CHILDHOOD OBESITY IN LATINO CHILDREN AND A NUTRITION EDUCATION INTERVENTION

by

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(Under the Direction of Silvia Giraudo)

ABSTRACT:

This pilot study assessed the effectiveness of a nutrition education intervention in the improvement of nutrition and physical activity attitudes, knowledge and behaviors in Latino children. Participants (n=18) were Latino children 5-11 years old from the Garnet Ridge Boys and Girls Club. The participants received educational lessons for an hour once a week. Eating behaviors, knowledge, food preferences, and physical activity were evaluated with the use of pre-test and post-test questionnaires. The post-test indicated improvements in eating behavior following the intervention. Participant's knowledge, food preference, physical activity, healthy foods, vegetable and fruit consumption were not improved after the intervention. Participant's knowledge and food preference were positively associated with the healthy items, although not significant. These changes in knowledge and food preference can lead to positive changes in attitudes, behavior and self efficacy towards a healthier lifestyle. This pilot study will be a useful tool in the development of future interventions.

INDEX WORDS: Latino childhood obesity, nutrition intervention, dietary behaviors, knowledge, food preference, physical activity behaviors

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DEDICATION

To Mami, Papi, Bebo, Natalia, family and friends that have contributed throughout my educational and life journey

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First of all, thank you to without whom none of this would have been possible, God, who leads me, guides me and walks beside me. Also I am very grateful to each person that has assisted me in the accomplishment of this research project. It could not have been completed without the support, contribution, effort and sacrifice of my colleagues, friends and family. Much appreciation goes to Dr. Silvia Giraudo for her guidance and support. I would like to thank my committee members, Drs. Rebecca Mullis and Judy Harrison, for willingly contributing their time, effort and insightful comments to this research project. Thank you to Dr. Mary Ann Johnson for her leadership and commitment to my graduate career and for always encouraging me and supporting me through these two years.

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CHAPTER 1

INTRODUCTION

Purpose of the Study

Overweight and obesity in children are significant public health problems in the United States. Childhood obesity is a serious concern for United States Latino children. The dramatic increase in the prevalence of obesity among children has led to obesity prevention becoming a major national health priority (1). Interventions have been effective in reducing the risk of obesity particularly in interventions that considered the culture, beliefs and practices among their ethnic group (2-5). Thus, the purpose of the study was to expand our knowledge of Latino children eating behaviors and physical activity and how it correlates with their obesigenic behaviors.

Rationale and Significance

Ethnic minority and low income children appear more likely to experience obesity-related health problems (6). Previous studies have shown that obese children are at risk for health problems during their youth and as adults (7). Preventing childhood obesity through different programs and education will help protect the health of the child now and in the future. After-school programs provide an opportunity for obesity prevention by incorporating physical activity and nutrition education (2, 8). Thus, this project will fill in the gaps about our knowledge of Latino children eating patterns and physical activity and how that will correlate with their obesigenic behaviors through the

innovative use of a culturally based nutrition education intervention in the after school setting.

Research Question

Will a culturally based nutrition education intervention in an after school program improve knowledge, attitudes and behaviors related to food choices and physical activity in Latino children?

Overall Hypothesis

A nutrition education intervention will improve the attitude of the Latino children to healthy food choices and children will become more physically active.

Specific Aims

The overall hypothesis will be tested in Latino children between the ages of 5-11 years of age from the Garnet Ridge Boys and Girls club. The specific aims are to:

1. Develop culturally based educational materials and an intervention that emphasizes the importance of food variety, healthy choices, portion control and physical activity for Latino children.
2. Assess eating behaviors, knowledge, food preferences, and physical activity in 5-11 year old Latino children with the use of pre-test and post-test questionnaires adapted from Gibson et al. (9), Mullis et al. (10) and Kelder et al. (11).

Organization of the document

Chapter two is a literature review of childhood obesity in Latino children, contributing factors, health consequences, childhood dietary behaviors, food preference, diet quality, nutrition knowledge, afterschool programs and previous nutrition interventions that have addressed this problem in this population. Chapter three is a manuscript style chapter in

which methods and research findings of the nutrition intervention are discussed. In chapter four, overall conclusions and future directions are discussed and summarized.

CHAPTER 2

LITERATURE REVIEW

Childhood Obesity Prevalence in Latino Children

Latinos are individuals living in the United States who come from 20 different Spanish-speaking countries in Latin America and the Caribbean (12). They are the largest minority group and experience a disproportionate burden of poverty and poor health (12). According to Ogden et al. (13) the prevalence of high BMI for age over the 97th percentile for 6-11 year old Latino children (17.6%) was higher than non-Latino Whites (8.9%). More recently, in the 2007-2008 National Health and Nutrition Examination Survey (NHANES), this trend kept increasing in that 19.3% of Latino children between the ages of 6-11 years were at or above the 97th percentile of the BMI-for-age growth charts compared to non-Latino Whites and non-Latino Blacks that were 14.0% and 13.8%, respectively (14). According to the Centers for Disease Control and Prevention (15) a greater proportion of Latino children are overweight than are children from other ethnic groups. In addition, the Latino population is affected by other additional risks such as: low-income, acculturation to United States diet and lifestyle, parental obesity, recent immigration and limited health insurance further exacerbating the rates of obesity in the population (6, 16).

Moreover, the National Survey of Children's Health (17), has shown that eight of the 10 states with the highest rates of obese and overweight children are in the South. Georgia ranks third in the nation with a rate of 37.3%. Lewis et al. (18) studied the

prevalence and degree of childhood obesity in different areas of Georgia and showed that Georgia's children have a higher prevalence of obesity than the national sample, with nearly 24% of third graders, 20.9% of fourth graders, 18% of eighth graders and 22.4% of eleventh graders classified as obese. The disparities found in Georgia are similar to those seen nationally, with children who are minorities from low income households and from rural areas more likely to be obese. The high prevalence of childhood obesity is attributed to the interaction of genes and the obesigenic environment that promotes physical inactivity and high calorie diets (19).

Childhood Obesity and Chronic Diseases:

Obesity is a well known risk factor for multiple chronic diseases such as diabetes, heart disease and fatty liver diseases. Children who are overweight are more likely to develop secondary health problems such as type 2 diabetes, hyperlipidemia, heart problems and sleep-disordered breathing (7). Obesity results in metabolic consequences that can affect many organs in children leading to increased risk of metabolic syndrome, hyperinsulinemia, impaired glucose tolerance, dyslipidemia, hypertension, cardiovascular disease, chronic inflammation, endothelial dysfunction and thrombosis (20-22). In the respiratory system, some of the complications include: decreased exercise tolerance, sleep apnea and asthma. Moreover, steatohepatitis, renal disorders, musculoskeletal, neurological and psychological complications have been observed in obese children (20-22). Ethnic minority and low income children appear more likely to experience some of the obesity-related health problems (6). Chen et al. (23) have shown that in children with a BMI greater than the 95^{th} percentile, the prevalence of metabolic syndrome is 17.3%

and is strongly associated with insulin resistance. In addition, children with high BMI are at more risk to become obese adults (24).

Obesity and Contributing Factors

Obesity results from the imbalance between energy intake and expenditure. Certain behaviors such as high dietary intake, lack of physical activity and other sedentary behaviors result in energy imbalance and obesity (25). Acculturation has been shown to exacerbate these behaviors (26, 27). Similarly, recent research in the Latino population has shown these obesity trends (26, 28, 29). Other factors that have contributed to the current dietary behaviors in children are: increased portion sizes served at restaurants, increased variety and availability of low-cost and energy-dense foods, increased consumption of sugar-sweetened beverages (soft drinks), decreased proportion of meals prepared as "family meals" and insufficient consumption of fruits and vegetables (22). The lack of physical activity in children can be explained by the increased prevalence in sedentary behaviors (video games, computers and TV watching), increased reliance on cars, buses, escalators and elevators and decreased physical education classes in schools (22). Therefore, understanding the environment and situational factors of school-aged children are crucial in the development of an effective obesity prevention program.

Snethen et al. (29) conducted a study in a Latino community center in Milwaukee, Wisconsin to understand the Latino perspective about childhood obesity. According to Snethen et al. (29), parents and children knew about the importance of a healthy lifestyle to prevent obesity; however, they recognized some limitations that are present in the Latino community to achieve good nutrition and physical activity. The participants distinguished that the lack of time for the parents to prepare healthy meals resulted in the

consumption of high calorie food by the children. The lack of time and busy work schedule have been common factors in most of the focus groups conducted in Latino families (26, 28). In addition, the children recognized that the parents use sweets as rewards for good behavior, therefore resulting in the increased intake of sugar by the children. Moreover, Lindsay et al. (28) found that food pricing (expensive), availability and accessibility to healthy foods, convenience of eating out, accessibility to fast food and limited social support from friends and neighbors were factors that influence the high level of dietary intake in Latino preschool-age children.

Furthermore, the lack of parental time was also mentioned as a factor that prevented physical activity in their children. Safety and cost were distinguished by the parents as a limitation to promote physical activity in their children. Children recognized that their sedentary activities such as TV, video games and computers are factors that promote decreased physical activity. In addition, Sussner et al. (26) have shown that cold weather, housing and greater reliance on transportation decreased the physical activity in Latino families.

Additionally, the Latino population is affected by other risk factors that contribute to the high prevalence of obesity. According to Kumanyika and Grier (6), ethnic minorities are exposed to a great deal of food advertisements and have a higher share of female-headed families, low parental education and higher rates of teen pregnancy, which can influence their eating patterns. Therefore, understanding the environment and situational factors in the Latino community are essential in the development of an effective nutrition education intervention.

Childhood Dietary Behaviors

Dietary behavior is complex. Family and social factors can influence childhood dietary behaviors. This includes: food availability, preferences, accessibility, portion size, modeling, meal time structure, parents' attitudes and behaviors regarding food, feeding styles, socioeconomic status and cultural factors (30, 31). These factors can affect the children's diets either in a positive or negative manner. Children tend to eat foods that are served most often and that are readily available at home (31). Availability and accessibility of fruits and vegetables have been associated with more consumption of fruits and vegetables among children (31, 32). Therefore, availability and accessibility can influence childhood dietary behavior, and it becomes crucial in the consumption of healthy food choices versus less healthy food choices and subsequently taste and food preference (31, 32).

Children learn about eating through their own experiences and watching others. Therefore, parents' preferences, beliefs, attitudes, modeling and feeding styles are going to influence eating behavior (31, 33). Ayala et al. (34) studied the relationship between Latino family variables and children's dietary intake. They found that greater family support for healthy eating was associated with fewer snacks and more fiber consumption, and that parents who bought food items that were mainly advertised on TV and were not healthy lead to the consumption of more snacks, more fat and more fast foods. Moreover, Gibson et al. (35) have shown that fruit consumption of the mother is positively associated with fruit intake of children. In addition, parents further influence childhood dietary behaviors by actively encouraging, discouraging or controlling certain

behaviors, with examples including no sweets or high fat and more fruits and vegetables (33).

Another factor that can influence childhood dietary behavior is the mealtime structure. This involves the social context of the meal such as eating together as a family, TV viewing while eating and eating out (31). Studies have shown that children who eat meals with other family members tend to eat more healthful and nutrient rich foods (36). TV viewing has been associated with consumption of more high fat and sugar foods and less fruit and vegetable consumption (37). In addition, TV advertisement has been associated with more obesigenic behaviors in children and in their families (31, 32, 34).

Food Preferences

Food preference is strongly associated with the children's eating patterns (38, 39). Food preferences are mainly learned through experiences with food (40). Food preference is influenced by food likes, dislikes, food neophobias, exposure, availability, food flavor, food advertising, parent and peer modeling and cues about post-ingestive consequences (32, 38, 40-42)

According to Birch et al. (41), humans have an innate predisposition to taste preferences. Humans have a preference for sweet and salty and an aversion for bitter and sour tastes. In addition, humans might have the tendency to learn to prefer the taste of energy-dense foods and reject new foods. This finding is evident in children (40), who are more likely to prefer high fat and high sugar foods than fruits and vegetables (38). In addition, older children are more likely to like more foods than younger (40). This is related to more exposure and to a possible reduction to food "neophobia." According to Rozin (43), food "neophobia" behaviors are crucial in the willingness of the child to try

new foods. However, studies have shown that repeated exposure to food can have a positive effect on food preference for a particular food (41, 44). Several studies have suggested that up to 10 exposures to a food are necessary to result in a change of food preference (41, 44). The possible explanation for this is that the increase of liking is related to the familiarity of taste, experience and subsequent acceptance of the food (38).

In addition, parents can influence food preference. Skinner et al. (42) conducted a longitudinal analysis of the relationship between mothers' and children's food preferences. They analyzed 196 commonly eaten foods for a period of five years. They found that children's and mother's food preferences were significantly correlated for foods liked, disliked and never tasted. Moreover, another factor that can affect food preference is food advertising. Robinson et al. (45) examined the effects of marketing and brand exposures on children's preferences. They evaluated food preference using 5 food items that were either wrapped in a McDonald's wrapper showing the McDonald's logo or wrapped in a plain white wrapper with no logos. The items included hamburger, chicken nuggets, French fries, 1% fat milk and "baby" carrots. The children preferred the items that had the McDonald's logo including the baby carrots that are not even sold in McDonald's. Therefore, the authors concluded that food branding is a strong influence on children's foods preference.

Latino Children and Their Families' Diet Quality

Latino diet in the United States is heavily influenced by the traditional dietary patterns of their countries of origin, as well as by the dietary practices of the adopted communities in which they live (46). Many Latinos still maintain core elements of their

traditional diet, which include a reliance on grains and beans and the incorporation of fresh fruits and vegetables in the diet (46).

Wilson et al. (16) assessed the overall diet quality and nutrient adequacy in participants of the Viva La Familia Study. They evaluated the diet quality of 1,030 low income Latino children for a period of 4 years. The authors found that the Latino diet quality was adequate in most nutrients; however, they frequently exceed the guidelines for total fat, saturated fat, cholesterol, sugar and sodium intake. In addition, the quality of the diet was diminished by the low intake of fiber, fruits and vegetables. Furthermore, Jímenez-Cruz et al. (47) evaluated the consumption of fruits, vegetables, soft drinks and high fat-containing snacks among fifth grade Mexican children attending the public schools of Baja, California. The authors found that the intake of fruits and vegetables was 70% and 62% respectively below The Apple of Health program standards levels which recommend two fruits and three vegetables per day. Regarding soft drink consumption, 92% reported consuming one soft drink daily and 85% consumed one portion of high fat-containing snacks daily. Moreover, a study conducted by Basch et al. (48) to examine if Latino children's intake of fruits and vegetables was in adherence with the "5 A DAY" campaign showed that children's fruit and vegetable intake falls short of the "5 A DAY" recommendation.

