and veggies in each group
- Get excited about eating healthy foods in a variety of fun colors

Description
It is important to "eat a rainbow" when consuming fruits and vegetables. Variety is key, and the more vibrant the color, the better! This lesson highlights the naturally occurring assortment of colors found in fruits and vegetables, and provides examples for each of the categories. The colors are a good way to select a healthy fruit or vegetable by looking at it, because bright colors let you know they are full of vitamins and minerals.

Activities: Color the Rainbow
Each child will receive a coloring sheet with many fruits and vegetable that they will color according to the group in which they belong (red, orange, yellow, green, blue, purple, or white). They are encouraged to place the picture on their fridge or somewhere at home to remind them to eat a rainbow and provide them with examples.

Taste Test: Eat the rainbow
While the kids are coloring, they are given a fruit and veggie kabob with an assortment of colorful fruits and veggies that can be eaten raw. Therefore, they make for great snack options throughout the day or as side items in lunch boxes. The kabobs display fruits and veggies in a fun way that highlights the colors of the rainbow. They will also be given a low fat spinach dip for the veggies and a yogurt dip for fruit.
Remember, all well behaved taste testers receive a sticker to place on their My Plate
Recipe from University of Georgia Extension Services
Options include:

Red	Apples, bell pepper, strawberries, raspberries, radishes, tomatoes, cherries
Orange/Yellow	Carrots, bell pepper, squash, mangoes, oranges, peaches, cantaloupe, pineapple
Green	Broccoli, bell pepper, avocados, kiwi, spinach/greens, honey dew, cucumber
Blue/Purple	Blueberries, black berries, grapes/raisins, plums, eggplant
White	Bananas, cauliflower, mushrooms, onion

Materials
- ✓ Coloring sheets
- ✓ Crayons
- ✓ Stickers
- ✓ Plates
- ✓ Dips (pre-prepared)
- ✓ Strawberries
- ✓ Tomatoes
- ✓ Squash
- ✓ Pineapple
- ✓ Kiwi
- ✓ Broccoli
- ✓ Eggplant
- ✓ Blueberries
- ✓ Cauliflower
- ✓ Bananas

Foods & Nutrition EDUCATION

The University of Georgia Cooperative Extension Service

Spinach Dip

1 cup low-fat plain yogurt
1 cup low-fat mayonnaise
1 envelope dry vegetable soup mix
1 (10 oz) package frozen, chopped spinach, thawed and squeezed dry
Assorted raw vegetables for dipping

In a medium bowl combine the first 3 ingredients together with a fork. Add the dry spinach to the dip mixture and mix well until blended. Cover and refrigerate until ready to serve. Serve with assorted fresh vegetables such as broccoli, cauliflower, carrot sticks, celery sticks, bell pepper strips and cucumber slices, or serve with crackers. Makes a great snack!

Foods & Nutrition EDUCATION

The University of Georgia Cooperative Extension Service

Easy Lowfat Fruit Dip

1 cup low-fat vanilla yogurt
1/4 cup low-fat mayonnaise
2 teaspoons honey (optional)
1/2 teaspoon cinnamon (optional)
1/2 teaspoon nutmeg (optional)
Assorted fruits for dipping

In a small bowl combine ingredients together and stir with a spoon until well blended. Cover and refrigerate until ready to serve. Serve with your favorite fruits, such as apple wedges, strawberries, grapes, orange sections, peach slices, and pineapple. Makes a great snack!

a

Nutrition Facts

Servings Per Recipe 24
Amount Per Serving 2 Tablespoons

Calories 31	22% of total calories from fat
Total Fat 1g	Sodium 251mg
*Vitamin A 36%	*Vitamin C 2%
*Calcium 4%	*Iron 1%

* Percentage Daily Values

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Issued in furtherance of Cooperative Extension work, Act of May 8 and June 30, 1914, The University College of Agriculture and Environmental Sciences and the U.S. Department of Agriculture cooperating. Gale A. Buchanan, Dean and Director

