

Exploring the Effect of the Athletes for Life Intervention on Food Shopping Practices
Among Latino Parents with Elementary School-aged Children

by

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ABSTRACT

Food shopping practices are important in promoting healthy eating habits. Whereas previous behavioral interventions have assessed the effects of such interventions on parent and child health behaviors and quality, few have examined their impact on food shopping practices. This study used a randomized controlled trial design to investigate the efficacy of Athletes for Life (AFL), a 12-week community-based, family-focused intervention program that targeted physical activity and dietary behavior, on food shopping practices among Latino parents with elementary school-aged children. A total of 140 Latino adults were randomized to the AFL intervention or a wait-list control group. AFL included weekly sessions that focused on nutrition education, meal planning, grocery shopping, and physical activity. Participants completed surveys at baseline and after the 12-week program to assess their frequency of use of healthy food shopping practices (i.e., nutrition facts panel use, ingredients list use, grocery list utilization), and whether they refer to specific nutrients within the nutrition facts panel. Intervention effects on the frequency of use of food shopping practices were analyzed using a logistic binomial regression. Effects on consulting specific nutrients within the nutrition facts panel were analyzed using a Quade's analysis of covariance. Results showed that there was a significant increase in the utilization of grocery lists (2.45 ± 1.42 vs. 1.64 ± 1.57 , $p=.011$, $F=6.664$), nutrition facts panels (2.76 ± 1.30 vs. 1.40 ± 1.24 , $p<.0001$, $F=47.128$), and ingredients lists (2.79 ± 1.26 vs. 1.58 ± 1.51 , $p<.0001$, $F=20.055$) among the intervention group participants. Additionally, participants in the intervention group increased their use of nutrition facts panels to look up individual nutrients, particularly calories (OR=4.162, 95% CI=1.762-9.833, $p=.009$), carbohydrates (OR=7.889, 95% CI=2.136-29.137, $p=.018$), protein (OR=12.013, 95%

CI=2.479-58.222, $p=.018$), and sodium (OR=4.247, 95% CI=1.624-11.105, $p=.027$), compared to baseline use. These findings demonstrate that the AFL intervention program was successful in implementing a positive change among parents, which will presumably allow parents to make improvements in their food shopping behaviors that may in turn have an effect on their home food environment and dietary intake among adults and children within the home.

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CHAPTER 1

INTRODUCTION

Overview

The Latino population in the United States has grown steadily over the last three decades.¹ As the Latino population continues to increase, so does their risk for chronic diseases over the life span, starting in youth. One of the first chronic diseases faced by Latino children is obesity.³ Latino children have the highest obesity rates in the nation while the most recent data places adults second behind African Americans.^{3,47} It is estimated that 25.8% of Latino children had obesity between 2015 and 2016, relative to 14.1% of non-Latino white children.³ Obesity puts Latino children at risk for chronic diseases most commonly seen in adults (e.g., hypertension, type 2 diabetes mellitus, heart disease).¹⁵ Therefore, there is a dire need for lifestyle interventions that can contribute to reducing the risk of chronic diseases throughout the life span among Latino youth and adults.

An unhealthy diet and lack of exercise both play a large role in the development of chronic disease among all ethnic groups.⁴ Although some reports suggest that Latino diets tend to consist of more fruits and vegetables when compared to the diets of other ethnic groups, other reports have documented that the Latino diet also consists of foods that are high in calories, starch, saturated fats, and cholesterol, which in turn increases the risk of developing the chronic diseases associated with high intake of these food components; such as diabetes and heart disease.^{5,6} Much of the dietary intake among the Latino population is ancestral and in modern times is continued not only because of familiarity, but because of convenience.⁷ Many of the food items consumed by the Latino

population are easy to prepare for Latino families who, like many other ethnic groups, work many hours a week.⁷ For example, meat can be easily boiled or grilled, refried beans can be used in canned form, and rice and beans can be made in large batches. Each of these foods are easy to cook and can be cooked in large amounts for the whole family. Community-based programs must assure the lifestyle changes recommended are convenient for busy parents by including culturally relevant foods adjusted to improve health.

Family-oriented, community-based programs can be of particular benefit by reaching members of this population in their communities. Many community-based nutrition programs have not focused specifically on Latino populations.^{8,9} Generalized community-based programs do not necessarily take into account cultural factors, competing demands, or access to resources, all of which may determine the extent to which diet change is achievable.^{8,9} For example, some programs provide food and exercise facilities to the participants free of charge, without considering these items may not be accessible at home.^{8,9} This can hinder the success of the participants long term. One way to combat this is to consider developing culturally tailored community-based programs that adjust for the sociocultural factors influencing dietary behavior change. Most existing community-based programs only focus on individual behaviors (e.g., food intake), and do not consider related behaviors, such as shopping practices, as ways to support dietary change.^{8,9} Therefore, there is a need to develop and evaluate the efficacy of including strategies to change food shopping practices as part of culturally tailored interventions promoting healthy eating among Latino families.

Being that the family as a whole is affected by nutrition and shopping practices, it is important to include both children and parents in any intervention programs targeting behavior change.¹⁰ Parents are the providers for their children and therefore influence the behaviors and food consumption of their children.¹⁰ It has been documented that when parents are the focus of the intervention, there is a higher chance of success long term.¹¹ Particularly when focusing on diet change interventions, it is generally understood that parents play a large role in the family's eating behaviors; children do not necessarily have control over foods purchased or the activities that the family partakes in.¹⁰ Being that the ultimate decision maker is the parent, programs must begin to hone in on parent-inclusive interventions.

There is no existing evidence that focuses on shopping practices as an intervention strategy, however, there have been findings that show utilization of grocery lists and nutrition facts labels are associated with healthier BMI and lifestyle.^{12,13} Healthy food shopping practices include the utilization of nutrition facts labels, ingredient lists, and shopping lists to make health promoting choices related to nutrient intake. Healthy food shopping practices are not typically taught in the classroom or at home. Therefore, interventions focusing on food shopping practices will allow for changes to occur where it matters the most, in the grocery store. Being that utilization of grocery lists and nutrition facts labels have shown to promote healthy shopping practices, the Latino population may benefit if culturally tailored community-based programs make an effort to teach healthy shopping practices to this population.^{12,13}

The Athletes For Life (AFL) program is a 12-week community-based, family-focused intervention involving children and their parents, and promoting healthy eating and physical activity among Latino families with elementary school-aged children.¹⁴ The program required participation from both, parents and their children. While the program for children was mostly focused on promoting physical activity through organized group activities, the curriculum for parents included a behavioral intervention focusing on promoting healthy eating for the entire family. The parent nutrition curriculum included information about the use of shopping practices as strategies to improve the home food environment.¹⁴ The program was conducted at a local community center to provide access to facilities and parks for physical activities, and educated parents on healthy food choices, without necessarily changing the current diet as a whole.¹⁴ The AFL program efficacy was assessed through a 2-arm parallel randomized controlled trial in comparison to a wait-list control group.¹⁴

Determining the shopping outcomes of parents who partook in this study is an important step in determining the efficacy of this culturally-based community program. Therefore, the purpose of this study is to evaluate whether intervention participation influenced the following shopping outcomes: reading nutrition facts labels, reading lists of ingredients, formulating shopping lists, and the parent's monitoring of specific nutrients on the nutrition facts labels while shopping for food. If parents become more oriented to perform these actions, they may have a higher chance of long-term diet improvement for the entire family.

Purpose of the Study

There is limited research on how parental shopping practices may contribute to the dietary intake of Latino families and whether those practices may change in response to lifestyle interventions. The purpose of the proposed analysis is to assess the efficacy of AFL in improving healthy shopping practices among parents participating in the intervention relative to those in the control group. The working hypothesis is that participants randomized to the AFL intervention will have an increase from baseline in their nutrition facts label use, monitoring of specific ingredients and nutrients in foods, and grocery shopping planning, relative to participants in the control group.

Research Aims and Hypothesis

Research question: Does a 12-week, culturally appropriate community-based, family-focused behavioral intervention focusing on nutrition and physical fitness improve shopping practices related to the use of nutrition facts labels and ingredients lists, and to the preparation of shopping lists from baseline among intervention participants (specifically parents) compared to those in the control group?

Aim 1: To assess whether study participants who attended the AFL intervention changed their frequency of use of the nutrition facts label (including the ingredients list) from baseline, relative to those in the control group.

H1: Relative to participants in the control group, participants in the AFL intervention will have a greater increase the frequency of using the nutrition facts labels and the ingredients list from baseline to post-intervention.

Aim 2: To assess whether study participants who attended the AFL intervention changed their frequency of use of shopping lists from baseline, relative to those in the control group.

H2: Relative to participants in the control group, participants in the AFL intervention will have a greater increase in the frequency of using shopping lists from baseline to post-intervention.

Aim 3: To assess whether study participants who attended the AFL intervention changed their frequency of using the nutrition facts label to monitor caloric, sugar and fat content of foods from baseline, relative to those in the control group.

H3: Relative to participants in the control group, participants in the AFL intervention will choose to monitor calories, sugar, and fat when shopping more often post-intervention compared to baseline.

Definition of Terms

Randomized Controlled Trial: A study design that randomly divides participants into treatment or control groups to test whether the implemented intervention is successful

Shopping Practices: Performing specific actions necessary to complete the shopping process. Specific to food shopping, these practices include formulating shopping lists, reading nutrition labels, reading ingredient labels, and monitoring nutrients of concern (e.g., calories, carbohydrates, fats, sodium, and protein)

Nutrition Facts Panel: A label that is required by the FDA, to be on all packaged food items by the FDA that contain the overall nutrient content of the food. (e.g., fats, proteins, carbohydrates, added sugars, vitamins, minerals)

Ingredients List: A list of the ingredients utilized to create a food item. This list is required by the FDA to be on all packaged food items.

Obesity: CDC defines obesity as BMI of 30.0 kg/m² or higher

CHAPTER 2

LITERATURE REVIEW

This literature review will discuss the socioeconomic determinants of health affecting the Latino community. It will discuss how these items contribute to disease risk in the community, how these influence diet and common foods consumed by the Latino population, how healthy shopping practices can contribute to diet quality, and the role a Culturally Tailored Community-Based Program (CBP) intervention has in guiding Latinos to choose healthier options to improve chronic disease risk throughout the community by educating parents, more so than children, in nutrition and fitness. In the United States (US) research literature the terms “Hispanics” and “Latinos” are often used interchangeably. For purposes of this thesis the term “Latinos” will be used when referring to these populations.