Latino diet quality and nutrient adequacy have been associated with food insecurity, demographic factors and acculturation (27, 49-53). Kaiser et al. (27) examined the relationship between food insecurity and the food supplies in Latino households. The authors found that the greater the food insecurity, the lower the variety of foods, mainly foods such as fruits and vegetables. Moreover, Dave et al. (50)

performed a cross-sectional pilot study to examine the association between food insecurity, demographic factors and acculturation in the Latino children's fruit and vegetable consumption. They found that children's fruit and vegetable intake was significantly lower among participants with greater food insecurity. They also found that the overall intake of fruits and vegetables decreased with increased levels of acculturation. Acculturation has been studied extensively over the years to determine its relationship to Latino health behaviors, diet quality and health outcomes (49, 51-53). Neuhouser et al. (52) examined the association between acculturation and dietary patterns in Mexicans living in Washington State. The dietary pattern varied according to the level of acculturation, with highly acculturated Latinos consuming fewer servings of fruits and vegetables and having a slightly higher fat intake than low-acculturated Latinos.

Nutrition Knowledge

Nutrition knowledge has been associated with dietary behaviors. According to Singleton et al. (54) children that are 4 to 7 years of age are cognitively ready to learn more about food, nutrition, and health. Moreover, studies have shown that children at this age begin to understand concepts like nutritive value, nutrient function, and the impact of nutrition on health, and their nutritional awareness correlates with the quantity and quality of food and nutrition-related information delivered by the parents (55). However, concepts like "low-fat food" and "low-sodium food" are more difficult for them to understand (55). Olvera-Ezzell et al. (56) studied Mexican American children understanding of the relationship between health behavior and health status. The author found that knowledge regarding nutrition was very limited. Most of the limitations were associated with knowledge regarding the healthiness of consuming high sugar and high

fat foods vs. low fat and low sugar foods. In addition, Pérez-Escamilla et al. (57) studied the nutrition knowledge, attitudes and behaviors among Latino mothers. They found that most of the participants had a positive attitude towards nutrition; however, they lacked specific knowledge of terms such as saturated fat and were also not able to identify good food sources of folate, calcium and vitamin A. On the other hand, a study performed by Brug et al. (33) showed that knowledge of the recommendations was positively related to fruit and vegetable intake. Therefore, promoting knowledge in children can impact positive fruit and vegetable consumption.

Children and Afterschool Programs

Schools are ideal settings to address obesity because children spend most of their time in school and the school, provides one to two meals daily (3). More recently, First Lady Michelle Obama introduced the program, *Let's Move*, which is a nationwide effort to solve the obesity epidemic within one generation. The *Let's Move* program aims to help schools implement provisions made by The Child Nutrition Act (58). In this program, the U.S. Department of Agriculture will partner with schools across the nation to help them meet guidelines set by the Healthier U.S. Schools Challenge Program, which establishes rigorous standards for schools regarding food quality, participation in meal programs, physical activity and nutrition education.

Settings such as schools and after school programs are ideal for reaching children to promote healthy eating and physical activity. However, school-based interventions face challenges. Schools focus mainly on the basic educational skills and test scores, thus there is reluctance to release class time for non-academic activities. There is a lack of physical education in some schools. Afterschool programs provide a ready-made

opportunity for health programs that may be difficult to incorporate into an already full school day. On average, children in afterschool programs participate three days per week for an average of 8.1 hours per week or more (59). Due to the gap in time that exists between parents' working hours and their children's school hours, programs offered after school have been identified as potential environments for health and physical activity promotion (2, 11, 60-62). Furthermore, The Food Research and Action Council identify afterschool programs as effective venues for improving nutrition education and physical activity (63).

In 2009, the Afterschool Alliance conducted a household survey of nearly 30,000 families to learn about the number of children that participate in afterschool programs. Latino children were more likely to be enrolled in afterschool programs than other children. Twenty-one percent of Latino children are enrolled in afterschool programs (e.g. schools, community centers, churches or elsewhere) compared to 15 percent of all children in general. Demand for afterschool programs is great in the Latino community. The survey also showed that 47% of Latino parents would enroll their children if programs were available compared to 38% of parents in general. Furthermore, 96% of Latino parents are more likely than the general population (91%) to say that there should be some type of organized activity or place for children to go after school every day that provides opportunities for them to learn.

Wethington et al. (64) analyzed different after school programs and policies that have been implemented with apparent success to prevent obesity by improving the eating habits and physical activity levels of children. Some of the programs that were described

as effective in some states were CATCH (Coordinated Approach to Child Health), CKC (CATCH Kids Club) and Fit Kid Project.

Nutrition Interventions in Latino Children

Several other researchers have established that the proposed research approach is feasible. Community and school interventions that take into account the culture, beliefs and practices among their ethnic group are effective (2-5). A multi-component school-based intervention was associated with a 50% decrease in the incidence of overweight in children from ten elementary schools in the Mid-Atlantic region (3).

Furthermore, Tsai et al. (5) conducted a study to evaluate the effectiveness of implementing the TAKE 10! program in a school serving primarily Latino children. The program was designed to increase physical activity and to improve nutrition in the students. Student knowledge and awareness of physical activity and nutrition increased after implementation of the program.

Furthermore, Coleman et al. (65) conducted a study to assess the impact on children's health of translating an evidence-based national intervention trial (CATCH) to a low-income elementary school with primarily Hispanic students. The translation of the program to fulfill the needs of the Hispanic children was effective in slowing the increased risk of overweight in children. Therefore, understanding how they want to learn is necessary for the development of an effective nutrition education intervention in Latino children. Additionally, James et al. (4) studied the feasibility of a weight management program adapted to meet the needs of Latino families. The program proved to be feasible and effective by including the suggestions made from the Latino families' focus groups.

Based on this literature review, it is important to observe and to evaluate how the target population wants to learn and what are their needs are in order to change their behaviors to prevent obesity. There is considerable evidence regarding education interventions in schools settings; however, there is little research regarding the effectiveness of afterschool interventions in Latino children. More research is needed in this area considering that Latino children are one of the largest minority groups in the United States.

Atiles et al. (66) have conducted a nutrition education intervention in the local Latino community of Pinewood Estates South in Athens, Georgia. The intervention was part of the Study Abroad program to Xalapa, Mexico in which University of Georgia (UGA) students developed educational materials and nutrition counseling sessions for the Latino community based on the cultural experience they had in Mexico; however, outcomes regarding the effectiveness of this intervention were not measured. Thus, the proposed study will assess the effectiveness of a nutrition education intervention in the improvement of nutrition and physical activity attitudes, knowledge and behaviors in Latino children.

CHAPTER 3

CHILDHOOD OBESITY IN LATINO CHILDREN AND A NUTRITION EDUCATION INTERVENTION

ABSTRACT

Childhood obesity is a serious concern for U.S. Latino children. The development of prevention programs will help in the fight against childhood obesity. The purpose of the study was to expand our knowledge of Latino children's eating behaviors and physical activity and how these correlate with their obesigenic behaviors. This pilot study assessed the effectiveness of a nutrition education intervention in the improvement of nutrition and physical activity attitudes, knowledge and behaviors in Latino children. Participants (n = 18) were Latino children 5-11 years old from the Garnet Ridge Boys and Girls Club. All participants were assigned to the intervention group. The nutrition intervention was conducted for four weeks. The participants received the educational lessons for one hour once per week. The curriculum contained learning modules including: food choices, portion control, healthy snacking, healthy lunch box and games. Eating behaviors, knowledge, food preferences, and physical activity were evaluated with the use of pre-test and post-test questionnaires. Descriptive statistics including means, standard deviations, medians, confidence intervals, percentages and correlations were calculated (SPSS). The post-test indicated improvements in eating behavior following the intervention. Participant's knowledge, food preference, physical activity, healthy foods, vegetable and fruit consumption were not improved after the intervention; however, some positives changes were observed. Participants' knowledge and food preferences were positively associated with the healthy items, although not to the level of significance. These changes in knowledge and food preference can lead to positive changes in attitudes, behavior and self efficacy towards a healthier lifestyle. A better understanding of Latino children's environment and social factors that influence dietary

behaviors can lead to successful interventions in the prevention of childhood obesity. This pilot study will be a useful tool for the development of future interventions in this target population and in the prevention of childhood obesity.

INTRODUCTION

Childhood obesity has more than tripled in the past 30 years. According to the Centers for Disease Control and Prevention (15), a greater proportion of Latino children are overweight than are children from other ethnic groups. Childhood obesity has both immediate and long-term health consequences. Children who are overweight can develop secondary health problems such type 2 diabetes, hyperlipidemia, cardiovascular problems and sleep-disordered breathing (7). Ethnic minority and low income children appear more likely to experience obesity-related health problems (6). The dramatic increase in the prevalence of obesity among children has led to obesity prevention becoming a major national health priority (1).

The high prevalence of childhood obesity is attributed to the interaction of genes and the obesigenic environment that promotes physical inactivity and high calorie diets (19). Studies have shown that Latino families' diet quality is adequate in most nutrients; however, they frequently exceed guidelines for total fat, saturated fat, cholesterol, sugar and sodium intake. Furthermore, studies have shown that Latino children have a high consumption of soda and high fat snacks and a low consumption of fruits and vegetables (47, 48).

Dietary behaviors can be influenced by several factors such as knowledge, food preference, parental influence, attitudes towards food, socioeconomic status and cultural factors (30, 31, 38, 54). Addressing these factors can lead to the improvement of dietary behaviors and a healthier lifestyle. Preventing childhood obesity through different programs and education will help protect the health of the child now and in the future. Interventions are effective in reducing the risk of obesity particularly when interventions

have considered the culture, beliefs and practices among their ethnic groups (3-5, 65). This proposed pilot study will examine the development of a culture based nutrition intervention and will increase our knowledge of Latino children's eating behaviors, attitudes, food preference and physical activity.

METHODS

The purpose of this pilot study was to expand our knowledge of Latino children eating patterns and physical activity and how it correlates with their obesigenic behaviors. The proposed pilot study assessed the effectiveness of a nutrition education intervention in the improvement of nutrition and physical activity attitudes, knowledge and behaviors in Latino children.

Social cognitive theory approach was used as the theoretical approach in this study (67, 68). This approach takes into account the environment, the individual and behavior and how they constantly interact (67, 68). In the Latino community the individual factors are their knowledge, food preference and behavior regarding food choices and physical activity (Figure 1). Environmental factors are the home, the afterschool program and the community settings that affect their attitudes and behaviors towards food choices and physical activity. Sources of support for healthy food choices and physical activity include family members, friends, the participants and the Boys and Girls Club staff. Barriers may include cost, effort involved in making healthy choices, availability of healthy food choices and support for physical activity in their environment.

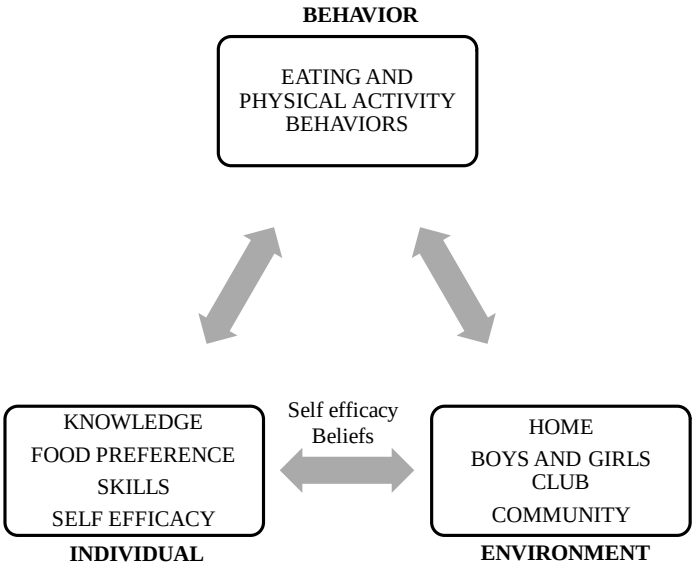

Figure 1: Social Cognitive Model: *Use of a social cognitive theory in the development and evaluation of an intervention to prevent childhood obesity in Latino children. Adapted from (67, 68).*

Study Design

The proposed study was a pilot study and included only an intervention group. All participants were assigned to the intervention group. The independent variable of the pilot study is the nutritional education curriculum. The dependent variables of the pilot study are the scores obtained from the different instruments that were used to measure knowledge, food preference and behavior. The study design was approved by the University of Georgia Institutional Review Board and the Georgia Department of Human Services Institutional Review Board before contact with human subjects was initiated.

Study Population

The study population consisted of 18 participants (Table 1), all of whom were Latino children (100%). Fifty percent of the participants were girls, and the other fifty percent were boys. Eighty-three percent of the participants were between the ages of 5 and 8 years old, and sixteen percent of the participants were between the ages of 9 and 11

years old. Most of the participants were in kindergarten and second grade (22% and 33%, respectively). Sixteen percent of the participants were in first and third grade.

Table 1. Description of the Study Population (n = 18)

	Total	**Intervention**	**Percentage**
	N	**N**	**%**
Characteristics			
Total	18		
Ethnicity			
Latino	18	18	100
Child Age Group			
5-8 years		15	83.3
9-11 years		3	16.6
Child Gender			
Girls		9	50
Boy		9	50
Child Education			
Kindergarten		4	22.2
First Grade		3	16.6
Second Grade		6	33.3
Third Grade		3	16.6
Fourth Grade		1	5.6
Fifth Grade		1	5.6

Sample Size

From previous research in similar populations and with similar protocols, it was estimated that at the pre-test the total intake of fruits and vegetables would be 4.66 ± 2.00 servings daily (69). To detect an increase of 0.5 or 1.0 daily servings would require a sample size of approximately n = 41 (70).

Study Site

The pilot study was conducted in the Garnet Ridge Boys and Girls Club in Athens, GA. The reason for the selection of this particular site is due to its location in a mostly Latino community in the North part of Athens, GA.

Development of the intervention

Needs Assessment

In order to develop the intervention, a literature review was conducted (Chapter 2). In addition, the target population was observed and research of the national and local sources was evaluated. Moreover, interviews were conducted to determine the different components of the intervention and consequently guided the development of an appropriate curriculum for the education of Latino children and prevention of childhood obesity within this ethnic group. The assessment was conducted with the children, parents and Boys and Girls Club staff in January, 2011.

