

COLBY, SARAH E., Ph.D. Development of Peer-Led Youth Theater as a Nutrition Education Tool to Promote the Healthy Traditional Latino Diet. (2005)
Directed by Dr. Lauren Haldeman. 152 pp.

The overall purpose of my research was to develop culturally appropriate nutrition education for Latino immigrants.

In phase one, a needs assessment was conducted with the low-income Latina population (N=166) in Guilford County, North Carolina. Seventy-six percent were overweight/obese. Eighty-nine percent were living in food insecure households. Forty percent living in food insecure households with moderate hunger were obese compared to 73% of respondents with severe hunger. Severe food insecurity was related to less positive nutrition beliefs ($\chi^2(9, N=166)=17.56, p<.05$). Forty-five percent had received nutrition education previously. Having had previous nutrition education was related to positive nutrition beliefs, self-efficacy and knowledge [$\chi^2(9, N=166)=29.04, p<.001, \chi^2(2, N=154)=4.89, p<.05, \chi^2(3, N=157)=10.36, p<.05$, respectively]. Highly traditional diets were related with less weight increase and better diet quality ($\chi^2(12, N=104)=21.94, p<.05, \chi^2(9, N=155)=18.79, p<.05$, respectively).

The purpose of phase two was to better understand the dietary acculturation process. Observations, in-depth interviews, and questionnaires were conducted with one family in Mexico. In-depth interviews and questionnaires were conducted with families (N=4) in Guilford County, North Carolina. Decreases in fruit and vegetable intakes and increases in snack and processed food had occurred. Availability, food displacement and cost were identified as reasons changes occurred. Because of school children's diets adopt faster thus becoming the primary driver of the families' dietary acculturation.

In phase three, nutrition theater education was developed to address knowledge, attitudes and behaviors of Latino youth. Pre and post surveys were conducted with an intervention group (N=19) and with a matched non-intervention group (N=19). The traditional Latino diet was promoted. Seventy percent reported learning about nutrition. Respondents thought the American diet (group defined as hotdogs, hamburgers, pizza and French fries) was less healthy ($P < .05$). They also liked vegetables more and were planning to or trying to eat more beans, fruits and vegetables and less sugar after the intervention ($P < .05$). No changes occurred in the non-intervention group. Theater education with nutrition information appears to be effective at increasing knowledge, promoting positive attitudes and behaviors of Latino youth.

THE DEVELOPMENT OF PEER-LED YOUTH THEATER AS A
NUTRITION EDUCATION TOOL TO PROMOTE
THE HEALTHY TRADITIONAL
LATINO DIET

by

Sarah Elizabeth Colby

A Dissertation Submitted to
the Faculty of The Graduate School at
The University of North Carolina at Greensboro
In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Greensboro
2005

Approved by

Dr. Lauren Haldeman, Co-Chair

Dr. Martha Taylor, Co-Chair

ACKNOWLEDGMENTS

This work is dedicated to my Grandparents, William and Elizabeth Clarkson, who passed away while I was working on my doctorate. I am glad they had the opportunity to see where I was going. They will always be everything to me. I miss them very much. I want to thank my friends for all they have done. They have taught me many things over the years in ways that cannot be contained in a classroom. I want to thank my parents, Dr.'s Jane and Daniel Perlmutter, for being my inspiration and for all of their unconditional love and support. I want to thank my children, Dylan and Devin Colby, for being my heart and my life. I cannot thank my husband, Jason Colby, enough for everything he has done. He is my best friend and my incredible love. I also want to thank my committee, Dr. Martha Taylor-Hawkins, Dr. Daniel Bibeau, Rachael Briley for their support and guidance that made this work possible. I want to especially thank Dr. Lauren Haldeman. Again, a thank you is not enough. She has taught me so much and supported me at every step of the way. It has truly been a pleasure to go through the life shaping experience (that graduate school is) with such a wonderful mentor.

APPROVAL PAGE

This dissertation has been approved by the following committee of the
Faculty of The Graduate School of The University of North Carolina at Greensboro.

Committee Co-Chair _____

Committee Co-Chair _____

Committee Members _____

Date of Acceptance by Committee

Date of Final Oral Examination

PREFACE

I grew up loving theater. As a child I took every chance to participate in theater in my school and community. By Middle school, I was advocating for theater with my principal. I tried to express how important theater could be in the school. I argued that it was possible to include theater arts without stretching the already limited schools resources. I lost the battle at the time, but carried it into my adult life.

After theatrical training at the college level, I began a career in nutrition. I wanted to help people. I believe that one reason nutrition education often fails to result in behavior change is because of a lack of emotional arousal. Without some emotional response, I believe behavior changes are unlikely to occur. Knowing first hand the impact of experiencing someone else's life through a theatrical role, I believed the principles of theater education could be effectively applied in nutrition education.

During my doctoral preliminary research I learned that Latino immigrants have much lower rates of many chronic diseases such as diabetes and obesity when they live in their native countries. Traditional diets are rich in fruits, vegetables, and beans. As immigrants begin to acculturate to the US diet (foods identified by Latino children and adults as hamburgers, hotdogs, French fries and pizza) and lifestyle, their rates of many chronic diseases increase dramatically.

A primary driving force of dietary acculturation, in the newly arrived immigrant family, is the child/adolescent. The adult female caretakers often exist in a cultural enclave. When the children begin to attend public schools, they are exposed to American

foods. At home the children watch American cartoons containing commercials filled with American foods. When the family goes shopping, they ask for these newly discovered foods. These new adolescent preferences drive the family's dietary acculturation process.

As a nutritionist I understood the importance of educating these children about the risks that they face by adopting the American diet and lifestyle. Dietary acculturation is not an academic process that can be successfully addressed by educating youth solely with factual information. This time for newly arrived adolescents is filled with complex emotional and social issues. For many young immigrants initial acculturation is occurring during a time when they are developing self, social and ethnic identity. This development of identity is often centered in struggles between peers and family. Because of these complex issues embedded within this nutrition education topic, I felt it was the perfect opportunity to use theater as a nutrition education tool.

TABLE OF CONTENTS

| | Page |
|--|------|
| LIST OF TABLES | viii |
| LIST OF FIGURES | ix |
| CHAPTER | |
| I. INTRODUCTION..... | 1 |
| II. REVIEW OF LITERATURE | 7 |
| Acculturation | 7 |
| Dietary Acculturation | 8 |
| Determinants of Dietary Behaviors | 9 |
| Obesity and Diabetes | 10 |
| Food Insecurity | 12 |
| Nutrition Intervention and Education Programs | 14 |
| Theater | 16 |
| Gaps in Knowledge | 19 |
| References | 23 |
| III. PROMOTION OF TRADITIONAL FOODS AS NUTRITION EDUCATION MESSAGE FOR NEWLY ARRIVED LOW INCOME MEXICAN IMMIGRANTS | 35 |
| ABSTRACT..... | 35 |
| BACKGROUND | 37 |
| SUBJECTS AND METHODS | 39 |
| RESULTS | 42 |
| DISCUSSION..... | 47 |
| CONCLUSION..... | 52 |
| APPLICATIONS..... | 53 |
| REFERENCES | 60 |
| IV. DIETARY ACCULTURATION OF THE NEWLY ARRIVED MEXICAN IMMIGRANT: A COMPARISON CASE STUDY.. | 65 |

| | |
|---|-----|
| ABSTRACT..... | 65 |
| BACKGROUND | 67 |
| METHODS | 69 |
| RESULTS | 71 |
| DISCUSSION..... | 72 |
| IMPLICATIONS | 75 |
| REFERENCES | 78 |
| | |
| V. THE DEVELOPMENT OF PEER-LED YOUTH THEATER AS A NUTRITION EDUCATION TOOL TO PROMOTE THE HEALTHY TRADITIONAL MEXICAN DIET..... | 82 |
| | |
| ABSTRACT..... | 82 |
| INTRODUCTION | 84 |
| STUDY PROCEDURES | 87 |
| RESULTS | 93 |
| DISCUSSION..... | 98 |
| IMPLICATIONS FOR RESEARCH AND PRACTICE | 101 |
| REFERENCES..... | 111 |
| | |
| EPILOGUE..... | 116 |
| | |
| Limitations..... | 121 |
| Future Work..... | 124 |
| | |
| APPENDIX A. NEEDS ASSESSMENT CONSENT FORMS | 125 |
| APPENDIX B. MEXICO FIELD RESEARCH CONSENT FORMS | 128 |
| APPENDIX C. MEXICO FIELD RESEARCH INTERVIEW GUIDE | 131 |
| APPENDIX D. INTERVENTION CONSENT FORMS | 138 |
| APPENDIX E INTERVENTION HANDOUT | 146 |
| APPENDIX F. INTERVENTION INTERVIEW GUIDE | 151 |

LIST OF TABLES

| | Page |
|---|------|
| CHAPTER III | |
| Table 1. Level of Positive Nutrition Knowledge, Attitudes and Behaviors. | 54 |
| Table 2. Dietary Intake and Servings Recommended Identification | 55 |
| CHAPTER IV | |
| Table 1. Acculturation Related Dietary and Lifestyle Changes | 76 |
| CHAPTER V | |
| Table 1. Survey Components..... | 104 |
| Table 2. Changes in Knowledge..... | 105 |
| Table 3. Increases in Knowledge..... | 106 |
| Table 4. Postproduction Interviews: Quotes from Latino Youth Theater Participants..... | 107 |
| Table 5. Changes in Attitudes..... | 108 |
| Table 6. Changes in Reported Youth Intake and Intended Intake of Fruit, Vegetable, Bean and Sugar..... | 109 |

LIST OF FIGURES

| | Page |
|--|------|
| CHAPTER II | |
| Figure 1. Dietary Predictors of Latino Youth Concept Model | 22 |
| CHAPTER III | |
| Figure 1. Levels of Food Insecurity..... | 56 |
| Figure 2. Food Insecurity and Obesity..... | 57 |
| Figure 3. Traditional Foods and Severity of Hunger | 58 |
| Figure 4. Education Related Variables | 59 |
| CHAPTER IV | |
| Figure 1. Lifestyle Changes with Acculturation..... | 77 |
| CHAPTER V | |
| Figure 1. Dietary Predictors of Latino Youth Concept Model | 103 |
| Figure 2. Improvements in Modified Healthy Eating Index Score..... | 110 |

CHAPTER I

INTRODUCTION

The Latino population is the fastest growing minority group in the United States (US). Mexican Americans make up the majority of this population group. As this population acculturates to the US, their rates of developing chronic diseases such as obesity and diabetes will also increase. Rates of obesity and diabetes are increasing at disturbing rates in the US. The increases in the prevalence of these diseases are higher in the Latino population than the non-Latino Caucasian population. The rates of both obesity and diabetes are much lower in Latin American countries than they are for individuals of Latin American origin living in the US. This increase in disease prevalence is associated with consumption of high fat and high sugar diets and a decrease in complex carbohydrate, fiber, vitamins and minerals (specifically foods such as beans, corn tortillas, fruits and vegetables) and decrease in physical activity. This pattern suggests that if an individual retains more of the healthy traditional Latino diet patterns, they may reduce or avoid the anticipated increased risk of chronic disease that occurs with acculturation to the US. *What is needed is identification of effective nutrition education interventions that can be used to promote this healthy traditional diet pattern.* Without such effective nutrition education tools, interventions targeting chronic disease prevention for the Latino population are limited.

The long-term goal of this research was to improve the health of newly arrived Latino immigrants. *The objective* was to identify and categorize a unique nutrition education strategy for the promotion of a healthy diet. *The central hypothesis* for this proposed research was that peer-led theater play focused on encouraging healthy traditional Latino eating patterns is an effective nutrition education tool to promote positive changes in nutrition knowledge, attitudes, and behaviors for Latino youth. This hypothesis was formulated based on existing knowledge of diet acculturation patterns, the effectiveness of theater used as an educational and therapeutic tool, a needs assessment of the low income Latino population in Guilford County, and a series of in-depth interviews with community members. *The rationale* for this proposed research was based on a number of points. First, early intervention has been shown to be more effective than late interventions in making positive improvements in outcomes. The adoption of a diet pattern associated with chronic diseases occurs most prominently between first and third generation Mexican Americans. Thus, it is important to target the children of Mexican-born Mexican Americans in order for this to be an early intervention. Mexican American school age youth are the most appropriate target population for intervention because research has shown that children are being exposed to American foods in the public school system and then coming home (to the less acculturated adults in the family) and influencing shopping and cooking choices. Children begin to have more of an impact on the family as they grow older and become more autonomous; more dietary concessions typically begin to occur to accommodate the new independent individual. Thus, the Latino adolescent is the appropriate primary target for intervention. This focus on the

adolescent will provide a reciprocal supportive environment between the adult and adolescent for the targeted behavior change. Increased acceptance of the traditional Mexican diet by the adolescent should provide environmental support for the adults' retention of the traditional diet patterns. The preexisting tendency by the adult to retain the traditional diet patterns will provide environmental support for the behavior of the youth. Second, theater with a nutrition message that is created by adult theater professionals and brought to a young audience has been effective in increasing knowledge and behavior change. Peer-led interventions have also been found to be effective at changing knowledge and behavior. The effectiveness of peer-led theater interventions can be explained in the principles of social ecology. Social Ecology is based in the concept that all aspects of an individual's environment must be considered in order to produce behavior change. Creating theater involves exploration of all levels, components, beliefs and perceived realities of an individual's environment. Peer-led theater has been effectively used as a therapeutic tool in a variety of health promotion activities but has not been used for nutrition education. Third, emotional arousal plays an important role in successful behavior change (as suggested by the stages of change addressed in the transtheoretical model) and many traditional nutrition education methods successfully impart knowledge but fail to create an emotional impact. Theater should be a more effective nutrition education tool because of its ability to create an emotional impact. Fourth, a peer-led intervention has been shown to be one of the most effective tools to change knowledge, attitudes, and behaviors in an adolescent population.

The central hypothesis and objectives stated were achieved by pursuing the specific aims discussed as follows:

Aim #1. Developed, implemented and evaluated the essential components of peer-led theater used as a nutrition education tool. The working hypothesis for Aim #1 was that utilizing existing theater methods, nutrition education promoting the traditional healthy Latino diet with Latino youth would illuminate the essential components of effective peer-led theater nutrition education. These components and steps were documented and a practical tool was developed. The tool that was developed is now available for use by classroom teachers and community program facilitators. This hypothesis was supported by previous research on theater in education and peer-led interventions. Additionally, preliminary data indicated this method was culturally appropriate for the target audience. An initial program template created from a synthesis of multiple theater approaches based on existing knowledge was used. The document was then modified based on the experiences discovered in the peer-led theater process.

Aim #2 Determined the extent that peer-led theater can change an adolescent's nutrition knowledge, attitudes and behaviors. The working hypothesis for Aim #2 was that peer-led theater nutrition education would result in positive changes in nutritional knowledge, attitudes and behaviors related to traditional healthy Latino eating patterns. Previous research, as well as Guilford County needs assessment preliminary data, indicated that traditional Latino eating patterns are high in fresh fruits, vegetables, beans, and corn tortillas but are replaced by hotdogs, pizza, hamburger, snacks and desserts as a result of acculturation. The traditional diet is filled with foods

associated with disease prevention and the acculturated diet is associated with increased chronic disease rates. Theater was used to educate the target audience about the benefits and risks associated with these changes in eating patterns. A pre and post survey examining nutrition diet patterns, attitudes, belief and knowledge was conducted to assess changes. A follow-up survey was also conducted three months post intervention.

The unique approach of using theater as a nutrition education tool to affect positive changes in nutritional knowledge, attitudes and behaviors related to traditional healthy Latino eating patterns produced a valuable tool in the fight against obesity and diabetes in the Latino population. This tool may also be able to be applied to many populations and nutrition messages in a viable low cost process in public school systems.

Aim #3 Determined the extent that peer-led theater play can change family member's nutrition knowledge, attitudes and behaviors. The working hypothesis for Aim #3 was that peer-led theater nutrition education would affect positive changes in nutrition knowledge, attitudes and behaviors related to traditional healthy Latino eating patterns among participants' family members. Previous research and Guilford County needs assessment preliminary research indicate that traditional Latino eating patterns are highly affected by the adolescents' preferences and beliefs. The adolescent is a driving force of the families' food acculturation patterns. Theater was used to educate the family about the benefits and risks associated with these changes in eating patterns. The theater youth participant engaged in discussions of the theater process within the family and community. The family was repeatedly exposed to nutrition education concepts when rehearsing lines with their children and when observing rehearsals and the public

performance. This utilized multiple learning domains. A pre and post survey examining nutrition diet patterns, attitudes, belief and knowledge was conducted to assess changes. A follow-up survey was also conducted three months post intervention.

CHAPTER II

REVIEW OF LITERATURE

Acculturation. Acculturation is a complex process. It can be defined as a phenomenon that occurs when an individual from one culture enters into a new culture and changes in the original cultural patterns of that individual subsequently occur. [1] Acculturation has been associated with increases in many chronic diseases including obesity and diabetes. [2-5] Acculturation can be assessed by considering the variables of length of residence in the host country, generation status, proportion of life in the host country, age at arrival, cultural orientation of daily activities (food, television, or friends), self identification, language use and proficiency, and western lifestyle (highly processed foods, type A behaviors, and sedentary lifestyle). [6-8] The definition of, disease risks associated with, and methods of assessment are all components involved in the process of acculturation.