Socioeconomic Determinants of Health and Nutrition

Social determinants of health and nutrition include the social, financial, political and other environmental factors that influence health and nutrient intake within a population.⁵⁸ These determinants make up the conditions in which the population is living under and external factors that shape the daily life, health, and food intake.⁵⁸

Education level

Education is a key component when discussing health and decisions within the household. Parents with higher levels of education tend to have higher household income levels, and better health outcomes than those who have lower levels of education.¹⁸ Only 18% of Latinos have a bachelor's degree, which is the lowest among ethnic groups.¹⁸ It

has been found that Latino youth have better dietary outcomes when parental education is high and parents can make better purchasing decisions based on healthier options.⁷

In a study evaluating Nutrition Facts label comprehension within two Latino communities in Los Angeles, it was found that comprehension was associated with higher education.³¹ Despite a 60% utilization rate of the Nutrition Facts Label among the participants, only 13% showed adequate comprehension.³¹ Based on the study's results, the Latino population being studied utilized the label, but was unable to interpret the available information correctly.³¹ This lack of comprehension does not only affect Latino adults, but their children are also affected, as it limits parents' ability to educate their children on healthier food options.³² This shows promise that with targeted education this group can begin to use Nutrition Facts Labels correctly. Culturally Tailored Community Programs must take this into consideration and nutrition education should be a focus among most programs.

Level of income

Along with education, income level has a strong effect on health outcomes. The level of income among Latino Americans was found to be 2nd to last among all racial/ethnic groups in 2021, with a weekly earning average of just 799 USD.¹⁹ This can be a barrier to healthier food options and community activities that may prove to be costly. In one study, Latinos felt that the food items they purchased were purchased because they were less costly and were not familiar with the nutritional content of these foods.⁴³ Low income within the Latino community has been linked to buying calorie-dense foods that are low cost, such as sugary drinks, processed meats, high-sugar cereals, and ramen noodles which contain high salt.⁴³ Consistently consuming these food items

will lead to food habits that may increase the risk of obesity and chronic diseases among low-income Latino communities.⁴³ Latinos who bring home a low monthly income also struggle with food insecurity.⁴³ Food insecurity occurs when an individual or group has difficulty accessing nutritious foods.³⁴ In a study evaluating low-income Latinos, 42% of participants were found to be experiencing household food insecurity and 33% experiencing child food insecurity.³⁴ The findings of this study highlight the urgent need to address food insecurity in low-income Latino communities and other vulnerable populations. Strategies to address food insecurity may include increasing access to affordable, healthy food options, promoting nutrition education, and providing food assistance programs.

Language barrier

Nutrition facts labels are in English, making it difficult for non-English speakers to translate them. It is well known in US healthcare that language barriers have a large effect on patient outcomes.³⁵ In the book *Hispanics and The Future of America*, it was determined that English proficiency limitations, and low-grade levels, prevent Latino parents from developing their children's literacy skills and activities.²⁰ This language barrier is very apparent in the interactions with health professionals who work in medicine and nutrition.³⁵ It is still uncommon to find Spanish-speaking healthcare workers (e.g., medical practitioners and dietitians).³⁵ Therefore, patients may only walk away with a portion of the knowledge needed to be successful. Some Spanish speakers may even avoid health care altogether due to the feeling of being a burden to health care professionals and fear of discrimination.³⁵ These language barriers are one of the many

reasons why Developing a Culturally Tailored Intervention Program is necessary to prevent poor outcomes in wellness intervention programs.

Behavioral Factors That Contribute to Obesity and Other Chronic Conditions

Smoking

Once a national fad, cigarettes have been found to increase the risk of chronic diseases.¹⁰ In one study, smoking cigarettes was strongly associated with each of the following diseases when compared to physical inactivity and alcohol use: congestive heart failure, chronic obstructive respiratory disease, diabetes, lung cancer, myocardial infarction, and stroke, among other conditions.² Therefore, determining the prevalence of smoking in the Latino population is important. In another study, smoking was more common among Mexican men (23.4%) than women (10.4%).²¹ It has been found that Latinos who smoke intermittently are at higher risk of progression to daily smoking.³⁶ Although rates of parental prompting have become reduced over time, one study focusing on smoking influence in Latino youth found that Latino children who were prompted to participate in parental tobacco use (e.g., lighting cigarettes, bringing the package, or buying cigarettes) were more likely to progress to tobacco use themselves.³⁷ This supports the idea that parent-focused wellness interventions are very important in preventing unhealthy habits such as smoking in Latino youth.³⁷

Physical Inactivity

Both Latino men and women reported a lower prevalence of regular physical activity than their non-Latino White counterparts.⁴ Physical activity has been shown to reduce risks of chronic diseases, such as DM and cardiovascular disease, in all ethnic

groups.²² In contrast, physical inactivity tends to be associated with heart disease, obesity, thyroid diseases, and even vascular disorders.¹³ Men and women who practiced physical activity more often had lower odds of having heart problems, breathing problems, type 2 diabetes, and obesity.²² There are many internal and external factors affecting participation in physical activity within the Latino population.⁴ For example, the perception of the benefit among Latinos may be low, and there may be a lack of social support, as discussed before socioeconomic status, age, and perception of health are all significantly associated with lack or incorporation of exercise.⁴ In one study 67.6% of Latino participants did not meet physical activity recommendations when compared to 55.6% of adults in the US.³⁸ The participants in the same study cited lack of self-discipline, lack of time, and lack of childcare, among other reasons, as barriers.³⁸ Therefore, family involvement, affordability, time, and education are some of the most important aspects to consider when addressing physical activity in this population.

Diet Quality of Latinos in the United States

USDA Dietary Guidelines and The American Diet

The United States Department of Agriculture (USDA) releases new dietary guidelines every 5 years. The guidelines were developed to reduce chronic disease in the American population by providing a guide to follow when making food choices.³⁹ The current edition was developed for the years 2020-2025 and focuses on increased nutrient-dense foods in the diet, such as 2.5 servings of vegetables, 2 servings of fruits, and 6 servings of whole grains.³⁹ They also recommend limiting the intake of added sugars, saturated fats, sodium, and alcoholic beverages.³⁹ Recommendations go as far as

consuming less than 10% of calories from saturated fats and added sugars.³⁹ The MyPlate Plan was also created as a visual representation of what this type of meal should look like.³⁹ The USDA also provides a scoring system that determines how well a set of foods align with the dietary guidelines.⁵⁹ This system is known as the Healthy Eating Index and using this index, researchers can score foods on a scale of 0 to 100.⁵⁹

Despite the guidelines being developed for the American population, the American Diet consists of large amounts of refined carbohydrates, added sugars, high saturated fats, high calories, and low fiber; all of which have been highly associated with chronic disease and obesity.³⁹ Only 59% of the American population met the guidelines in 2016 when the last edition was released. This may be, in part, the reason why heart disease is the leading cause of death in the United States (US) and over 70% of adults are overweight or obese.⁴⁰ Relative to the Dietary Guidelines for Americans, Latinos have been found to have a better-quality diet when compared to other ethnic groups being that they tend to meet fruit and vegetable recommendations. However, Latinos still tend to overconsume sodium, added sugars and fats.⁴⁸

Dietary Intake and Acculturation of Latinos in America

Acculturation is the process through which individuals from a given culture adopt a portion, or all, the traditions of the dominant culture.⁴¹ The unacculturated, or traditional, Latino diet includes large amounts of fruits, vegetables, and fiber, and the traditional Latino foods tend to mimic the dietary guidelines more so than the typical American diet.^{41, 48} Because of this, those who follow the traditional Latino diet tend to have a lower level of chronic disease when compared to their American counterparts.⁴²

It has been found that Latinos who migrate to the United States tend to adopt many of the eating habits of Americans.^{41,42} More recently it has been proposed that many individual, social, and structural factors affect the rate of acculturation into what is described as segmented assimilation.⁴⁹ The diet adoption depends on the pattern of integration into the US which is described in 3 segments.⁴⁹ For example, the “classic” segments of the migrant population tend to fully adopt the American diet while gaining education and income, whereas “underclass” segments tend to maintain culture while also living in poverty, and “selective” segments tend to advance in education and retain much of the cultural diet.⁴⁹ When comparing diet quality among different segments it was observed that Healthy eating index (HEI) totals were lowest in the classic segment (49.1), whereas the underclass and selective segments were similar, 52.5 and 52.8 respectively. Those Latinos who fully adopt the American diet tend to keep refined foods, sugary drinks, and fried foods in the home despite income and education.^{41,49} Once the American diet has been adopted, the risk of developing chronic disease and obesity increases among this population.^{41,42} The theory of segmented assimilation does a great job considering the outside factors included in the process of acculturation and may show that poverty and education do not necessarily guarantee the negative effects of acculturation in the group.⁴⁹

Prevalence of Obesity in Latinos Living in America

There are many factors associated with obesity, including diet, lack of exercise, and fast-food marketing which have all been linked to a rise in childhood obesity.¹⁶ Of those who are disproportionately affected are minority populations, with African American children having the highest rates of childhood obesity followed by Latino

children.³ In 2015-2016 data from the National Health and Nutrition Examination Survey (NHANES), showed that Latino adults had the highest rates of obesity among all other race/ethnic groups, with 47% of Latino adults in the US falling in the obesity category.³ Most recently Latinos moved to second with African Americans reaching 48% and Latinos at 47%. This trend has been continuously rising in the last 20 years and shows little to no change.³ Not only does obesity affect Latino adults but obesity has been rising in Latino children since the 1980s.^{3,15} It is estimated that 25.8% of Latino children were obese between 2015 and 2016, relative to 14.1% of non-Latino white children.³

Obesity and Chronic Disease Risk in Latino Adults and Children

The percentage of Latinos with obesity in the US correlates closely to the percentage of Latino adults who have a chronic disease.¹⁷ Based on the National Diabetes Statistics Reports from 2020, the prevalence of Diabetes Mellitus (DM) was 12.5% in Latino adults which ranks second behind American Indians/Alaska Natives (14.7%).¹⁷ Some were at risk well before they were adults, as children with obesity. In a 2017 review on childhood obesity, it was found that children who are born from parents with obesity have a 50% chance of developing obesity.¹⁵ Therefore, it is possible that parents are unintentionally affecting their child's future health environmentally, behaviorally, and possibly genetically.