The interviews were performed in January 2011 at the Garnet Ridge Boys and Girls Club family night. The interviews were conducted with every parent and child that were present that day. Nine Latino parents, 16 Latino children (5-12 years old) and the club director participated in the interviews for about 10 to 20 minutes. Children and parents were asked questions regarding eating behaviors and physical activity (Appendix A). In addition, questions about how they like to learn were asked. After the interviews were performed, the curriculum and the questionnaires were developed based on the interview results.

Design of the intervention

Intervention Map

Learning Goals and Objectives for the Curriculum

The curriculum was adapted from Atiles et al. (66). In order to design an effective intervention, learning goals and objectives were identified:

Goal 1:

Educate and empower Latino children and their families to make healthier food choices.

Objectives:

After completion of the intervention:

1. Participants will be able to correctly identify five fruits and the seasons in which they are harvested.
2. Participants will be able to correctly identify five fresh vegetables and the seasons in which they are harvested.
3. Participants' consumption of fruits and vegetables will have increased 0.5 or one daily serving size.
4. Participants will be able to identify five healthy snack alternatives.

Goal 2:

To improve the knowledge, attitudes and behaviors related to food choices and physical activity of Latino families and others in the community as a whole, and to provide the necessary skills and confidence in one's capacity to practice a healthy lifestyle individually, in the family and in the community setting.

Objectives:

After completion of the intervention:

1. Participants' knowledge, attitudes and behavior related to food choices and physical activity will increase 25 % over baseline.
2. Participants will be able to identify five healthier food choices at the grocery stores, restaurants, fast food and other food establishments.
3. Participants will be able to relate that increasing fruits and vegetables consumption and physical activity leads to a healthy lifestyle.
4. Participants will feel confident about their ability to successfully make healthier food choices.
5. Participants will value and develop the necessary skills to practice a healthy lifestyle.

Methods and Strategies

The methods that were selected for this intervention include: information transmission, reevaluation, identification of barriers and modeling (Table 2).

Table 2. Methods and Strategies for the Intervention

Method	Strategy
Information transmission	Share information about food groups, healthy vs. not healthy snacks, fruits and vegetables and healthy vs. not healthy options in a meal during a large group discussion. Share information in an interactive and playful way to keep the participants interested.
Reevaluation	Present clear messages about the importance of eating healthy and adding fruits and vegetables in their diet. Use pre-assessment and post assessment questions after the lessons to reinforce the message.
Identification of Barriers and planning of solutions	Use questions and answer dynamic with parents in a workshop.
Modeling	Taste healthy snacks when performing one of the lessons. Taste healthy recipes in the parents' workshop and meetings.

Implementation

The interactive intervention was conducted for four weeks (January - February, 2011). The participants received the educational lessons for an hour once a week. The curriculum contained learning modules including: food choices, portion control, healthy snacking, healthy lunch box and games (Appendix C). In addition, a workshop was conducted with the parents about healthier food choices and the "Eat well" plate method. The learning activities were discussed as follows:

Lesson 1: "Eatwell Plate" or "El Plato del Buen Comer" - Participants learned about the different food groups and how to create a plate that includes the correct serving of each group.

Lesson 2: Fishing for Healthy Foods - Participants were introduced to healthy snack alternatives while having fun.

Lesson 3: "Fruits and Vegetables Hot Potato" - Participants learned about fruits and vegetables using a fun activity. They learned where the fruits and vegetables are harvested and the seasons in which they are harvested.

Lesson 4: Lunch Box - Participants learned about healthy food choices and unhealthy food choices.

Evaluation

The evaluation of the intervention was conducted using a pre-test before the intervention, a post-test immediately after the intervention and a post-post test 4 months after the intervention. The evaluation protocol consisted of the collection of demographic information, "My Food Choices" questionnaires, "My Physical Activity" questionnaires

and the knowledge and food preference questionnaires. Evaluation materials are found in Appendix D.

Pre-test

Before the intervention, three sessions were conducted to complete the pre-test measures (December 2010 – January 2010). In the first session, participants completed the demographic profile including age, gender, grade and ethnicity (Appendix B). Participants also completed the "My food choices" questionnaires during that session. In the second session, participants completed the "My physical activity" questionnaires. Lastly, in the third session, participants completed the knowledge and food preference questionnaires.

Immediate Post-test and Four Month Post-test

Immediately after the intervention, three sessions were conducted just like before to complete the post-test measures (February 2011). In these three sessions, participants completed the same "My food choices," "My physical activity" and the knowledge and food preference questionnaires. The same protocol was followed 4 months after the intervention (May 2011) for the participants to complete the post-post test questionnaires.

Informed Consent

Parents and children were recruited in their once-a-month family nights at the Boys and Girls club in November 2010. Interested parents and children were informed of the purpose of the study, the study procedure and the time of commitment for the study. All participants and their parents were asked to read and sign a consent form and were given a copy of the consent form for their records.

The number of active members of the Garnet Ridge Boys and Girls Club was 50 children. Thirty out of fifty returned with a signed parental consent form and child assent form and were eligible to participate. However, not all children participated in each test. Some of the children did not finish homework before we started the lessons or filling out the questionnaires. Attendance of the children was not the same each week. Some children were not allowed to participate due to disciplinary issues. Therefore, after adjusting for missing data in either the pre-test and/or post-tests, the total number of children who participated in all evaluation components was 18.

Data Collection

Data collection occurred through the four surveys before intervention, immediately and 4 month after the intervention. All measures were self-reported by the participants at the different evaluation times (pre-test, post-test, 4 month post-test). There was no penalty for non-participation for the participants.

Measures

Dietary Assessment

Eating behaviors were assessed by using pre-test and post-test questionnaires modified from Gibson et al. (9). The questionnaire developed by Gibson et al. (9) included digital food photographs to assist in recall of recent food intake based on how many times they consumed the food in the photographs (Appendix D).

Physical Activity Assessment

Physical activity was assessed with the use of a physical activity questionnaire developed by Mullis et al (2009). The questionnaire included digital physical activity

photographs to assist in recall of recent physical activity based on how many times they practiced a sport or any type of physical activity shown in the photographs (Appendix D).

Knowledge and Food Preference Assessment

Knowledge and food preferences were assessed with the use of a questionnaire modified from the Afterschool Student Questionnaire (ASSQ) developed by Kelder et al (2005). The questionnaire included survey items to measure food preferences and dietary knowledge (Appendix D). In the knowledge questionnaire, the participants were presented with 10 pairs of foods and asked to choose which food in each pair they thought was the healthy one. In the food preference questionnaire, the participants were presented with 11 pairs of foods and asked to choose which food in each pair they preferred. In both questionnaires, the pairs included a healthy option and a less healthy option.

Assessment Measures Analysis

"My Food Choices" and "My Physical Activity" Questionnaires (10)

The "My food choices" questionnaire contained 59 questions designed to measure consumption of common food items (10). There were two categories in the "My food choices": healthy and less healthy food choices. Thirty-four questions represented healthy food choices and 25 questions represented less healthy food choices (Table 3). All responses in each category, healthy food choices and less healthy food choices were summed and then divided by the number of questions in each category. In addition, within the 59 questions there were nine questions regarding fruit consumption and 13 questions regarding vegetable consumption (Table 3). Fruit and vegetable consumption was determined using the same calculations used for the healthy and less healthy food

choices. All together, this created a measure of the number of times in the prior week the participants consumed healthier foods and less healthy foods and the number of times in the prior week the participant consumed fruits and vegetables.

Table 3. Categories of the "My Food Choice" Questionnaire Food Items

Healthy Items n = 34	**Vegetable Items n = 13**	**Fruit Items n = 9**	**Less Healthy Items n = 25**
Orange/Apple/Grape Juice	Spaghetti Sauce	Orange/Apple/Grape Juice	Whole Milk
Low Fat Milk	Greens	Bananas	Fruit Flavored Drinks
Water	Green Beans	Apples	Soda
Cereal	Other Beans	Grapes	Honey Buns
Yogurt	Sweet potatoes	Pears	Chips
Bananas	Other Potatoes	Oranges	Popcorn
Apples	Carrots	Raisins	Cheese
Grapes	Corn	Canned Mixed Fruit	Hot Wings
Pears	Broccoli	Peaches	Fried Chicken/Nuggets
Oranges	Tossed Salad		Fish Sticks
Raisins	Yellow Squash		Macaroni and Cheese
Canned Mixed fruit	Tomatoes		Fried rice
Peaches	Vegetable Soup		Add gravy
Pretzels			French Fries
Peanut Butter			Hamburgers
Chicken (not fried)			With Cheese
Spaghetti			With Mayo
Rice			Pizza
Greens			Ice cream
Green Beans			Cookies
Other Beans			Snack Cakes
Sweet Potatoes			Chocolate Candy
Other Potatoes			Cake
Carrots			Jam
Corn			Empanadas
Broccoli			
Tossed Salad			
Yellow Squash			
Tomatoes			
Vegetable Soup			
Tacos			
Burritos			
Quesadilla			
Mexican Rice			

The "My physical activity" questionnaire contained 22 questions to measure physical activity and sedentary activities (10). Seventeen questions represented high activity and five questions represented sedentary activities. All responses in each category were summed and then divided by the number of questions in each category (Mullis et al 2009). The final scale for physical activity consisted of 15 items; it did not include wrestling in the baseline measurement cycle (Table 4). Moreover, some of the activity items such as cheerleading and dance represent activities that are primarily engaged in by females, and other activities such as football represent activities that are primarily engaged in by males. Therefore, separate scales representing male and female activities were created to analyze physical activity by gender.

Table 4. Categories of the "My Physical Activity" Questionnaire Items

Male High Activity Items n = 14	**Female High Activity Items n = 15**	**Male and Female Sedentary Activity Items n = 5**
Jump Rope	Jump Rope	Read
Play Basketball	Play Basketball	Play Video Games
Play Football	Bicycle	Play on the Computer
Bicycle	Walk/Push	Watch Television
Walk/Push	Play on Playground	Talk on the Telephone/ Text Message
Play on Playground	Cheerlead/Dance	
Skate/Skateboard	Dance	
Play Soccer	Skate/Skateboard	
Run/Jog	Play Soccer	
Play Baseball	Run/Jog	
Play Tennis	Play Baseball	
Play Volleyball	Play Tennis	
Stretch	Play Volleyball	
Go Swimming	Stretch	
	Go Swimming	

Knowledge and food preference assessment analysis

The knowledge questionnaire was an evaluation instrument designed to measure knowledge about healthy food choices. The questionnaire contained ten questions that included healthy and less healthy options. Scores were created with the responses of each question, where a zero was given to the unhealthy option and a one to the healthy option. All the scores for each category were summed and then divided by the number of participants. The food preference questionnaire was an evaluation instrument designed to measure the participant's food preference. The questionnaire contained 11 questions that included healthy and less healthy options. Scores were created with the responses of each question, where a zero was given to the less healthy option and a one to the healthy option. All the scores for each category were summed and then divided by the number of participants.

Statistical Analysis

Descriptive statistics including means, standard deviations, medians, confidence intervals, percentages and correlations were calculated using SPSS (SPSS version 14.0, SPSS, Inc, Chicago, IL, 2003). In addition, a mixed model analysis of variance (ANOVA) and paired t-test were used to compare the pre-test and post-tests. Moreover, McNemar test was used to determine differences among the pre-test and post tests in the knowledge and preference scores. The level of statistical significance was defined at $p< 0.05$.

RESULTS

Dietary Behaviors

Changes in Eating Healthier Foods

Thirty-four healthy items from the "My food choice" questionnaires were analyzed to determine the number of times in the prior week the participant consumed healthier foods (Figure 2; Table 5). The evaluation was conducted before (pre-test) and immediately (post-test) and 4 months (4 month post-test) after the intervention. There was no statistically significant change in the healthy eating behaviors among the nutrition intervention participants from the pre-test measure (2.70 ± 0.26) to the immediate and 4 month post-tests measures (2.29 ± 0.28 and 2.21 ± 0.33, respectively). In addition, the healthy items that were consumed the most by the participants at the time of evaluation were water, cereal and low fat milk (Table 5).

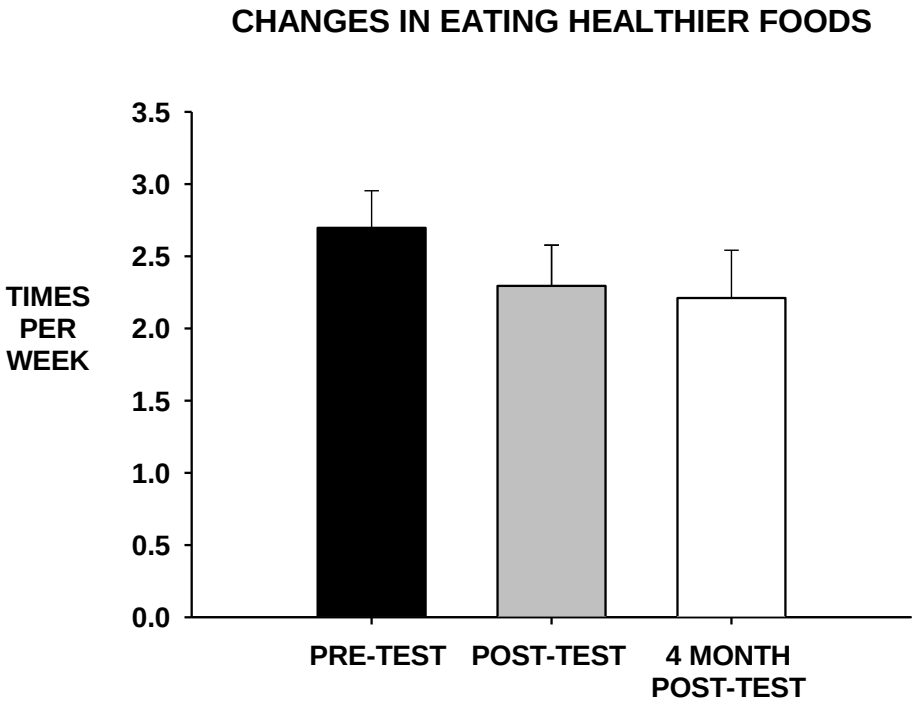

Figure 2. *Healthy food choices from 18 Latino children that participated in a nutrition intervention. Values are means ± SEM of the times per week the participants consumed 34 of the healthy items that were evaluated before (Pre-test) and after a nutrition intervention (Post-test and 4 month Post-test).*

Table 5. Mean Scores of Times per Week Individual Healthy Items (n = 18) were Consumed by Latino Children