Generation status is an important element of acculturation. An individual's generation level affects their lifestyle behavior choices. First generation Mexican-Americans are more likely to speak only Spanish, live in and desire Mexican environments, and identify themselves as Mexican. Third generation Mexican-Americans are more likely to speak English, live in Anglo environments and identify themselves as

Mexican-Americans, Latinos, or Hispanics. [6, 9, 10] An immigrant's gender is also associated with English proficiency and perceived social acceptance. Males tend to speak English more fluently but feel less social acceptance. [6] These and other factors are all involved in the process of acculturation.

Dietary Acculturation. In addition to considering acculturation from a global perspective, specific changes that occur in the original cultural patterns in a particular area, such as diet, can also be considered. The process by which an individual's diet changes is called dietary acculturation. The traditional Mexican diet is high in complex carbohydrates, animal protein, vegetable protein, B-carotene, fiber, calcium, iron and many major vitamins. [3, 11] In focus group settings, Mexican born Mexican-Americans recalled their eating habits in Mexico to be healthier. They reported that in Mexico generally less candy, desserts, and processed foods such as hotdogs and microwave meals are consumed. These changes in diet have been attributed to food quality, cost and availability. [12]

Individuals born in Mexico (regardless of language spoken in the United States) are more likely to consume less fat and more fiber, Vitamin A, Vitamin C, and Vitamin E, Vitamin B6, folate, calcium, potassium, and magnesium than Mexican-Americans born in the United States. [3] These differences in nutrient intakes can be explained by the changes in whole foods that occur. Mexican born Mexican-Americans have higher intakes of fruits and vegetables, whole grains, legumes and traditional Mexican foods such as cornbread, tortillas, beans and rice and lower intakes of desserts and added fats. [3] Mexican-Americans who are more acculturated eat fewer beans, fruits, vegetables and

consume more convenience, sugary, salty and high fat foods. [2, 7, 13] Fruit, vegetable and fiber intake have been associated with chronic disease prevention. [14] As the intake of traditional foods is decreased there are subsequent increases in chronic diseases such as obesity and diabetes. [2, 15]

Determinants of Dietary Behaviors. There are many determinants of dietary behaviors associated with an individual's level of diet acculturation (figure 1). Research has found that psychosocial factors for Mexican American youth in a multiethnic setting can have an influence on ethnic identity. [16] Culture and ethnicity are determinants of dietary behaviors. [16] Peer interactions and feelings of social comfort have also been found to be important in determining adolescent behaviors. [16] Eating behaviors of adolescent girls are influenced by self-perceptions, self reported teasing and their belief that popularity is partially based on weight and shape. [17] Peer modeling and social reinforcements are also related to eating behaviors in adolescents. [18] Youths' growing autonomy and social networks (including family) are determinants of youth dietary behaviors. [19] Socioeconomic status and family background affect the nutritional knowledge of the primary caretaker in a Latino family. [20] Ethnicity and level of acculturation are predictors of the level of parental control over a child's food intake. The level of parental control over a child's food intake is a predictor of current and future food intake for the child. [21] An adolescent's knowledge of health, perceived peer pressures, social context regarding food, food media exposure, food preferences, gender, social norms and growing autonomy are determining factors in youth dietary selections.

[22] Dietary behaviors that are influenced by the above factors have effects on the development of obesity and diabetes.

Obesity and Diabetes. The American diet is associated with six of the ten leading causes of death in the United States. [23] There are many changes in Mexican-Americans' diet as acculturation occurs that have negative health outcomes. If an immigrant continues to choose his or her traditional cultural food patterns, they will have disease patterns more similar to their home country including lower rates of obesity and diabetes. [2, 15]

Fiber rich foods such as beans, fruits and vegetables, contained in the traditional Mexican diet are partially responsible for the health benefits associated with the traditional diet. Fiber has been shown to protect against diabetes by improving insulin action. [24] Beans have been shown to protect against hunger, obesity and diabetes by increasing postprandial cholecystokinin (CCK). [25] Research has indicated that nutrition education programs need to encourage the traditional diet patterns of immigrants to prevent the development of many chronic diseases including obesity and diabetes. [26-29]

Obesity rates increase dramatically between first and second-generation immigrants. [1] Research has indicated a relationship exists between obesity, length of residency in the US and generational status. [3, 30, 31] The increase in obesity associated with length of residency has been attributed to the adoption of unhealthy American dietary behaviors. [32] Interestingly, research has found that Mexican-Americans are

more sensitive to this acculturation related obesity process than other non-Mexican Latinos. [33]

Obesity and diabetes are influenced by both environmental and genetic factors. [34-36] The Mexican-American population is genetically at risk for the development of these diseases. There are many genes that predispose an individual to developing diabetes. [37] The Trp64Arg variant has been identified as a genetic variable predisposing the Mexican-American population to this disease. [35] Another predisposing diabetic variation in the Mexican-American population exists on chromosome 3p. [36] Additionally, obesity's influence on insulin sensitivity has been found to be related to ethnicity. Many Mexican-Americans are more susceptible to obesity related diabetes than White or Black individuals. [38] Mexican-Americans are also more at risk of having the metabolic syndrome than non-Latino individuals. [39] Although all youth populations in the US are experiencing increases in Type 2 diabetes, minority populations are experiencing significantly higher rates. [40] Because of these genetic and environmental factors, the Mexican-American population has higher rates of obesity and diabetes than non-Latinos.

NHANES 1999-2002 data showed that 33% of Mexican-Americans were obese and 73% were overweight/obese. [41] Twenty one percent of the population in Mexico is obese. [42] Research has found that in the US, Hispanic children are more overweight than non-Hispanic white children. [43] In fact, Hispanic children are two times as likely to be overweight/at risk for being overweight than non-Hispanic children. [44] Although the rates of at risk for overweight/obesity for all groups of children in the US are

increasing, Mexican-American children are increasing at greater rates. [45] Researchers have found 15% of black children and 28% of Hispanic children to be overweight. [46] Research has also shown as much as 31 % of Hispanic, 23% of Black and 16% of White children are overweight in specific research populations. [47] The least educated, poorest groups in the United States (who are also often minority groups) have the highest rates of obesity. [48] It is important to develop obesity interventions targeting adults and children in minority population. [46] In order to develop obesity prevention interventions, factors related to the development of obesity in minority populations need to be understood. Food insecurity is one factor that has been associated with the development of obesity in both adults and children. [21, 49]

Food Insecurity. Food insecurity is defined as the inability to obtain safe and nutritiously adequate foods in socially acceptable ways. [50] The 18-item US Core Food Hunger Module was developed by the National Center for Health Statistics (NCHS) and the USDA to assess food security. Since 1995 it has been utilized with the yearly Census Bureau's Current Population Survey (CPS) and is a component of the National Health and Nutrition Examination Survey (NHANES). [51] A Spanish version of the 18-item US Core Food Hunger Module has been developed and validated. [51] Using the Spanish version of the US Household Food Security Survey Module researchers have found 47.1% of Latino farm workers in North Carolina to be food insecure, 9.8% with moderate hunger and 4.9% with severe hunger. [52] The USDA reports that 11.2% of the US population suffers from food insecurity (7.7% without hunger and 3.5% with severe hunger) and 22.3% of the Latino US population being food insecure. [53]

Food insecurity results in a poor quality of diet. [48] Latino families with higher levels of food insecurity have less variety of many foods especially vegetables and fruits. [54] Children from food insecure homes are less likely to meet the minimum recommendations of the food guide pyramid. [21] Decreased food intake that occurs with severe food insecurity increases the risk for nutrient deficiencies. [55]

Food insecurity has also been associated with obesity. Lower socio-economic status (SES) is related to increases in body mass index (BMI) in minority ethnic populations. [56] Research has found that Hispanics with food insecurity (which is related to having a lower SES) have an increased risk of developing obesity. [49] Low cost foods are high in refined grains, added sugars and fat. [48] Food insecure individuals also have lower fruit and vegetable consumption. [48] With limited economic resources there is an increase in high calorie, high fat, and low nutrient dense foods. [57] High-fat energy dense foods are more affordable than lean meats, fish, fresh fruits and vegetables. [48] The relationship between obesity and food insecurity may be partially due to the increased intake of low cost energy-dense foods and reinforced by the high palatability of these high sugar and fat foods. [48]

Hispanic families who eat a more traditional diet have been found to experience less food insecurity. [58] It is appropriate to use nutrition education encouraging traditional eating habits with immigrants. [4] Additionally, nutrition education with Latinas will be more successful if focused on reinforcing and promoting current positive traditional eating behaviors as opposed to focusing on a child's weight status. [29] Researchers have advised nutrition practitioners to encourage traditional diet patterns

when working with the Mexican-American immigrant population in obesity prevention education. [28]

Nutrition Interventions and Education Programs. In order to develop successful obesity prevention education programs, the relationships between nutrition knowledge, attitudes and behaviors need to be understood. Although nutrition education has been found effective in increasing nutrition knowledge, changes in knowledge alone do not appear to be the only changes necessary to alter behaviors. [59] Self-efficacy has also been found to be an important variable with higher levels of self-efficacy being related to more positive related attitudes. [60] Changes in self-efficacy are important outcomes to measures when assessing a nutrition intervention. [60] Attitude is another variable to consider. [61] BMI has been found to be directly related to attitude. [62] School based interventions have been effective in changing youths' attitudes and beliefs. (25) Nutrition education that focuses on behavioral characteristics as opposed to knowledge only has been found to more effectively result in improved dietary behaviors. [63] Self-efficacy, attitudes and overall behavioral characteristics need to be considered along with knowledge when developing obesity prevention education programs.

Additional factors have been identified as important for developing successful nutrition interventions. The interventions that have proven to be the most effective in changing behaviors of youth are those that involve multiple components. [64] Multiple components influence diet patterns including individual factors (taste preference, nutrition knowledge, and the functional meaning of foods) and social environmental factors (social norms, family eating patterns, and availability of food). [22] Components

of food purchasing behaviors include nutrition knowledge, financial resources, food availability, and cultural beliefs and attitudes. [12] Other factors attributed to successful outcomes are programs that are behaviorally based, include environmental components, use sufficient education duration, and developmentally appropriate. [65]

Interventions targeting nutrition behavior change are more effective when developed using a foundation of multiple behavioral theories. [66] Social ecology has been found to be an important theory to incorporate into research designs targeting obesity prevention. [67] Social Ecology is characterized as an interdisciplinary approach to studying social and environmental problems. It examines problems at multiple levels of analysis and views them from an ecological perspective. In applying the Social Ecology Theory one must: 1. identify an observable fact as a social problem; 2. view the problem from many levels and methods of investigation; 3. use and apply assorted theoretical perspectives; 4. recognize human-environmental relations as active and dynamic processes; 5. consider the social, cultural, historical and institutional context of people-environmental associations; and 6. consider people's lives in an everyday perspective. [67] The incorporation of multiple behavioral theories, which include social ecology perspectives, is important when developing programs to address nutrition behaviors.

Research based in concepts of social ecology has indicated additional considerations for developing effective interventions. Giving the same advice to parents as is provided to children, followed by encouraging communication between parents and children, increases levels of knowledge in children. [68] Tailored nutrition messages that

address attitudes more successfully produce changes in knowledge and behavior than general nutrition messages. [69] In fact, nutrition interventions using tailored messages for multiethnic youth have been successful in increasing activity levels, diet behaviors, and improving glucose and insulin status. [40] These specific program components, appropriate to social ecology, are approaches that can be included in nutrition interventions.

In addition to tailored messages, nutrition interventions utilizing peer leaders have been found to be effective with adolescent populations. [70] Nutrition interventions utilizing peer leaders, which promote fruit and vegetable consumption, found the peer leaders had the greatest changes in behaviors. [70] Peer education used with Latinos is successful at improving the knowledge and behaviors of the peer educators involved. [71] Nutrition education for adolescents has to be different than nutrition education for younger children. These required differences are a result of developmental changes. Adolescents are shifting to more abstract thinking and problem solving. They are also beginning to question adult authority in new ways. They are seeking autonomy from their parents and increasingly relying on peers for their source of identity, support and behavioral norms. Because of these developmental changes, peer led initiatives are more effective with this age group. The effectiveness of peer leaders has been documented in the areas of alcohol, tobacco, drugs, violence, and sex. [70]

Theater. Another education method that has been found to be effective when working with adolescent and adult groups is Theater in Education (TIE). TIE is founded in the concept that behavior and institutional structure is formed by social activities and

can be changed. [72] TIE has specific educational purpose and utilizes active audience participation. [72] Since the audience can be an active agent in change, they should be active participants in the learning process. [72] The goal of TIE is the learning/teaching objective. [73] The artistic vision is driven by the teaching objective. [73] Theater can be used as an education method to work with both adults and adolescents because of its unique characteristics.

Theater serves as a mirror of society. It is a way to examine life and culture. Theater also provides aesthetic enrichment. [74] TIE has historically been one of the most socially aware theater groups and explores social issues important to children. [75] Freire believed that education should seek to be an active process in pursuit of social change. [72] TIE has been called “theater for social change”. [72] Freire also believed both teachers and students explored existing reality and re-created the knowledge on which reality is based. [72] TIE is both an educational resource and an art form. [72]

Theater has been used for many purposes. Christian Reil (1759-1813) first defined therapeutic theatre in the 1700’s. [76] Theater is an accepted form of therapy that has been shown to have many benefits. [76] Researchers at the National Center for Post Traumatic Stress Syndrome used therapeutic theatre with Vietnam veterans. [77] Theater has also been used with mentally ill patients to develop living, social and occupational skills. [78]

Theater can also help adolescents deal with social and emotional issues. [79] It has been successfully used to promote positive attitudes and decrease negative behaviors in adolescent populations. [80] Community drama has been used with Aboriginal

Australian youth at risk for committing crimes. [78] By helping students explore and deal with social issues of discrimination, an urban middle school drama program improved the troubled youth's behavioral problems. [81] These findings have shown that theater can be effective for helping adolescents work with complex social and emotional issues.

Theater has also been used to explore cultural issues. Museum theatre is used to communicate and explore museum exhibitions. The Smithsonian National Museum of American Indians Gustav Heye Center has conducted pieces such as 'Harvest Ceremony: Beyond the Thanksgiving Myth'. The production was performed to increase cultural understanding between American Indians and the non-native American population. [82] Youth developed theater focused on acculturation has also been positively received by Latino youth. [83, 84] Teachers in the classroom have successfully developed theater based assignments on culture. [83]

Theater has also been used in health education. Theater is effective at stimulating thoughts and discussion regarding health behaviors with adolescents. [85] Participants and audience members have had positive experiences with theater used as health education. [86] In Papua, New Guinea theater was used to address negative health behaviors related to being a positive "citizen" in the community and making safe choices to prevent injury. [87] Theater has been used in many public health HIV/AIDS interventions. [88] Participatory theatre has also been used in Tanzania to explore cultural and sexual issues related to HIV transmission and learn about preventative behaviors. [89] These examples in health education have resulted in positive experiences and self-reported improved target behavior outcomes of participants involved. [86]

Theater has been used to initiate discussions and change beliefs about health related behaviors in hard to reach populations. [90] The Latino population in the US is often a hard to reach group. TIE research with the Latino population has shown promising results. It has been used effectively with a Latino farm workers population in Eastern Washington to improve knowledge of safe working environments. [91] Theater focused on acculturation has also been conducted with Latino youth. [84] Students discussed acculturation experiences. Conflicts and possible solutions were identified and put into theatrical situations that were then presented to the community. This successful use of theater with the Latino population indicates that theater used with a nutrition education message with the Latino population should result in positive behavior outcomes.

Theater has also successfully been used as a component of school based nutrition intervention programs. [64] The National Theater for Children was founded in 1979 with a goal to educate children using theater in schools. Theater about nutrition, created by adults, that is presented to children has been shown to improve nutrition knowledge and behavior. [86, 90] These examples from previous research support the hypothesis that theater can be used with a nutrition education message to cause positive changes in nutrition knowledge, attitudes and behaviors.