As the weight starts to climb in Latino children, so do early-onset chronic diseases.¹⁵ The most common finding in children with obesity is hyperlipidemia, characterized by elevated triglycerides and/or cholesterol in the blood.¹⁵ Children with obesity are also more predisposed to developing the non-alcoholic fatty liver disease

(NAFLD) and elevated glucose levels (a precursor to DM), which are both becoming more common in this population.¹⁵

Family-Based Behaviors and Health Outcomes

Family-Based behaviors tend to impact health outcomes within the family. In an observational study, families were observed to see if BMI was impacted by three general categories of dinner-related behaviors which included dinner preparation, socializing during dinner, and eating at the table.²⁷ This study found that families who regularly ate dinner in the kitchen or dining room had lower BMIs for both adults ($r=-0.31$) and children ($r=-0.24$) compared to families who ate elsewhere. This suggests that the environment in which meals are consumed may have an impact on body weight. However, helping cook dinner was associated with higher BMI for girls ($r=0.26$), and boys who remained at the table until everyone finished eating had lower BMIs ($r=-0.31$). These findings suggest that the roles and behaviors of individuals during mealtimes may also affect body weight.

In one study it was found that siblings tend to have similar dietary patterns, specifically breakfast patterns.⁵⁰ They also tend to eat fast food at the same rates and sedentary behavior was significantly positively correlated among siblings.⁵⁰ Interestingly, weight status, dieting behaviors and birth order were not significantly correlated among siblings and there were no positive correlations between parents and siblings.⁵⁰

In another study researchers found correlations between weight status within the family.⁵² It was determined that it is 2.2 times more likely for a child with an obese parent to be obese, but the pattern was stronger among siblings.⁵² Parent obesity status was no longer significant if sibling obesity was correlated within the family.⁵² This was

more prominent amongst children of the same gender.⁵² A behavior that was significantly associated with obesity status despite gender, was child physical activity.⁵² This study adds more support to the sibling influence within a household.

More recently it has been found that eating behaviors when a child leaves home are best explained by modeling.⁵³ These children were more likely to eat unhealthy snacks just as their parents did.⁵³ The researchers found that modeling had more influence than parental control.⁵³ This is an important concept to consider in future studies, indicating that parental guidance must also include healthy parental actions.

Shopping Practices and Whether They Affect Food Selection and Intake

Food shopping practices are defined in this study as formulating shopping lists, reading nutrition labels/ingredient lists, and monitoring nutrients. Researchers determine whether teaching these behaviors will improve obesity and health outcomes by influencing the choices made at the grocery store. One study evaluated whether grocery store interventions would have any impact on purchasing behaviors.⁵¹ The study evaluated the most effective ways to induce change within the grocery store before implementing nutrition interventions. They found that changes were found when the price was manipulated, a swap was suggested (alternative food choice), and when item availability was affected. This confirms that grocery shopping practices can be adjusted if environmental factors call for it. Therefore, food shopping practices taught in a family-based program, may be used as a tool to improve food selection and intake within the home.

How The Nutrition Facts Panel Improves Outcomes

The nutrition facts panel is a very important tool for the average consumer as it provides the nutrition information needed to make healthy food choices. The nutrition facts panel was incorporated on food items starting in 1994 by the FDA.¹² The FDA requires the panel to contain calories, fat, saturated fats, trans fats, cholesterol, sodium, totals carbohydrates, fiber, sugars, added sugars, protein, vitamin D, Calcium, iron, and potassium. The requirements on nutrition facts panels were adjusted in 2016 to make calories and serving sizes more notable to the consumer, and added sugars were placed on the label as well.⁵⁴

In a secondary analysis of an intervention trial where the nutrition panel was studied before use, 1255 participants were evaluated over a 4-weeks.¹² Researchers looked at products purchased after viewing the nutrition panel.¹² The participant's phone camera was used to scan barcodes of packaged foods and link them to corresponding nutrient composition in a food composition database. It was found that panel use was associated with healthy food purchases.¹²

In a meta-analysis, nine peer-reviewed studies were utilized to evaluate whether food panel use increased the selection of healthier products and in reducing high calorie choices.⁴⁴ Different schemes of the panel were utilized to find which scheme produced the best result. For example, the traffic light scheme which gives the consumer a snapshot using colors coding for a high nutrient of concern on the front of packages, and the Guideline Daily Amount GDA which provides more details.⁴⁴ A few of the smaller studies showed increased panel use despite panel type, and others showed reduced use leading to mixed results among the smaller studies.⁴⁴ Overall, when all studies were

reviewed and larger studies were included despite the type of label, results of the meta-analysis showed that food labeling may play a significant role in prompting shoppers to select healthier food products as they significantly increase the number of people selecting a healthier option.⁴⁴

The Benefit of Encouraging Grocery List Usage

Research is very limited on grocery list use as an intervention, especially among Latinos. Most utilize them in the overall nutrition education intervention but do not focus on its result. Grocery planning before attempting to shop has been associated with more successful lifestyle changes among populations.⁴⁵ In one study, 1,372 adults who were the primary shoppers in their households, primarily low income African Americans, were evaluated to determine if using a shopping list improved dietary quality and BMI.⁴⁵ Dietary quality was defined as higher HEI-2005 (Healthy Eating Index) scores.⁴⁵ BMI was based on the measured height and weight when the participants returned for an interview.⁴⁵ Those who stated they *always* used a list, had better HEI-2005 scores and lower BMI, which appeared to show a direct relationship between list use and better diet quality and lower weight.⁴⁵

In another study, 150 participants who were the primary shoppers in the home were evaluated and given brief shopping education including the use of shopping lists.²⁹ In this study, researchers used digital photography to capture images of food and beverage purchases made by participants at a supermarket. They also obtained grocery receipts from the checkout clerk and took field notes to identify food items without packaging or nutrition labels.²⁹ Those who were involved in the intervention were more likely to choose healthier food options and eat healthier meals because they had planned

for their shopping trip.²⁹ Although research is limited, the above studies support the use of shopping lists in future nutrition interventions.

Community-Based Nutrition Program Success

A randomized control trial in the UK evaluated the Mind, Exercise, Nutrition, Do it (MEND) program which is a 12-month study including 116 obese children who were randomized into intervention and control groups. The children were put through 18 two-hour education and activity sessions followed by a 12-week swimming intervention.⁹ The sessions focused on healthy eating advice/tips in the form of weekly targets, instructions on reading and understanding food labels, recipes to try, and cooking sessions which included vegetable and fruit sampling. The main goal of this study was to improve obesity outcomes among the child participants.⁹ The 60 children in the intervention group at 6 months had a -4.1 cm change in waist circumference and a -1.2kg/m² change in BMI (P < 0.0001); children in the control group showed no difference from baseline to 6 mo.⁹ MEND did not include parents in the study but did include parents in the same education and physical activity sessions as the children.⁹ Parents were not assessed pre and post intervention. Being that 50% of the participants were of Caucasian descent, it is important to determine how these findings translate to minority cultures.⁹

A second randomized control trial focused on the Healthy Home Offerings via the Mealtime Environment (HOME) study which included 160 families which included 8–12-year-old children and the primary meal provider, who would undergo a 10-month intervention.⁸ The control received weekly newsletters, whereas the intervention group would participate in 10 monthly sessions of education on nutrition (meal planning and

food prep) and physical activity.⁸ This study intervention also included goal setting sessions for parents which is an intervention that has been found successful as discussed in the Parental Influence section.⁸ Retention was also very high in this study, which may indicate parent and child receptivity to the program sessions. Improved outcomes included reduced media usage and increased healthy food intake among children.⁸ Although this study was very promising, the study was less diverse than the one mentioned above as 70% of the participants were Caucasian.⁸ Therefore it is important to determine the effectiveness of the HOME program in minority children.

Although there are few studies focusing on food shopping practices, one study did evaluate food purchasing selection among low-income Spanish-speaking Latinos after being educated on food shopping practices.⁴³ They used a family-based approach by going to participants' homes. The food shopping practices were taught over a 6-month period and included instructions on reading labels, forming shopping plans, and healthy meal planning.⁴³ After the intervention families decreased the total number of calories purchased, and decreased carbohydrate-related calories.⁴³

Cultural tailoring is especially important when developing community-based interventions. This type of intervention ensures that the native language, and cultural dietary preferences are taken into consideration.⁵⁶ These interventions also encourage family participation and support, and allow researchers to hold open discussions of cultural beliefs and treatment practices.⁵⁶ One example of a culturally tailored intervention program evaluates the effects of culturally tailored nutrition education on the dietary quality of Latino mothers.⁵⁷ The intervention included a 2-hour weekly workshop divided into 3 classes on nutrition (30-minute session), family time, and physical

activity.⁵⁷ Dietary intake was assessed using the Rate Your Plate self-report questionnaire which included an English and Spanish version.⁵⁷ A low score is 24-40 indicating the need for improvement, 41-57 indicated there are some ways to improve, and 58-72 indicated healthy choices are being made. Initially the control group and experimental groups scored in the range of 32-65 and 38-65 respectively.⁵⁷ After the intervention the control group scored 39-66 and the experimental group scored 43-71 which was found to be a statistically significant change in self-reported dietary quality among participants.⁵⁷ This study supports the importance of a culturally tailored nutrition intervention in improving health choices.

Parent-Focused Interventions

Parent-focused interventions seem to be more efficacious when compared to interventions that include parents and children in reducing the incidence of overweight children.¹¹ In this study they evaluated the differences between community-based interventions that focus on parents versus those that focus on parents and children as a pair in childhood obesity treatment.¹¹ They determined that when parents receive a high level of attention and training in nutrition and physical activity, there is much more improvement in the children's obesity when compared to paired interventions.¹¹

When developing a family-focused nutrition intervention program, the decision to focus on parents, children, or the family is a very important one to make. Being that children are fresh minds, ready to be taught new things, inclusion in these intervention programs is imperative so the children can make healthier choices early on.⁴⁶ In one study, parents in the intervention group were given six 2-hour dietitian-delivered sessions over 15 months focusing on parental knowledge, skills, and social support around infant

feeding, diet, physical activity, and television viewing, and by the end of their 20-month-old children were watching less TV and eating fewer sweets when compared to controls.⁴⁶ Parental interventions tend to be successful because children tend to mimic their parents.³⁰ A randomized control trial studied the Influences of Parental Snacking-Related Attitudes, Behaviors and Nutritional Knowledge on Young Children's Snacking.³⁰ The study included parents and children between the ages of 3 and 5 years old.³⁰ They found that unhealthy snacking was lower in parents with higher education levels and therefore the children had lower levels of unhealthy snacking.³⁰ It seems parents with higher income, higher education, and nutrition knowledge had children who mimic their food intake which led to healthier snacking.³⁰ Therefore, if parents are not involved in community-based intervention programs there may be a high risk of failure long term.