Released by Kelly Cordray, MS, RD, LD, EFNEP Nutrition Specialist
October 2004
Publication Number FDNS-NE-1059

Nutrition Facts

Servings Per Recipe 10
Amount Per Serving 2 tablespoons

Calories 35	17% of total calories from fat
Total Fat 1g	Sodium 72mg
*Vitamin A 1%	*Vitamin C 1%
*Calcium 5%	*Iron 1%

* Percentage Daily Values

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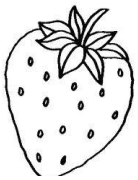
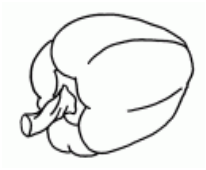
Released by Kelly Cordray, MS, RD, LD, EFNEP Nutrition Specialist
October 2004
Publication Number FDNS-NE-1059

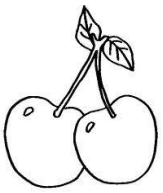


Strawberry

Apple

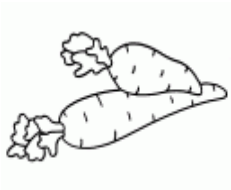


Bell Pepper

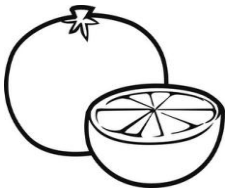


Cherries

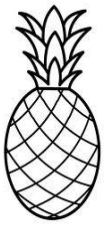
Tomato



Carrot

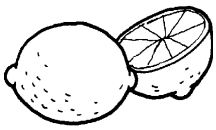


Orange



Pineapple

Corn



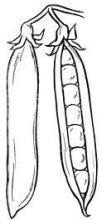
Lemon

Broccoli

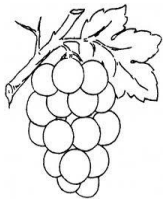
Celery

Avocado

Cabbage



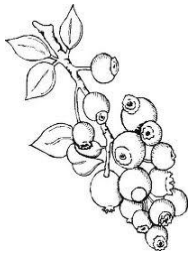
Peas



Grapes

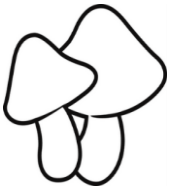
Egg Plant

Beet



Blue Berries

Plums



Mushroom

Onion

Banana

Cauliflower

Potato

Lesson Plan 3: Make Your Own Healthy Snack

Goal
The children will be able to perform appropriate and accurate measuring techniques for liquids and solids utilizing measuring cups and spoons.

Objectives
- Interact with family members and friends about selecting healthier food options
- Be more interested in grocery shopping and helping cook at home
- Confidently use measuring devices correctly

Description
This lesson is meant to encourage kids to shop with their parents and help cook meals at home together. Kids who grocery shop with their families are more likely to consume fruits and vegetables throughout the day, especially if they are permitted to select their favorite fruit and vegetable. This is a much better practice than letting them pick out their favorite sugary cereal or bag of chips. There are plenty of ways to involve children in the kitchen. They can easily and safely measure, pour, and mix ingredients. These activities promote family unity and team work, as well as instill a sense of self efficacy in the kids. They are more likely to accept what it is served if they feel like they were a part of buying and preparing the food.

Activity/Taste Test: Making, Measuring, and Mixing a Nutritious Chicken Salad
Today's activity/taste test gives the kids a break from the strictly fruit and veggie focused menu from the other lesson plans. Kids answer questions based on the current and previous lessons. Those who get the questions right get to measure and add the next ingredient. This continues until all the ingredients are added and someone gets to mix them together. Finally, the kids get to eat the chicken salad that they helped make over a bed of romaine lettuce.
Remember, all well behaved taste testers receive a sticker to place on their My Plate
recipe from kidshealth.org