Gaps in Knowledge. Research with the Latino population has been conducted primarily in traditional immigration locations such as in the Border States (California and Mexico). Recently nontraditional immigration areas, such as North Carolina, have

experienced rapid increases in Latino population. *The current status and needs of this newly arrived population needs to be assessed.*

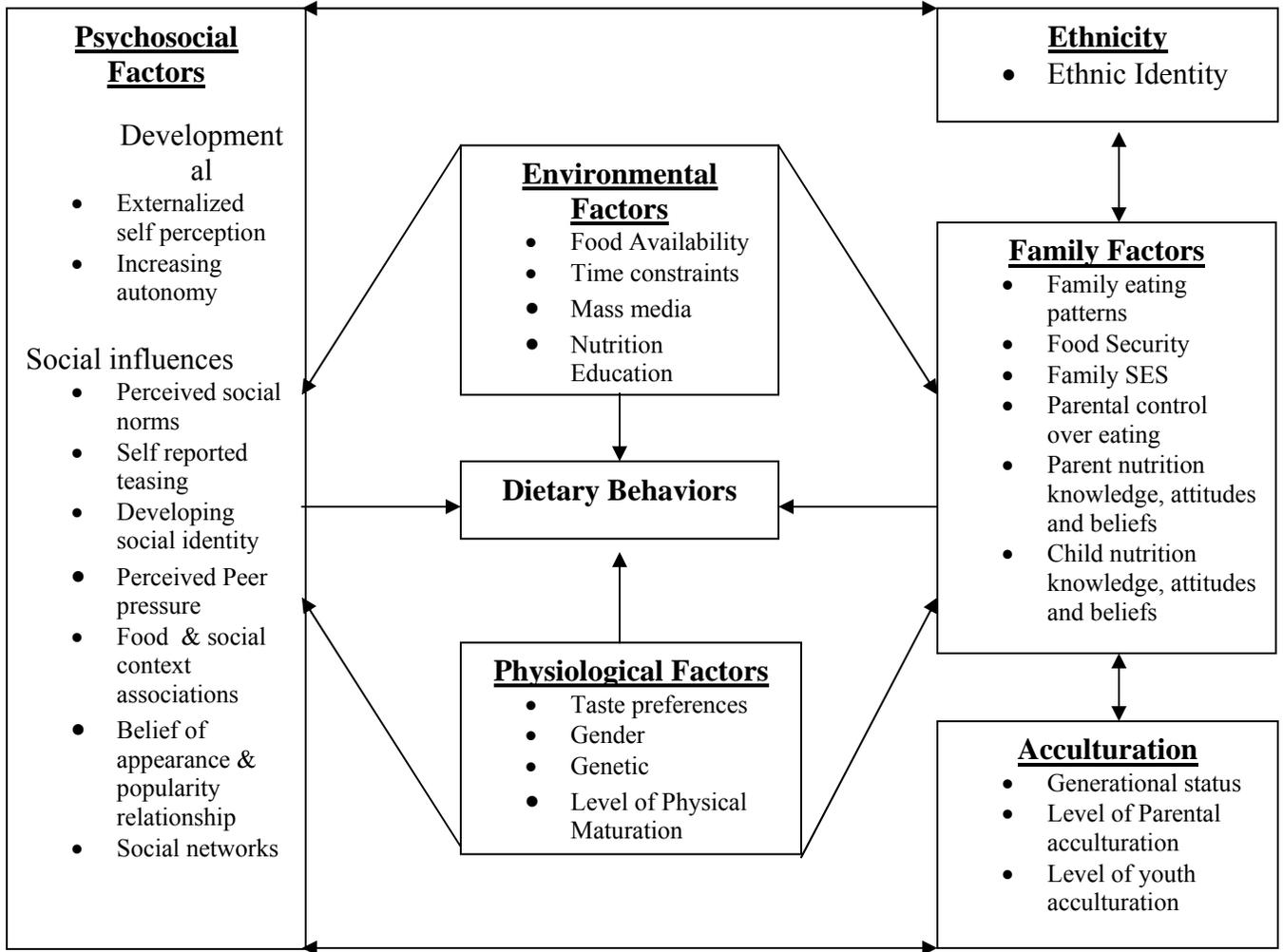
Research has shown that with acculturation there are increases in consumption of fat and sugar and decreases in complex carbohydrates, fiber, many vitamins and minerals (specifically a decrease in beans, fruits, and vegetables). [2] The traditional Mexican diet is high in complex carbohydrates, animal and vegetable protein, B-carotene, fiber, calcium, iron and many major vitamins. [2] *Although research has highlighted changes and some causes of dietary acculturation, more research is needed to better understand this complex process.*

Although theater has been shown to be effective at changing knowledge and behaviors, its use has been limited because it either relies on theater professionals and/or is costly. It also may not be reaching its full potential impact because it does not utilize peer led strategies. Little of the previous health promotion theater has been focused on nutrition. A peer-led theater nutrition education method that can, with minimal resources, be effectively utilized by a facilitator would prove to be a valuable nutrition and health education tool. *However, the specific components and the effectiveness of this theater education method as a nutrition education tool are currently unknown.*

Additionally, research has shown that teachers are interested in teaching about nutrition but feel unprepared to adequately address many nutrition topics. [92, 93] This approach may be an effective tool to meet this existing teacher interest. *A step-by-step classroom guide showing teachers how to effectively disseminate existing nutrition*

information, while creating emotional arousal thereby increasing the likelihood of the adoption of new nutrition knowledge, attitudes, and behaviors, does not exist.

Figure 1. Dietary Predictors of Latino Youth Concept Model^a



^a This Concept model is based on existing literature and preliminary data. It indicates the interrelationships between different variables. This research primarily addresses social influences, ethnic identity, and parent and child nutrition

REFERENCES

1. Gordon-Larsen P, Harris KM, Ward DS, Popkin BM. Acculturation and overweight-related behaviors among Hispanic immigrants to the US: the National Longitudinal Study of Adolescent Health. *Soc Sci Med.* 2003; 57:2023-34.
2. Bermudez OI, Falcon LM, Tucker KL. Intake and food sources of macronutrients among older Hispanic adults: association with ethnicity, acculturation, and length of residence in the United States. *J Am Diet Assoc.* 2000; 100:665-73.
3. Dixon LB, Sundquist J, Winkleby M. Differences in energy, nutrient, and food intakes in a US sample of Mexican-American women and men: findings from the Third National Health and Nutrition Examination Survey, 1988-1994. *Am J Epidemiol.* 2000;152:548-57.
4. Satia-Abouta J, Patterson RE, Neuhauser ML, Elder J. Dietary acculturation: applications to nutrition research and dietetics. *J Am Diet Assoc.* 2002;102:1105-18.
5. Singh GK, Siahpush M. Ethnic-immigrant differentials in health behaviors, morbidity, and cause-specific mortality in the United States: an analysis of two national data bases. *Hum Biol.* 2002;74:83-109.
6. Arcia E, Skinner M, Bailey D, Correa V. Models of acculturation and health behaviors among Latino immigrants to the US. *Soc Sci Med.* 2001; 53:41-53.

7. Norman S, Castro C, Albright C, King A. Comparing acculturation models in evaluating dietary habits among low-income Hispanic women. *Ethn Dis*. 2004;14:399-404.
8. Salant T, Lauderdale DS. Measuring culture: a critical review of acculturation and health in Asian immigrant populations. *Soc Sci Med*. 2003;57:71-90.
9. Monroe KR, Monroe KR, Hankin JH, Pike MC. Correlation of dietary intake and colorectal cancer incidence among Mexican-American migrants: the multiethnic cohort study. *Nutr Cancer*. 2003;45:133-47.
10. Popkin BM, Udry JR. Adolescent obesity increases significantly in second and third generation U.S. immigrants: the National Longitudinal Study of Adolescent Health. *J Nutr*. 1998;128:701-6.
11. Guendelman S, Abrams B. Dietary intake among Mexican-American women: generational differences and a comparison with white non-Hispanic women. *Am J Public Health*. 1995;85:20-5.
12. Satia JA, Patterson RE, Taylor VM, et al. Use of qualitative methods to study diet, acculturation, and health in Chinese-American women. *J Am Diet Assoc*. 2000;100:934-40.
13. Neuhauser ML, Thompson B, Conrado GD, Solomon CE. Higher fat intake and lower fruit and vegetables intakes are associated with greater acculturation among Mexicans living in Washington State. *J Am Diet Assoc*. 2004;104:51-7.
14. Hung HC, Joshipura KJ, Jiang R, et al. Fruit and vegetable intake and risk of major chronic disease. *J Natl Cancer Inst*. 2004;96:1577-84.

15. Lin H, Bermudez OI, Tucker KL. Dietary patterns of Hispanic elders are associated with acculturation and obesity. *J Nutr.* 2003;133:3651-7.
16. Umana-Taylor AJ. Ethnic identity and self-esteem examining the role of social context. *J Adolescence.* 2003;11.
17. Misra R, Aguillon S. Predictors of Health Behaviors in Rural Adolescents. *Health Ed.* 2001;101:22-32.
18. Lieberman M, Gauvin L, Bukowski WM, White DR. Interpersonal influence and disordered eating behaviors in adolescent girls-The role of peer modeling, social reinforcement, and body-related teasing. *Eating Behav.* 2001;2:215-237.
19. Piper DL, King MJ. Implementing A Middle School Health Promotion research Project. *Eval Prog Plann.* 1993;16:171-180.
20. Boulanger PM, Perez-Escamilla R, Himmelgreen D, Segura-Millan S, Haldeman L. Determinants of nutrition knowledge among low-income, Latino caretakers in Hartford, Conn. *J Am Diet Assoc.* 2002;102:978-81.
21. Kaiser LL, Melgar-Quinonez HR, Lamp CL, Johns MC, Sutherlin JM, Hardwood JO. Food security and nutritional outcomes of preschool-age Mexican-American children. *J Am Diet Assoc.* 2002;102:924-9.
22. Webb NM, Mastergeorge A. Promoting effective helping behavior in peer-directed groups. *Int J Educ Res.* 2003;73-97.
23. Mokdad AH, Marks JS, Stroup DF, Gerberding. Actual causes of death in the United States, 2000. *Jama.* 2004;291:1238-45.

24. Bessesen DH, The role of carbohydrates in insulin resistance. *J Nutr.* 2001;131:2782S-2786S.
25. Bourdon I, Olson B, Backus R, Richter BD, Davis PA, Schreeman BO. Beans, as a source of dietary fiber, increase cholecystokinin and apolipoprotein b48 response to test meals in men. *J Nutr.* 2001;131:1485-90.
26. Kaiser LL, Melgar-Quinonez HR, Lamp CL, Johns MC, Harwood JO. Acculturation of Mexican-American mothers influences child feeding strategies. *J Am Diet Assoc.* 2001;101:542-7.
27. Vine C. TIE and the Theater of the Oppressed. In: Jackson T, ed. *Learning Through Theater: New Perspectives on Theater in Education.* New York, Routledge; 1993.
28. Ayala GX, Elder JP, Campbell NR, et al. Correlates of body mass index and waist-to-hip ratio among Mexican women in the United States: implications for intervention development. *Womens Health Issues.* 2004;14:155-64.
29. Crawford PB, Gosliner W, Anderson C, et al. Counseling Latina mothers of preschool children about weight issues: suggestions for a new framework. *J Am Diet Assoc.* 2004;104:387-94.
30. Himmelgreen DA, Perez-Escamilla R, Martinez D, et al. The longer you stay, the bigger you get: length of time and language use in the U.S. are associated with obesity in Puerto Rican women. *Am J Phys Anthropol.* 2004;125:90-6.

31. Sundquist J, Winkleby M. Country of birth, acculturation status and abdominal obesity in a national sample of Mexican-American women and men. *Int J Epidemiol.* 2000;29:470-7.
32. Kaplan MS, Hugué N, Newson JT, McFarland BH. The association between length of residence and obesity among Hispanic immigrants. *Am J Prev Med.* 2004;27:323-6.
33. Khan LK, Sobal J, Martorell R. Acculturation, socioeconomic status, and obesity in Mexican Americans, Cuban Americans, and Puerto Ricans. *Int J Obes Relat Metab Disord.* 1997;21:91-6.
34. Comuzzie AG, Mitchell BD, Cole S, et al. The genetics of obesity in Mexican Americans: the evidence from genome scanning efforts in the San Antonio family heart study. *Hum Biol.* 2003;75:635-46.
35. Mitchell BD, Blangero J, Comuzzie AG, et al. A paired sibling analysis of the beta-3 adrenergic receptor and obesity in Mexican Americans. *J Clin Invest.* 1998;101:584-7.
36. Mitchell BD, Cole SA, Hsueh WC, et al. Linkage of serum insulin concentrations to chromosome 3p in Mexican Americans. *Diabetes.* 2000;49:513-6.
37. Damcott CM, Sack P, and Shuldiner AR. The genetics of obesity. *Endocrinol Metab Clin North Am.* 2003;32:761-86.
38. Palaniappan LP, Carnethon MR, Fortmann SP. Heterogeneity in the relationship between ethnicity, BMI, and fasting insulin. *Diabetes Care.* 2002;25:1351-7.

39. Park YW, Zhu S, Palaniappan L, Heshka S, Camethon MR, Heymsfield SB. The metabolic syndrome: prevalence and associated risk factor findings in the US population from the Third National Health and Nutrition Examination Survey, 1988-1994. *Arch Intern Med.* 2003;163:427-36.
40. Grey M, Berry D, Davidson M, Galasso P, Gustafson E, Melkus G. Preliminary testing of a program to prevent type 2 diabetes among high-risk youth. *J Sch Health.* 2004;74:10-5.
41. Flegal KM, Ogden CL, Carroll MD. Prevalence and trends in overweight in Mexican-american adults and children. *Nutr Rev.* 2004;62:S144-8.
42. Arroyo P, Loria A, Fernandez V, et al. Prevalence of pre-obesity and obesity in urban adult Mexicans in comparison with other large surveys. *Obes Res.* 2000;8:179-85.
43. Coleman KJ, Heath EM, Alcala IS. Overweight and aerobic fitness in children in the United States/Mexico border region. *Rev Panam Salud Publica.* 2004;15:262-71.
44. Nelson JA, Chiasson MA, Ford V. Childhood overweight in a New York City WIC population. *Am J Public Health.* 2004;94:458-62.
45. Ogden CL, Flegal KM, Carroll MD, Johnson CL. Prevalence and trends in overweight among US children and adolescents, 1999-2000. *Jama.* 2002. 288:1728-32.

46. Stolley MR, Fitzgibbon ML, Dyer A, Van Horn L, KauferChristoffel K, Schiffer L. Hip-Hop to Health Jr., an obesity prevention program for minority preschool children: baseline characteristics of participants. *Prev Med.* 2003;36:320-9.
47. Thorpe LE, List DG, Marx T, May L, Helgerson SD, Frieden TR. Childhood obesity in New York City elementary school students. *Am J Public Health.* 2004;94:1496-500.
48. Drewnowski A, Specter SE. Poverty and obesity: the role of energy density and energy costs. *Am J Clin Nutr.* 2004;79:6-16.
49. Adams EJ, Grummer-Strawn L, Chavez G. Food insecurity is associated with increased risk of obesity in California women. *J Nutr.* 2003;133:1070-4.
50. Kaiser LL, Townsend MS, Melgar-Quinonez HR, Fujii ML, Crawford PB. Choice of instrument influences relations between food insecurity and obesity in Latino women. *Am J Clin Nutr.* 2004;80:1372-8.
51. Harrison GG, Stomer A, Herman DR, Winham DM. Development of a spanish-language version of the U.S. household food security survey module. *J Nutr.* 2003;133:1192-7.
52. Quandt SA, Arcury TA, Early J, Tapia J, Davis JD. Household food security among migrant and seasonal latino farmworkers in North Carolina. *Public Health Rep.* 2004;119:568-76.
53. USDA. Food Security in the United States: Conditions and Trends. 2005
Accessed 2005 January 24, 2005; Available from:
<http://www.ers.usda.gov/Briefing/FoodSecurity/trends/>.

54. Kaiser LL, Melgar-Quinonez H, Townsend MS, et al. Food insecurity and food supplies in Latino households with young children. *J Nutr Educ Behav*. 2003;35:148-53.
55. Tarasuk VS, Beaton GH. Women's dietary intakes in the context of household food insecurity. *J Nutr*. 1999;129:672-9.
56. Winkleby MA, Kraemer HC, Ahn DK, Varady AN. Ethnic and socioeconomic differences in cardiovascular disease risk factors: findings for women from the Third National Health and Nutrition Examination Survey, 1988-1994. *Jama*. 1998;280:356-62.
57. Arroyo P, Loria A, Mendez O. Changes in the household calorie supply during the 1994 economic crisis in Mexico and its implications on the obesity epidemic. *Nutr Rev*. 2004;62:S163-8.
58. Mazur RE, Marquis GS, Jensen HH. Diet and food insufficiency among Hispanic youths: acculturation and socioeconomic factors in the third National Health and Nutrition Examination Survey. *Am J Clin Nutr*. 2003;78:1120-7.
59. Rasanen M, Niinikoski H, Keskinen S, et al. Parental nutrition knowledge and nutrient intake in an atherosclerosis prevention project: the impact of child-targeted nutrition counselling. *Appetite*. 2003;41:69-77.
60. Mold JW, Fryer GE, Thomas CH. Who are the uninsured elderly in the United States? *J Am Geriatr Soc*. 2004;52:601-6.

61. Beech BM, Rice R, Myers L, Johnson C, Nicklas TA. Knowledge, attitudes, and practices related to fruit and vegetable consumption of high school students. *J Adolesc Health*. 1999;24:244-50.
62. Kuchler F, Lin BH. The influence of individual choices and attitudes on adiposity. *Int J Obes Relat Metab Disord*. 2002;26:1017-22.
63. Bhargava A, Hays J. Behavioral variables and education are predictors of dietary change in the Women's Health Trial: Feasibility Study in Minority Populations. *Prev Med*. 2004;38:442-51.
64. Perry CL, Bishop DB, Taylor GL, et al. A randomized school trial of environmental strategies to encourage fruit and vegetable consumption among children. *Health Educ Behav*. 2004;31:65-76.
65. Hoelscher DM, Evans A, Parcel GS, Kelder SH. Designing effective nutrition interventions for adolescents. *J Am Diet Assoc*. 2002;102:S52-63.
66. Achterberg C, Miller C. Is one theory better than another in nutrition education? A viewpoint: more is better. *J Nutr Educ Behav*. 2004;36:40-2.
67. Baranowski T, Cullen KW, Nicklas T, Thompson D, Baranowski J. Are current health behavioral change models helpful in guiding prevention of weight gain efforts? *Obes Res*. 2003;11:23S-43S.
68. Rasanen M, Niinikoski H, Keskinen S. Impact of nutrition counseling on nutrition knowledge and nutrient intake of 7- to 9-y-old children in an atherosclerosis prevention project. *Eur J Clin Nutr*. 2004;58:162-72.