Healthy Items	Pre-test	Post-test	4 Month Post-test
Orange/Apple/Grape Juice	3.17 ± 0.66	2.94 ± 0.75	3.33 ± 0.67
Low Fat Milk	4.22 ± 0.77	3.78 ± 0.76	5.78 ± 0.59
Water	5.56 ± 0.55	6.50 ± 0.41	5.00 ± 0.72
Cereal	5.28 ± 0.58	4.44 ± 0.70	4.67 ± 0.57
Yogurt	4.78 ± 0.60	4.39 ± 0.65	2.39 ± 0.63
Bananas	3.61 ± 0.69	3.39 ± 0.74	3.61 ± 0.74
Apples	3.72 ± 0.60	3.72 ± 0.78	3.50 ± 0.75
Grapes	4.11 ± 0.61	4.17 ± 0.79	3.39 ± 0.76
Pears	2.50 ± 0.61	1.56 ± 0.58	2.44 ± 0.81
Oranges	4.11 ± 0.67	4.56 ± 0.66	2.94 ± 0.72
Raisins	2.78 ± 0.76	1.72 ± 0.56	1.00 ± 0.58
Canned Mixed Fruit	2.72 ± 0.66	2.39 ± 0.70	1.78 ± 0.63
Peaches	3.28 ± 0.67	1.61 ± 0.57	2.39 ± 0.75
Pretzels	3.39 ± 0.75	2.44 ± 0.71	1.89 ± 0.68
Peanut Butter	3.00 ± 0.78	0.67 ± 0.42	2.17 ± 0.68
Chicken (not fried)	3.28 ± 0.79	4.00 ± 0.76	2.56 ± 0.74
Spaghetti	3.00 ± 0.69	2.78 ± 0.77	2.06 ± 0.71
Rice	1.89 ± 0.58	0.61 ± 0.41	1.39 ± 0.57
Greens	0.72 ± 0.48	1.61 ± 0.72	1.56 ± 0.73
Green Beans	0.33 ± 0.20	0.39 ± 0.40	0.89 ± 0.54
Other Beans	1.00 ± 0.46	1.56 ± 0.68	1.44 ± 0.60
Sweet Potatoes	1.11 ± 0.46	0.78 ± 0.45	1.17 ± 0.57
Other Potatoes	1.61 ± 0.57	0.56 ± 0.29	0.56 ± 0.36
Carrots	3.00 ± 0.67	2.33 ± 0.70	2.11 ± 0.65
Corn	3.83 ± 0.79	2.56 ± 0.76	2.28 ± 0.70
Broccoli	1.61 ± 0.65	1.61 ± 0.64	1.28 ± 0.59
Tossed Salad	0.56 ± 0.35	1.72 ± 0.64	1.06 ± 0.54
Yellow Squash	1.17 ± 0.65	0.50 ± 0.40	0.44 ± 0.40
Tomatoes	1.89 ± 0.71	1.61 ± 0.72	1.72 ± 0.64
Vegetable Soup	1.11 ± 0.46	0.28 ± 0.18	1.17 ± 0.54
Tacos	2.50 ± 0.70	1.78 ± 0.65	1.72 ± 0.64
Burritos	2.67 ± 0.82	1.50 ± 0.63	1.67 ± 0.66
Quesadilla	1.22 ± 0.65	1.06 ± 0.55	1.44 ± 0.65
Mexican Rice	2.94 ± 0.71	2.50 ± 0.73	2.39 ± 0.72

Values are means ± SEM of the times per week the participants consumed individually the healthy items that were evaluated before (Pre-test) and after a nutrition intervention (Post-test and 4 month Post-test).

Changes in Overall Vegetable Consumption

Thirteen items from the "My food choice" questionnaires were analyzed to determine the number of times in the prior week the participant consumed vegetables (Figure 3; Table 6). The evaluation was conducted before (pre-test) and immediately (post-test) and 4 months (4 month post-test) after the intervention. There was no significant change in vegetable consumption among the nutrition intervention participants from the pre-test measure (1.61 ± 0.28) to the immediate (1.41 ± 0.31) and 4 month (1.36 ± 0.33) post-tests measures did not change. Vegetables such as carrots, corn and spaghetti sauce were the vegetable items that were consumed the most by the intervention participants (Table 6).

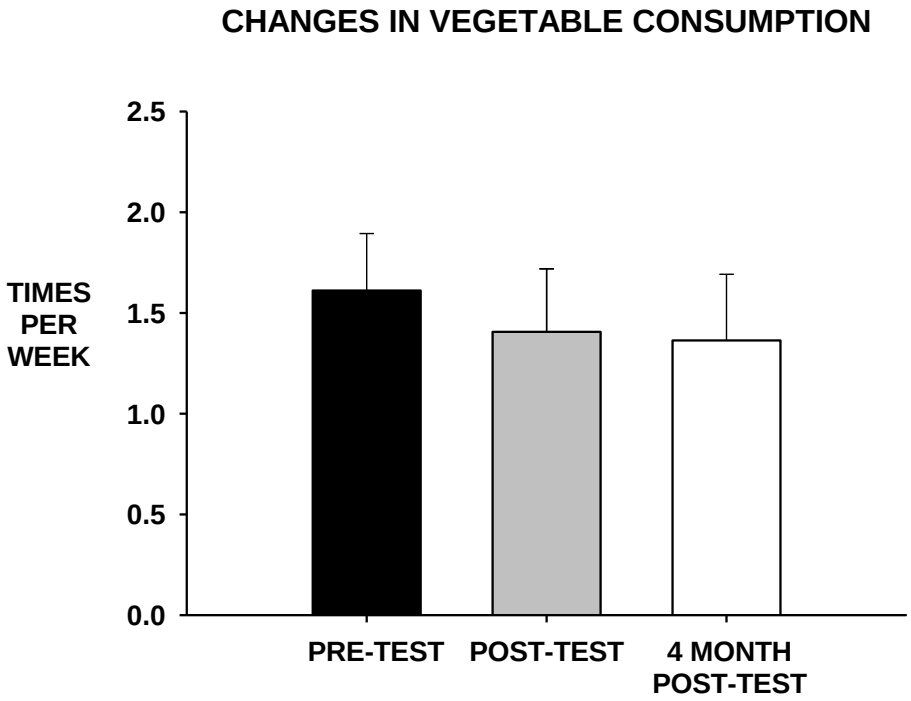

Figure 3. *Vegetable consumption from 18 Latino children that participated in a nutrition intervention. Values are means ± SEM of the times per week the participants consumed 13 of the vegetable items that were evaluated before (Pre-test) and after a nutrition intervention (Post-test and 4 month Post-test).*

Table 6. Mean Scores of Times per Week Individual Vegetable Items (n = 18) were Consumed by Latino Children

Vegetable Items	Pre-test	Post-test	4 Month Post-test
Spaghetti Sauce	3.00 ± 0.69	2.78 ± 0.77	2.06 ± 0.71
Greens	0.72 ± 0.48	1.61 ± 0.72	1.56 ± 0.73
Green Beans	0.33 ± 0.20	0.39 ± 0.40	0.89 ± 0.54
Other Beans	1.00 ± 0.46	1.56 ± 0.68	1.44 ± 0.60
Sweet Potatoes	1.11 ± 0.46	0.78 ± 0.45	1.17 ± 0.57
Other Potatoes	1.61 ± 0.57	0.56 ± 0.29	0.56 ± 0.36
Carrots	3.00 ± 0.67	2.33 ± 0.70	2.11 ± 0.65
Corn	3.83 ± 0.79	2.56 ± 0.76	2.28 ± 0.70
Broccoli	1.61 ± 0.65	1.61 ± 0.64	1.28 ± 0.59
Tossed Salad	0.56 ± 0.35	1.72 ± 0.64	1.06 ± 0.54
Yellow Squash	1.17 ± 0.65	0.50 ± 0.40	0.44 ± 0.40
Tomatoes	1.89 ± 0.71	1.61 ± 0.72	1.72 ± 0.64
Vegetable Soup	1.11 ± 0.46	0.28 ± 0.18	1.17 ± 0.54

Values are means ± SEM of the times per week the participants consumed individually the vegetable items that were evaluated before (Pre-test) and after a nutrition intervention (Post-test and 4 month Post-test).

Changes in Overall Fruit Consumption

Nine items from the "My food choice" questionnaires were analyzed to determine the number of times in the prior week the participant consumed fruits (Figure 4; Table7). The evaluation was conducted before (pre-test) and immediately (post-test) and 4 months (4 month post-test) after the intervention. There was no significant change in fruit consumption among the nutrition intervention participants from the pre-test measure (3.33 ± 0.32) to the immediate (2.92 ± 0.47) and 4 month (2.71 ± 0.44) post-tests measures (Figure 4). Oranges, grapes and bananas were some of the common fruit items that were consumed by the participants (Table 7).

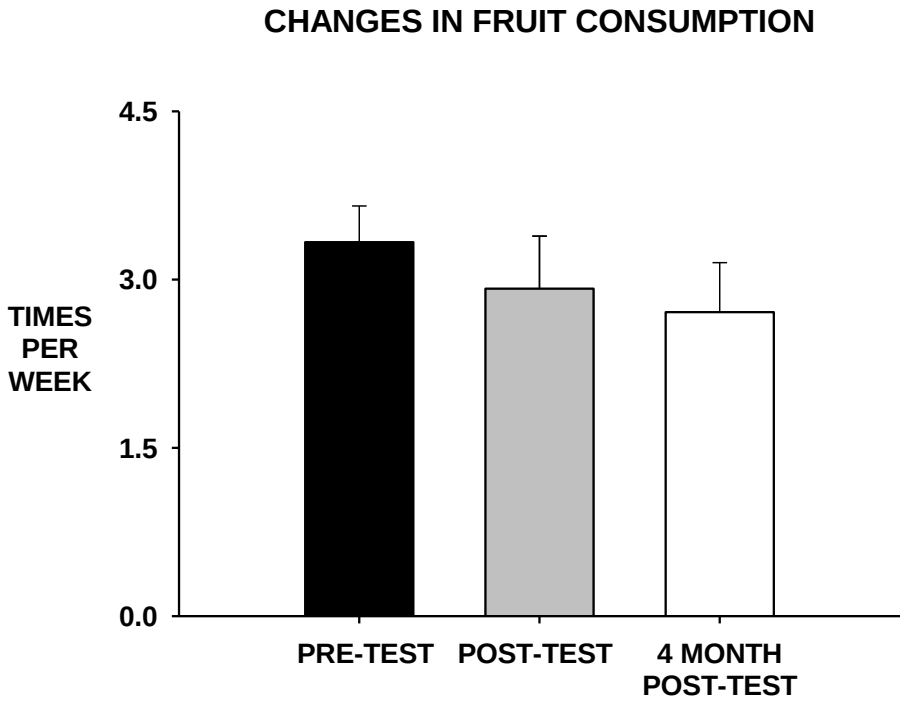

Figure 4. *Fruit consumption from 18 Latino children that participated in a nutrition intervention. Values are means ± SEM of the times per week the participants consumed nine of the fruit items that were evaluated before (Pre-test) and after a nutrition intervention (Post-test and 4 month Post-test).*

Table 7. Mean Scores of Times per Week Individual Fruit Items (n = 18) were Consumed by Latino Children

Fruit Items	Pre-test	Post-test	4 Month Post-test
Orange/Apple/Grape Juice	3.17 ± 0.66	2.94 ± 0.75	3.33 ± 0.67
Bananas	3.61 ± 0.69	3.39 ± 0.74	3.61 ± 0.74
Apples	3.72 ± 0.60	3.72 ± 0.78	3.50 ± 0.75
Grapes	4.11 ± 0.61	4.17 ± 0.79	3.39 ± 0.76
Pears	2.50 ± 0.61	1.56 ± 0.58	2.44 ± 0.81
Oranges	4.11 ± 0.67	4.56 ± 0.66	2.94 ± 0.72
Raisins	2.78 ± 0.76	1.94 ± 0.64	1.00 ± 0.58
Canned Mixed Fruit	2.72 ± 0.66	2.39 ± 0.70	1.78 ± 0.63
Peaches	3.28 ± 0.67	1.61 ± 0.57	2.39 ± 0.75

Values are means ± SEM of the times per week the participants consumed individually the fruit items that were evaluated before (Pre-test) and after a nutrition intervention (Post-test and 4 month Post-test).

Changes in Less Healthy Foods

Twenty-five items from the "My food choice" questionnaires were analyzed to determine the number of times in the prior week the participants consumed less healthy foods (Figure 5; Table 8). The evaluation was conducted before (pre-test) and immediately (post-test) and 4 months (4 month post-test) after the intervention. A marked decrease in eating less healthy foods was observed in the nutrition intervention participants from the pre-test measure (3.26 ± 0.40) to the post-test measure (2.62 ± 0.33) ($p< 0.05$). However, no statistically significant change was observed in less healthy foods consumption in the nutrition intervention participants from the pre-test measure to the 4 month post-test (2.80±0.38) measure although the consumption of less healthy foods remained decreased from baseline measure (Figure 5; Table 8). Less healthy food items commonly consumed by the participants any time point included fruit flavored drinks, pizza, soda, chips, popcorn and ice cream (Table 8).

Figure 5. *Less healthy food choices from 18 Latino children that participated in the nutrition intervention. Values are means ± SEM of the times per week the participants consumed 25 of the less healthy items that were evaluated before (Pre-test) and after a nutrition intervention (Post-test and 4 month Post-test). *p< 0.05 Pre-test vs. Post-test.*

Table 8. Mean Scores of Times per Week Individual Less Healthy Items (n = 18) were Consumed by Latino Children.