In an exploratory study focusing on parent intervention, they used goal setting to improve parental influence on nutrition and obesity in children. It was found that parents who made healthier choices also improved the food given to their children.³¹ Similarly, in a randomized control trial of the HOME-Plus program, parent interventions led to children who were more likely to consider healthier options and perform physical activities.⁸

By looking into school-based obesity interventions, researchers find more reasons to involve parents. School-based interventions are the best way to reach children without the parent present. In one study which evaluated the long-term effect of "Kinder- und Jugendsportstudie" (KISS) a school-based physical activity program, on fitness and

adiposity they found 3 years later aerobic was improved compared to control but there was no difference in physical fitness, adiposity, or quality of life.⁵⁵

Each of these studies supports the idea that parent-focused, or parent-inclusive interventions, are superior to those that only focus on the children.¹¹

Summary

Whether it is habits such as smoking, lack of physical activity, or social determinants, the Latino community has multiple barriers that make it difficult to maintain a healthy lifestyle. As programs such as HOME, MEND, and AFL continue to build upon prior findings, Culturally Tailored Community Programs will be developed and tested to determine the most appropriate interventions for each culture. It is important to find ways to face the barriers within minority cultures so that creative ideas can develop and improve these barriers. Although some barriers, such as income, may not be adjustable, language barriers, and education barriers can be overcome with Culturally Tailored Community Programs by incorporating bilingual education and basic nutrition education to participants. The participants that should receive the most focus are the parents who are responsible for their children's meals and health. Therefore, if parents are the focus of most community-based programs and culture is considered, improved outcomes will naturally improve the health of parents along with that of their children.

CHAPTER 3

METHODS

Study Design

The proposed study is a secondary data analysis from a completed randomized controlled trial (RCT) evaluating a behavioral intervention for Latino families with elementary school-aged children. The parent study was a parallel arm, RCT evaluating the efficacy of the 12-week Athletes for Life (AFL) intervention program on increased cardiovascular fitness (CVF) as the primary outcome, relative to a waitlist control group. The study enrolled dyads of one parent and one child (age 6-11 years old) from the same household. Randomization to the active intervention (AFL) or a wait-list control group was done via an automated computer program, stratified by language spoken by the parent. The study design and intervention program have been described in detail elsewhere.¹⁴ For the present study, the secondary data analysis focused on the effects of the AFL intervention on healthy food shopping practices among the intervention parents compared to those in the wait-listed control group using data collected at baseline (pre-randomization) and immediately after the 12-week intervention. Children were excluded from the present analysis because it is assumed that they were not the main household member involved in food shopping for the family.

Participants

Eligibility required parents to be at least 18 years old, able to speak, read, and comprehend English or Spanish, and not currently participating in a physical activity or nutrition intervention. Recruitment involved the utilization of word-of-mouth marketing, social media, and reaching out to community centers for permission to distribute flyers to recreation center members. The recruiters also attended community center events to distribute flyers and information about the study. During these events, recruiters collected contact information and language preferences to prevent language barriers during informational callbacks.

Participants were screened and excluded for the following criteria: the presence of a mental/physical condition that contradicts participation in physical activity, chronic condition that limits mobility, use of medications that influence body composition, and pregnancy.

This study was approved by the Institutional Review Board at Arizona State University (STUDY00001286; Appendix A) and all parent participants provided informed written consent before enrollment in the study (Appendix B). Parents provided consent for their child's participation, and all children assented to participate in the study. These consenting documents are not included in this thesis because child data are not included in this analysis.

Athletes for Life Intervention

The parent intervention included 24 ninety-minute sessions, offered two times per week over 12 weeks. The participants were separated into groups associated with either

English or Spanish-guided nutrition sessions and the bilingual staff was available as needed. Sessions consisted of a 45-minute structured exercise program and 45 minutes of a behavior change program focusing on nutrition and diet improvement. Some topics that were discussed during the behavior change sessions that are most relevant to this study include meal planning, grocery shopping, reading nutrition labels, portion control, and nutrition basics (Table 1).

Table 1. Nutrition Intervention Topics

Section	Intervention Topic	Section	Intervention Topic
1	Introduction to Athletes for Life Program	13	Controlling Blood Fats
2	Reaching Your Goals	14	Meal Planning and Grocery Shopping
3	Chronic Disease: Reducing Your Risk (Food Preparation)	15	Environmental Restructuring: Making the Healthy Choice the Easy Choice
4	Lifestyle Habits: Making good nutrition and physical activity a way of life	16	Get Moving: Reducing screen time
5	Nutrition 101: Basics of Nutrition	17	Smart Snacking
6	The Power Plants (Food Preparation)	18	Transforming Your Favorite Recipes
7	Reading Labels	19	Damage Control: Avoiding Holiday Weight Gain
8	Energy Density vs Nutrient Density (Food Preparation)	21	Maintaining Change
9	Energy Density vs Nutrient Density (Food Preparation)	22	Long-term Goals
10	The Power of Positivity	23	Mindful Eating
11	Controlling Blood Sugar	24	Graduation Celebration

Independent and Dependent Variables

The independent variable in this study was the group assignment. Therefore, intervention versus wait-listed control remained consistent throughout the study. The dependent variables were the healthy shopping practices which were evaluated in the original study using a self-administered survey pre and post-intervention.

Measures

Parents' sociodemographic characteristics were collected at baseline via paper questionnaires and included date of birth, gender, marital status, household size, employment, income, education, country of birth, acculturation, medical history, and race/ethnicity.

Information about healthy food shopping practices such as nutrition facts panel usage, ingredients list usage, and grocery list development were assessed pre- and post-intervention through a survey. The questions utilized in this survey can be found below. See Appendix C for a detailed format.

Question 1: How often do you do the following?

- a. Prepare a list when you go grocery shopping?
 - 0 Never, 1 Rarely, 2 Sometimes, 3 Mostly, 4 Always
- b. Read the ingredients section to help you to decide what foods to buy?
 - 0 Never, 1 Rarely, 2 Sometimes, 3 Mostly, 4 Always
- c. Use the nutrition label to help you make food selections?
 - 0 Never, 1 Rarely, 2 Sometimes, 3 Mostly, 4 Always

Question 2: If you look the nutrition panel to make food selections, what do you look for? (If the above answers were never, the answer to this question should be marked as “I don’t know”) (Interviewer checks all options mentioned by participant)

Answer Options: Calories, Total Fat, Saturated Fat, Cholesterol, Carbohydrates, Sugars, Fiber, Protein, Sodium, Vitamins, Minerals, I don’t use the nutrition panel when selecting.

Statistical analysis

All statistical analyses were done via SPSS software (version 28.0) with a statistical significance set at $p < 0.05$. The sociodemographic characteristics of participants at baseline were compared using independent sample t-tests (age) or chi-square tests (gender, ethnicity, education, public assistance, and income). Data are displayed as mean \pm SD or n (%).

Likert scale responses from Question 1 were evaluated as continuous variables. Outcome variables were non-normally distributed. Therefore, a Quade nonparametric ANCOVA was performed to assess intervention effects on outcome variables (shopping list formation, nutrition label use, and ingredients list usage) relative to the control condition, controlling for baseline values. A significant change in values would indicate a change in utilization of these items by participants from baseline to post-intervention.

A binary logistic regression analysis was performed on the dichotomous responses to questions related to whether participants consulted individual nutrients from the Nutrition Facts Panel post-intervention, controlling for baseline nutrition panel usage

for nutrient monitoring. A significant change in values would indicate a change in nutrient monitoring by participants from baseline to post-intervention.

CHAPTER 4

RESULTS

Descriptive Characteristics of the Participants

Baseline adult participant characteristics along with the characteristics of their children are shown in **Table 2**. A total of 140 adult participants completed baseline data collection and were randomly assigned to the intervention and control groups. Of these participants, 111 returned for the post-intervention data collection with 53 belonging to the control group and 58 belonging to the intervention group. The participants were primarily female (92.9%) with a mean age of 38.4 ± 6.9 years. A majority of the participants were married (67.9%) or unmarried and living with a partner (17.1%). The majority of the participants completed high school (40%) and attended college (23.6%). About 10% of participants were college graduates. Participants' mean household monthly income was $\$2560 \pm \2137 . The mean household size was 2.4 ± 1.0 adults and 3.0 ± 1.0 children. Children were predominately female (58.6%) with a mean age of 9.3 ± 1.7 years. There were no significant differences in sociodemographic characteristics between participants placed into the intervention or wait-list control groups (**Table 2**).

Table 2. Sociodemographic characteristics of participating parents and children.

Sociodemographics	All (n=140)	Control (n=70)	Intervention (n=70)	P value for group comparison¹
Parents				
Age (y), mean ± SD	38.4 ± 6.9	38.0 ± 7.4	38.8 ± 6.5	.915
Income (\$), mean ± SD	2560 ± 2137	2311 ± 1567	2800 ± 2563	.281
Sex, n (%)				.189
Female	130 (92.9)	67 (95.7)	63 (90.0)	
Male	10 (7.1)	3 (4.3)	7 (10)	
Level of Education, n (%)				.473
Less than high school	20 (14.3)	12 (17.1)	8 (11.4)	
Some high school	17 (12.1)	8 (11.4)	9 (12.9)	
High school grad	56 (40.0)	29 (41.4)	27 (38.6)	
Some college	33 (23.6)	17 (24.3)	16 (22.9)	
College Graduate	14 (10)	4 (5.7)	10 (14.3)	
Marital Status, n (%)				.616
Single	12 (8.6)	6 (8.6)	6 (8.6)	
Married, living with spouse	95 (67.9)	44 (62.9)	51 (72.9)	
Married, not living with spouse	5 (3.6)	3 (4.3)	2 (2.9)	
Living together, not legally married	24 (17.1)	15 (21.4)	9 (12.9)	
Separated	3 (2.1)	2 (2.9)	1 (1.4)	
Divorced	1 (.7)	0 (0)	1 (1.4)	
Children				
Age (y), mean ± SD	9.3 ± 2.0	9.4 ± 2.0	9.2 ± 2.0	.472
Sex, n (%)				.731
Female	82 (58.6)	40 (57.1)	42 (60)	
Male	58 (41.4)	30 (42.9)	28 (40)	
Total people in home	5.2 ± 1.5	5.2 ± 1.6	5.3 ± 1.4	.928
Adults in the home	2.4 ± 1.0	2.4 ± 1.0	2.5 ± 1.0	.062
Children in the home	3.0 ± 1	2.8 ± 1.4	2.7 ± 1.2	.484

¹Independent samples t-test or chi-squared

Food Shopping Practices

A Quade's analysis of covariance was performed to evaluate the intervention effects on the frequency of use of the three shopping practices of interest (reading list of ingredients, reading nutrition facts panel, preparing a grocery list) controlling for baseline use of these practices (**Table 3**). At T2 grocery list usage among intervention participants (2.45 ± 1.42) was significantly higher than that of wait-list control group participants (1.64 ± 1.57 , $p=.011$, $F=6.664$). Intervention participants also reported a greater frequency of reading the list of ingredients (2.79 ± 1.26) when compared to control group participants (1.58 ± 1.51 , $p<.0001$, $F=20.055$). Additionally, intervention participants reported greater frequency of reading nutrition facts panels (2.76 ± 1.30) when compared to participants in the wait-list control group (1.40 ± 1.24 , $p<.0001$, $F=47.128$).