69. Brinberg D, Axelson ML, Price S. Changing food knowledge, food choice, and dietary fiber consumption by using tailored messages. *Appetite*. 2000;35:35-43.
70. Birnbaum AS, Lytle LA, Story M, Perry CL, Murray DM. Are differences in exposure to a multicomponent school-based intervention associated with varying dietary outcomes in adolescents? *Health Educ Behav*. 2002;29:427-43.
71. Taylor T, Serrano E, Anderson J, Kendall P. Knowledge, skills, and behavior improvements on peer educators and low-income Hispanic participants after a stage of change-based bilingual nutrition education program. *J Community Health*. 2000;25:241-62.
72. Vine C. TIE and the Theater of the Oppressed. In: Jackson T, ed. *Learning Through Theater: New Perspectives on Theater in Education*. New York: Routledge; 1993.
73. Wood D. *Adapting, Directing, and Acting*. Chicago: Ivan R Dee;1999.
74. Wolff JT. The Use of Interactive Theatre in AIDS-Prevention Education. *Arts in Psychotherapy*. 1993;20:335-338.
75. Jackson T. Education of theatre? The development of TIE in Britain. In: Jackson T, ed. *Learning Through Theater: New Perspectives on Theater in Education*. New York: Routledge;1993.
76. Snow S, D'Amico M, Tanguay D. Therapeutic theatre and well-being. *Arts Psychotherapy*. 2003;30:73-82.

77. Katz A, Hadas R, Beck T, Benjamin J, Scharf S. When patients run the show: the Sderot Psychiatric Center's Puppet Theater. *Isr J Psychiatry Relat Sci.* 2004;41:61-6.
78. Gray B. This is the Story of Wicked: Community Drama Theatre with At-Risk Aboriginal Australian Youth. *Arts Psychoth.* 1997;24:275-279.
79. Pagni JL, Teen theaters grapple with issues. *Plan Parent Rev.* 1984;4:11-2.
80. Slusky RI, Decreasing high-risk behavior in teens. A theater program empowers students to reach out to their peers. *Healthc Exec.* 2004;19:48-9.
81. Nelson B, Colby R, McIlrath M. Having Their Say: The Effects of Using Role with an Urban Middle School Class. *Youth Thea J.* 2000;15:59-69.
82. Schindel DN, Oughtred K. Museum Theatre as a Catalyst for Inclusivity Embracing a multicultural community through the production of Harvest Ceremony: Beyond the Thanksgiving Myth. *SOTA.* 2001;7-13.
83. Garcia L. Uncovering Hidden Stories: Pre-service teachers explore cultural connections. *SOTA.* 2002;14:5-9.
84. Zimmer PM, Borrowing a Cup of Culture: An Example of Creating an Original Cross-Cultural Theater for Youth Production. *SOTA.* 2001;12:19-21.
85. Harding CG, Safer LA, Kavanagh J, et al. Using live theatre combined with role playing and discussion to examine what at-risk adolescents think about substance abuse, its consequences, and prevention. *Adolesc.* 1996;31:783-96.
86. Perry CL, Zauner M, Oakes JM, Taylor G, Bishop DB. Evaluation of a Theate Production About Eating Behavior of Children. *J Sch Health.* 2002;72:256.

87. Sommi SS, Peter W, Bisai N. Using drama to target risky behaviours in Papua New Guinea. *Dev Bull.* 2000;52:92-3.
88. Blair C, Valadez JJ, Falkland J. The use of professional theatre for health promotion including HIV / AIDS. *J Dev Comm.* 1999;10:9-15.
89. Mabala R, Allen KB. Participatory action research on HIV/AIDS through a popular theatre approach in Tanzania. *Eval Prog Plan.* 2002;25:333-339.
90. Harris T, Griep K. [Interview] The National Theater for Children. Minneapolis, MN. Available at: www.nationaltheater.com. Accessed February 26, 2003.
91. Elkind PD, Pitts K, Ybarra SL. Theater as a mechanism for increasing farm health and safety knowledge. *Am J Ind Med.* 2002;2:28-35.
92. Perez-Escamilla R, Haldeman L, Gray S. Assessment of nutrition education needs in an urban school district in Connecticut: establishing priorities through research. *J Am Diet Assoc.* 2002;102:559-62.
93. Brenowitz N, Tuttle CR. Development and testing of a nutrition-teaching self-efficacy scale for elementary school teachers. *J Nutr Educ Behav.* 2003;35:308-11.

CHAPTER III

PROMOTION OF TRADITIONAL FOODS AS NUTRITION
EDUCATION MESSAGE FOR NEWLY ARRIVED LOW
INCOME MEXICAN IMMIGRANTS.

This chapter is an article in a draft form prepared for submission to the Journal of the American Dietetic Association. Co-author is Dr. Lauren Haldeman.

ABSTRACT

Objective: To determine the nutrition status and needs of newly arrived Mexican immigrants.

Design: A bilingual-bicultural community interviewer and a registered dietitian orally administered a 32-page survey in respondents' homes.

Subjects: Participants were low-income Mexican-American caregivers (n=166) with at least one child 12 years old or younger living in Guilford County, North Carolina.

Statistical Analysis: Descriptive analyses were conducted. Chi square analyses compared previous nutrition education, beliefs, self-efficacy, level of traditional diet, nutrition knowledge and overall diet quality.

Results: Seventy-six percent were overweight or obese (33% and 43%, respectively) and averaged a four-pound weight gain per year in the US. Eighty nine percent of respondents were food insecure (24 % with moderate hunger and 9 % with severe hunger). Forty percent of food insecure respondents with moderate hunger were obese compared to 73 of respondents with severe hunger. Severe food insecurity was related to less positive nutrition beliefs ($\chi^2(9,N=166)=17.56, p<.05$). Having previous nutrition education was significantly related with more positive nutrition beliefs, self-efficacy and knowledge ($\chi^2(9, N=166)= 29.04, p < .001, \chi^2(2, N=154)= 4.89, p < .05, \chi^2(3, N=157)= 10.36, p < .05,$ respectively). Highly traditional diets were related to less weight increase and higher overall diet quality ($\chi^2(12,N=104)=21.94, p<.05, \chi^2(9, N=155)= 18.79, p< .05,$ respectively).

Conclusions: Nutrition education (for low-income food insecure immigrants) which promotes traditional low cost foods will help to promote positive dietary belief patterns, nutrition self-efficacy and nutrition knowledge. This should result in overall diet quality improvements.

BACKGROUND

The Latino population is the fastest growing minority population in the United States (US) and is currently the largest minority group. [1] The majority of Latino individuals in the US are from Mexico. [1] The Mexican-American population is rapidly increasing in nontraditional immigration areas (non-border states) such as North Carolina.[2] Many immigrants are attracted to the geographic climate, types of available work, and political/social environment. As the newly arrived Mexican-American population acculturates (individuals from one culture coming into a new culture and adopting the new dominant cultural patterns), there are increases in many chronic diseases. [3-5] These increases in diet related chronic diseases such as obesity and diabetes are of serious concern; therefore, investigations into the nutrition status and needs of the newly arrived Latino population are of great importance.

Individuals born in Mexico (regardless of language spoken in the US) are more likely to consume less fat, and more fiber, Vitamin A, Vitamin C, Vitamin E, Vitamin B6, folate, calcium, potassium, and magnesium than Mexican-Americans born in the US. [4, 6] Mexican born Mexican-Americans have higher intakes of fruits and vegetables, whole grains, legumes and traditional Mexican foods such as cornbread, tortillas, beans and rice and lower intakes of desserts and added fats. These dietary patterns are associated with decreases in rates chronic diseases such as obesity and diabetes. [7-9] .

Research has shown a relationship between country of birth and level of acculturation with obesity. [5] Country of birth is an indicator of level of acculturation. Data from the National Health and Nutrition Examination Survey (NHANES) indicates that in comparison to US-born non-Latino women and US-born Mexican-Americans,

Mexican-born women have the smallest waist size (93.6cm and 96.9cm vs. 90.4 cm, respectively). [5] These differences in obesity related to level of acculturation may be attributed, in part, to the adoption of the American diet. The American diet is associated with six of the ten leading causes of death in the United States.[10] The diet consumed in American is traditionally lower in fruits, vegetables, complex carbohydrates, and legumes and higher in sugar and processed foods.[11, 12] As Mexicans acculturate, decreases in traditional foods and increases in meat, fatty snacks, sweets and processed foods occur. [6] Researchers have indicated that if an immigrant chooses more of their traditional cultural foods they will have lower rates of many chronic diseases such as obesity and diabetes. [13-15]

Food security has also been related to diseases such as obesity among immigrant groups. [13] Food security is defined as the ability to obtain safe and adequate food in socially acceptable ways. [16] Researchers have found that as food insecurity increases so does BMI. [13, 17-20] It was also reported that given similar financial constraints, obese individuals are more likely than normal weight individuals to buy cheaper foods and have an increased fear of running out of food. [21] This is of particular concern as food insecurity occurs at high rates among newly arrived immigrants. [16]

The purpose of this study was to determine the nutrition status and needs of newly arrived Latino immigrants in order to develop effective nutrition education messages. Our research questions were: (a) what is the current nutritional status and practices of the low income Latino population living in Guilford County, North Carolina; and (b) what factors are related to improved levels of dietary quality?

SUBJECTS AND METHODS

Participants

A trained bilingual-bicultural community interviewer recruited a convenience sample (N=166) of low-income Latino caregivers. Individuals had to be Latino, live in Guilford County, North Carolina and be the primary caretaker for at least one child 12 years of age or younger. All study protocols were reviewed and approved by The University of North Carolina at Greensboro's Human Subjects Institutional Review Board.

Survey Validation

All surveys were translated into Spanish by the bilingual-bicultural community interviewer (SM). After initial translation, bilingual-bicultural community members reviewed surveys (n=5). The corrected Spanish surveys were then read back in English to a registered dietitian (SC) in order to verify consistency and accuracy. All survey materials were then face validated with target community members (n=5) and content validated with nutrition professionals (n=5).

Data Collection

The bilingual-bicultural community interviewer, assisted by a registered dietitian, conducted oral surveys in the respondents' home. Surveys were 32 pages in length and lasted approximately 1.5 hours. Surveys included questions on demographics, acculturation, food security (using a translated 18 Item US Core Food Hunger Module), nutrition behaviors (including a previously validated and used brief food frequency questionnaire), nutrition knowledge, nutrition self-efficacy, nutrition beliefs,

anthropometrics (heights/weights), and self reported weight before migration to the US. In partial compensation for their time respondents were given \$10.00 cash incentives.

Acculturation

Acculturation related questions included: county of birth, years in the US, language spoken, ethnic food preparation, ethnic food consumption and transportation utilization. These acculturation factors were assigned a numerical value between zero and a hundred. Zero reflected a response indicating low acculturation and 100 reflected a response indicating high acculturation. Individuals' scores were summed and weighted and a single scaled variable was created for each individual. The acculturation variable was assigned a range of (1) very low acculturation to (4) very high acculturation in order to most accurately retain raw data patterns.

Nutrition Behaviors

Nutrition behaviors were assessed with a short food frequency questionnaire, food shelf inventory for specific food items (fruits, vegetables, meats and cereals) and food purchasing behaviors. Level of dietary acculturation was also determined using daily intake of food items identified in previous research [4, 6] as traditionally consumed and categories were created with a range of (1) very low acculturated diet to (4) very high acculturated diet in order to most accurately retain raw data patterns..

Overall diet quality was determined using a modified (culturally appropriate foods assigned and collapsed into groups of the Food Guide Pyramid and scored as 10 meeting recommendations for that group or 0 not meeting recommendations with a possible high score of 60) healthy eating index. Average daily intake for each category of the food

guide pyramid was determined using food frequency data. Respondents' diets were evaluated and scored based on whether they were meeting food guide pyramid recommendations. An overall diet quality score was created. Overall diet quality was categorized with ranges between (1) very poor to (4) very good.

Scaled Variables

Nutrition knowledge, self-efficacy, and beliefs scores were created using questions included in the survey instrument. Nutrition knowledge score was based on ability to correctly identify recommended servings and specific nutrient composition. Self-efficacy scores were based on respondents' level of confidence on several nutrition related tasks such as feeling that they were able to select and prepare healthy foods. Nutrition belief scores were based on how important respondents felt about the importance of nutrition in maintaining good health. Scores were categorized from (1) very low to (4) very high.

Data Analyses

Descriptive statistics for demographic data, previous nutrition education, acculturation level, dietary acculturation, food security, dietary behaviors and BMI were analyzed using SPSS for Windows, version 11, 2001(Chicago, IL). Chi square analysis was used to investigate the relationships between the level of traditional diet, level of acculturation, knowledge, self-efficacy, beliefs, nutrition behaviors, and overall diet quality.

RESULTS

Demographics & Level of Acculturation

Respondents were (N=166) females between 18-54 years of age. The majority of respondents were from Mexico (90%). On average they had an eighth grade Mexican education. Respondents had lived in the US for an average of 4 years (or 16% of their lives). The average household was a family of five with a yearly income of \$15,000. Most respondents (81%) reported their spouse to be the head of the household. Seventy three percent of the head of the household spouses were employed full time.

Only 2% of the respondents spoke English well. Seventy four percent spoke only Spanish. The majority of respondents reported going outside of the home between one to three times a week and preparing ethnic foods daily (99%). All respondents were determined to be at a low level of acculturation as indicated by the scaled acculturation variable and when considering only the variable of language spoken .

Only 10% of adult respondents had a moderately acculturated diet versus 17% of the youth (children 12 years old or younger). Similar percentages of adults and youth had a low level of diet acculturation (51% and 53%, respectively). The greatest difference in level of dietary acculturation between parents and children, was seen at the very low acculturated diet level. Thirty-eight percent of adults had a very low acculturated diet whereas only 24% of youth had retained a very low acculturated diet.

Food Security

The majority (89%) of respondents had some level of food insecurity. (Figure 1.) Twenty four percent of respondents were food insecure with moderate hunger and 9 % were food insecure with severe hunger.

Household income was divided by the number of household members in order to compare incomes between food security groups. Respondents in food insecure with moderate and severe hunger categories were determined to have statistically equivalent incomes. The food insecure without hunger group did have significantly higher levels of household income but were still below 200% of the poverty threshold. The food secure group did have the highest income level but were also still below 200% of the poverty threshold.

Nutrition Practices

The majority of respondents met the recommended servings for protein, fruit and milk but not for vegetables. Limited starch items were asked on the food frequency questionnaire (pasta, bread, cereal, tortillas). Based on the starch items covered in the food frequency questionnaire respondents consumed 3.3 servings of starch a day. Respondents on average reported going outside the home one time a week to grocery shopping with family and spending \$100.00 at a large grocery/department store. Most foods eaten were eaten inside of the home with the exception of the school-aged children eating breakfast and lunch at school. Forty eight percent of adults had an overall moderately healthy diet. (Table 1.)

Seventy-six percent of respondents reported that at sometime they had received assistance from the Women, Infant and Child (WIC) food assistance program. To be eligible to participate in WIC respondents would have to meet a variety of requirements including low income, currently pregnant or recently postpartum or lactating and/or have a child under five years old. Only 4% were enrolled in the WIC program at the time of

the study. Fifteen percent of the respondents were currently participating in the food stamps program.

Nutrition knowledge

Fifty-five percent of respondents reported never receiving prior nutrition education. Twenty-eight percent of the respondents had received previous nutrition education at the Special Supplemental Nutrition Program for Women's, Infants and Children (WIC). Fifty-five percent of respondents had seen the food guide pyramid but only 1% correctly identified how many servings of starch are needed a day. Just over forty percent of respondents were able to correctly identify the recommended number of servings for meat/protein and milk, 34% for fruit and 19% for vegetables. Fifty-one percent had low to moderate levels of nutrition knowledge and the remaining 49% had high levels of nutrition knowledge. (Table 1) Ninety-nine percent of respondents would like to learn more about nutrition. In order of preference, the top three choices for how respondents would like to learn more about nutrition were: by mail, workshop settings, and on television.

Self-Efficacy

Seventy-six percent of respondents were somewhat to very confident in their ability to select healthy snacks for their family. Seventy-seven percent were somewhat to very confident in their ability to prepare healthy foods for their family. Seventy percent were somewhat to very confident in their ability to select healthy foods at the grocery store. Overall, 74% of respondents had somewhat to very high levels of nutrition related self-efficacy. (Table 1)

Nutrition Beliefs

Eighty-six percent of respondents believed eating a low fat diet was important to maintaining good health. Only 47% of respondents believed eating fiber was important. Ninety-six percent felt it was important to eat fruits and vegetables. Eighty-seven percent believed it is important to eat a low sugar diet. Ninety-eight percent of respondents believed it was important to maintain a healthy weight. Ninety-nine percent believe that making healthy food choices will help to keep their family healthy. Overall, respondents (76%) had very high levels of belief that nutrition is important in maintaining good health. (Table 1) Thirty-nine percent of respondents believed it was hard to eat healthy with the primary barriers to eating healthy cited as: hard to find healthy foods that the family will eat, knowing how to read food labels, knowing what to buy at the store, family support for cooking healthy foods, and the cost of healthy foods.