Materials
- ✓ Liquid measuring cup
- ✓ Dry measuring cups
- ✓ Measuring spoons
- ✓ Stickers
- ✓ Greek yogurt
- ✓ Low fat mayonnaise
- ✓ Salt and pepper
- ✓ Romaine lettuce
- ✓ Celery
- ✓ Grapes
- ✓ Rotisserie chicken breast
- ✓ Red onion

Chicken Salad & Greens

Note: *Here's a great way to use leftover chicken from last night's dinner. No leftovers? Buy a rotisserie chicken from the grocery store. Either way, get a grownup's help with the chopping and cutting.*

Prep time: 5-10 minutes

What you need:

- ½ cup plain, nonfat Greek-style yogurt
- ¼ cup low-fat mayonnaise
- ½ teaspoon salt
- ½ teaspoon black pepper
- 1 large celery stalk, finely chopped
- ¼ cup red onion, finely chopped
- 1/3 cup grapes, cut in half
- 2 cups leftover roasted chicken, chopped into ½-inch pieces
- 4 cups romaine lettuce, coarsely chopped

Equipment and supplies:

- Mixing bowl
- Knife for chopping
- Bowls for serving

What to do:

1. In a large bowl, combine yogurt, mayonnaise, salt, pepper, celery, red onion, grapes, and chicken.
2. Mix gently until everything is well coated in dressing.
3. Divide lettuce between four bowls.
4. Top each bowl with some chicken salad. Serve cold.

How much does this recipe make?

- 4 servings

Reviewed by: Mary L. Gavin, MD
Date reviewed: April 2011

Nutrition Facts

Serving size: 1/4 of recipe

Amount Per Serving

Calories 220	Calories from Fat 60
	% Daily Value*
Total Fat 7g	**11%**
Saturated Fat 1.5g	**7%**
Cholesterol 60mg	**20%**
Sodium 490mg	**20%**
Total Carbohydrate 14g	**5%**
Dietary Fiber 1g	**6%**
Sugars 11g	
Protein 24g	

Vitamin A 25% • Vitamin C 20%

Calcium 4% • Iron 8%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Saturated Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

Lesson 4: Fruits and Vegetable Processing

Goal
Each child will be able to list at least two ways that a fruit or vegetable can be processed

Objectives
- Compare similar fruits and veggies that have been processed differently
- Identify which processing method was used on various fruits and veggies

Description
Fruits and vegetables can be purchased at the grocery store in a variety of forms. Processed fruits and veggies still count toward your total amount needed each daily. Depending on the way they are processed, the same fruit or vegetable may taste different. Some methods are healthier than others. When fruits and veggies are processed, they last longer before they spoil. Some methods used to increase shelf life include: freezing, canning, and drying. They can also be found as juices, jellies and pickled, although these forms are high in sugar and/or sodium. So only moderate amounts of fruits and vegetables should be consumed in these forms.

Activity/Taste Test: Food judges
For this lesson, the activity and the taste test are combined. The children will act like professional taste testers who will rate fruits and vegetables that have been processed differently. They will receive fresh, frozen, and canned peach slices. They will score each one for texture, taste, and smell. Based on these criteria, they pick which one is their favorite.
Remember, all well behaved taste testers receive a sticker to place on their My Plate

Materials
- ✓ Canned peaches
- ✓ Frozen peaches
- ✓ Fresh peaches
- ✓ Stickers

Lesson 5: Food Labels

Goal
The children will learn how to read and understand food nutrition labels

Objectives
- Critique nutrition labels
- Compare nutrition labels to identify the healthier option
- Be more interested in shopping at the grocery store and picking out healthy food

Description
All food in the grocery store has to have a nutrition label and ingredient list that lets you know what is in the food that you are eating. By law, nutrition labels must tell you how many calories are in the product; how much protein, carbohydrates, and fat are in the product; and how much vitamin A and C, and calcium and iron is in the food. The ingredients list tells us what ingredients were used to make the food. They are listed from high to low, so the ingredient that is listed first is what the food has the most of.