Less Healthy Items	Pre-test	Post-test	4 Month Post-test
Whole Milk	2.28 ± 0.76	2.56 ± 0.63	1.28 ± 0.53
Fruit Flavored Drinks	4.83 ± 0.72	4.83 ± 0.70	4.67 ± 0.70
Soda	4.28 ± 0.63	4.33 ± 0.67	4.22 ± 0.71
Honey Buns	3.44 ± 0.77	3.22 ± 0.82	3.44 ± 0.79
Chips	4.83 ± 0.77	4.78 ± 0.70	4.78 ± 0.67
Popcorn	4.22 ± 0.69	4.17 ± 0.74	4.22 ± 0.71
Cheese	2.50 ± 0.65	1.61 ± 0.51	1.56 ± 0.65
Hot Wings	4.22 ± 0.80	3.28 ± 0.76	3.06 ± 0.74
Fried Chicken/Nuggets	3.72 ± 0.70	2.94 ± 0.75	3.00 ± 0.73
Fish Sticks	2.11 ± 0.58	0.72 ± 0.43	0.94 ± 0.49
Macaroni and Cheese	3.06 ± 0.73	1.94 ± 0.67	2.94 ± 0.74
Fried Rice	2.72 ± 0.69	1.44 ± 0.57	1.94 ± 0.65
Add Gravy	0.78 ± 0.51	0.44 ± 0.40	0.72 ± 0.43
French Fries	4.67 ± 0.72	3.00 ± 0.76	3.17 ± 0.72
Hamburgers	3.22 ± 0.78	2.06 ± 0.63	3.39 ± 0.73
With Cheese	2.67 ± 0.78	1.44 ± 0.58	3.28 ± 0.77
With Mayo	0.83 ± 0.44	0.67 ± 0.41	1.28 ± 0.59
Pizza	5.06 ± 0.67	4.56 ± 0.67	2.83 ± 0.66
Ice Cream	4.56 ± 0.73	4.17 ± 0.72	4.11 ± 0.67
Cookies	4.17 ± 0.73	3.06 ± 0.80	3.28 ± 0.70
Snack Cakes	3.78 ± 0.76	2.33 ± 0.73	2.94 ± 0.82
Chocolate Candy	3.72 ± 0.84	3.44 ± 0.79	3.78 ± 0.79
Cake	3.06 ± 0.70	1.39 ± 0.45	1.61 ± 0.55
Jam	2.28 ± 0.69	1.94 ± 0.64	2.06 ± 0.68
Empanadas	0.61 ± 0.34	1.11 ± 0.56	1.50 ± 0.64

Values are means ± SEM of the times per week the participants consumed individually the less healthy items that were evaluated before (Pre-test) and after a nutrition intervention (Post-test and 4 month Post-test).

Nutrition Knowledge

Changes in Nutrition Knowledge

The nutrition knowledge of participants did not change significantly from the pre-test measure to the immediate and 4 month post-tests measures either in the healthy items (6.60 ± 0.57, 6.89 ± 0.36 and 6.44 ± 0.52, respectively) or the less healthy items (3.94 ± 0.57, 3.11 ± 0.36 and 3.56 ± 0.52, respectively; Figure 6; Table 9). On the other hand, regarding the knowledge of the participants of the healthy vs. less healthy items within each test, participants were more knowledgeable about which items were healthy and which items were less healthy after the intervention ($p < 0.05$). Analysis of the individual items in each question showed a non-significant trend for improvement. For example the eggs + bacon item and the candy item improved; however, it did not reach a level of significance (Table 9; $p < 0.074$)

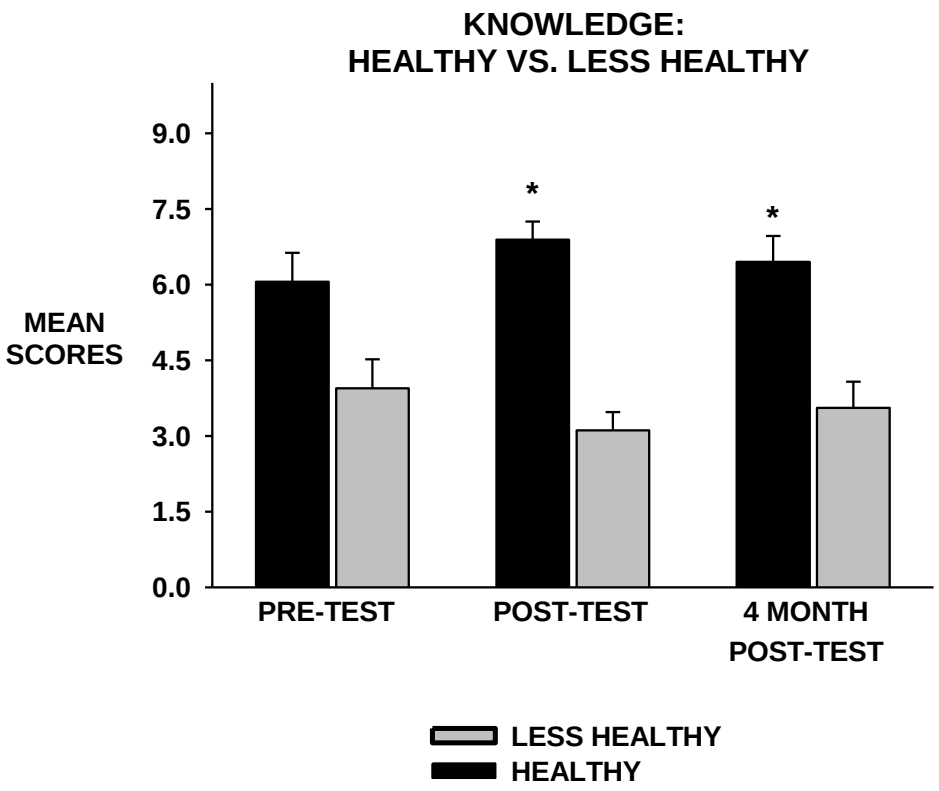

Figure 6. *Nutrition knowledge: healthy vs. less healthy from 18 Latino children that participated in a nutrition intervention. Values are means ± SEM of the sum of healthy and less healthy scores created for each question in the knowledge questionnaire before (Pre-test) and after a nutrition intervention (Post-test and 4 month Post-test). *p< 0.05 Healthy vs. Less Healthy.*

Table 9. Changes in Knowledge among Latino Children Participating in a Nutrition Intervention at Pre-test, Post-test and 4 months Post-test (n = 18)

Pair Questions	Pre-test %	Post-test %	4 Month Post-test %	Pre-test vs. Post-test *p* value	Pre-test vs. 4 month Post-test *p* value
White vs.	83.3	83.3	77.8	.617	1.00
Whole Wheat	16.7	16.7	22.2		
Potato Chips vs.	27.8	11.1	27.8	.371	.683
Pretzels	72.2	88.9	72.2		
Eggs + Bacon				.074	.371
vs.	33.3	5.6	16.7		
Cereal	66.7	94.4	83.3		
Candy vs.	16.7	0	5.6	.074	.617
Apple	83.3	100	94.4		
Regular Milk vs.	38.9	27.8	27.8	.724	.683
Skim Milk	61.1	72.2	72.2		
Ice Cream vs.	50.0	27.8	50	.423	.752
Frozen Yogurt	50.0	72.2	50		
Hamburger vs.	38.9	22.2	16.7	.450	.289
Salad	61.1	77.2	83.3		
French Fries vs.	44.4	16.7	22.2	.182	.289
Baked Potato	55.6	83.3	77.8		
Doughnut vs.	16.7	16.7	11.1	.683	1.00
Fresh Fruit	83.3	83.3	88.9		
Potato Chips vs.	44.4	38.9	16.7	1.00	.182
Yogurt	55.6	61.1	83.3		

Food Preference

The food preference of participants did not change significantly from the pre-test measure to the immediate and 4 month post-test measures either in the healthy items (6.33 ± 0.70, 6.61 ± 0.85 and 6.83 ± 0.87, respectively) or the less healthy items (4.61 ± 0.68, 4.39 ± 0.85 and 4.06 ± 0.90, respectively; Figure 7) as a result of the intervention. In addition, participants' food preferences were positively associated with the healthy items but not statistically significant (Table 10).

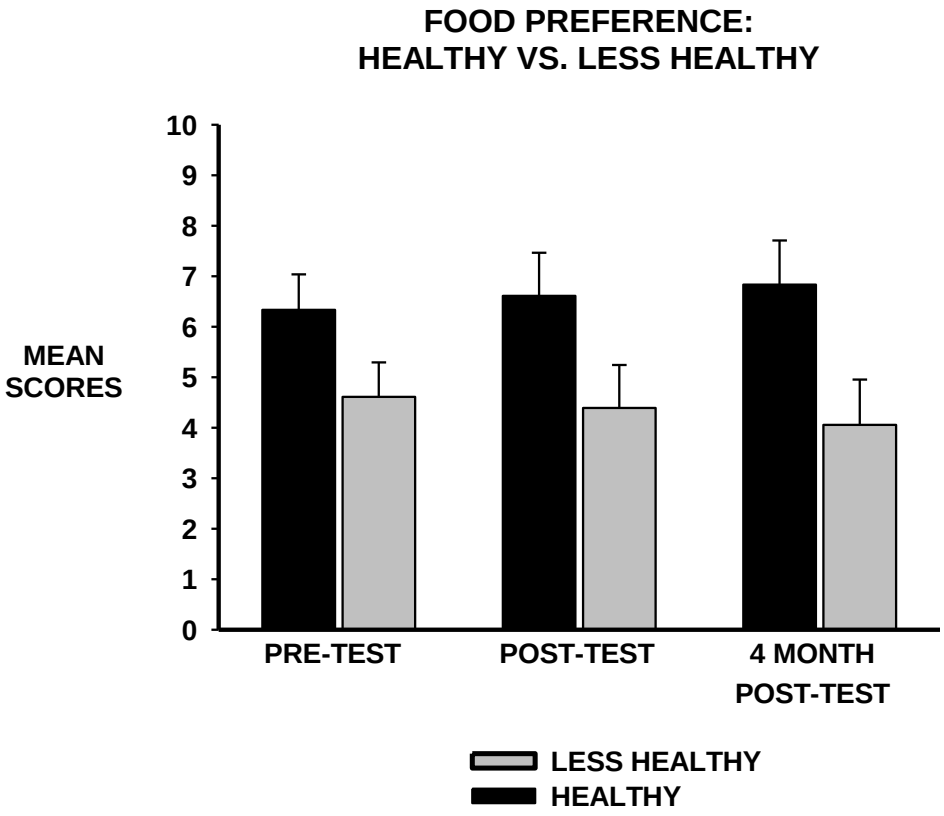

Figure 7. *Food preference: healthy vs. less healthy from 18 Latino children that participated in a nutrition intervention. Values are means ± SEM of the sum of healthy and less healthy scores created for each question in the food preference questionnaire before (Pre-test) and after a nutrition intervention (Post-test and 4 month Post-test).*

Table 10. Changes in Food Preference among Latino children Participants in a Nutrition Intervention at Pre-test, Post-test and Four month Post-test (n = 18)

Pair Questions	Pre-test %	Post-test %	4 Month Post-test %	Pre-test vs. Post-test *p* value	Pre-test vs. 4 month Post-test *p* value
Candy Bar vs.	22.2	16.7	22.2	1.00	.617
Fresh Fruit	77.8	83.3	77.8		
Potato Chips vs.	33.3	44.4	33.3	.683	.617
Yogurt	66.7	55.6	66.7		
Soda vs.	50	38.9	33.3	.724	.371
Water	50	61.1	66.7		
French Fries vs.	38.9	38.9	44.4	.724	1.00
Vegetables	61.1	61.1	55.6		
Cookies vs.	22.2	33.3	16.7	.683	1.00
Oranges	77.8	66.7	83.3		
Hamburger vs.	66.7	55.6	38.9	.724	.182
Salad	33.3	44.4	61.1		
Pizza vs.	61.1	50	61.1	.724	.683
Chicken	38.9	50	38.9		
Hot Dogs vs.	38.9	33.3	38.9		
Sandwich	61.1	66.7	61.1	1.00	.752
Chicken Nuggets vs.	44.4	44.4	66.7		
Chicken	55.6	55.6	33.3	.724	.289
Doughnut vs.	27.8	27.8	27.8		
Apple	72.2	72.2	72.2	.683	.683
Cupcake vs.	61.1	55.6	33.3		
Carrots	38.9	44.4	66.7	1.00	.074

Physical Activity Behaviors

Overall Male High Activity Behaviors

Fourteen high activity items from the "My physical activity" questionnaires were analyzed to determine the participants' physical activity behaviors at pre-test, immediate post-test and a 4 month post-test. There was no significant decrease in physical activity in the participants from the pre-test (3.47 ± 0.50) to the immediate (2.67 ± 0.46) and 4 month (2.60 ± 0.71) post-tests measures (Figure 8; Table 11). The physical activity items

that were practiced the most by the participants were skate/skateboard and soccer ($p < 0.05$; Table 11).

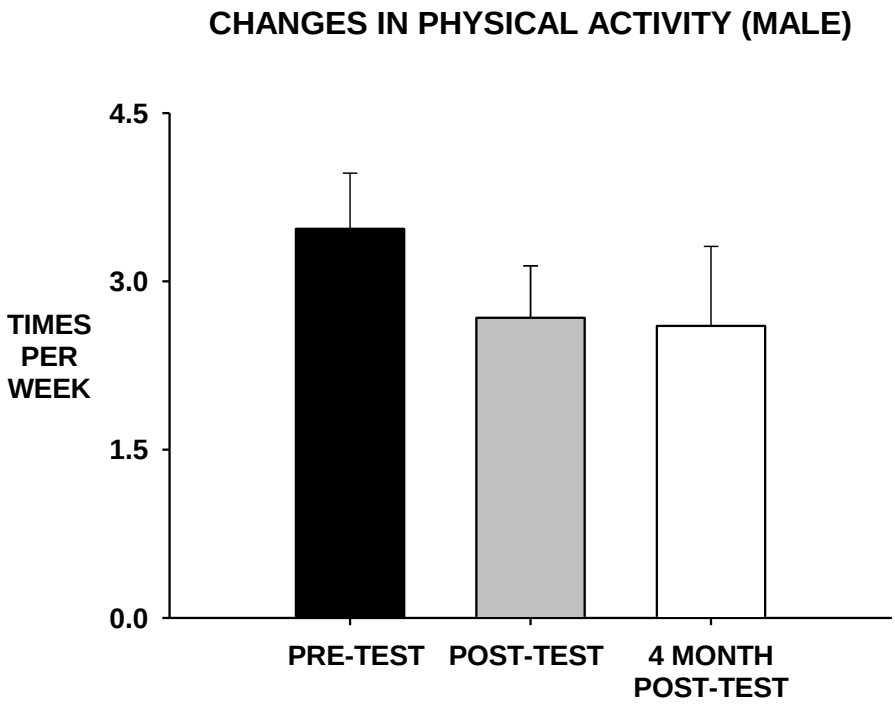

Figure 8. *Physical activity from nine male Latino children that participated in a nutrition intervention. Values are means ± SEM of the times per week of 14 high activity items evaluated before (Pre-test) and after a nutrition intervention (Post-test and 4 month Post-test).*

Table 11. Mean Scores of Times per Week Male Latino Children Participated in Individual Physical Activity (n = 9)

High Activity Items	Pre-test	Post-test	4 Month Post-test
Jump Rope	2.44 ± 1.09	1.22 ± 0.58	1.33 ± 0.88
Play Basketball	3.89 ± 1.11	2.00 ± 1.10	4.56 ± 0.83
Play Football	2.44 ± 0.83	1.00 ± 0.81	2.22 ± 1.03
Bicycle	4.00 ± 0.83	2.44 ± 1.09	3.56 ± 1.20
Walk/Push	2.56 ± 1.08	1.67 ± 1.08	1.22 ± 0.81
Play on Playground	4.67 ± 0.97	4.11 ± 1.23	5.44 ± 0.85
Skate/Skateboard	6.44 ± 0.59	2.67 ± 1.20	2.11 ± 1.14
Play Soccer	6.33 ± 0.50	6.11 ± 0.65	4.67 ± 1.03
Run/Jog	2.44 ± 1.15	1.67 ± 1.08	2.00 ± 1.10
Play Baseball	2.78 ± 1.06	0.56 ± 0.40	2.33 ± 1.10
Play Tennis	2.67 ± 0.85	0.56 ± 0.40	1.33 ± 0.85
Play Volleyball	2.44 ± 1.05	2.00 ± 0.94	2.00 ± 1.06
Stretch	3.11 ± 1.04	1.89 ± 1.05	1.67 ± 0.98
Go Swimming	2.33 ± 1.09	2.22 ± 1.06	2.00 ± 1.05

Values are means ± SEM of the times per week male Latino children participated in individual high activity items evaluated before (Pre-test) and after a nutrition intervention (Post-test and 4 month Post-test).