Anthropometrics

Based on standard BMI calculation (kg/m^2) and BMI classification (18-24.9 normal, 25-29.9 overweight, >30 obese) 43% percent of adult respondents were obese and another 33% were overweight. [11] On average, respondents reported gaining four pounds per year since moving to the US (total self-reported weight gain divided by years lived in the US).

Bivariate Analyses

Results revealed that as severity of food insecurity increased, respondents were more likely to have a BMI $\geq 30\%$ (with moderate hunger 40%, with severe hunger 73%).

(Figure 2) Those respondents living in households with lower levels of food security had significantly lower belief in the importance of nutrition ($\chi^2(9, N=153)=27.08, p<.001$) .

The pattern of food behaviors (Figure 3) indicates that respondents living in food insecure households with severe hunger were more likely than respondents in food insecure households with moderate hunger to consume non-traditional foods. Specifically non-traditional foods included artificial juices, desserts, and snacks. Forty-three percent of severe hunger category respondents consumed artificial juices on a daily basis whereas only 20% of those respondents in the food insecure with moderate hunger consumed artificial juices on a daily basis. Similar patterns were seen with desserts (27% vs. 12%, respectively) and snacks (13% vs. 2%, respectively). Additionally, patterns of food behavior indicate that respondents living in food insecure households with severe hunger are less likely than respondents in food insecure households with moderate hunger to eat traditional foods. Traditional food category included tortillas and legumes. Respondents in the food insecure with severe hunger ate less tortillas on a daily basis (77%) and legumes (7%) than those respondents in the food insecure with moderate hunger's intake of tortillas (82%) and legumes (20%) on a daily basis. Those who had a lower acculturated diet (consumed more traditional foods) had less weight gain since moving to the US ($\chi^2(12, N=104)=21.94, p<.05$).

As seen in Figure 4., chi square analysis revealed that having received previous nutrition education is significantly related to having the belief that good nutrition is important to health, having a higher level of nutrition self efficacy and a higher level of nutrition knowledge ($\chi^2(4, N=96)=18.59, p<.001, \chi^2(6, N=95)=14.75, p<.05, \chi^2(6,$

N=87)= 34.77, $p < .001$, respectively). Specific beliefs such as, eating a low sugar diet is important, is significantly related to improvements in overall diet quality (χ^2 (6, N=155)= 14.10, $p < .05$). Having had previous nutrition education was significantly related to having improved levels of overall diet quality (χ^2 (9, N=155)= 80.84, $p < .001$). (Figure 4) Having a more traditional diet is related to having an overall higher quality of diet (χ^2 (9, N=155)= 189.79, $p < .05$). These relationships are depicted in Figure 4.

DISCUSSION

This study examined the nutritional needs and status of the low-income Latino population living in Guilford County, North Carolina. Previous research has indicated that as Latino individuals acculturate to the US, they experience changes in their diet patterns leading to the development of chronic diseases. [13-15] The nutrition status, practices, knowledge, self-efficacy and beliefs of this newly arriving population were assessed.

Subject Characteristics

Our respondents are relatively new immigrants to the US. During their time here, it appears they have been living in a cultural enclave as indicated by language spoken and experiences outside the home per week. A cultural enclave is where they have surrounded themselves with as much of their traditional culture as possible. This has slowed the acculturation process for the adult respondent.

There has been much discussion regarding the complex process of acculturation. This study utilized many factors to determine acculturation status. Interestingly, using the variable for language alone would have provided the same acculturation level assignment

outcome. This supports previous research in assessment of acculturation status that has also found language spoken to be the primary indicator of acculturation status. [22] Research has also indicated that language spoken is a better indicator of dietary acculturation level than other acculturation factors such as years lived in the US. [23]

More of our respondents were from Mexico than the national average (90% vs 64%). [1] It is possible that the higher than average percentage of respondents represents a trend in immigration patterns. It is also possible that the higher percentages are a result of convenience sampling.

Nutrition Practices

Our respondents were consuming adequate servings of protein, fruit, and milk according to the Food Guide Pyramid. They also reported fewer than two servings for added fats and sweets per day. Servings of vegetables appear to be the biggest deficit. These results are somewhat different than previous research, which found Mexican-born Latinas meeting all the minimum recommendations from the Food Guide Pyramid except for milk. [24] It is possible that actual food intake varies from reported intake in this research because of incorrect serving size estimation. Combination foods that include vegetables may also be a factor in the very low reported intake of vegetables. These food intake patterns may also be accurate and may reflect the food prioritization (e.g. when food selection is made under financial constraints meat is often prioritized over fruits and vegetables). When food has to be purchased on limited income, many individuals will maintain protein and milk sources before selecting vegetables. [13] The intake patterns

found may also be a result of WIC participation that assists with milk and juice (fruit) purchasing power but not with vegetables.

Research has indicated that if immigrants retain more of their traditional eating patterns they experience less increases in chronic diseases associated with the dietary acculturation process. [11, 25] Our results support this proposed relationship between dietary acculturation and disease related diet patterns which indicate that a more traditional diet is related to having an overall higher quality of diet.

Nutrition knowledge

Forty-five percent of respondents reported having received previous nutrition education and fifty-five percent had moderately high to very high levels of nutrition knowledge. Having received previous nutrition education is significantly related to higher levels of nutrition knowledge; however a higher level of nutrition knowledge is not directly related to overall diet quality. An interesting example of this relationship between knowledge and behavior is fiber. It is the food topic the respondents knew the least about but one of the healthy food habits strongest in this population.

Having had previous nutrition education was significantly related to having improved levels of overall diet quality. Similar improvements in dietary intake have been found by previous research when nutrition education is provided to the Latino population. [26] This indicates that the positive benefits of receiving nutrition education may not be the increases in nutrition knowledge that occur; but may in fact be in the changes that occur in some other area, such as beliefs. Having had nutrition education was related to increases in positive nutrition beliefs, and having increases in specific nutrition beliefs

was associated with higher levels of overall diet quality. The protein, fruit and milk sections of the Food Guide Pyramid were sections that respondents were more able to identify the correct recommended servings. These were also sections for which they were more often meeting their minimum recommended servings. The vegetable section of the Food Guide Pyramid was the section for which respondents both were least likely to identify recommended servings and was the farthest below the recommended servings (Table 2.).

Respondents were overwhelmingly interested in learning more about nutrition. Two (mailings and television) of the top preferred identified educational approaches are both non-intrusive methods. One factor that was cited as a reason that respondents were interested in information delivered in a workshop setting was the opportunity to talk. This may be a method that addresses issues of social isolation. The majority of the respondents only went out of the home, with their family, one day a week to do grocery shopping. Research has shown that men are more likely to become bilingual before women. [22] Similar to findings from previous research, many of the respondents in this survey husbands have a car and a job that takes them into American culture on a daily basis and their children ride a bus to a school where they are immersed in American culture and become bilingual. [22] This may leave the Latina caregivers in a position of social isolation. In Guilford County most of the Latino community lives spread out in various neighborhoods. Many of the respondents have very few or no nearby Spanish speaking neighbors. Female caretakers are often in socially isolated situations and nutrition

education in a workshop setting (with transportation and childcare provided) would provide a much-needed social opportunity.

Self-Efficacy

Overall the respondents in this study reported high levels of nutrition related self-efficacy. Self-efficacy has been related to an increase in the likelihood of an individual's adoption and retention of positive dietary behaviors. [27] Respondents that had previous nutrition education had a higher level of self-efficacy. Although self-efficacy and nutrition education have been considered in other populations and found related, more needs to be understood about the relationship between behaviors and self-efficacy in this population. [27]

Nutrition Beliefs

Changes in knowledge alone may not be the only factor involved in behavior change, therefore a greater understanding of the multiple factors involved in successful behavior change is needed. In this study, the stronger the belief, such as eating a diet low in sugar is important, the higher the respondents' overall diet quality. Beliefs appear to play a role in dietary behaviors. [28] Although beliefs may be a factor, they are not the only factor. Seventy six percent of respondents had very high levels of belief that nutrition is important in maintaining good health but only 48% of respondents had a moderately healthy diet. More research on the relationship that nutrition belief patterns have in dietary behavior is needed.

Anthropometrics

The rates of overweight and obesity in this Latino female population were found to be slightly higher in our study than previous research (76% vs. 73%). [29] Obesity rates for all populations in the US are increasing. [29] There are differences in obesity rates between Latino females in Mexico (52%) and in this research with Mexican-Americans (76%). [29, 30] These findings may indicate that a more dramatic increase in weight in this population is occurring than in other US populations in the US. This may be due, in part, to compounding factors of genetics and the rapid dietary changes that occur with acculturation. [31-34] In addition that acculturated behaviors increase between first and successive generations and this increase is related to increases in overweight prevalence. [5, 15]

Food Security

The rates of food insecurity found in this needs assessment are much higher than previous findings for Latino immigrants in North Carolina (89% vs. 48%). [35] The relationship of traditional food choices and obesity indicate that, under similar financial constraints, if an individual selects more low cost traditional foods they will experience less hunger. Less reported hunger has been associated with a lower BMI in recent research reports. [13, 17, 21] The relationship between food insecurity and increased BMI is supported by the patterns of obesity in the most food insecure homes in our study.

CONCLUSION

Rates of food insecurity in the Latino population are very high. There is a known relationship between food insecurity and increased BMI. Considering these factors and

the role of traditional foods and decreased hunger that was found in this research, nutrition education interventions that promote traditional foods could decrease the hunger associated with food insecurity.

APPLICATIONS

Nutrition education with the low-income Latino population will be effective. It will help to increase nutrition knowledge and will be associated with increases in positive dietary belief patterns and increased nutrition self-efficacy. Increases in positive dietary beliefs and levels of self-efficacy will result in improvements in overall diet quality. Specifically, the findings of this research support previous studies that suggest nutrition education targeted at the newly arrived low income Latino individuals should encourage the retention of traditional dietary practices to improve overall dietary quality.

Table 1. Level of Positive Nutrition Knowledge, Attitudes and Behaviors. ^a

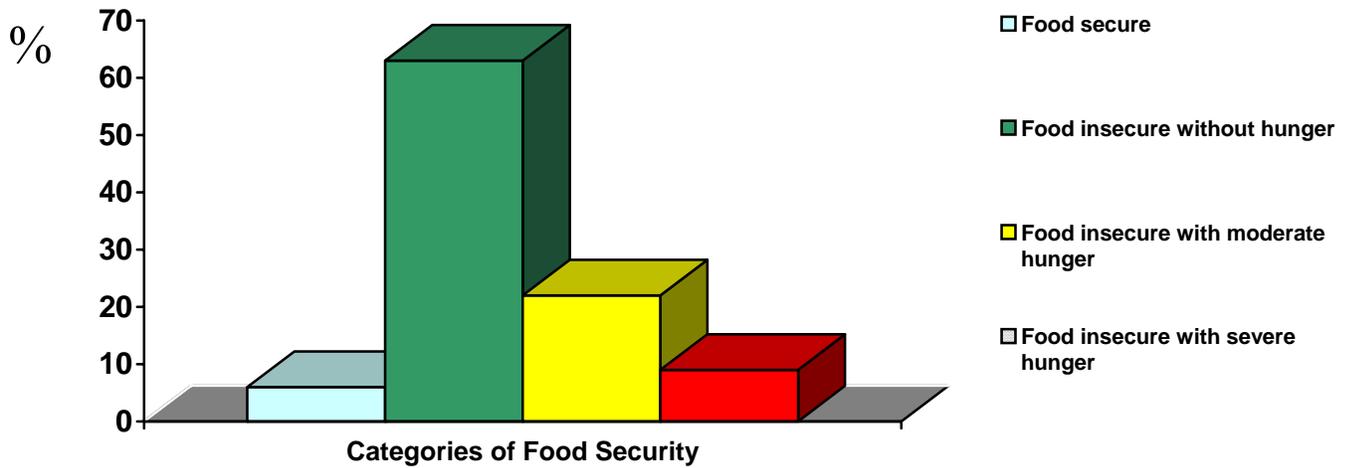
| KAB | % |
|-------------------|----|
| Knowledge | 51 |
| Self Efficacy | 74 |
| Beliefs | 76 |
| Dietary Behaviors | 48 |

^a Fifty-one percent of respondents had overall high levels of nutrition knowledge. The majority of respondents (74% and 76% respectively) had high levels of nutrition self-efficacy and nutrition beliefs. Only 48% of respondents had an overall high quality of diet.

Table 2. Dietary Intake and Servings Recommended Identification

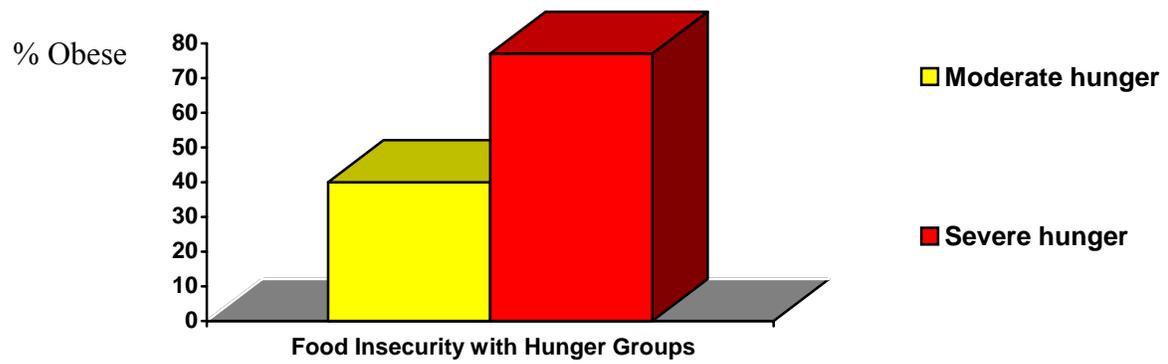
| Food Group | Percent able to correctly identify recommended daily servings | Average daily serving intake |
|------------|---|------------------------------|
| Fruit | 34% | 3 |
| Milk | 42% | 2 |
| Protein | 43% | 3 |
| Vegetables | 19% | >1 |

Figure 1. Levels of Food Insecurity.^a



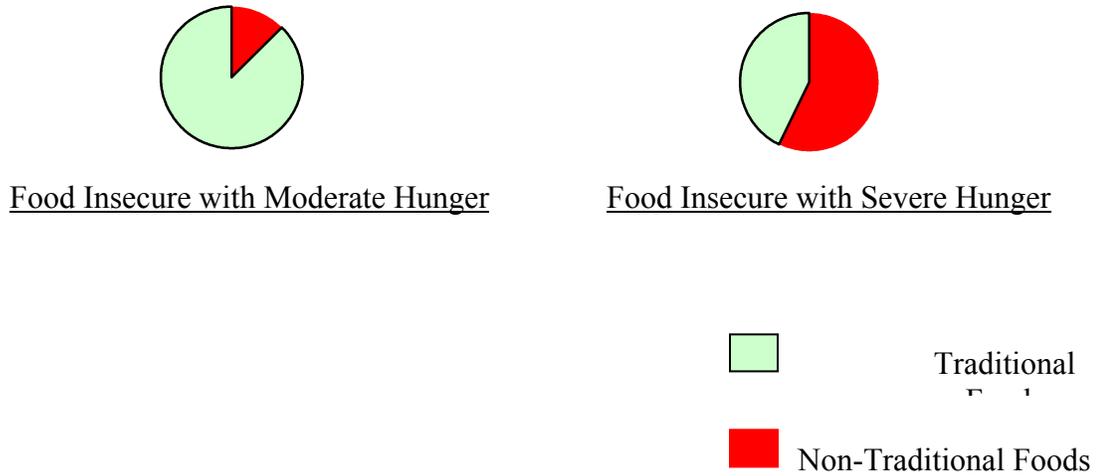
^a Eight-nine percent of respondents had some level of food insecurity. Twenty four percent of respondents were food insecure with moderate hunger and 9 % were food insecure with severe hunger.