Learning Activity: Nutrition Spies
Each student will receive a nutrition label and they will have to evaluate it based on 4 "clues"
1) Do not let the big fancy print on the front of the box trick you, check the small print on the side
2) The first ingredient is in the food the most (use this to help find whole grain wannabes!)
3) Look out for words that end in "–ose" like high fructose corn syrup and partially hydrogenated oil
4) Avoid ingredient lists that are very Long

Taste Test: Whole grain pasta salad
Assemble the pasta salad ahead of time according to recipe. Save the box that the whole grain noodles came in and use it during the lesson so the children can see that the first ingredient of the noodles they are eating in the pasta salad is whole grain, which means it is higher in fiber.
Recipe from University of Georgia Extension Services

Materials
- ✓ Nutrition labels
- ✓ Stickers
- ✓ Placemats

Foods & Nutrition EDUCATION

The University of Georgia Cooperative Extension Service

Spiral Noodle Salad

8 ounces spiral noodles
1/2 pound broccoli, cut into bite-size pieces
3 large carrots, sliced
1/2 green or red pepper, diced
1 cup fresh cooked or frozen English peas (or half of a 16 ounce can, drained)
1 cup cherry tomatoes, or large tomatoes, cut up

Cook noodles according to package directions. Steam broccoli and carrots over boiling water until crisp-tender (about 5 minutes). Add pepper and peas during the last minute to steam slightly. Mix all ingredients and refrigerate.

(continues on back)

Make the dressing:

1/8 cup olive oil, or other vegetable oil	2 cloves of garlic, crushed
1/2 cup lemon juice	2 Tablespoons of chives or green onions
1/4 teaspoon pepper	1 teaspoon basil
1/8 teaspoon red pepper, if desired	1/2 teaspoon dill, if desired

Mix in a jar, close lid, then shake. Pour dressing over pasta and vegetables. Toss and chill in refrigerator. Serve cold.

Variations: Add 1 cup chopped, cooked ham, or 1 (8 ounce) can tuna, drained.

Nutrition Facts

Servings Per Recipe 8

Amount Per Serving — Calories 167 — 25% of total calories from fat
Total Fat 5g — Sodium 29mg
*Vitamin A 83% *Vitamin C 71% *Calcium 3% *Iron 10%

Released by Gail M. Hanula, MS, RD, LD, Family Nutrition Program Specialist
November 2002
Publication Number: FDNS-NE 755

Lesson 6: Sugar Sweetened Beverages

Goal
The children will be able to identify alternative beverage options to replace sugar sweetened beverages

Objectives
- Understand the benefits to replacing sugar sweetened beverages with water or diet beverages

Description
Many beverages, especially sodas and energy or sport drinks, contain a lot of sugar. That is why we like them so much! But that much sugar is not good for us. Using the clues we learned from the previous lesson about nutrition labels, we can look on the ingredient list for sugar. Sometimes it is called high fructose corn syrup. We want to avoid foods and drinks that list this ingredient as one of the first few ingredients. Water is the best drink and we need a lot of it every day. Milk is also good, but we want to drink skim or 1% because 2% and whole milk have a lot of fat! Milk has a lot of protein to build muscle, and it is a good source of vitamin D and calcium. Fruit juices may seem healthy because they have the word "Fruit" on the label. But you want to make sure you see the words "100% fruit juice" on the container, otherwise it might have extra sugar and artificial fruit flavoring.

Activity: Measuring Sugar
This activity is intended to demonstrate the amount of sugar found in various foods and beverages. The children will empty bottles of various popular drinks. They will use measuring spoons to funnel the sugar into the bottles based on the amount that is found in soda, fruit juice, sport drink, etc. This activity also gives them more experience with measuring tools and looking at food labels.

Taste Test: Beverages
The kids will try various drinks such as: skim milk, 1% milk, chocolate skim milk, 100% orange juice, and vegetable juice, water with lemon juice.