Table 4 presents the results of a binomial logistic regression model examining parents' use of individual nutrients from the nutrition facts at T2 panel based on nutrition facts panel use at baseline and group allocation. The odds ratio, 95% confidence interval, and Bonferroni-corrected p-values for each predictor are reported.

Relative to parents in the control group, the intervention group parents were more likely to look for calories (OR=4.162, 95% CI=1.762-9.833, $p=.009$), carbohydrates (OR=7.889, 95% CI=2.136 - 29.137, $p=.018$), protein (OR=12.013, 95% CI=2.479-58.222, $p=.018$), and sodium (OR=4.247, 95% CI=1.624-11.105, $p=.027$) at T2. However, looking for individual nutrients at T1 was a predictor of looking at those nutrients at T2 for saturated fat (OR=17.202, 95% CI=2.985-99.135, $p=.009$), cholesterol (OR=7.542, 95% CI=0.851-66.842, $p=.63$), carbohydrates (OR=15.237, 95% CI=3.307-70.198, $p<.0001$), sugar (OR=6.621, 95% CI=2.597-16.881, $p<.0001$), protein

(OR=19.701, 95% CI=2.896-134.001, p=.018), fiber (OR=8.580, 95% CI=2.034-36.190, p=.027), and sodium (OR=3.871, 95% CI=1.528-9.809, p=.036). Neither group allocation nor baseline use significantly predicted looking at total fat in the nutrition facts panel at T2.

Table 3. Parent-reported pre- and post-intervention food shopping practices of interest (reading ingredients list, reading nutrition facts panel, and preparing a grocery list) based on allocation to the intervention or control condition¹

Variable	Group (n)	Baseline ²	Post-intervention ²	F statistic	P value
Read Ingredients List					
	Intervention (n =57)	1.4 ± 1.35	2.79 ± 1.26	20.055	.000
	Control (n=53)	1.26 ± 1.30	1.58 ± 1.51		
Read the nutrition facts panel					
	Intervention (n = 58)	1.31 ± 1.30	2.76 ± 1.30	47.128	.000
	Control (n=52)	1.57 ± 1.30	1.40 ± 1.24		
Prepare a grocery list					
	Intervention (n =58)	1.66 ± 1.40	2.45 ± 1.42	6.664	.011
	Control (n=53)	1.66 ± 1.35	1.64 ± 1.57		

¹Quade’s nonparametric analysis of covariance controlling for baseline values.

²Raw data are shown as Mean ± SD. Scale: 0 = Never, 1 = Rarely, 2 = Sometimes, 3 = Mostly, 4= Always

Table 4. Binomial logistic regression model of predictors of parents’ use of individual nutrients from the Nutrition Facts Panel based on Nutrition Facts Panel use at baseline and group allocation.

		N	Odds Ratio	95% Confidence Interval	P value ²
Calories					
<i>Group</i>	Control	49	4.162	1.762 - 9.833	.009
	AFL	53			
<i>Baseline use</i>	No	49	3.265	1.304 – 8.174	.099
	Yes	53			
Total fat					
<i>Group</i>	Control	49	2.447	1.030 – 5.816	.387
	AFL	53			
<i>Baseline use</i>	No	69	1.128	0.431 – 2.952	1.0
	Yes	33			
Saturated fat					
<i>Group</i>	Control	49	6.410	1.720 – 23.892	.054
	AFL	53			
<i>Baseline use</i>	No	80	17.202	2.985 – 99.135	.009
	Yes	22			
Cholesterol					
<i>Group</i>	Control	49	7.542	.851 – 66.842	.63
	AFL	53			
<i>Baseline use</i>	No	92	41.288	4.056 – 420.285	.018
	Yes	10			
Carbohydrates					
<i>Group</i>	Control	49	7.889	2.136 – 29.137	.018
	AFL	53			
<i>Baseline use</i>	No	76	15.237	3.307 – 70.198	<.001
	Yes	26			
Sugars					
<i>Group</i>	Control	49	3.337	1.314 – 8.475	.099
	AFL	53			
<i>Baseline use</i>	No	56	6.621	2.597 – 16.881	<.001
	Yes	46			
Protein					
<i>Group</i>	Control	49	12.013	2.479 – 58.222	.018
	AFL	53			
<i>Baseline use</i>	No	81	19.701	2.896 – 134.001	.018
	Yes	21			
Fiber					
<i>Group</i>	Control	49	2.305	.796 – 6.673	1.0
	AFL	53			
<i>Baseline use</i>	No	80	8.580	2.034 – 36.190	.027
	Yes	22			
Sodium					
<i>Group</i>	Control	49	4.247	1.624 – 11.105	.027
	AFL	53			
<i>Baseline use</i>	No	69	3.871	1.528 – 9.809	.036
	Yes	33			

¹Logistic regression controlling for baseline values

²P values were adjusted using a Bonferroni correction to account for multiple comparisons

CHAPTER 5

DISCUSSION

The purpose of this secondary data analysis was to assess the efficacy of AFL in improving healthy shopping practices among Latino parents who participated in the parent study. The analysis was conducted to address gaps in the literature about the effectiveness of a culturally appropriate community-based, family-focused behavioral intervention on nutrition facts label use, monitoring of specific ingredients and nutrients in foods, and grocery shopping planning. There are limited studies evaluating the effects community-based programs have on these factors, and to our knowledge no studies have been done among Latino participants post a randomized controlled trial.

Findings from the current study suggest that following the 12-week culturally appropriate community-based, family-focused behavioral intervention program, the participants increased nutrition facts label use, monitoring of specific ingredients and nutrients in foods, and grocery shopping planning. These findings demonstrate that the AFL intervention program was successful in implementing a positive change among parents, which will presumably allow parents to make improvements in their food shopping behaviors that may in turn have an effect on their home food environment and dietary intake among adults and children within the home.

Frequency of Nutrition Facts Label Use and Ingredients list Monitoring

Study results suggest that participants increased nutrition facts panel use and ingredient list use as a result of AFL intervention participation. There is minimal research available that suggests nutrition education programs may increase the frequency of using

nutrition facts panels and ingredient lists. One study that focused on this theory, led 17 home-based sessions taught by community health workers to improve food label use and diet quality among n=203 Latino adults with type 2 diabetes.⁶⁰ By the end of the intervention, food label use was significantly higher at 3, 12, and 18 months (odds ratio = 2.99; 95% confidence interval = 1.69, 5.29).⁶⁰ This goes to show that if food label use is stressed by community-based nutrition programs, it may lead to a learned skill that may be beneficial to the participants' long term health.

In a systematic review, researchers evaluated the effect of educational interventions on participants' understanding and use of nutrition labels.⁶¹ The review included a total of 17 studies.⁶¹ The researchers sorted studies into two types of interventions: Type 1, which solely focused on nutrition label education during a one-time program or session, and Type 2, which encompassed nutrition label education along with other components like behavioral aspects and diabetes management. Both intervention types had positive effects on the use and understanding of nutrition label information. Out of the 17 studies, 13 evaluated the impact of the interventions on nutrition label use and all 13 demonstrated significant improvements in one or more measures of this outcome. Most studies evaluated the use of nutrition labels through self-reported pre-post questionnaire items, while one study measured objective use through eye gaze time. Four studies found significant improvements in self-confidence in using nutrition labels, including for specific tasks like checking sugar content.

Three studies found that the use of nutrition labels increased during follow-up periods, which occurred after the final intervention session. This included follow-up

periods of 6 weeks with 927 low-income Australian adults and 3-4 months with 62 Scottish adults at risk for developing chronic diseases. Also, participants with diabetes who had individual, multiple home-based sessions over a 12-month intervention reported a significant impact on the frequency of using nutrition labels up to 6 months after the intervention. However, the reduced number of participants who returned for follow-up suggests a risk of bias. This finding is important because it suggests that educational interventions can be effective in promoting nutrition label use and comprehension. Improved understanding and use of nutrition labels can help consumers make more informed food choices, which may lead to better dietary habits and improved health outcomes. This systematic review provides strong evidence that educational interventions can have a positive impact on nutrition label use and understanding.⁶¹ However, it is important to note that the effectiveness of these interventions may vary depending on the specific intervention approach and the population being targeted. Therefore, future research should continue to explore and evaluate different educational intervention strategies to promote nutrition label use and comprehension among diverse populations.

In contrast to the results from the present study, a randomized controlled trial evaluated the effects of a culturally-tailored nutrition education program on the diet quality of participants after educating them on label use. The program consisted of six weekly sessions, each lasting two hours, and included nutrition education sessions, cooking demonstrations, and recipe taste tests. The nutrition education sessions stressed nutrition fact label use on week 1, week 4, and week 5 which is 50% of the nutrition sessions provided. The study participants were 154 low-income Latino mothers, with a mean age of 38.67 years, who had at least one child average age 9.75.⁵⁷ Participants were

asked to select how frequently they consumed each food and report the servings for each category. Total scores ranged from 24–72. Participants fell into 1 of 3 categories based on their total scores. The lowest scores (i.e., 24–40) indicated that “there are many ways you can make your eating habits healthier,” scores in the middle range (i.e., 41–57) indicated that “there are some ways you can make your eating habits healthier,” and scores in the highest category (i.e., 58–72) indicated that “you are making many healthy choices.” 23% of intervention participants scored in the healthiest category at T0. This increased to 66% at the end of the intervention, while the control group decreased from 23% to 20%. The difference in scores by the end of the intervention was statistically significant ($p < 0.001$).⁵⁷ The study found that participants in the intervention group had significant improvements in diet quality, as measured by results after undergoing the dietary assessment. It is worth noting that the study did not include post-intervention evaluations of label use, so it is unclear whether the culturally-tailored nutrition education program had an impact on participants' use of nutrition labels but it is promising that the education sessions showed improvement in overall diet quality being that 50% of these sessions included label use as a topic.⁵⁷ The significant increase in diet quality observed in the study suggests that the intervention was effective in increasing participants' awareness of nutrition in the foods they were purchasing. This, in turn, has the potential to lead to changes in shopping behaviors, such as selecting healthier food options and avoiding those with high levels of calories, carbohydrates, sugars, or sodium to name a few.