Figure 2. Food Insecurity and Obesity.^a



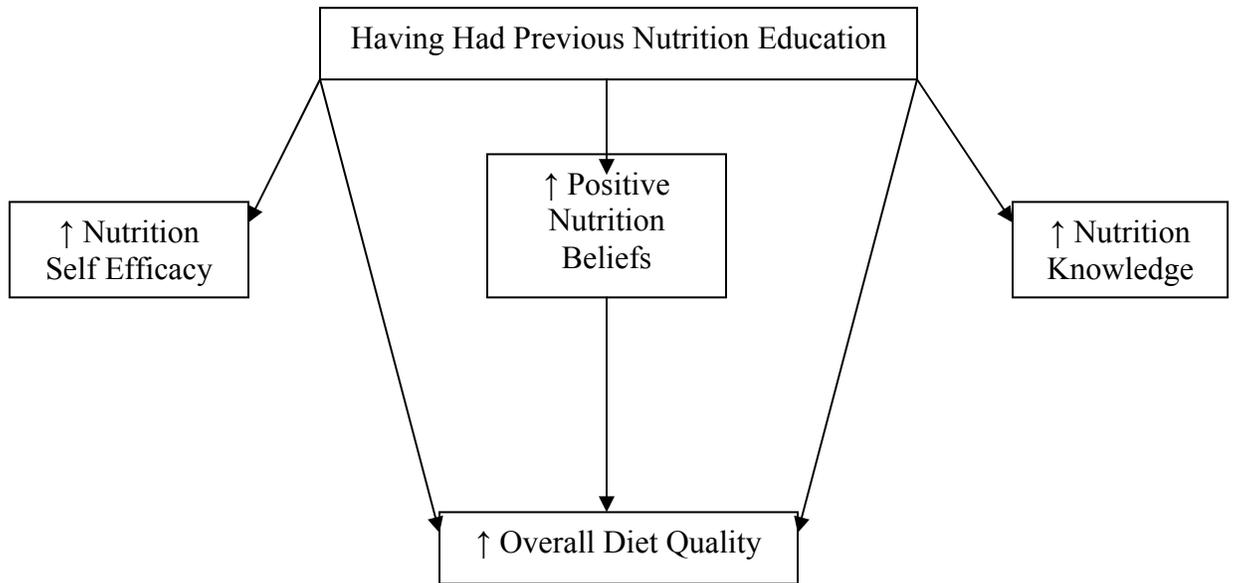
^a Food insecurity was related to level of obesity. There were higher rates of obesity in the food insecure with severe hunger category than in the food insecure with moderate hunger category.

Figure 3. Traditional Foods and Severity of Hunger.^a



^a Hunger associated with food insecurity was related to level of consumption of traditional foods. Both categories of food insecurity (moderate and severe) were found to be of equivalent income and therefore equivalent financial constraint. Those who, given the same financial resource, selected more traditional foods experience less hunger.

Figure 4. Education Related Variables.^a



^a Having had previous nutrition education was related to having higher levels of nutrition self efficacy, more positive nutrition beliefs a higher level of nutrition knowledge and higher overall quality of diet. Having more positive nutrition beliefs was also found to be related to having a higher overall quality of diet.

REFERENCES

1. US Census Bureau. Available at:
<http://www.census.gov/prod/2003pubs/p20545.pdf>. Accessed November 1, 2004.
2. *U.S. Immigration and Naturalization Service*. Available at:
<http://uscis.gov/graphics/index.htm> Accessed November 1, 2004.
3. Satia-Abouta J, Patterson RE, Neuhauser ML, Elder J. Dietary acculturation: applications to nutrition research and dietetics. *J Am Diet Assoc.* 2002;102:1105-18.
4. Dixon LB, Sundquist J, Winkleby M. Differences in energy, nutrient, and food intakes in a US sample of Mexican-American women and men: findings from the Third National Health and Nutrition Examination Survey, 1988-1994. *Am J Epidemiol.* 2000;152:548-57.
5. Sundquist J, Winkleby M. Country of birth, acculturation status and abdominal obesity in a national sample of Mexican-American women and men. *Int J Epidemiol.* 2000;29:470-7.
6. Guendelman S, Abrams B. Dietary intake among Mexican-American women: generational differences and a comparison with white non-Hispanic women. *Am J Public Health.* 1995;85:20-5.
7. Hung HC, Joshipura KJ, Jiang R, et al. Fruit and vegetable intake and risk of major chronic disease. *J Natl Cancer Inst.* 2004;96:1577-84.

8. Bourdon I, Olson B, Backus R, Richter BD, Davis PA, Schreeman BO. Beans, as a source of dietary fiber, increase cholecystokinin and apolipoprotein b48 response to test meals in men. *J Nutr.* 2001;131:1485-90.
9. Bessesen DH, The role of carbohydrates in insulin resistance. *J Nutr.* 2001;131:2782S-2786S.
10. Mokdad AH, Marks JS, Stroup DF, Gerberding. Actual causes of death in the United States, 2000. *Jama.* 2004;291:1238-45.
11. Gordon-Larsen P, Harris KM, Ward DS, Popkin BM. Acculturation and overweight-related behaviors among Hispanic immigrants to the US: the National Longitudinal Study of Adolescent Health. *Soc Sci Med.* 2003; 57:2023-34.
12. Neuhouser ML, Thompson B, Conrado GD, Solomon CE. Higher fat intake and lower fruit and vegetables intakes are associated with greater acculturation among Mexicans living in Washington State. *J Am Diet Assoc.* 2004;104:51-7.
13. Drewnowski A, Specter SE. Poverty and obesity: the role of energy density and energy costs. *Am J Clin Nutr.* 2004;79:6-16.
14. Popkin .M, The nutrition transition: an overview of world patterns of change. *Nutr Rev.* 2004;62:S140-3.
15. Popkin BM, Udry JR. Adolescent obesity increases significantly in second and third generation U.S. immigrants: the National Longitudinal Study of Adolescent Health. *J Nutr.* 1998;128:701-6.

16. Harrison GG, Stomer A, Herman DR, Winham DM. Development of a spanish-language version of the U.S. household food security survey module. *J Nutr.* 2003;133:1192-7.
17. Adams EJ, Grummer-Strawn L, Chavez G. Food insecurity is associated with increased risk of obesity in California women. *J Nutr.* 2003;133:1070-4.
18. Kaiser LL, Townsend MS, Melgar-Quinonez HR, Fujii ML, Crawford PB. Choice of instrument influences relations between food insecurity and obesity in Latino women. *Am J Clin Nutr.* 2004;80:1372-8.
19. Melgar-Quinonez HR, Kaiser LL. Relationship of child-feeding practices to overweight in low-income Mexican-American preschool-aged children. *J Am Diet Assoc.* 2004;104:1110-9.
20. Tarasuk VS, Beaton GH. Women's dietary intakes in the context of household food insecurity. *J Nutr.* 1999;129:672-9.
21. Sarlio-Lahteenkorva S, Lahelma E. Food insecurity is associated with past and present economic disadvantage and body mass index. *J Nutr.* 2001;131:2880-4.
22. Arcia E, Skinner M, Bailey D, Correa V. Models of acculturation and health behaviors among Latino immigrants to the US. *Soc Sci Med.* 2001; 53:41-53.
23. Norman S, Castro C, Albright C, King A. Comparing acculturation models in evaluating dietary habits among low-income Hispanic women. *Ethn Dis.* 2004;14:399-404.

24. Sharma S, Murphy SP, Wilkens LR, et al. Adherence to the food guide pyramid recommendations among African Americans and Latinos: results from the Multiethnic Cohort. *J Am Diet Assoc.* 2004;104:1873-7.
25. Ayala GX, Elder JP, Campbell NR, et al. Correlates of body mass index and waist-to-hip ratio among Mexican women in the United States: implications for intervention development. *Womens Health Issues.* 2004;14:155-64.
26. Taylor T, Serrano E, Anderson J, Kendall P. Knowledge, skills, and behavior improvements on peer educators and low-income Hispanic participants after a stage of change-based bilingual nutrition education program. *J Community Health.* 2000;25:241-62.
27. Ma J, Betts NM, Horacek T, Georgiou C, White A, Nitzke S. The importance of decisional balance and self-efficacy in relation to stages of change for fruit and vegetable intakes by young adults. *Am J Health Promot.* 2002;16:157-66.
28. Krumeich A, Weijts W, Reddy P, Meijer-Weitz A. The benefits of anthropological approaches for health promotion research and practice. *Health Educ Res.* 2001;16:121-30.
29. Flegal KM, Ogden CL, Carroll MD. Prevalence and trends in overweight in Mexican-american adults and children. *Nutr Rev.* 2004;62:S144-8.
30. World Health Organization. Available at: <http://www.who.int/en/> Accessed November 1, 2004.
31. Damcott CM, Sack P, Shuldiner AR. The genetics of obesity. *Endocrinol Metab Clin North Am.* 2003;32:761-86.

32. Comuzzie AG, Mitchell BD, Cole S, et al. The genetics of obesity in Mexican Americans: the evidence from genome scanning efforts in the San Antonio family heart study. *Hum Biol.* 2003;75:635-46.
33. Mitchell BD, Cole SA, Hsueh WC, et al. Linkage of serum insulin concentrations to chromosome 3p in Mexican Americans. *Diabetes.* 2000;49:513-6.
34. Mitchell BD, Blangero J, Comuzzie AG, et al. A paired sibling analysis of the beta-3 adrenergic receptor and obesity in Mexican Americans. *J Clin Invest.* 1998;101:584-7.
35. Quandt SA, Arcury TA, Early J, Tapia J, Davis JD. Household food security among migrant and seasonal latino farmworkers in North Carolina. *Public Health Rep.* 2004;119:568-76.

CHAPTER IV

DIETARY ACCULTURATION OF THE NEWLY ARRIVED MEXICAN IMMIGRANT: A COMPARISON CASE STUDY.

This chapter is an article in a draft form prepared for submission to the Journal of the American Public Health Association. Co-author is Dr. Lauren Haldeman.

ABSTRACT

Objectives: To identify dietary changes that occur as the Mexican-American population acculturates to the US.

Methods: Observations, in-depth interviews, and questionnaires were conducted with a family in Mexico for a one-week period. In-depth interviews and questionnaires were conducted with four comparison families in Guilford County, North Carolina.

Results: Decreases in fruit intake were the first and primary changes to occur. Small decreases in vegetable intakes also occurred. Snack and processed food consumption increased. Availability, food displacement and cost were identified as reasons changes occurred. Children's diets adapt faster because of the exposure to American foods in school and is the primary driver of the families' diet acculturation.

Conclusions: Education needs to be directed at the newly arriving Mexican-American youth. Messages need to be focused on increasing awareness of the risks of adopting an American diet and promoting the retention of the healthy traditional diet.

BACKGROUND

The Latino population is the fastest growing population in the United States (US). [1] The majority of Latinos in the US are from Mexico. [1] In Guilford County, North Carolina there has been more than a 500% increase in the Latino population in the past decade. [2] Much like the national trend, a needs assessment of the Latino population in Guilford County revealed that the majority of respondents were of Mexican origin. [3]

Compared to Caucasians, the Mexican-American population is more at risk for many chronic diseases such as diabetes and obesity. [4-9] World Health Organization data reveal that 31% of females living in Mexico are overweight or obese compared to 71% of Mexican-American females living in the US. [10] Only 0.3 % of the population in Mexico is documented as having diabetes compared to 8% of the Mexican-American US population being diagnosed with diabetes. [10] Many of these increases in chronic diseases can be linked with changes that occur in diet and lifestyle. [11, 12]

With acculturation to the US diet, increases in fat and sugar and decreases in complex carbohydrates, fiber, and many vitamins and minerals occur. More specifically, there is a decrease in beans, fruits, vegetables, and corn tortillas. [12, 13] Individuals born in Mexico (regardless of language spoken in the United States) are more likely to consume less fat and more fiber, vitamin A, Vitamin C, Vitamin E, Vitamin B6, folate, calcium, potassium, and magnesium than Mexican-Americans born in the US. [11] These differences in nutrient intakes can be explained by the changes in whole foods that occur. Mexican born Mexican-Americans have higher intakes of fruits and vegetables, whole grains, legumes and traditional Mexican foods such as cornbread, corn tortillas, beans

and rice and lower intakes of desserts and added fats. [11] Some of the reasons Mexican-Americans report for the decreases in rice and beans and increases in meat as individuals acculturate (as well as increases in fatty snacks and sweets) are because these foods (meats, snacks, and sweets) are more available at lower costs than in Mexico. [14-15] Conversely, these same subjects reported the reasons the intake of many traditional Mexican meals decrease are because of the increased cost and decreased availability of ingredients. [15]

The traditional Mexican diet is high in complex carbohydrates, animal and vegetable protein, B-carotene, fiber, calcium, iron and many major vitamins. [15] The primary increases in dietary intake that occur with acculturation are increases in fat, salt, meat, and dairy. [16] Specific foods that increase in the Mexican-American diet as acculturation occurs include ready to eat breakfast cereals, white sliced bread, peanut butter, American soft drinks, butter, margarine, vegetable oils, salad dressings, mayonnaise, cookies, sour cream and ham. [15] The primary decreases in dietary intake that occur with acculturation are decreases in fruit, vegetables, beans and tortillas. [15]

In focus group settings, Mexican born Mexican-Americans reported their eating habits in Mexico to be healthier. They reported that in Mexico there is generally less candy, desserts, and processed foods such as hotdogs and microwave meals consumed. It is also reported that people spend less time watching television or sitting around. People have increased levels of physical activity in Mexico. [17]

In considering cultural change, the passage of time can be an important variable to consider. Since this population is increasing so rapidly in the US and there is limited

current published research, it is important to reassess previous findings. Additionally, research with the Latino population was primarily conducted in locations such as Texas and California that have a higher concentration of Mexican-American immigrants. Very little research has been conducted with immigrants in less traditional areas such as North Carolina. In order to verify and observe the traditional Mexican diet, a case study of a family living in central Mexico was conducted. To corroborate previous research on diet acculturation patterns, the Mexico observations and documentations were compared with Mexican-American families living in Guilford County in a series of in-depth interviews and questionnaires.

METHODS

A family in Mazatalan, Mexico, and a bilingual community interviewer were recruited with the help of a local University and a Social Services Agency. The University and Social Services were asked to select and contact a family that they believed most accurately represented an average family for the area. Verbal and written consent forms were obtained for every member of the household.

A bilingual community interviewer and a registered dietitian (SC) administered a thirty-two-page questionnaire orally with the family's mother and daughter. The questionnaire contained questions on demographics, socio-economic status, education, activity, television viewing, health history, food purchasing behaviors, a short food frequency questionnaire, nutrition knowledge, food security (using a translated modified version of the 18-item US food core hunger module), income, assistance program utilization, nutrition beliefs, nutrition self efficacy, height and weight measurements. The

survey had been utilized in a needs assessment research project in Guilford County, North Carolina, conducted by the nutrition department at the University of North Carolina at Greensboro. The survey had been content and face validated.

In order to have at least one member of the family observed and documented completely during the observation period one member was selected as the primary focus. The focus individual for the case study was the family's 11-year-old daughter. The family was followed for one week with complete documentation of activities and intake for a three-day period (Saturday, Sunday and Monday). Monday was determined to be representative of normal weekly activity and diet. Photographic and written documentation of observed activities and diet intake were collected.

Families in Guilford County, North Carolina were recruited through the Center for New North Carolinians and The University of North Carolina at Greensboro's existing Latino Needs Assessment Project. Four families were determined to be comparable for origin and family structure to the case study family in Mexico. Each family had previously completed the same survey as was administered to the family in Mexico. A focus group guide was created based on previous literature documenting probable diet and lifestyle acculturation changes. Photos from Mexico were compiled into a pictorial guide depicting the Mexico family's lifestyle and dietary habits.

A bilingual, bicultural community interviewer and a registered dietitian (SC) conducted in-depth interviews in the respondents' homes. They used prepared guide questions and a pictorial guide of traditional Mexican lifestyle. The questions were open ended and included preset prompts. The pictorial guide began with pictures on socio-

demographic factors including housing, income, and geographic location, location of extended family, social service community programs and schools. The pictures then showed the Mexico family's living spaces, cooking equipment, water supply, and outside neighborhood. The pictorial guide went on to visually review dietary behaviors including transportation to shopping, money spent on foods, meal preparation, meals provided and locally available foods. The family's average weekday and weekend activities were also depicted in pictures. Mexican-American families were asked if the characteristics seen and described were the same as or different than what they had experienced when they lived in Mexico. If there were differences, Mexican-American respondents were asked open-ended questions about those differences. Interviews were transcribed and analyzed for patterns of response.

RESULTS

Our interview respondents in Guilford County, North Carolina did report that the family in Mexico had a lifestyle, activities and demographic characteristics similar to those they had when they lived in Mexico. Home, neighborhood and school characteristics, income and shopping were determined to be approximately equivalent between families. Adult respondents in both Mexico and the US were overweight/obese with a Body Mass Index greater than 30.

Our four comparison families in the US held parallel beliefs regarding the differences that occur in diet and lifestyle from Mexico to the US and why those changes occur (Table 1). They believed that people do eat differently in Mexico than they do in America. However, they did not perceive their personal diet patterns had changed that

much. Parents, more than their children, perceived that there are greater differences between their children's activities and lifestyle in America than those of children living in Mexico. Parents and children reported that the biggest change in the children's diet occurred because of the food they eat in the public school system. They did report children still liked the traditional Mexican foods they received at home but that they preferred the taste of the American foods they were served at school (specifically, pizza, hamburger, chicken nuggets, and hotdogs). Parents and children report an increase in fast food consumption due to a more scheduled lifestyle, which they contrast to the more "relaxed" lifestyle in Mexico. With after school activities and planned events there is less time to cook meals.

The male youths interviewed (n=2) thought other non-Latino peers felt less negatively about traditional Mexican foods. Their perceptions about peers' feelings had less of an impact on their dietary patterns. Females (n=2), however, were more sensitive to feelings they perceived their non-Latino peers held about traditional Mexican foods. This sensitivity may result in a greater impact on the female youth's acculturation.

Respondents did not believe there were differences between the healthiness of traditional Mexican or American diets. They were not aware of any increased disease risks associated with the American diet.