Male Sedentary Activity Behaviors

Sedentary activity behaviors (Figure 9; Table 12) did not change among the male participants from the pre-test measure (5.13 ± 0.49) to the immediate post-test measure (4.96 ± 0.42). On the other hand, a decrease in sedentary activity behaviors was observed in the participants from the pre-test measure to the 4 month post-test measure (3.82±0.66; $p < 0.05$; Figure 9). Sedentary activities commonly practiced among the female participants were playing video games and TV viewing (Table 12).

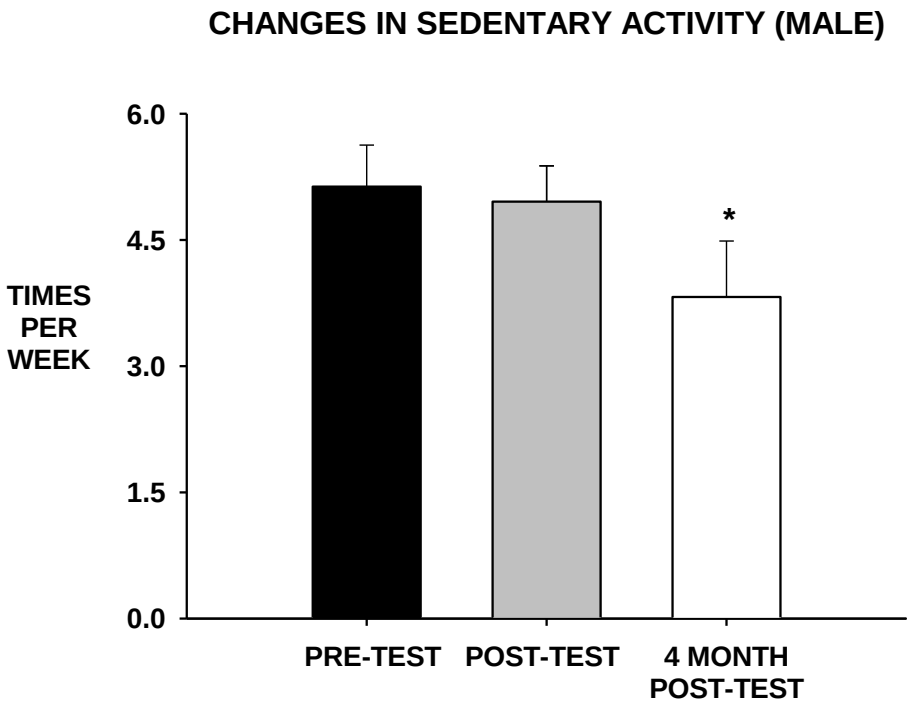

Figure 9. *Sedentary activity from nine male Latino children that participated in a nutrition intervention. Values are means ± SEM of the times per week of five sedentary activity items evaluated before (Pre-test) and after the intervention (Post-test and 4 month Post-test). *p< 0.05 Pre-test vs. Post-test.*

Table 12. Mean Scores of Times per Week Male Latino Children Participated in Individual Sedentary Activity (n = 9)

Sedentary Items	**Pre-test**	**Post-test**	**4 Month Post-test**
Read	4.56 ± 1.13	4.89 ± 1.02	3.44 ± 1.21
Play Video Games	5.44 ± 0.92	6.00 ± 0.71	4.44 ± 1.20
Play on the Computer	5.44 ± 0.87	5.78 ± 0.66	3.89 ± 1.30
Watch Television	5.67 ± 0.95	6.56 ± 0.36	4.33 ± 1.16
Talk on the Telephone/ Text Message	4.56 ± 0.90	1.56 ± 0.94	3.00 ± 1.26

Values are means ± SEM of the times per week male Latino children participated in individual sedentary activity items evaluated before (Pre-test) and after a nutrition intervention (Post-test and 4 month Post-test).

Overall Female High Activity Behaviors

High activity behaviors for female participants were not significantly changed from the pre-test measure (2.35 ± 0.58) to the immediate post-test (2.09 ± 0.40) and 4 month post-test (2.57 ± 0.69) measures (Figure 10; Table 13). The physical activity item that was practiced the most by the participants was playing in the playground ($p < 0.05$; Table 13).

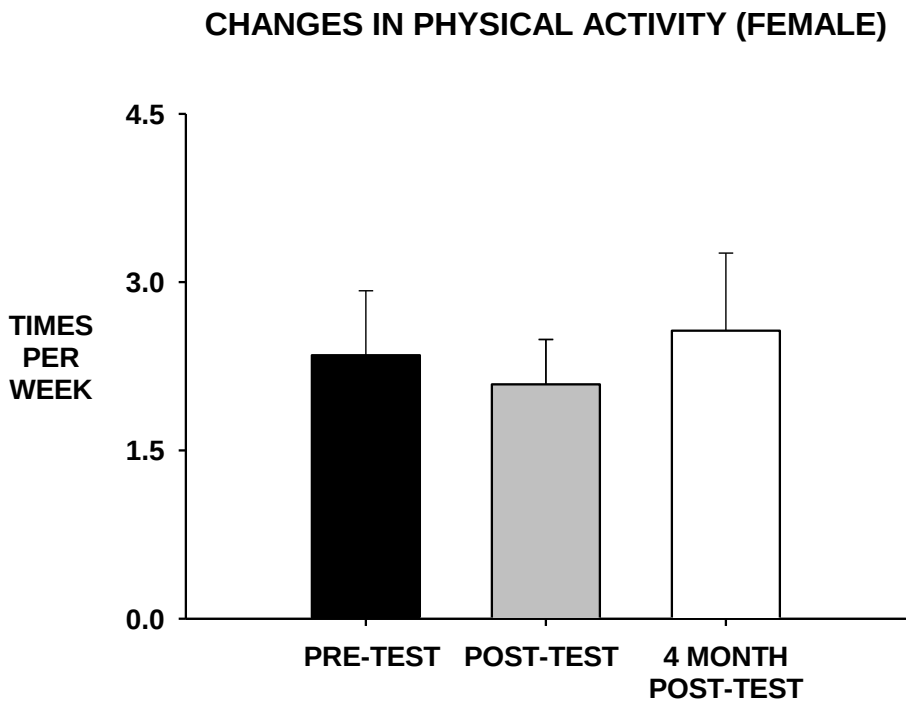

Figure 10. *Physical activity from nine female Latino children that participated in a nutrition intervention. Values are means ± SEM of the times per week of 15 high activity items evaluated before (Pre-test) and after a nutrition intervention (Post-test and 4 month Post-test).*

Table 13. Mean Scores of Times per Week Female Latino Children Participated in Individual Physical Activity (n = 9)

High Activity Items	Pre-test	Post-test	4 Month Post-test
Jump Rope	2.78 ± 1.09	1.89 ± 0.86	2.89 ± 1.12
Play Basketball	1.22 ± 0.61	0.22 ± 0.24	3.11 ± 1.11
Bicycle	1.89 ± 0.93	2.44 ± 1.00	3.56 ± 1.17
Walk/Push	3.00 ± 1.15	2.89 ± 1.14	2.78 ± 1.13
Play on Playground	5.78 ± 0.70	5.22 ± 0.81	6.78 ± 0.24
Cheerlead/Dance	1.00 ± 0.81	2.22 ± 1.00	2.89 ± 1.10
Dance	3.56 ± 1.05	3.00 ± 1.03	3.11 ± 1.10
Skate/Skateboard	1.89 ± 0.93	2.33 ± 1.24	1.33 ± 0.88
Play Soccer	2.78 ± 1.18	2.78 ± 1.09	2.00 ± 1.03
Run/Jog	3.44 ± 1.12	1.89 ± 1.04	1.78 ± 0.84
Play Baseball	0.44 ± 0.36	0.11 ± 0.12	0.89 ± 0.82
Play Tennis	0.56 ± 0.47	0.22 ± 0.24	2.22 ± 1.18
Play Volleyball	0.67 ± 0.40	0.44 ± 0.47	0.89 ± 0.82
Stretch	4.33 ± 0.87	3.00 ± 1.09	3.78 ± 1.00
Go Swimming	1.89 ± 0.99	2.67 ± 1.17	2.11 ± 1.08

Values are means ± SEM of the times per week female Latino children participated in individual high activity items evaluated before (Pre-test) and after a nutrition intervention (Post-test and 4 month Post-test).

Overall Female Sedentary Activity Behaviors

There was no significant change in sedentary activity in the female participants after the nutrition intervention (Figure 11; Table 14). Sedentary activities commonly practiced among the female participants were reading and TV viewing (Table 14).

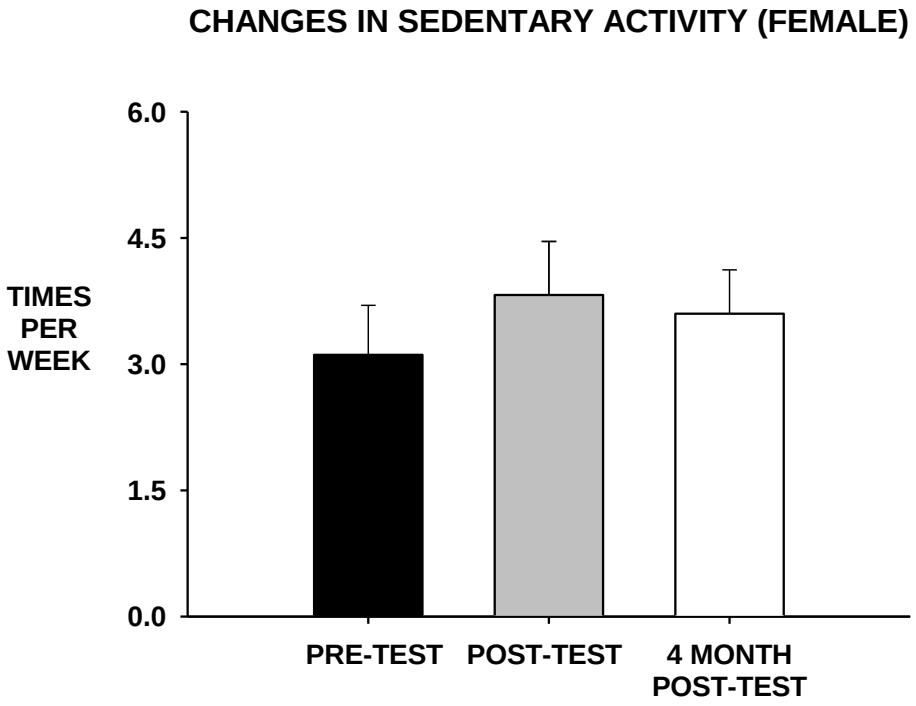

Figure 14. *Sedentary activity from nine female Latino children that participated in a nutrition intervention. Values are means ± SEM of the times per week of five sedentary activity items evaluated before (Pre-test) and after a nutrition intervention (Post-test and 4 month Post-test).*

Table 14. Mean Scores or Times per Week Female Latino Children Participated in Individual Sedentary Activity (n = 9)

Sedentary Items	**Pre-test**	**Post-test**	**4 Month Post-test**
Read	3.78 ± 0.77	5.56 ± 0.59	5.67 ± 0.59
Play Video Games	1.44 ± 0.94	2.00 ± 1.03	2.11 ± 1.05
Play on the Computer	3.44 ± 0.79	3.89 ± 1.01	4.11 ± 1.02
Watch Television	5.33 ± 0.85	5.44 ± 0.94	3.44 ± 1.00
Talk on the Telephone/ Text Message	1.56 ± 0.75	2.22 ± 1.06	2.67 ± 1.09

Values are means ± SEM of the times per week the participants consumed individually the sedentary activity items that were evaluated before (Pre-test) and after a nutrition intervention (Post-test and 4 month Post-test).

DISCUSSION

The primary focus of this pilot study was to expand our knowledge of Latino childhood eating behaviors and physical activity and how these correlate with their obesigenic behaviors. To examine our knowledge of Latino childhood eating patterns and physical activity, a culturally based nutrition education intervention was developed in the afterschool setting. To assess the Latino children eating and physical activity behaviors, knowledge and food preferences, four surveys were used before and immediately and 4 months after the intervention.

The primary question of this pilot study was whether a culturally based nutrition education intervention in an afterschool program would improve knowledge, attitudes and behaviors related to food choices and physical activity in Latino children. Analyses of the data collected from the pre-test, the post test and the post-post test after the intervention show mixed results. Changes in eating less healthy foods in the post-test supported part of the hypothesis in which a nutrition education intervention improved the attitudes of Latino children toward healthy food choices. However, regarding knowledge, food preference, eating healthier foods, vegetable consumption, fruit consumption and physical activity, the findings did not support the hypothesis. Nevertheless some positives changes were observed. Participants' knowledge and food preferences were towards the healthier items, although not to the level of significance. Although not significant, there was a trend toward selection of healthier food items. This change in knowledge and food preference is a first step toward positive changes in attitudes, behavior and self efficacy towards a healthier lifestyle. Therefore, this pilot

study has filled in the gaps about our knowledge of Latino children's eating behaviors, nutrition knowledge, food preferences and physical activity behaviors.