To assess whether nutrition label use results in shopping or dietary behavior changes, further research is needed that examines the long-term effects of such interventions. This could include follow-up studies that assess participants' food choices

and dietary habits over time, as well as qualitative research that explores the contextual factors that may influence these choices. However, it is important to note that increased nutrition label use does not necessarily equate to changes in shopping behaviors or dietary habits. While nutrition labels can provide valuable information to consumers, other factors such as language barriers, food availability, cost, taste, and cultural preferences may also influence food choices. Therefore, while an intervention that promotes nutrition label use is an important step toward improving food shopping practices, it may not be sufficient on its own to promote dietary behavior change.

Frequency of Shopping List Use

In the current study, intervention group participants increased the use of a shopping list after participation in AFL. Shopping list usage after a nutrition education program has not been evaluated in many studies. The current study evaluated the effect of a nutrition education program leading to the development and implementation of a shopping list among intervention group participants. The use of a shopping list is an important behavior that can influence food choices and dietary quality.

Previous studies have primarily focused on evaluating the relationship between shopping list usage that is already in practice among participants and its effect on dietary quality or weight.^{62,63} These studies have shown that individuals with higher education tend to use shopping lists more frequently, and shopping list usage is associated with better diet quality and lower BMI.^{62,63} However, these studies do not evaluate participants who have been educated on the development of this tool. The current study's finding that intervention group participants increased the use of a shopping list after participating in

the AFL program highlights the potential impact of nutrition education programs on shopping list usage. This is an important finding because shopping list usage can be a practical and effective tool for individuals to make healthier food choices and maintain a healthy diet.

Overall, the current study adds to the limited literature on the effect of nutrition education programs on shopping list usage. Further research is needed to determine the long-term effectiveness of these programs on shopping list usage and their impact on dietary quality and health outcomes.

Monitoring of Nutrients

Overall, the results suggest that the AFL group was more likely to use the nutrition facts panel to look for calories, carbohydrates, protein, and sodium compared to the control group. However, whether parents already consulted individual nutrients at baseline was a predictor of them consulting the same nutrients at T2. Nutrient monitoring has scant research available to compare to this study. Research studies on nutrition labeling often focus on how well people interpret and understand the nutrients presented on food labels. Several studies have found that consumers may struggle with interpreting and using nutrition labels, particularly those with low educational backgrounds and limited nutrition knowledge.⁶⁴ For example, a study found that many consumers had difficulty interpreting the nutrients on the new nutrition facts label, particularly with regard to serving sizes and added sugars.⁶⁴ The study aimed to assess US consumers' understanding of nutrition labels in 2013, with a focus on the importance of health literacy. The researchers used an online survey to collect data from a nationally

representative sample of 3,185 adults.⁶⁴ The Newest Vital Sign (NVS) instrument was developed as a rapid health literacy screening tool that evaluates nutritional panel knowledge. Participants read a nutrition facts panel label from an ice cream container and 4 questions from the NVS instrument were asked. Responses were gathered from these open-ended questions: “If you eat the entire container, how many calories will you eat?”, “If you are allowed to eat 60 g of carbohydrates as a snack, how much ice cream could you have?”, “Your doctor advises you to reduce the amount of saturated fat in your diet. You usually have 42 g of saturated fat each day, which includes 1 serving of ice cream. If you stop eating ice cream, how many grams of saturated fat would you be consuming each day?” and “If you usually eat 2,500 calories in a day, what percentage of your daily value of calories will you be eating if you eat 1 serving?”. The findings showed that many consumers had difficulty interpreting the nutrients on the new nutrition facts label. One-third (35.4%) of participants with less than a high school diploma were unable to correctly answer any of the label questions, and fewer than 9% could answer all 4 questions correctly.⁶⁴ Only 54% of participants with a 4-year college degree correctly answered all 4 nutrition label questions.⁶⁴ Additionally, 24% of participants incorrectly identified the number of calories in a food package with a single serving.⁶⁴ Therefore, those with lower levels of education and health literacy were found to have lower understanding of the nutrition facts label. These findings highlight the need for targeted education and support to improve consumers' understanding and use of nutrition labels.

Most research about the nutrition facts panel use has focused on how nutrient monitoring affects diet quality. Results from a cross-sectional study done between 2015-2016 aimed to assess the use of nutrition facts panels among adults and examine how the

use of the nutrition facts panels relates to dietary intake.⁶⁵ The study included 1,830 participants from the Minneapolis/St. Paul metropolitan area in Minnesota, USA. Participants completed surveys on their use of nutrition facts panels, dietary intake, and demographic information. The surveys were conducted by mail or online. The mean age of the participants was 31.0 ± 1.7 years and 49% of them were female. 48.3% were white, 19.1% Asian American, 18.3% African American, 5.6% Latino, and 7.7% mixed or other. Most of the participants (31.4%) reported using nutrition facts panels at least sometimes. Label components used most often included total calories (73.1%), sugars (72.9%), serving size (68.9%), and the ingredients list (65.7%). In this study, users of the nutrition facts panels consumed significantly more fruits (1.72 vs. 1.46 servings/day), vegetables (3.80 vs. 2.92 servings/day), and whole grains (2.32 vs. 1.94 servings/day) and fewer sugar-sweetened beverages (0.29 vs. .65 servings/day) compared to non-frequent users. These differences were statistically significant ($p < 0.05$) after adjusting for age, gender, education, race/ethnicity, and household income.⁶⁵

Improving Food Labels for Better Consumer Understanding

There have been several recommendations to change food labels or nutrition facts panels to make them easier to understand for consumers.^{44,66} One approach that has been adopted by other countries is the use of front-of-package labeling. For example, in Mexico, a front-of-package labeling system was introduced in 2019, which used a stoplight system to indicate the levels of fat, sugar, and salt in a product.⁶⁶ Green means the product is low in these nutrients, yellow indicates moderate levels, and red signals high levels.⁶⁶

It is important that a simple, easy-to-understand language and/or icons be used to communicate key information about a product's nutritional value to those who do not speak English or have lower literacy skills. In the US manufacturers currently place their own front-of-package labeling on foods which is not following one scheme making the information confusing.⁶⁷ It is very important that a particular schematic is developed for these manufacturers to utilize for consistency. The traffic light scheme seems to be very helpful, simply providing colors for products that are high in specific nutrients, but there are concerns that this may hinder the first amendment right to choose without bias.⁶⁷ Therefore, no matter which scheme is utilized it is important that we utilize community-based programs to educate on food labels as they are improved over time.

Overall, there is a need for food labels and nutrition facts panels to be more user-friendly and accessible to all consumers, regardless of their level of education or health literacy. By adopting clear and simple labeling systems, we can empower consumers to make more informed choices about the foods they purchase and consume but consumers will still need to be educated on their use.

Study Strengths and Limitations

The current study has several strengths that support its findings. Firstly, the use of a randomized controlled trial design allowed for the control of extraneous variables, increasing the internal validity of the study. Secondly, the study included a large sample size and had a high response rate, which enhances the generalizability of the results to the broader population. The population studied was diverse and included individual parents from a range of socioeconomic backgrounds and ages, which increases the representativeness of the findings. This diversity enhances the generalizability of the

study to other populations with similar characteristics. Additionally, the study used validated measures, including the survey questionnaire, increasing the reliability and validity of the findings. Finally, the study used multiple methods of data collection, including pre- and post-intervention surveys.

However, the study also has several limitations that should be considered when interpreting the findings. Firstly, the study relied on self-reported measures, which may be subject to social desirability bias and recall bias, leading to inaccurate data. Secondly, the study was conducted in a single geographical location and within a specific group, limiting the generalizability of the findings to other settings and cultures. The study was limited to just a few sessions provided to educate the participants which were not repeated over the 12 weeks. Additionally, the study did not assess the impact of the intervention on actual food purchasing and consumption behavior, which may limit the conclusions that can be drawn about the effectiveness of the intervention.

Summary and Future Implications

In summary, the study found that a culturally tailored intervention to promote healthy food choices among Latino shoppers was effective in increasing the reported use of nutrition panels on food labels, reading ingredient lists, and utilization of a grocery list. The intervention was associated with significant improvements in the reported use of nutrition panels for several components including calories, carbohydrates, protein, and sodium. These findings have important implications for health promotion efforts among Latino populations, who may face unique cultural and linguistic barriers to accessing and using health information.

In terms of future implications, the results suggest that culturally tailored interventions can be an effective strategy to promote shopping behaviors that may lead to healthy food choices in Latinos and other communities. Several studies have shown that many consumers have difficulty interpreting various aspects of nutrition labels, such as serving sizes, added sugars, and other nutrient information.⁶⁴ Low health literacy and the lack of educational background have been identified as important factors that can affect nutrition label use and understanding.⁶⁴ Overall, while there may be some challenges associated with nutrition label use literacy, efforts can be made to improve nutrition education and support individuals in making healthy food choices. However, it is important to note that this study had several limitations, including a small sample size and self-reported outcomes, which may limit the generalizability of the findings.

Given the limitations associated with self-reported outcomes, it is important that we find different methods to collect data and improve the validity of future studies evaluating similar intervention variables. In addition to collecting data on food purchases utilizing surveys, there are other outcomes that could be assessed to evaluate behavior change related to food shopping practices and dietary intake. One approach is to collect information on actual shopping lists or store receipts, which can provide insight into the types of foods and beverages that are being purchased and consumed by individuals. Photo-voice is another technique that can be used to gather information on food shopping practices, where participants take photographs of their food shopping experiences and record thoughts before sharing them with researchers.

Assessing multiple outcomes can provide a more comprehensive understanding of the behavioral pathway that links food shopping practices with dietary intake. By evaluating multiple outcomes and interventions, we can develop more effective strategies to promote healthy food choices and improve dietary intake.

Lastly, future interventions should also address structural barriers to accessing healthy food options, such as food deserts, limited availability of healthy foods in stores, and affordability of healthy foods. These interventions should also consider addressing broader social determinants of health, such as poverty, discrimination, and lack of access to healthcare, that contribute to health disparities among Latino populations. By addressing these broader structural factors, interventions to promote healthy food choices can have a more lasting and meaningful impact on the health of Latino communities.