Materials
- ✓ Empty Drink Bottles: Coke, Diet Coke, Fruit Juice, Gatorade, Water, Milk, Chocolate Milk,
- ✓ Skim milk
- ✓ 1% milk
- ✓ Chocolate syrup
- ✓ 100% orange juice
- ✓ Vegetable juice
- ✓ Water
- ✓ Lemon
- ✓ Cups
- ✓ Placemats
- ✓ Stickers

APPENDIX B

QUESTIONNAIRES

ID Number _____

1. **According to MyPlate, how many servings (cups) of fruits and vegetables should you eat every day?**

   a. 1-2 cups
   b. 3-5 cups
   c. 6-8 cups
   d. 9-11 cups

2. **When you fill your plate up with food, how much of the plate should be fruits and vegetables when you look at it?**

   a. 1/2 (one half)
   b. 1/4 (one fourth)
   c. 1/3 (one third)
   d. 2/3(two thirds)

3. **Which of the following is a food group on MyPlate?**

   a. Chicken
   b. Pizza
   c. Vegetables
   d. Vitamins

4. **Which of the following is a fruit?**

   a. Cauliflower
   b. Broccoli
   c. Asparagus
   d. Peach

5. **Which 2 of the following are vegetables?**

   a. Radishes
   b. Celery

c. Pineapple
d. Grapes

6. **Which word should you look for on the ingredient list of a food package to know if that food is <u>bad</u> for you?**

   a. Whole Grains
   b. High Fructose Corn Syrup
   c. Monounsaturated Fat
   d. Soy protein

7. **Can you name a fruit or vegetable that is red?**

   _____

8. **Can you name a fruit or vegetable that is orange or yellow?**

   _____

9. **Can you name a fruit or vegetable that is green?**

   _____

10. **Can you name a fruit or vegetable that blue or purple?**

    _____

11. **Can you name a fruit or vegetable that is white?**

    _____

12. Do you like to help your mom, dad, grandmother, or grandfather prepare food in the kitchen?

All the time
Sometimes
Not very much
Never

13. Do you like to go grocery shopping with your mom, dad, grandmother or grandfather?

All the time
Sometimes
Not very much
Never

14. Do you ever pick out fruits or vegetables that you want from the grocery store so you can eat them at home?

All the time
Sometimes
Not very much
Never

15. When you get a fruit or vegetable for lunch at school do you:

Eat all of the fruit of vegetable
Eat some of the fruit or vegetable
Give it to a friend
Eat none of it and throw it in the trash can

Draw a line connecting the name of the fruit of vegetable with its picture

1. **Lettuce/Lechuga**
2. **Tomatoes/Jitomates**
3. **Broccoli/Brocoli**
4. **Grapes/Uvas**
5. **Asparagus/Esparragos**
6. **Raisins/Pasas**
7. **Peach/Durazno**

8. Avocado/Aguacate

9. Bell Peppers/Chiles

10. Blueberries

11. Cauliflower/Coliflor

12. Carrots/Zanahorias

13. Celery/Apio

14. Pineapple/Piña

15. **Radishes/Rábano**

Circle the food in each pair that is healthiest?

1.

Whole Wheat Bread

White Bread

2.

Pretzels

Potato Chips

3.

Cereal

Bacon and Eggs

4.

Granola Bar

Candy Bar

5.

Whole Milk

Milk

Low Fat or Skim

6.

Yogurt

Ice Cream

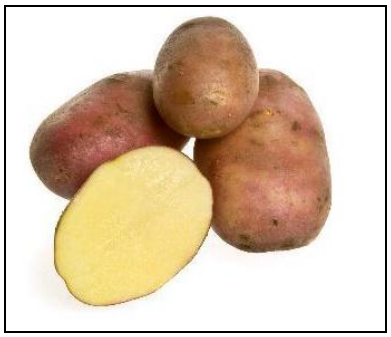
7.

Salad

Hamburger

8.