DISCUSSION

Our findings support previous research reporting that acculturation results in an increase in fat and sugar and a decrease in complex carbohydrates, fiber, and many vitamins and minerals (specifically a decrease in beans, fruits, vegetables, and corn

tortillas). [12] The families interviewed were all first generation and newly acculturated with average length of stay in the US less than three years. The changes in diet and lifestyle and subsequent increases in many chronic diseases such as obesity and diabetes that occur are more obvious in second and third generation Mexican-Americans. [18, 19]

Decreases in fruit consumption have been found to be one of the first diet changes that occur with acculturation. [20] Our findings support previous research that indicated this is the largest change in diet patterns that has occurred for these families. This may be because our respondents are so early in the acculturation process. Based on previous research, if these families were followed longitudinally, movement away from traditional Mexican foods and toward high fat, high sugar, highly processed foods would occur.

Previous research indicates that many diet changes occur because of availability and cost. [21, 22] Our respondents, however, did not report the same barrier of decreased availability of traditional foods in grocery stores. One possible explanation for this difference is that many of the lower cost traditional ingredients (such as chilies) had been less available prior to the influx of Latino individuals. Since the previous research was conducted, the Latino population has grown and large supermarkets have increased the availability of these ingredients in their stores. Thus, this availability is not as much a barrier as it may have been in previous years.

Results also support focus group research that investigated the differences between US and Mexico lifestyles. As previous researchers found, our respondents also recalled their eating habits in Mexico to be healthier. [15] They reported that in Mexico there is generally less candy, desserts, processed foods such as hotdogs and microwave

meals consumed. They also reported that people spend less time watching television or sitting around and people have increased levels of physical activity in Mexico. [17]

Differences in perceptions regarding social acculturation peer acceptance were observed in youth. The sample sizes were very small but these differences observed support relationships between psychosocial factors and dietary behaviors proposed by previous research. Females have been found to be more sensitive to perceived social norms, self reported teasing, perceived peer pressure, and have a greater belief that physical appearance is related to popularity. These psychosocial factors have been identified as determinants of dietary behavior for youth. [30]

As an individual acculturates to the US, many changes in diet and lifestyle are likely to occur (Figure 1). [11, 12, 18, 23, 24] These changes are followed by subsequent increases in many chronic diseases such as obesity and diabetes. [18] Generational status is related to rates of obesity. Latinos born in the United States are more than two times as likely to be obese than first generation Latinos. [19] As an individual acculturates, the prevalence rates of obesity increase. [6, 25-27] Obesity and diabetes are increasing for all populations in the United States. [4, 5, 28, 29] The Mexican-American population is at greater risk of developing obesity and diabetes than the Caucasian population. [4, 5, 28, 29] Therefore, understanding what dietary changes occur and why these changes take place is a very important step in developing strategies to reduce these increases in chronic diseases.

IMPLICATIONS

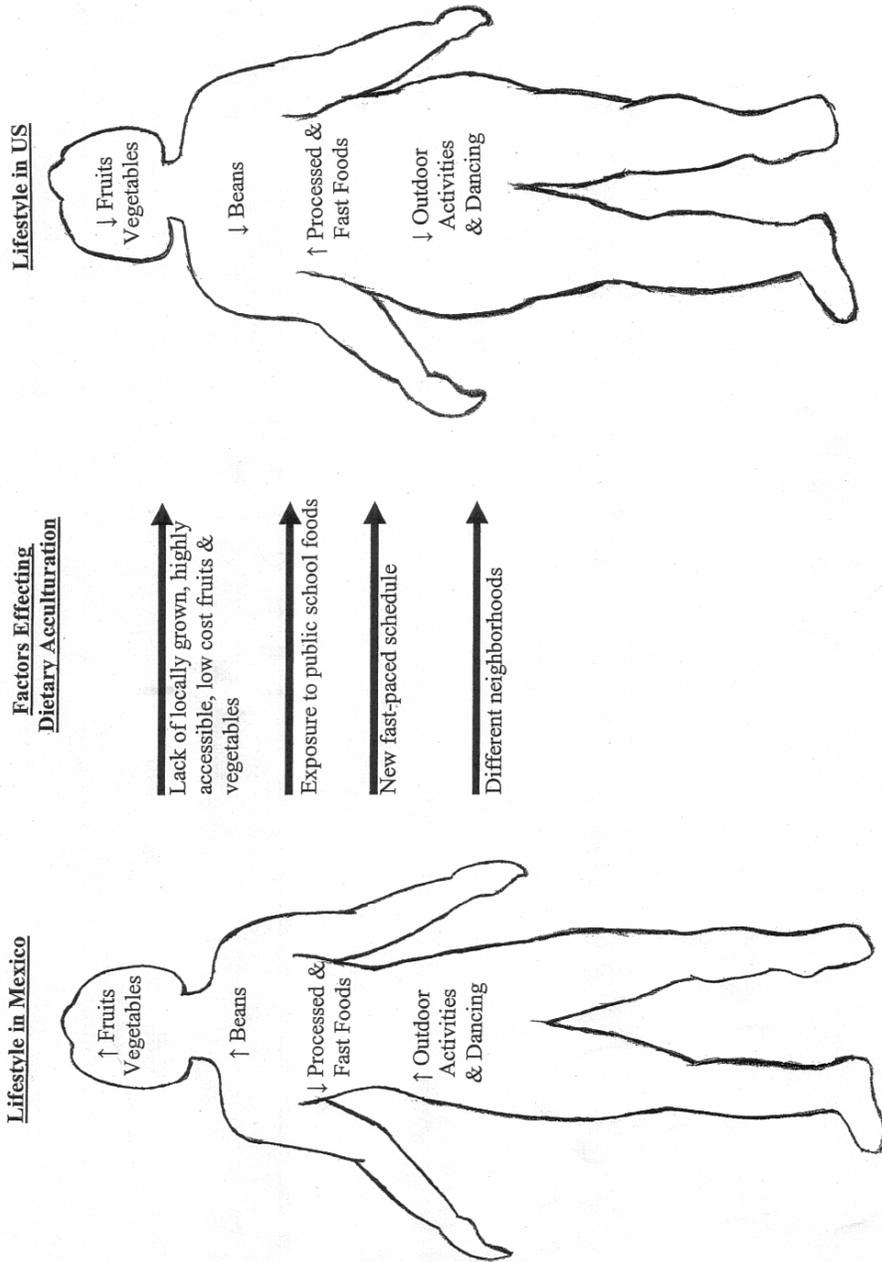
Education needs to be focused on newly arrived Mexican-American youth explaining the risks of adopting the American diet and lifestyle and the benefits of retaining the traditional healthy Mexican diet and lifestyle. Additionally, the findings of the impact on the school system in the acculturation of the Mexican-American diet indicates that efforts need to be made to make more traditional healthy, culturally appropriate foods available in the public school system.

A nutrition message that promotes the retention of healthy traditional eating patterns is appropriate for a newly arriving immigrant population. It is an empowering message, which celebrates and recognizes the differences and strengths of the immigrants' cultural background. If nutrition and public health professionals adopt this strategy, it will more likely result in behavioral change. When individuals are asked to adopt new unfamiliar behaviors they may be less likely to adopt the promoted behaviors than they would be if more familiar recently held behaviors were being promoted. If we promote standard healthy American food choices we are not only asking the immigrants to adopt change, to new cultural eating patterns, but we are also asking them to make healthy choices within that new eating pattern; choices that are not supported behaviors in the mainstream American dietary environment. By encouraging the retention of traditional healthy culturally appropriate food, we have a greater opportunity to make a significant impact on the health of a growing proportion of our nation's population.

Table 1 Acculturation Related Dietary and Lifestyle Changes.

| Behaviors in Mexico | Behaviors in the United States | Why the changes occur |
|--|---|--|
| They have drinks made with fresh fruits at every meal. They eat fresh fruits as snacks throughout the day. They eat frozen fresh fruit desserts. | They eat less fresh fruits. | Cost and availability. In Mexico fresh foods are very low cost or grown in the backyard. There are trucks that come to the home and sell low cost fresh fruits. |
| They eat some snacks and sweets. | They eat more snacks and sweets. | Cost and Availability. There are more low cost high sugar, high fat processed snacks available at lower costs in America. |
| They eat very little or no fast food. | They eat more fast food | Cost and time constraints. Fast food is cheaper (respectively) and more available in America. Schedules are much more complex in America. |
| They eat a lot of beans tortillas and fresh vegetables. | They still eat beans, tortillas, and fresh vegetables but a little less. | Availability. These foods are partially misplaced by new variety of foods available. |
| They have a lot of activity. They walk to school and around the neighborhood. They also spend time dancing with friends in the afternoon. | There is less physical activity. There is more time spent watching TV and staying in the house. They ride the bus to school. More of the activities are structured sports that primarily involve non-Latino youth participants. | Availability. The neighborhood is not as appropriate for outdoor play and loud music for dancing. They have fewer friends and playmates living in the same area. The school is too far away to walk to. |

Figure 1. Lifestyle Changes with Acculturation.



REFERENCES

1. US Census Bureau. Available at:
<http://www.census.gov/prod/2003pubs/p20545.pdf>. Accessed November 1, 2004.
2. Guilford County Census. Available at:
<http://quickfacts.census.gov/qfd/states/37/37081.html>. Accessed November 1, 2004.
3. Colby SE, Haldeman L. Eating behaviors and level of food insecurity among Latino immigrants in Guilford County, North Carolina. *American Public Health Association 131st Annual Meeting Proceedings*. November 15-19, 2003. San Francisco, CA.
4. Ludwig DS, Ebbeling CB, Pereira MA, Pawlak DB. A physiological basis for disparities in diabetes and heart disease risk among racial and ethnic groups. *J Nutr*. 2002;132:2492-3.
5. Mitchell BD, Cole SA, Hsueh WC, et al. Linkage of serum insulin concentrations to chromosome 3p in Mexican Americans. *Diabetes*. 2000;49:513-6.
6. Adams EJ, Grummer-Strawn L, Chavez G. Food insecurity is associated with increased risk of obesity in California women. *J Nutr*. 2003;133:1070-4.

7. Comuzzie AG, Mitchell BD, Cole S, et al. The genetics of obesity in Mexican Americans: the evidence from genome scanning efforts in the San Antonio family heart study. *Hum Biol.* 2003;75:635-46.
8. Damcott CM, Sack P, and Shuldiner AR. The genetics of obesity. *Endocrinol Metab Clin North Am.* 2003;32:761-86.
9. Mitchell BD, Blangero J, Comuzzie AG, et al. A paired sibling analysis of the beta-3 adrenergic receptor and obesity in Mexican Americans. *J Clin Invest.* 1998;101:584-7.
10. World Health Organization. Available at: <http://www.who.int/en/> Accessed November 1 2004.
11. Dixon LB, Sundquist J, Winkleby M. Differences in energy, nutrient, and food intakes in a US sample of Mexican-American women and men: findings from the Third National Health and Nutrition Examination Survey, 1988-1994. *Am J Epidemiol.* 2000;152:548-57.
12. Neuhouser ML, Thompson B, Conrado GD, Solomon CE. Higher fat intake and lower fruit and vegetables intakes are associated with greater acculturation among Mexicans living in Washington State. *J Am Diet Assoc.* 2004;104:51-7.
13. Guendelman S, Abrams B. Dietary intake among Mexican-American women: generational differences and a comparison with white non-Hispanic women. *Am J Public Health.* 1995;85:20-5.
14. Drewnowski A, Specter SE. Poverty and obesity: the role of energy density and energy costs. *Am J Clin Nutr.* 2004;79:6-16.

15. Romero-Gwynn E, GD, Grivetti L, McDonald R, Stanford G, Turner B, West E, Williamson E., Dietary Acculturation among Latinos of Mexican Descent. *Nutr Today*. July/August 1993:6-12.
16. Artinian, N.T., et al., *Eating patterns and cardiovascular disease risk in a Detroit Mexican American population*. Public Health Nurs, 2004. **21**(5): p. 425-34.
17. Kaiser, L.L., et al., *Child feeding strategies in low-income Latino households: focus group observations*. J Am Diet Assoc, 1999. **99**(5): p. 601-3.
18. Gordon-Larsen, P., et al., *Acculturation and overweight-related behaviors among Hispanic immigrants to the US: the National Longitudinal Study of Adolescent Health*. Soc Sci Med, 2003. **57**(11): p. 2023-34.
19. Popkin, B.M. and J.R. Udry, *Adolescent obesity increases significantly in second and third generation U.S. immigrants: the National Longitudinal Study of Adolescent Health*. J Nutr, 1998. **128**(4): p. 701-6.
20. Monroe, K.R., et al., *Correlation of dietary intake and colorectal cancer incidence among Mexican-American migrants: the multiethnic cohort study*. Nutr Cancer, 2003. **45**(2): p. 133-47.
21. Satia, J.A., et al., *Use of qualitative methods to study diet, acculturation, and health in Chinese-American women*. J Am Diet Assoc, 2000. **100**(8): p. 934-40.
22. Satia-Abouta, J., et al., *Dietary acculturation: applications to nutrition research and dietetics*. J Am Diet Assoc, 2002. **102**(8): p. 1105-18.
23. Bermudez, O.I., L.M. Falcon, and K.L. Tucker, *Intake and food sources of macronutrients among older Hispanic adults: association with ethnicity*,

- acculturation, and length of residence in the United States.* J Am Diet Assoc, 2000. **100**(6): p. 665-73.
24. Lin, H., O.I. Bermudez, and K.L. Tucker, *Dietary patterns of Hispanic elders are associated with acculturation and obesity.* J Nutr, 2003. **133**(11): p. 3651-7.
 25. Kaplan, M.S., et al., *The association between length of residence and obesity among Hispanic immigrants.* Am J Prev Med, 2004. **27**(4): p. 323-6.
 26. Khan, L.K., J. Sobal, and R. Martorell, *Acculturation, socioeconomic status, and obesity in Mexican Americans, Cuban Americans, and Puerto Ricans.* Int J Obes Relat Metab Disord, 1997. **21**(2): p. 91-6.
 27. Sundquist, J. and M. Winkleby, *Country of birth, acculturation status and abdominal obesity in a national sample of Mexican-American women and men.* Int J Epidemiol, 2000. **29**(3): p. 470-7.
 28. Grey, M., et al., *Preliminary testing of a program to prevent type 2 diabetes among high-risk youth.* J Sch Health, 2004. **74**(1): p. 10-5.
 29. Palaniappan, L.P., M.R. Carnethon, and S.P. Fortmann, *Heterogeneity in the relationship between ethnicity, BMI, and fasting insulin.* Diabetes Care, 2002. **25**(8): p. 1351-7.

CHAPTER V

THE DEVELOPMENT OF PEER-LED YOUTH THEATER AS
A NUTRITION EDUCATION TOOL TO PROMOTE THE
HEALTHY TRADITIONAL MEXICAN DIET.

This chapter is an article in a draft form prepared for submission to the Journal of Nutrition Education and Behavior. Co-author is Dr. Lauren Haldeman.

ABSTRACT

Objective: To develop peer-led nutrition theater education as a means to promote nutrition knowledge, attitudes and behaviors of Latino youth.

Design: Five days a week, ninety-minute sessions were conducted over one month. Pre and post surveys were conducted with an intervention group (N=19) and a matched non-intervention group (N=19).

Participants: Participants were 38 Latino males and females between the ages of 8-12 years old.

Intervention: The knowledge, attitudes and behaviors of Latino youth, related to dietary acculturation and disease, were explored in a theatrical setting. A registered dietitian

facilitated nutrition theater education, culminating in a public performance promoting the retention of the traditional healthy Mexican diet.

Results: The intervention resulted in a 26% increase in knowledge scores. Seventy percent reported having learned about nutrition. After the intervention, respondents thought the American diet (group defined as hotdogs, hamburgers, pizza and French fries) was not healthy ($P < .05$). They also reported liking vegetables more, planning to or trying to eat more beans, fruits and vegetables and less sugar after the intervention ($P < .05$). No changes occurred in these variables in the non-intervention group.

Conclusions and Implications: Peer-led theater education used with nutrition messages and information appear to be effective at increasing knowledge and changing beliefs and behaviors of Latino youth. Similar nutrition theater educational experiences, offered in community and school settings, should be used as a novel and effective way to promote healthy dietary changes in youth populations.

INTRODUCTION

The Latino population is the fastest growing and largest minority population in the United States (US). [1] Guilford County, North Carolina has experienced more than a 500% increase in the Latino population in the past ten years. [2] As individuals acculturate to the US, their rates of many chronic diseases, including obesity and diabetes, increase. [3, 4] In Mexico 31% of Latino females are overweight/obese compared to the US in which 74% of Latino females are obese.[5] Average weight increases in America are one pound per year. [6] Latino females living in America have an average increase of four pounds per year. [7] When conducting nutrition education with a newly arrived Latino immigrant, it is important to consider these patterns of acculturation and related increases in diseases. [8-10]

Retention of traditional foods is associated with decreases in chronic disease, especially obesity. [4, 11, 12] The traditional Mexican diet is high in fruits, vegetables, beans, rice and tortillas. [4, 13, 14] It is low in sugar and processed foods. [4, 13, 14] As an individual acculturates, he/she increases their intake of high calorie and non-nutrient dense American foods. [15] Mexican-Americans born outside of the US retain a more traditional diet throughout their lives. [16] As generations progress, the diets become more and more acculturated. [17] As this acculturation process occurs, the rates of chronic diseases such as obesity and diabetes increase. [18, 19] Children of first generation adult immigrants are the driving force in this acculturation process. They are introduced to American foods in the public school system and begin to direct the family's dietary acculturation, unaware of the risks associated with the adoption of the American

diet. [20] These Latino youth are an important group to target for nutrition education promoting the retention of traditional Latino dietary patterns.