CHAPTER 6

CONCLUSION

In conclusion, this study provides evidence of the effectiveness of a culturally appropriate, community-based, family-focused behavioral intervention program using AFL in improving healthy food shopping practices among Latino parents. The findings suggest that this intervention was successful in increasing nutrition facts label use, monitoring specific ingredients and nutrients in foods, and grocery shopping planning. The study highlights the potential of culturally tailored interventions to promote healthy food choices and improve health outcomes in Latino communities, and potentially other cultures as well, as long as the support is provided throughout the program. Overall, this study contributes to the growing body of evidence supporting the effectiveness of culturally tailored interventions in promoting healthy food choices and improving health outcomes in underserved communities.

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APPENDIX A
INSTITUTIONAL REVIEW BOARD APPROVAL



APPROVAL FULL BOARD

Noe Crespo
 SNHP - Exercise and Wellness
 602/827-2279
 Noe.Crespo@asu.edu

Dear Noe Crespo:

On 8/1/2014 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Athletes for Life Phase 3: A family nutrition and physical activity intervention to improve fitness and prevent cardiovascular disease among elementary aged children and their parents.
Investigator:	Noe Crespo
IRB ID:	STUDY00001286
Funding:	Name: American Heart Association, National Center; Funding Source ID: 14SDG20490382,
Documents Reviewed:	<ul style="list-style-type: none"> • Appendix 12_Child Assent Form_English_072414_AC.pdf, Category: Consent Form; • Appendix 11_Parental Consent Form_English_073114_CLEANED.pdf, Category: Consent Form; • AHA_Bioscience application_FINAL_73114_AC.docx, Category: IRB Protocol; • Appendix 15- Child survey english+spanish.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Appendix 10-PAR-Q.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Appendix 14- Parent survey english+spanish.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Appendix 16-

	<p>FINAL_AFL_MODIFIEDHomeFoodInventory1_22_14.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);</p> <ul style="list-style-type: none"> • Appendix 13- Anthropometric Measurements Protocol (ALBERTO FLOREZ's conflicted copy 2014-07-06).pdf, Category: Other (to reflect anything not captured above); • Appendix 5- Adult Physical Activity Curriculum outline.pdf, Category: Other (to reflect anything not captured above); • Appendix 6- Adult nutrition program outline.pdf, Category: Other (to reflect anything not captured above); • Appendix 1-Valentina_MPHC_Letter of Support .pdf, Category: Other (to reflect anything not captured above); • Appendix 2-Frank_SMCC_Letter of Support .pdf, Category: Other (to reflect anything not captured above); • Appendix 3-Child Nutrition Curriculum Outline_.docx, Category: Other (to reflect anything not captured above); • Appendix 4-Child Physical activity Curriculum Outline_.pdf, Category: Other (to reflect anything not captured above); • Appendix 7-AFL2_RECRUITMENT FLYER_.pdf, Category: Recruitment Materials; • Appendix 8-AFL2_INTEREST PARENT CONTACT INFO SHEET_.pdf, Category: Recruitment Materials; • Appendix 7-AFL2_RECRUITMENT FLYER_.pdf, Category: Recruitment materials/advertisements /verbal scripts/phone scripts; • Appendix 9- Athletes for life_Recruitment Script_070313.pdf, Category: Recruitment materials/advertisements /verbal scripts/phone scripts; • Appendix 8-AFL2_INTEREST PARENT CONTACT INFO SHEET_.pdf, Category: Recruitment materials/advertisements /verbal scripts/phone scripts; • Crespo_AHA_RMT30521120_award_letter.pdf, Category: Sponsor Attachment; • AHA Grant_Research Strategy_1-13-13.pdf, Category: Sponsor Attachment; • Appendix 18- Home Visit Protocol.pdf, Category: Technical materials/diagrams; • Appendix 17-backtranslation-form.pdf, Category: Translations;
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The IRB approved the protocol from 7/23/2014 to 7/22/2015 inclusive. Before 7/22/2015, you are to submit a completed "FORM: Continuing Review (HRP-212)" and required attachments to request continuing approval or closure.

If continuing review approval is not granted before the expiration date of 7/22/2015 approval of this protocol expires on that date. When consent is appropriate, you must use final, watermarked versions available under the “Documents” tab in ERA-IRB.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc: Monica Gutierrez
Rachel Ganger
Erika Hernandez
Gabriel Shaibi
Michael Todd
Kendra Swanson
Peggy Gomez
Leopoldo Hartmann Manrique
Alayna Terrell
Sonia Vega-Lopez
Noe Crespo
Mia Teran
Sarah MULLANE
Rachel Cassinat
Argemiro A Florez Pregonero
Monica Gutierrez
Adrian Chavez
Jennifer Huberty
Matthew Hulse
Jeremy Webb
Carla Dellaserra

APPENDIX B
PARENTAL CONSENT FORM

**Arizona State University
Athletes for Life 3
Adult Consent Form**

INTRODUCTION:

The purpose of this form is to provide you with important information that may affect your decision regarding you and your child's participation and to record the consent of those who agree to participate and give permission for their child to participate in this study.

RESEARCHERS:

Drs. Sonia Vega-López, Noe Crespo, and Gabriel Shaibi are professors in the School of Nutrition and Health Promotion at Arizona State University, in collaboration with the City of Phoenix Parks and Recreation Department's South Mountain Community Center

DESCRIPTION OF THE RESEARCH STUDY:

We are inviting parent-child pairs to participate in a research study to test the effectiveness of a family fitness and nutrition program. If you and your child decide to participate, you will be randomly assigned (by chance) to be in one of two groups, either the "immediate program treatment" group or the "wait-list" group.

Both groups will participate in a 12-week fitness and nutrition program. The "immediate program" group will begin the 12-week fitness and nutrition program after completing the first set of measurements(described below). The "wait-list" group will wait to begin the 12-week fitness and nutrition program until all measurements have been completed, approximately 24 weeks after the completion of the first set of measurements.

Data from all participants (both immediate program group and wait-list group)will be collected in four phases: before the immediate program group starts the program (week 0) and at 6, 12, and 24 weeks, thereafter.The measurements will take place in three separate visits and will be collected before the immediate program group starts the program and at week 12.

Fitness and Nutrition Program:

Child Participation: Each session will consist of an 80-minute physical activity and a 10-minute interactive nutrition lesson. The sessions include group activities, games, and exercises designed to improve your child's fitness, sports skills, and wellbeing. These games and activities will provide information about the importance of eating nutritious foods. Your child may be given information from some of the sessions to share with the family.

Parent Participation. The parent portion consists of 45 minutes of interactive nutrition lessons with cooking demonstrations and taste tests. The other 45 minutes will be spent doing physical activities to help improve your health and fitness level.

At the end of the program your family will be invited to participate in a youth Olympics event to showcase you and your child's athletic skills developed over the course of the program.

We expect to have about 160 families enrolled in this study over four years. If assigned to the immediate program group, you and your child's participation will take approximately 28 weeks. If assigned to the wait-list group participation will take approximately 40 weeks (28 weeks of wait period plus 12 weeks of the program).

In order to evaluate this program we will ask each group to complete the following measurements.

Initial Procedures Before the start of the Program (Week 0)

Visit 1 (approximately 1 hour total)

Location: Your Home

- You and your child will receive a full explanation of the study and if both of you agree to participate; you and your child will sign a written informed consent.
- You (parent) will fill out a questionnaire about you, including your place of birth and child's place of birth, and your child's diet and physical activity habits
- (Optional) Home food inventory (approximately 45 minutes)–With your permission, a research assistant will go to your home to conduct a brief inventory of the food items that are available in your kitchen

Visit 2 (approximately 1 hour total)

Location: ASU Nutrition & Health Promotion Laboratory (downtown Phoenix)

- You and your child will be asked to fast (not consume foods or drinks) for at least 8 hours before the visit and you will be offered a light snack during the visit
- (Child) We will apply numbing cream at the spot of the blood draw
- Post-pubertal females will be asked to provide a urine sample to conduct a pregnancy test
- (Adult and child) We will ask you to sit down for 5 minutes after which we will measure blood pressure
- (Adult and child) Full body DEXA (x-ray) scan to measure total and abdominal body fat
- (Adult and child) We will measure height, weight, and waist circumference
- (Adult and child) We will draw blood (approximately 2 tablespoons from adults and 1 tablespoon from children)
- (Adult and child) Fitness assessment - stepping up and down from a 12 inch step while we measure your heart rate

Visit 3 (approximately 45 minutes)

Location: South Mountain Community Center

- Activity warm-up for exercise
- (Adult and child) Fitness assessment – same as the fitness assessment from the last visit
- (Adult and child) Run/walk 1 mile while being timed
- (Adult and child) Activity trackers (Accelerometers) - You and your child will be given an accelerometer that we will ask you to wear for one week to measure physical activity
- We will also ask you to fill out a 3-day food record in which you will write down all the foods and drinks you consume for the week before the start of the program.

Week 6 Procedures (takes place during intervention session)

Location: South Mountain Community Center

- (Adult and child) Repeat height, weight, and waist circumference measurements
- (Adult and child) Repeat a run/walk 1 mile while being timed

Week 12 Procedures

Visit 1 (approximately 1 hour and 30 minutes)

Location: South Mountain Community Center

- (Adult and child) Activity warm-up
- (Adult and child) Fitness assessment (step test)– same as the fitness assessment from the initial visit
- (Adult and child) Run/walk 1 mile while being timed
- You (parent) will fill out a questionnaire about you and your child's diet and physical activity habits

- (Adult only) We will also ask you to fill out a 3-day food record for the week following the last program session
- (Adult and child) Activity trackers (Accelerometers) - You will be given an accelerometer that we will ask you and your child to wear for one week to measure physical activity
- Immediate program group only – Parent Interview. We will interview to ask your opinions about your experience with the program.