There are possible explanations for the decrease in the consumption of less healthy foods. One possibility can be related to the parents. Studies have shown that children tend to eat foods that are served more often and are readily available at home (Patrick et al. 2005). Perhaps the parents bought less of the less healthy foods and therefore the participants consumed less of the less healthy foods. However, most of the studies in this population regarding diet quality have shown that their diets do not adhere to the fruit and vegetable recommendations and are high in fat, sugar and sodium (16, 47, 48). Also the Latino diet quality and nutrient adequacy have been associated with food insecurity and acculturation (27, 50). Less healthy foods are significantly less expensive than healthy food items (71). The Latino children examined in this pilot study are from low income families, and the children's dietary behaviors regarding less healthy foods were high before the intervention which agrees with the available scientific literature regarding their diet quality. Therefore, the parents buying less of the unhealthy foods cannot explain the decrease in the consumption of less healthy foods that was observed in the participants. The intervention curriculum offers another possible explanation for the significant decrease in the consumption of less healthier foods. The intervention curriculum emphasized the importance of making healthier choices. In the intervention, children were exposed to information about food groups, fruits, vegetables, healthy vs. less healthy snacks and healthy vs. less healthy options in a meal. The decrease in the consumption of the less healthy food items remained decreased even four months after

the intervention, and although not significantly, there was a tendency for participants to maintain healthier selections.

Another positive change observed in the participants was the knowledge about healthy options vs. the less healthy options. This concept did not change from the pre-test measure to the two post-tests measures. However, within the two post-test measures there was a significant difference between the healthy options vs. the less healthy options. The participants were knowledgeable about the differences between healthy and less healthy food choices, which is crucial in the development of healthy behaviors. A study performed by Brug et al. (33) has shown that knowledge about the recommendations for daily intake in fruits and vegetables was positively associated with fruit and vegetable consumption. Also, studies have shown that people's knowledge about nutrition can be high; however, they do not know how to apply it or they are not motivated to change (30, 57). Perhaps by empowering them and helping them to develop self efficacy, they will be able to apply knowledge and be motivated to change to a healthier lifestyle.

Participants' food preferences were not significantly changed before and after the intervention; however, there was a tendency for the participants to choose the healthy items after the intervention. This finding is important because food preference has been shown to be a barrier for change in dietary behaviors (31, 38, 41, 72). Food preference has been strongly associated with dietary behaviors in children (38, 41, 72). Studies have shown that there is a positive association between preference and intake of fruits and vegetables (72). Therefore, altogether the fact that the participants prefer healthier foods choices vs. the less healthy food choices is a step ahead in the development of behaviors, attitudes and self efficacy towards healthier foods in these participants and their families.

Dietary behaviors like eating healthier foods such as vegetables and fruits were not improved after the intervention. There are several possible explanations by which the intervention had no effect on these parameters. Some of these factors include food availability and accessibility. Availability and accessibility of fruits and vegetables have been related with more consumption of fruits and vegetables among children (31, 32). Possibly the participants do not have adequate availability and accessibility to fruit, vegetables and healthy foods at home. In addition, these families are low income families. Perhaps income level has an influence in the availability and accessibility of these items in their homes. Studies have shown that socioeconomic status is associated with the intake of fruits and vegetables (51, 72). Rasmussen et al. (72) conducted a review of the literature to examine the determinants of fruit and vegetable intake in children and adolescents. Low socioeconomic status, availability and accessibility were positively associated with low or less frequent intake of fruits and vegetables.

The intervention resulted in a non-significant improvement in physical activity behaviors. This could be explained by the fact that physical activity was not the main focus of the intervention. Some lessons and prizes involve getting the participants active but there were not specific lessons created to improve physical activity in the participants. The physical activity survey was used mainly to assess the physical activity behaviors in the participants to further develop a better intervention in this population.

Limitations

This pilot study has several limitations. The intervention was low-dose, which could explain the small magnitude in changes we observed in eating healthier foods, fruits and vegetables. The intervention consisted of a one-hour lesson, once per week for

four weeks, totaling four lessons in all. Most successful interventions are 12 months to 5 years in length (2, 5, 10, 73, 74). There are adjustments that can be made to expand the curriculum to include more lessons with games and more creative lessons to improve the knowledge, attitudes and self efficacy in the children.

Another way to improve this intervention would be to involve the parents more in the process. The parents were only part of one activity. Parents have a lot of influence in their children's food preferences, knowledge and attitudes (42, 75, 76). Therefore including the parents would help in the improvement of dietary behaviors in these participants.

The number of participants was lower than the number we calculated using the power calculation for determining the sample size needed to detect an intervention effect. The low number of participants was related to the number of consent forms returned and the attendance of the participants in the afterschool program. Providing some type of incentive to the parents and children would help in the participation of the children and their families for future interventions.

The instruments used to evaluate dietary behaviors, physical activity behaviors, food preference and knowledge have been tested for reliability and validity among children (9-11). A disadvantage of using self-reported surveys is that they can be biased by the participants' feelings at the time they filled out the questionnaire. All of these factors could have contributed to the results we obtained regarding the effectiveness of the nutrition intervention.

CHAPTER 4

SUMMARY AND CONCLUSION

This pilot study expanded our knowledge of Latino children's eating behaviors and physical activity and how they correlate with their obesigenic behaviors. Changes in eating less healthy foods in the post-test supported part of the hypothesis in where a nutrition education intervention improved the attitudes of Latino children toward healthy food choices; however, results regarding knowledge, food preference, eating more healthy foods, vegetable consumption, fruit consumption and physical activity did not support the hypothesis, nevertheless some positives changes were observed. Participants' knowledge and food preference were toward the healthier items, although not to the level of significance. These changes in knowledge and food preference can lead to positive changes in attitudes, behavior and self efficacy towards a healthy lifestyle. This pilot study has filled in the gaps about our knowledge of Latino children's eating behaviors, nutrition knowledge, food preferences and physical activity behaviors. Understanding better Latino children's environment and social factors that influence their dietary behaviors can lead to successful intervention in the prevention of childhood obesity. This pilot study will be a useful tool for the development of future interventions in this target population and in the prevention of childhood obesity.

Future Directions

This pilot study has the potential for the development of future interventions. There is a lot of evidence regarding intervention in children; however, interventions that focus on Latino children are not that abundant. This pilot study provided the base knowledge needed to further develop an intervention that is tailored to this target population.

A longer intervention will be beneficial for the participants and will help in the development of their self efficacy to improve their knowledge, attitudes and behaviors towards healthy food choices. Most successful interventions are six months to four years in length (2, 5, 10, 73, 74). For the target population that we studied, a one year intervention will be beneficial in the development of these concepts. It will be easier based on the way the program runs because they renew their membership every year. A year will provide them with enough time to have more lessons and increase the involvement of parents and the community in the process.

Lessons should include more hands-on activities. One of the lessons that was the most successful with the participants was the fishing for snacks lesson. It was a hands-on lesson in which they learned about healthy snacks by making a boat out of food, and then they had the opportunity to eat the foods that they used to build it. The participants' attention was much better than in any other of the lessons that were taught, and they had fun while learning which is very important in this target population.

DeVault et al. (73) conducted an intervention in children, and it was successful in improving the knowledge, attitudes and behaviors in the participants. Even though this intervention was only six weeks it had some elements that were crucial to its success.

First, their classes were six times a week for only 30 minutes. Second, all of the lessons were hands-on. The lessons included healthful-eating food games, taste-testing foods, whole grain bread baking, information on portion sizes and food demonstrations. This study had some elements that the scientific literature has proved to be successful in the development of self efficacy and in the change of dietary behaviors. The idea of having more but shorter lessons during the week would work in our target population. Maintaining the participants' attention was one of the challenges we faced when we were performing the intervention. Limiting instruction time to 30 minutes may be beneficial for them. Also, having the lessons more frequently during the week will help them grasp the concepts better. Having more interactive lessons may also be advantageous for our target population.

Exposing the children to more fruits and vegetables and having lessons in which they can taste the products will make them more aware of the food items and may increase their preference for the product. Also, involving them in the preparation of food as a way to teach them the benefits of those food items will be a good way to incorporate those items in their diet and again expose them to the food items. Studies have shown that taste exposure increases the liking of the items (41, 42, 44, 77). Lakkakula et al. (77) conducted different fruit and vegetable tastings in children for 10 weeks, and it increased the liking for fruits and vegetables in the participants. Another good lesson that can be conducted in our target population would be to perform a fruit and vegetable tasting in a garden. This community is in the process of developing a community garden. This could be used as an opportunity to stimulate the consumption of fruits and vegetables in the participants and their families. Studies have shown that the use of school gardens as a

component of a nutrition education intervention can increase fruit and vegetable knowledge and cause behavior change among children (78). The community garden would increase the accessibility and availability of fruits and vegetables, and with the lesson, it may help them to improve their knowledge, behavior and attitudes towards fruits and vegetables and help in the development of self efficacy.

Finally, another element that will help in a future intervention with this target population is the incorporation of the parents. Involvement of parents has proven to be a successful component of many interventions (75, 76). In this pilot study, this was another challenge that we faced. Participation of the parents was limited. Perhaps offering some type of incentive for parental participation can stimulate parents to be more involved in the process. Having more activities with the participants and their parents will be helpful in the success of a future intervention in this community.

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APPENCICES

APPENDIX A

Instrument number 1

Interview Questions:

A. Welcome and Introductions

1. Introduce myself and the participants will introduce themselves

B. Focus group Discussion

1. Explain the purpose of the study and that the session will be recorded
2. Ask the focus group questions

Questions:

Food and dietary behaviors:

What do you like to eat?/Que te gusta comer?

What is your favorite food? /Cual es tu comida favorita?

How often do you eat during the day? / Cuantas veces comes al dia?

Physical activity:

What do you think about your physical education class? Que piensas sobre la clase de educación física?

Which one is your favorite sport? / Cual es tu deporte favorito?

How often do you exercise? Cuantas veces haces ejercicio?

Learning:

Would you be interested in learning about nutrition? Te interesaría saber de nutrición?

How would you like to learn? / Como te gustaría aprender?

C. Closing

1. Thank the participants for sharing their thoughts with the moderator

APPENDIX B

Instrument number 2:

Demographic Assessment

1. What grade are you in? _____

2. How old are you? _____ years old

3. Are you a boy or a girl?

____ Boy

____ Girl

4. How do you describe yourself?

____ WHITE

____ BLACK

____ HISPANIC

____ ASIAN or PACIFIC ISLANDER

____ AMERICAN INDIAN or ALASKAN NATIVE

____ OTHER

APPENDIX C

A. "Eatwell Plate" or "El plato del buen comer"

Participants will learn about the different food groups and how to create a plate that includes the correct serving of them.

Instructions for Instructors

The instructor should:

1. Review the food groups and serving size for each group.
2. Make enough copies of the "My plate" and food cutouts for all the participants.
3. Set up the tables with glue, one set of cutouts per child and a pack of crayons for each table

Pre-assessment plan:

Ask the participants:

- What they think should be in a healthy meal?
- What are the food groups?
- How many servings we should eat every day from each food group?

Objectives

- Participant's knowledge, attitudes and behavior related to food choices will increase 25 % over baseline.
- Participants will be able to relate that increasing fruits and vegetables consumption leads to a healthy lifestyle.

- Participants will feel confident about their ability to successfully make healthier food choices.
- Participants will value and develop the necessary skills to practice a healthy lifestyle

Materials

- One "My Plate" cutout per participant
- A stick of glue per participant
- One set of food cutouts for each participant
- One pair of scissors for each participant
- One box of crayons per table

Activity

1. On a board draw a large version of the "My Plate" cut out. Explain the different food groups and the appropriate place for fruits, vegetables, grains, animal protein and non-animal protein. Place the food cutouts in their respective locations in the "My plate" cut out.
2. Once the food cutouts have been placed in the appropriate locations, make sure to emphasize the amount needed of each food group:
    a. Fruits and Vegetables- A lot
    b. Grains- Enough
    c. Animal and Non Animal Protein- Few.
    d. The teacher may find it necessary to explain "a lot," "enough," and "few."
3. Give each participant a copy of the "My plate" and food cutouts.

4. Explain to the participants that they will be making their own “My Plate”.
    a. The participants will choose:
        a. 3 vegetables
        b. 2 fruits
        c. 2 grains
        d. 2 animal protein (1 dairy and 1 meat)
        e. 1 non-animal protein
5. Remind the participants that their plate should include their favorite foods. The students can use the large version of the My Plate on the board, to verify where the different food types belong on their own plate.
6. After choosing the foods that they wish to include on their individual plate, the participants will color in the food cutouts.
7. Once the pictures have been colored, the participants will cut out the pictures.
8. The participants will then glue their chosen foods to their individual “My plate” cutout in the appropriate food group space.
9. Once the participants finish preparing their plate, they will share the plate with the class. The instructor will verify that the foods are located in the correct food groups.

<u>Post-assessment plan:</u>

- Verify how the participants arrange the food per group in their plates.
- Ask the participants about their plate and how they organize their favorite foods in the respective food groups.

B. Fishing for healthy foods

Instructions for Instructors

The instructor should:

1. Make sure all the materials needed for the activity are available.
2. Prepare the materials for the activity:
    a. Prepare the cream cheese mixture by mixing in a few drops of blue food coloring until cream cheese is desired color of "water."
    b. Cut celery stalks in half to make "fishing poles" for each participant.
    c. Cut each apple into four wedges. Each participant should get one wedge to be their "boat."
    d. Cut each low-fat American cheese singles diagonally to make two triangle "sails."
    e. Make sure all children have clean hands.

Pre-assessment plan

Ask the participants:

- What are snacks?
- What type of snacks they normally have at home?
- What are healthy snacks?

Objectives

- Participants will be able to identify five healthy snack alternatives.
- Participants will feel confident about their ability to successfully make healthier food choices.

- Participants will value and develop the necessary skills to practice a healthy lifestyle.

Materials

- 2 tablespoons of low fat cream cheese per participant
- Blue food coloring
- 20 pretzel goldfish per participant
- ½ of a celery stick per participant (for fishing pole)
- 1 apple wedge per participant (4 wedges per apple)
- 1 toothpick per participant
- ½ low fat American cheese (singles) slice per participant
- 1 paper plate per participant
- 1 plastic spoon per participant

Activity

Fun activity to learn about healthy snacks:

1. The instructor will briefly explain to the participants that they are going to be making a healthy snack. While preparing the snack and adding the different ingredients, explain the nutrition information and the food groups in which those snacks are classified.