French Fries



Baked Potato

9.

Fresh Fruit

Cookies

10.

Soda

Water

How do you feel about food/snacks made from vegetables?

1. **How do you feel about the taste of carrots?**

2. **How do you feel about the taste of broccoli?**

3. **How do you feel about the taste of avocado?**

4. **How do you feel about the taste of radishes?**

5. **How do you feel about the taste of bell peppers?**

6. **How do you feel about food/snacks made from fruit?**

7. **How do you feel about the taste of blueberries?**

8. **How do you feel about the taste of peaches?**

9. **How do you feel about the taste of bananas?**

10. **How do you feel about the taste of strawberries?**

Food choices questionnaire:

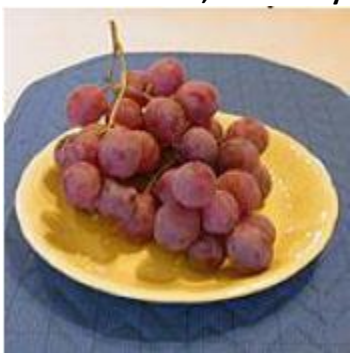
1. **In the last week, how many times did you eat bananas?**

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

2. **In the last week, how many times did you eat apples?**

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

3. **In the last week, how many times did you eat grapes?**



a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

4. **In the last week, how many times did you eat pears?**

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

5. In the last week, how many times did you eat oranges?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

6. **In the last week, how many times did you eat raisins?**

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

7. In the last week, how many times did you eat pineapple?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

8. In the last week, how many times did you eat peaches?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

9. In the last week, how many times did you eat green beans?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

10. In the last week, how many times did you eat other kinds of beans?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

11. In the last week, how many times did you eat sweet potatoes?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

12. In the last week, how many times did you eat French fries or tater tots?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

13. In the last week, how many times did you white potatoes?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

14. In the last week, how many times did you eat carrots?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

15. In the last week, how many times did you eat corn?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

16. In the last week how many times did you eat celery?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

17. In the last week, how many times did you eat broccoli?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

18. **In the last week, how many times did you eat salad?**

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

19. In the last week, how many times did you eat yellow squash?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

20. In the last week, how many times did you eat tomatoes

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

21. In the last week, how many times did you eat chips?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

22. **In the last week, how many times did you eat pretzels?**

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

23. In the last week, how many times did you eat cheese?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

24. **In the last week, how many times did you drink orange, apple or grape juice?**

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

25. **In the last week, how many times did you drink low fat milk?**

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

26. **In the last week, how many times did you drink whole milk?**

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

27. In the last week, how many times did you drink water?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

28. In the last week, how many times did you drink soda?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

29. In the last week, how many times did you eat cereal?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

30. **In the last week, how many times did you eat Biscuits?**

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

31. In the last week, how many times did you eat yogurt?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

32. In the last week, how many times did you eat peanut butter?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

33. In the last week, how many times did you eat fried chicken/nuggets?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

34. In the last week, how many times did you eat macaroni and cheese?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

35. In the last week, how many times did you eat rice?

a. 0 times
b. 1 time
c. 2 times
d. 3 times
e. 4 times
f. 5 times
g. 6 times
h. 7 or more time

36. In the last week, how many times did you eat a hamburger?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

37. In the last week, how many times did you eat pizza?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

38. **In the last week, how many times did you eat ice cream?**

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

39. In the last week, how many times did you eat cookies?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

40. In the last week, how many times did you eat candy?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

41. In the last week, how many times did you eat cake?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

42. **In the last week, how many times did you eat empanadas?**

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

43. **In the last week, how many times did you eat tacos?**

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

44. In the last week, how many times did you eat burritos?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week

45. In the last week, how many times did you eat quesadillas?

a. 0 times last week
b. 1 time last week
c. 2 times last week
d. 3 times last week
e. 4 times last week
f. 5 times last week
g. 6 times last week
h. 7 or more times last week