Visit 2 (approximately 30 minutes total)

Location: ASU Nutrition & Health Promotion Laboratory (downtown Phoenix)

- You and your child will be asked to fast (not consume foods or drinks) for at least 8 hours before the visit and you will be offered a light snack during the visit
- Post-pubertal females will be asked to provide a urine sample to conduct a pregnancy test
- (Adult and child) We will ask you to sit down for 5 minutes after which we will measure blood pressure
- (Adult and child) Full body DEXA scan to measure total and abdominal body fat
- (Adult and child) We will measure height, weight, and waist circumference
- (Adult and child) We will draw blood (approximately 2 tablespoons from adults and 1 tablespoon from children)

Visit 3 (approximately 1 hour total)

- (Optional) Home food inventory – With your permission, a research assistant will conduct a brief home food inventory of the food items that are available in your kitchen

Week 24 Procedures (approximately 45 minutes)

Location: South Mountain Community Center

- (Adult and child) Repeat blood pressure, height, weight, and waist circumference measurements
- (Adult and child) Fitness assessment (step test)– same as the fitness assessment from baseline and 12 weeks visit
- (Adult and child) Run/walk 1 mile while being timed.
- (Adult only) complete a survey about your and your child's eating and physical activity habits
- (Adult and child) Activity trackers (Accelerometers) - You will be given an accelerometer that we will ask you and your child to wear for one week in order to measure physical activity

INCLUSIONARY and EXCLUSIONARY CRITERIA:

In order for you and your child to participate in this study, your child must be 6 to 11 years old. You both must be free of any mental or physical condition that limits your ability to move or restricts participation in sports and are not currently pregnant.

RISKS:

There is risk of being injured, experiencing fatigue and shortness of breath or experiencing a cardiac problem during the exercise testing and exercise sessions. The research team will reduce these risks by first asking you some questions about your general health and your ability to safely do the exercise testing before starting the exercise tests. In addition, the study team will be utilizing recommended exercise training procedures including having warm-up and cool-down activities, using appropriate facilities and equipment for the exercise sessions, increasing exercise intensity slowly throughout the program, and request that everyone wear appropriate clothing and shoes. Participants will be screened prior to enrollment in this study to determine if it is safe for them to participate in exercise. In some situations where exercise may not be safe, a physician's approval is required.

It is possible that participants may feel uncomfortable answering survey or interview questions, during body measurements or during fitness assessments. You are able to stop during any procedures you are not comfortable with and can skip any survey or interview questions you do not wish to answer. Privacy screens will be used during body measurements to protect your privacy.

There is a risk of slight discomfort, bruising, swelling, dizziness, or you may faint as a result of the blood draw. Only trained research personnel will draw you and your child's blood and you both will be offered a snack after the blood draw. We will also apply numbing cream at the site of the draw for children. If at any time you or your child feels unable to complete the blood draw, you may ask to skip this measure.

There is a slight risk of discomfort when wearing the blood pressure cuff as it inflates. There is also a slight risk of discomfort to you or your child from doing the step-test.

There is a small risk associated with radiation exposure during the body composition measure (DEXA). However, the amount of radiation you and your child will be exposed to is approximately 1/10th of the amount that you would be exposed to during an x-ray and less than you would experience on a flight across the Atlantic Ocean. All female participants who are menstruating will receive a pregnancy test before completing the DEXA to avoid any possible risks of radiation exposure to the fetus.

BENEFITS:

The possible benefits of your family's participation in the research include improving your and your child's fitness and improving dietary habits.

NEW INFORMATION:

You will be contacted if new information is discovered that would reasonably change your decision about you and your child's participation in this study.

CONFIDENTIALITY:

The results of the research study may be published but you and your child's name or identity will not be revealed. In order to maintain confidentiality, participants will be assigned a study identification number that will be used on all study records in place of participants' names. Study records with information about you will be kept locked in filing cabinets or on computers protected with passwords. Only those who work with this study will be allowed access to your information.

WITHDRAWAL PRIVILEGE:

There will be no penalty if you choose not to participate in this study. It will not affect you or your child's medical treatment, or future participation in the South Mountain Community Center's activities. Likewise, you and your child are free to drop from the study at any time for any reason and there will be no penalty.

COSTS AND PAYMENTS:

There is no cost to participants to join this study.

As compensation for your time and participation in this program, you or your child will receive:

- Lab visit: Your family will receive an incentive worth approximately \$20 for participating in the laboratory visit (before the program and after the program at 12 weeks).
- Accelerometer: Your child will receive a toy worth approximately \$5 for each time that they wear the accelerometer (before the program, 12, and 24 weeks).

- Following last visit before the program begins: A one-year City of Phoenix Park and Recreation Department Recreation Pass/membership card for you and your child. If you already have one, we will give you a voucher to renew your membership when yours expires.
- Home visits: You will receive an incentive worth approximately \$10 for each home visit you participate in (before the program begins and after the program at week 12).
- Twelve week follow up: You will receive an incentive worth approximately \$10 participating in the 24 week follow-up measurements

COMPENSATION FOR ILLNESS AND INJURY:

Agreeing to you and your child’s participation does not waive any of your legal rights. However, no funds have been set aside to compensate you in the event of injury. In the event that you or your child suffers harm as a result of participation in this research project, you may contact Dr. Sonia Vega-López at (602) 827-2268 or you may contact the Chair of the Human Subjects Institutional Review Board through the Research Compliance Office at (480) 965-6788.

If, during the interviews, there is evidence that you or your child has extreme depression, other signs of mental illness, or even suicide; project staff would work with you to see that you or your child gets help. This might require that we inform other professionals if necessary to protect your safety.

Project staff will also report to appropriate professionals if there is evidence that any member of your family is in danger of being harmed by any other family member or of causing harm to themselves, another family member, or others. This includes evidence of possible suicide and abuse of minor children.

VOLUNTARY CONSENT

By signing this form, you are saying 1) that you have read this form or have had it read to you, and 2) that you are satisfied and you understand this form, the research study, and its risks and benefits. The researchers will be happy to answer any questions you have about the research. If you have any questions, please feel free to contact Dr. Sonia Vega-López at (602) 827-2268.

If at any time you feel pressured to participate, or if you have any questions about your rights or this form, please call the Chair of the Human Subjects Institutional Review Board through the ASU Office of Research Integrity and Assurance at (480) 965-6788.

Note: By signing below, you are telling the researchers YES, that you agree to participate and give permission for your child to participate in this study. Please keep one copy of this form for your records.

Your child’s name (please print)

Parent: Your name (please print)

Parent Signature

Date

Your initials here indicate whether you consent to completing the **home visit**.

I *DO* consent to completing the home visit.

I *DO NOT* consent to completing the home visit.

Parent's Initials

Your initials here indicate whether your child would like to wear the **additional activity monitor** during each of the data collection phases (0, 12, and 24 weeks)

I *DO* consent to have my child wear an additional activity monitor.

I *DO NOT* consent to have my child wear an additional activity monitor.

Subjects Initials

As a part of this program we would like to take pictures for use on our Facebook page, and presentations or publications describing the project. Your name and other contact information will not be associated with these pictures in any way.

Your initials here indicate whether you consent for the AFL research team to **take pictures of you and your children** while participating in the program.

I *DO* consent to the use of photographs of me and my family.

I *DO NOT* consent to the use of photographs of me and my family.

Parent's Initial's

INVESTIGATOR'S STATEMENT:

I certify that this form includes all information concerning the study relevant to the protection of the rights of the participants, including the nature and purpose of this research, benefits and risks, costs, and any experimental procedures.

I have described the rights and protections afforded to human research participants and have done nothing to pressure, coerce, or falsely entice the parent to allowing this child to participate. I am available to answer the parent's questions and have encouraged him/her to ask additional questions at any time during the course of the study.

Investigator's Signature

Date

August 2014

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ASU IRB IRB # STUDY00001286 | Approval Period 7/23/2014 – 5/16/2018

APPENDIX C

ATHLETES FOR LIFE FAMILY SURVEY

Athletes For Life Family Survey- English

Date: ___/___/_____

Screening ID: _____ Family ID: _____ Interviewer

We need your help to make our study a success. Your honest answers to the questions in this survey are very important to us. This survey will take approximately 45 minutes to complete. Remember...

- We want to know what you think
- Try to answer all the questions
- There are no right or wrong answers

The first section of questions is about you and the second section is about your child who is participating in the program with you.

All of your responses are kept strictly confidential—we will not share any personal information with anyone outside the study.

Now we will ask you some questions about you, remember everything is kept confidential.

1. What is your date of birth? (MM/DD/YYYY)

2. Are you...?

- ₁Female
- ₂Male

3. What is your marital status?

- 1Single
- 2Married, living with spouse
- 3Married, not living with spouse
- 4Living together, but not legally married (free union)
- 5Separated
- 6Divorced
- 7Widowed
- 777Don't know
- 999Refuse

4. How many people live in your household including yourself?

- Children _____
- Adults _____

5. Which of the following describes your employment? (Check all that apply)

- 1Employed full-time, 35 hours or more per week
- 2Employed part-time, less than 35 hours per week
- 3Employed in seasonal labor
- 4Out of work for more than 1 year
- 5Out of work for less than 1 year
- 6Homemaker
- 7Retired
- 8Student
- 9Unable to work
- 777Don't know
- 999Refuse

6. What is your household's total monthly income before taxes from all sources?

- 777Don't know

7. What is the highest degree or level of school you completed?

- 0 No school or kindergarten
- 1 1st grade
- 2 2nd grade
- 3 3rd grade
- 4 4th grade
- 5 5th grade
- 6 6th grade
- 7 7th grade
- 8 8th grade
- 9 9th grade
- 10 10th grade
- 11 11th grade
- 12 12th grade/GED
- 13 Trade/ vocational school certificate
- 14 Some college
- 15 College graduate
- 777 Don't know
- 999 Refuse

8. In what country were you born?

- 1 United States
- 2 Mexico
- 888 Another country, specify: _____
- 777 Don't know
- 999 Refuse

9. If you were not born in the US, how many years have you lived here?

_____ YEARS

10. Were the following family members born in the U.S.? Circle “yes” or “No” to indicate for each family member.

	₁ Yes	₀ No
Mom		
Dad		
Mom’s mother		
Mom’s father		
Dad’s mother		
Dad’s father		

25.

How often do you do the following?	Never 0	Rarely 1	Sometimes 2	Mostly 3	Always 4
a) Prepare a list when you go grocery shopping?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Read the ingredients section to help you to decide what foods to buy?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Use the nutrition label to help you make food selections?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

26. If you look at the nutrition panel to make food selections, what do you look for? (Interviewer: IF answer to previous question was never, choose the last answer choice)

(Interviewer: DO NOT READ ANSWER CHOICES. Check all that participant mentions)

- Calories
- Total Fat
- Saturated Fat
- Cholesterol
- Carbohydrates
- Sugars
- Fiber
- Protein
- Sodium
- Vitamins
- Minerals
- I don't use the nutrition panel when selection foods
- I don't know

The remaining questions are about "your child". Please remember to think about your child who will also be enrolled in this program with you when answering these questions.

1. Are you the...?

- ₁Biological parent
- ₂Legal guardian/caregiver

2. Is your child...?

- ₁Female
- ₂Male

3. What is your child's date of birth? (MM/DD/YYYY)

____/____/20__