Food	Nutrition	Food group
Low fat cream cheese	Provides calcium which helps build strong bones	Dairy
Pretzel goldfish	Better alternative that still provide a salty	Grain

	snack without all the fat	
Celery	Good source of fiber and vitamins	Vegetable
Apple	Provides natural sugar, energy	Fruit
American cheese	Provides calcium which helps build strong bones	Dairy

2. The healthy snack will resemble an ocean scene with fishes, a boat and fishing poles. The instructor will distribute a paper plate, spoon, and two scoops of the blue cream cheese to each participant.
3. On the paper plate, the participant will spread the two scoops of cream cheese using the back of the spoon. Explain to the participants that the cream cheese is dyed blue because it will be the "ocean."
4. Once the "ocean" has been created, the instructor will hand out a handful of goldfish to each participant. Have each participants count 20 pretzel goldfish to put into their ocean.
5. Once all of the participants have placed the goldfish around their ocean, tell them that we are going to be making boats to go in the ocean.
6. Distribute the material for the boats, which include one apple wedge, one triangle of cheese, and one toothpick.
7. Demonstrate to the participants how to assemble the boat.
8. Tell the participants to place the boat on the ocean, and allow them to sail their boat through the cream cheese ocean.
9. Hand out ½ a stick of celery to each participant. Allow the participant to "go fishing" with their celery sticks.
10. When the participants are finished playing, allow them to eat their healthy snack.

While they are eating, go over the different food groups that show up in this snack, including fruits (apple), vegetables (celery), grains (pretzel goldfish), and dairy (cream cheese and cheese triangles).

Post-assessment

Instructor should ask:

- Why are we using pretzel goldfish instead of cheese goldfish.
- What calcium does for the body?
- Name the types of foods we used in this particular snack: fruits, vegetables, grains, and dairy.

C. Fruits and vegetables "musical" chairs

Instructions for instructor:

Instructor should:

1. Review information about fruits and vegetables and their harvesting time.

Vegetable	**Harvest**
Eggplant	Summer and early fall
Onion	Spring through fall
Asparagus	Spring
Carrot	Year round
Pumpkin	Fall
Broccoli	Year round but best in fall and winter
Cauliflower	Year round but best in fall and winter
Corn	Summer
Spinach	Year round
Lettuce	Year round but best in spring
Red pepper	Summer and early fall
Peas	Spring and early summer

Fruit	**Harvest**
Watermelon	Summer

Strawberries	Spring and summer
Lime	Late summer and fall
Apples	Late summer and fall
Peach	Summer
Mangoes	Summer
Grapes	Late summer and early fall
Cherries	Late spring and summer
Pear	Fall
Orange	Winter and spring
Bananas	Year round
Cantaloupe	Late summer

2. Label 12 chairs from 1-12
3. Place the 12 chairs in circle with their backs to each other. The number of chairs should be less than the number of participants playing in the game. Place a picture of one fruit and one vegetable under each chair. The pictures include:
    a. Vegetables: eggplant, onion, asparagus, carrot, pumpkin, broccoli, cauliflower, corn, spinach, lettuce, red pepper and peas
    b. Fruits: watermelon, strawberries, lime, apple, peach, mangoes, grapes, cherries, pear, orange, bananas and cantaloupe
4. Set up the radio in where the CD "Movimiento por su vida" is going to be play for the activity. The CD contains music in Spanish with lyrics that promote a healthy diet and physical activity.

<u>Pre-assessment</u>

Ask the participants:

- Name 5 fruits
- Name 5 vegetables

<u>Objectives</u>

- Participants will be able to correctly identify five fruits and the seasons in which they are harvested
- Participants will be able to correctly identify five fresh vegetables and the seasons in which they are harvested
- Participant's consumption of fruits and vegetables will have increased 0.5 or 1 daily serving size.
- Participants will come to see themselves as capable of changing their attitudes and behaviors towards physical activity.

Materials

- 12 Fruit and 12 vegetables cutouts
- Tape
- 12 labels
- 12 chairs
- Radio
- CD, "Movimiento por su vida"
- Prize = jump rope

Activity

Fruits and vegetables "musical" chairs is a fun activity to promote physical activity while learning about fruits and vegetables

1. Divide the participants in groups of 13. Ask the participants to stand in a circle around the chairs before the music begins. Once the music starts, they should move in a line around the chairs.

2. Stop the music. All participants must try to take the seat closest to them.
3. The participant left without a chair is eliminated, and the participant sitting on chair number 1 will look under the chair and pick the fruit and vegetable pictures.
4. Instructor should briefly explain the fruit and vegetable under the chair including the season is harvested. Stimulate a fun environment while doing this part. Ask who likes the fruit and vegetable in the discussion. Also stimulate the involvement of the participants.
5. Then chair number 1 is removed from the circle.
6. Start the music again and repeat Steps 2-5. Remember the removal of the chair is in numerical order each time after each fruit and vegetable discussion. Repeat this until there are no more chairs, and the winner will receive a jump rope!!!

*** *Adjust the number of chairs depending on the numbers participants but always have one picture of a fruit and a vegetable under each chair****

Post-assessment

- Name 5 fruits and their harvesting time
- Name 5 vegetables and their harvesting time

D. Lunch Box

Instructions for instructor:

The instructor should:

1. Set up the tables with enough plastic food items for all participants. Each participant should pick 3-5 items for their lunch box.

Pre-assessment

- Participants will prepare their ideal lunch box

Objectives

- Participants will be able to identify 5 healthier food choices at the grocery stores, restaurants, fast foods and other food establishments.
- Participants will be able to relate that increasing fruits and vegetables consumption and physical activity leads to a healthy lifestyle.
- Participants will feel confident about their ability to successfully make healthier food choices.
- Participants will value and develop the necessary skills to practice a healthy lifestyle

Materials:

- A variety of plastic food items including fruits, veggies, fast food and junk food
- 1 Brown bag per participant

Activity

1. Distribute the brown bags. One brown bag per participant.
2. Ask the participant to pick 3-5 food items from the table. Ask them to prepare their ideal lunch or meal.
3. After each participant has prepared their lunch box, pick five participants to share their brown bag food with the class. Instructor should explain briefly the

importance of choosing healthy food items and the avoidance of unhealthy food items.

4. Have each participant to put all the food items back on the table. Ask the participants to now prepare a healthy lunch bag by picking 5 food items from the table. Pick 5 participants to share their healthy lunch box with the class.

Post-assessment

- Verify the healthy lunch box created the second time to make sure the participants learn the difference between healthy food choices and unhealthy food choices.

APPENDIX D

Name: _____

Age:_____

Food choices questionnaire:

1. **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

2. **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

3. **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

4. **In the last week, how many times did you drink other fruit flavored drinks?**

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 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

6. **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

7. **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

8. **In the last week, how many times did you eat honey buns?**

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 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

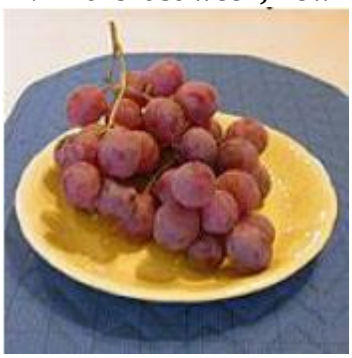
10. **In the last week, how many times did you eat bananas?**

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

11. **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

12. **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

13. **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

14. **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

15. **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

16. **In the last week, how many times did you eat mixed fruit?**

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 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

18. **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

19. **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

20. **In the last week, how many times did you eat popcorn?**

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 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

22. **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

23. **In the last week, how many times did you eat hot wings?**

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 eat chicken that was NOT fried?**

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 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

26. **In the last week, how many times did you eat fish sticks?**

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 eat spaghetti?**

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 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

29. **In the last week, how many times did you eat fried rice?**

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 other kinds of 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 times

31. **In the last week, how many times did you add gravy to it?**

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 greens?**

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 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

34. **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

35. **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

36. **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

37. **In the last week, how many times did you eat other kinds of 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

38. **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

39. **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

40. **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

41. **In the last week, how many times did you eat a tossed 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

42. **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

43. **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

44. **In the last week, how many times did you eat vegetable soup?**

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 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

46. **In the last week, how many times did you have cheese on it?**

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 times

47. **In the last week, how many times did you have mayonnaise with food?**

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

48. **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

49. **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

50. **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

51. **In the last week, how many times did you eat snack cakes?**

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

52. **In the last week, how many times did you eat chocolate 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

53. **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

54. **In the last week, how many times did you add jam, jelly or syrup to food?**

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

55. **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

56. **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

57. **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

58. **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

59. **In the last week, how many times did you eat Mexican rice?**

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

Name: _____

Age:_____

PHYSICAL ACTIVITY QUESTIONNAIRE

1. **In the last week, how many times did you jump rope?**

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 times or more last week

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

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 times or more last week

3. **In the last week, how many times did you play basketball?**

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 times or more last week

4. **In the last week, how many times did you play video games?**

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 times or more last week

5. **In the last week, how many times did you play football?**

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 times or more last week

6. **In the last week, how many times did you ride a bicycle or hand cycle?**

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 times or more last week

7. **In the last week, how many times did you take a walk/push?**

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 times or more last week

8. **In the last week, how many times did you play on a playground?**

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 times or more last week

9. **In the last week, how many times did you play on the computer?**

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 times or more last week

10. **In the last week, how many times did you cheerlead/go to dance class?**

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 times or more last week

11. **In the last week, how many times did you watch television?**

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 times or more last week

12. **In the last week, how many times did you dance?**

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 times or more last week

13. **In the last week, how many times did you skate/skateboard?**

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 times or more last week

14. **In the last week, how many times did you play soccer?**

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 times or more last week

15. **In the last week, how many times did you run/jog or sprint/road race?**

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 times or more last week

16. **In the last week, how many times did you talk on the telephone/text message?**

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 times or more last week

17. **In the last week, how many times did you play baseball/softball?**

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 times or more last week

18. **In the last week, how many times did you play tennis?**

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 times or more last week

19. **In the last week, how many times did you play volleyball?**

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 times or more last week

20. **In the last week, how many times did you stretch?**

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 times or more last week

21. **In the last week, how many times did you go swimming?**

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 times or more last week

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

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 times or more last week

Name: _____

Age:_____

Knowledge:

Which of these foods is healthier for you?

1.

a. whole wheat

b. white bread

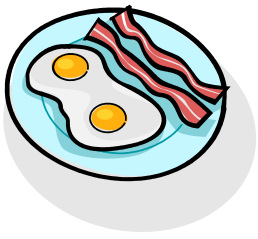
2.

a. pretzel goldfish

b. potato chips

3.

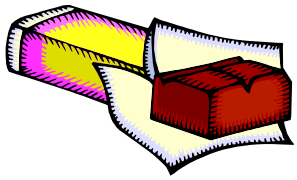
a. cereal



b. eggs and bacon

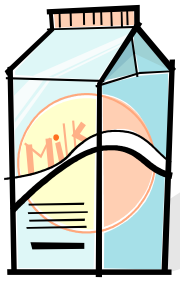
4.

a. apple



b. candy bar

5.



a. regular milk (whole milk)

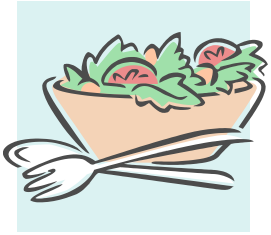
b. low fat or skim milk

6.

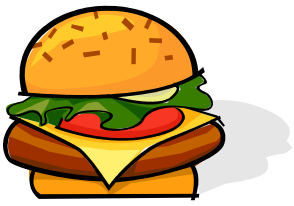
a. frozen yogurt

b. ice cream

7.

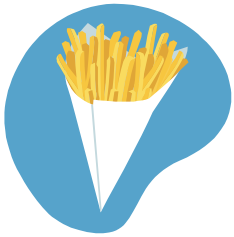


a. salad

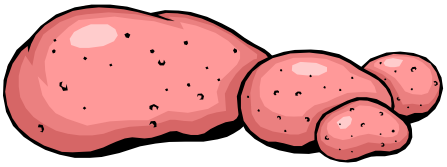


b. hamburger

8.

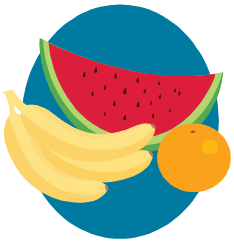


a. french fries

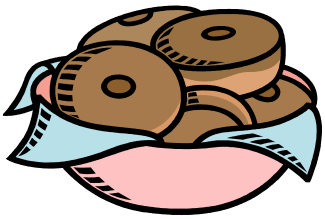


b. baked potato

9.

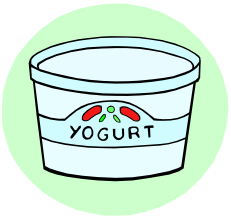


a. fresh fruit



b. doughnut

10.



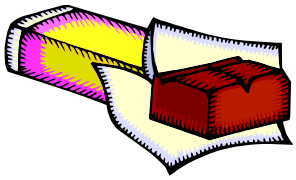
a. yogurt

b. potato chips

Food Preference Questionnaire:

Which of these foods is your favorite?

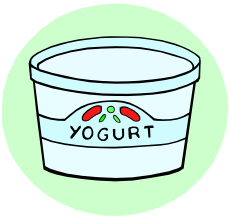
1.



a. candy bar

b. fresh fruit

2.



a. yogurt

b. potato chips

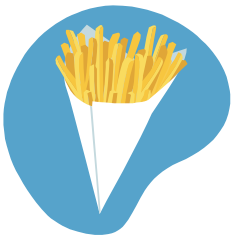
3.

a. soda

b. water

4.

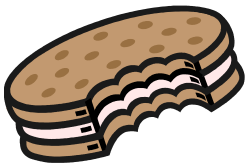
a. vegetables



b. French fries

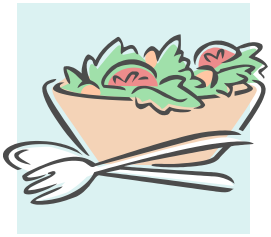
5.

a. orange

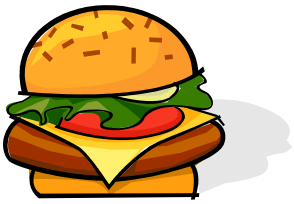


b. cookies

6.



a. salad



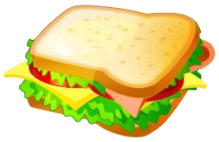
b. hamburger

7.

a. pizza

b. chicken

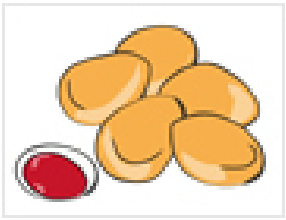
8.



a. hot dogs

b. sandwich

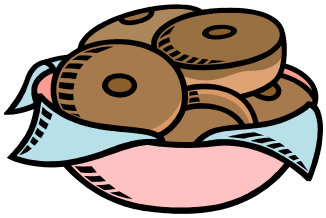
9.



a. chicken nuggets

b. chicken

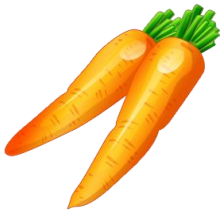
10.



a. doughnut

b. apple

11.



a. carrots

b. cupcake