Research has shown that changes in knowledge alone are not effective in changing behavior. [21, 22] It has been theorized that to achieve lasting behavior change; changes must occur in knowledge, attitudes and beliefs. [23] The Social Ecology Theory indicates the importance of the consideration of multiple factors of the environment. [24] Social Ecology is characterized as method of analyzing the causes of any phenomenon as a web of connections between an individual and his or her environment. It examines problems at multiple levels of analysis and views them from an ecological perspective. Dietary acculturation is a complex emotional process that involves evolution of social and ethnic identity. [13] In order to have an impact on this process, education methods must involve an emotional perspective that considers all parts of the individual's environment.

Theater in education (TIE) is a creative education approach that has been applied to the field of health. Christian Reil first defined therapeutic theatre in the 1700's. [25] Theater is an accepted form of therapy which has been shown to have many benefits. [25] Researchers at the National Center for Post Traumatic Stress Syndrome used therapeutic theatre with Vietnam veterans. Community drama has also been used with Aboriginal Australian youth who are at risk for committing crimes. [26] Participatory theatre was used in Tanzania to explore the cultural and sexual behaviors involved in HIV transmission. [27] Theatre has been used in the museum setting to communicate and explore museum exhibitions. The Smithsonian [28] National Museum of American

Indians Gustav Heye Center has conducted pieces such as ‘Harvest Ceremony: Beyond the Thanksgiving Myth’. The production was performed to increase cultural understanding with American Indians and non-native populations. [28] Teachers in the classroom have successfully used TIE to develop series of assignments on culture. [29] Theater focused on acculturation has been conducted with Latino youth. [30] Drama lessons have been found to be effective in urban middle school classes to improve behavioral problems of troubled youth by helping students explore and deal with social issues of discrimination. [31] The National Theater for Children was founded in 1979 with a goal to educate children using theater in schools. [32] Theater about healthy eating, created by adults, and presented to children has been shown to improve nutrition knowledge and food choice. [32-34]

Professional adult theater pieces presented for educational purposes, although effective, are costly. Most school systems have limited or no access to professional TIE companies. Using a peer-led process, youth participants can develop and present a theater play at very little cost to the school. Peer-led interventions targeted at youth have been found to be more effective than interventions that do not utilize peer-led strategies. [8, 35]

Peer-led theater may be effective for creating behavior change because of its inherent exploration of many complex social issues. Research has found that psychosocial factors for Mexican American youth in a multiethnic setting can have an influence on ethnic identity. [36] Both culture and ethnicity are important determinants of dietary behaviors. [36] Peer interactions and feelings of social comfort have also been

found to be important in determining adolescent behaviors. [36] Health knowledge, peer pressure, food social context, food advertising, taste preferences, gender differences, social norms and increasing autonomy are determining factors in youth dietary selections. [37] Eating behaviors of adolescent girls are influenced by self-perceptions, self reported teasing and their belief that popularity is partially based on weight and shape. [38, 39] The peer-led theater play is a format (based in Social Ecology principles) which allows for the inclusion and involvement of all these psychosocial related determinants. Figure 1 is a model developed based on existing literature and preliminary data that highlight interrelationships between variables. Theater education methodology based in Social Ecology Theories allows youth to addresses all the factors identified in previous research as determinants of dietary behavior. (Figure 1.)

The purpose of this study was to evaluate the effectiveness of theater education, designed to promote traditional healthy eating practices, in changing knowledge, beliefs and behaviors of Latino youth participants.

STUDY PROCEDURES

Survey tool development and validation. Surveys were developed based on previous research with Latino caretakers (N=166) of at least one child 12 years or younger residing in Guilford County. In-depth interviews (N=4) focused on how and why the traditional Latino diet changes as individuals acculturate to the US diet and lifestyle were conducted with primary caretakers and children. Based on these interviews a preliminary survey tool was developed.

Demographic and acculturation information were assessed. Level of acculturation was determined by language spoken in the home, ethnic food preparation and years in the US (Table 1). Surveys assessed belief in healthiness of foods (9 questions), healthiness of cultural diet patterns (2 questions), individual and cultural food preferences (7 questions), and stages of change (12 questions). A short (10 question) culturally appropriate food frequency questionnaire specifying servings per day consumed for fruits, vegetables, starches, meats, dairy, beans, tortillas, snacks, sweets and fats was also utilized. Youth participants' surveys included 10 questions in a nutrition knowledge section. Theater group post surveys included questions on the perceived impact and level of participation in the program (4 questions). Youth theater group postproduction interview questions included 9 questions on specific changes in knowledge, beliefs and behaviors and well as their overall enjoyment of the theater nutrition education experience. Youth non-intervention group post surveys assessed (2 questions) awareness of any theater nutrition education that had occurred. It also assessed (1 question) if any other nutrition education experience had occurred for non-intervention group members during the four-week period between pre and post surveys.

The tool was translated with the assistance of a bilingual, bicultural assistant trained in nutrition survey tool administration. The translated tool was back translated from Spanish to English to assure translation accuracy. The translated tool was face validated with two additional bilingual, bicultural individuals. The English version was then content validated with nutrition professionals (N=4) and early childhood education professionals (N=3). The English and Spanish versions were also content and face

validated by a bicultural, bilingual nutrition professional from Mexico. The Spanish survey tool was further face validated with 14 Latino subjects (10 adults and 4 youth). The English survey tool was face validated with 2 Caucasian and 2 African-American subject adult/youth pairs. All survey validation subjects completed consent forms. The Institutional Review Board of the University of North Carolina at Greensboro approved all study instruments and methods.

Subject recruitment and characteristics. A convenience sample of theater nutrition education participants was recruited through a Multicultural Center Summer Camp Program in High Point, North Carolina. The summer camp youth were predominantly Latino with some being African-American, Caucasian or Indian. The church/camp staff invited all summer camp youth ages eight and older to participate. All youth invited to participate elected to take part in the theater nutrition education program. Consent forms were obtained from parents. Assent forms were obtained from youth. Youth participants ranged from second to seventh graders. Most participants spoke English fluently. Few participants spoke limited to no English. Thirty-nine multiethnic youth, ages 8-14, participated in parts of a theater nutrition education experience. Six youth participants were non-Latino. Thirteen Latino youth completed only parts of the experience. Nineteen Latino youth completed all portions of the intervention and were included in the data analysis. A convenience sample of participants for a non-intervention group (n=19) was recruited through an existing database of Latino residents in Guilford County. Non-intervention participants were matched by gender and age to the

intervention group and invited to participate. Consent forms were obtained from parents. Assent forms were obtained from youth.

Survey administration. A registered dietitian (SEC) guiding the youth participants in a group setting collected baseline data. Individual assistance was provided as needed. Survey administration began with guided instruction in serving sizes. Standardized culturally appropriate food models and hand portions were used to show and discuss serving sizes. The registered dietitian, assisted by trained assistants, collected heights and weights. Participants' parents completed a pre survey with assistance from trained program staff and the registered dietitian. Parents were allowed, after instruction, to take the survey home to be completed and returned by the youth participant. The youth then participated in 90 minute a day theater nutrition education sessions five days a week for four weeks. At the beginning of the fourth week the youth participants completed a post survey using the same protocols as were employed with the pre surveys. Heights and weights were also collected. At the summer camp conclusion celebration, the peer-led theater play was presented to parents, peers and community members. After the public performance, parents of youth participants were asked to complete post surveys. Trained assistants collected the parents' heights, weights and waist circumferences. Parents were allowed to return the completed surveys the following day. Due to sensitivity to cash incentives in a church affiliated camp environment, gift cards to a large store were offered to youth participants who completed all intervention protocols. All members had equal opportunity to meet the intervention requirements. Participants were interviewed

individually the day after the public performance using a standard set of prepared questions.

A bicultural, bilingual community interviewer was trained and observed by the registered dietitian in survey administration. Non-intervention participants completed the pre survey within a one-month time period of pre survey administration for the intervention group. Heights, weights and waist circumference were collected for both parent and youth in the respondent's home by the community interviewer. After a four-week period the community interviewer administered post surveys. Heights, weights and waist circumference were again collected for both parent and youth in the respondent's home. Non-intervention participants were offered ten dollars for completing all portions of the intervention protocols. Efforts were made to select non-intervention participants from an area of Guilford County most geographically separate from the theater intervention location. The Institutional Review Board of the University of North Carolina at Greensboro approved all intervention study instruments and methods.

Intervention Components. A registered dietitian facilitated the theater nutrition education. Activities were based on Viola Spolin's book "Improvisations for the Classroom". [40] The first week was spent playing games from the book which developed the participants' ability and confidence to communicate and play in a theatrical setting. The second week, nutrition was incorporated by developing skits based on food related events or conflicts. Children's books with food related plots were brought in and used as outlines for skits. Group discussions were led about food. Beliefs and feelings regarding factual information presented by the registered dietitian were discussed. The

group discussed barriers to healthy eating. The youth devised solutions to identified barriers in small groups. The small groups then developed and rehearsed stories about their identified facts, barriers and solutions. Each story was then presented to the larger group. The third week the dietitian facilitated discussions on how and why the traditional Latino diet changes. Factual information on the risks associated with the adoption of the American diet was identified and discussed. A story line about dietary acculturation was developed by participants during the group discussion. The story was modified during the rehearsal process. The dietitian developed a bilingual script from the ideas and words the youth participants used in discussion and rehearsal. Backdrops were made using scrap wood with painted cloth stapled to the sides. Participants painted the backdrops. Their artwork reflected their perceptions of their experiences in Mexico and in America. They made lists of props and costumes that the dietitian needed to provide. Costumes were obtained from a thrift store for less than five dollars. Backdrops and props cost less than \$50.00. The fourth week the bilingual play was rehearsed and presented.

Outcome Measures. Demographic, acculturation, nutrition beliefs and dietary behaviors were all assessed. Youth participants' surveys included an assessment of nutrition knowledge. Theater group post surveys included perceived impact and participation in the program. Youth theater group postproduction interview questions included questions on specific changes in knowledge, beliefs and behaviors and well as their overall enjoyment of the theater nutrition education experience. Youth and adult non-intervention group post surveys assessed awareness of the theater nutrition education that had occurred. It also assessed other nutrition education experiences that had occurred

for non-intervention group members during the four-week period between pre and post surveys.

Statistical Analysis. All study data were analyzed using Statistical Package for the Social Sciences for Windows, version 11, 2001(Chicago, IL). Thirty-nine youth participated in some of the theater nutrition education program. The purpose of this study was to assess the impact of theater nutrition education promoting the benefits of the traditional diet on Latino youth. Six of the participants were removed from data analysis because they were not Latino. Thirteen Latino youth participants were removed from data analysis because they did not complete all portions of the intervention. Demographic characteristics were summarized into frequency data. Differences between non-intervention and intervention groups were assessed by student's t test analysis. Student's t test analysis was also conducted to determine if there were differences between those youth who completed all portions of the intervention and those who did not. Pre and post differences for knowledge, beliefs and behaviors for the theater intervention group were determined using paired t tests. If statistically significant differences were present as seen in paired t test paired samples, correlations were conducted to determine the strength and direction of the relationship. Daily intakes were assigned a point value based on meeting the recommendations of the Food Guide Pyramid and a total overall health score. The results are reported for significance levels of $P < .05$.

RESULTS

Descriptive Findings. The youth intervention (N=19) and non-intervention (N=19) participants were Latino children aged 8-12 years old. Participants' year in school

ranged from second to seventh grade. Sixty-five percent of youth respondents reported living in a home where Spanish is the only language spoken. Respondents had lived in the US on average 6.7 years. The majority of youth respondents identified themselves as Hispanic with the second most frequent response being Mexican. The average family was composed of two adults and three children. The monthly household average income was between \$1000- \$1500. The traditional Mexican diet was defined by respondents to be fruits, vegetables and beans. Respondents defined American foods to be hamburgers, hotdogs, French fries and pizza. Intervention and non-intervention groups did not differ at baseline by demographic characteristics.

Youth nutrition knowledge. Paired samples correlations (N=19, R .526, P< .05) revealed that post production intervention youth knew that the American diet was less healthy (Table 2). Intervention participants reported during post production interviews previously not knowing that there are benefits to their traditional diets or that there are risks associated with the American diet. They reported now understanding that there are healthy benefits to maintaining their traditional diet patterns and risks with adopting American foods. One 11 year old child in the intervention group, who still thought the American diet was healthy post intervention, said that *the American diet had to be healthy because so many people in America eat that way*. She went on to say that *they must know what is best, and if there was something wrong with it they would not be eating that way*. She did not have changes in knowledge and she was not planning to make changes in behaviors.

The theater youth group scored an average of 28 out of 100 on the 10 question nutrition knowledge multiple-choice section of the survey. Theater youth post test knowledge scores increased by 26% to 38 out of 100. There were many specific increases in knowledge that occurred (Table 3). The most dramatic increase in specific knowledge was the percentage of youth intervention respondents able to correctly identify the recommended daily number of servings for fruit which increased from 25% to 60%.

Postproduction interviews reflected similar improvements in knowledge. Postproduction individual interviews revealed that 70% of youth reported learning something. Many reported not knowing what diabetes was before the program but postproduction understood the causes, symptoms, possible complications and methods of prevention/management for diabetes. Others reported increases in areas of knowledge including dangers related to fast foods and high fat diets, and the importance of eating fruits and vegetables. Some of the most revealing information can be seen in the direct quotes of the youth intervention group (Table 4).

Nutrition Attitudes. Youth respondents reported liking vegetables more (Table 5) after participating in the program (N=19, R .618, P< .05). In postproduction interviews, 50% of youth reported that being in the theater nutrition education program had caused them to change their attitudes and beliefs about nutrition.

Dietary Behaviors. After the intervention youth theater participants reported planning to or trying to eat more fruits, vegetables and beans (N=16, R .537, P< .05, N=16, R .674, P< .05, N=19, P< .05, respectively) and less sugar (N=19, P< .05) (Table 6). Categorizing the foods from the 10-question short food frequency questionnaire into

each Food Guide Pyramid section created a modified healthy eating index. Ten points were given if the respondent was meeting the recommendations for each section of the Food Guide Pyramid. Each respondent had a possible high score of 60. Intervention youth increased from 57% scoring 40 or greater (out of 60) on a modified healthy eating index to 84% scoring a 40 or greater (out of 60) post intervention (N=19, R=.546, P<.05). (Figure 2) No statistically significant changes were found in the non-intervention group.

Fifty percent of youth in the theater intervention reported during postproduction interviews that they had changed the way they ate because of the intervention experience. During individual postproduction interviews, many youth reported specific changes in dietary behaviors such as decreasing sugar, fat, portion sizes and fast food consumption. Again, some of the most revealing information can be seen in the direct quotes of the theater youth intervention group in Table 4.

Script. The intervention youth developed a bilingual script based on the factual nutrition information that was presented and discussed. The youth focused the plot on diabetes. The story began with two families both living in Mexico. The fathers come home and tell the families that it is time to move to America. The youth shared their feelings about coming to America through the words of the script. Both families pack up and have to leave their family pets at home. One family travels by car and one family crosses the desert on foot with a guide. Again the youth share their perceptions of the journey. When they arrive in America they pay a guide to help them find a place to live, work and get the kids in school. On the first day of school the children meet new friends,

deal with language barriers and experience American school foods. At first the new foods taste bad and make them sick. In time they begin to prefer the new “American” foods. Both children begin to pester the Mother to buy the new foods when they go grocery shopping with the family. One Mother gives in and gives the child non-nutrient dense “junk food” and fast food. We see the child who is still eating traditional foods helping the Mother and staying active. We see the child eating the new “American” foods being inactive, watching TV and not help the Mother. In school a registered dietitian comes to teach about the health benefits of the traditional Latino diet and the health risks associated with the American diet. We see the child who has adopted American foods ignore the dietitian and continue eating “junk” food. The child grows up and has a family of their own. We see that adult not playing with their own children and watching TV while eating more “junk” food. A doctor comes in and explains that the now adult character has diabetes and that he must make changes in their diet and lifestyle but still the adult ignores the advice. In the last scene the adult who rejected the traditional foods and lifestyle is in the hospital about to have his leg amputated. The now adult childhood friend who retained the traditional foods comes to visit and brings his own child. On the way out that child begins begging for hamburgers on the way home but the parent wants to wait and make healthy traditional foods when they get home. The now adult character who is about to lose their leg to diabetes stops the child and explains how much he wishes he had listened to his own mother and learned how to make the healthy traditional foods and how it would have changed his life. The story was developed by the youth and told using the youth’s own words.

DISCUSSION

This study indicates that a theater education program which promoted traditional healthy eating practices, resulted in positive outcomes with Latino youth ages 8-12 years old. Changes occurred in nutrition knowledge, beliefs and reported behaviors of youth participants. This supports previous research indicating that theater with a nutrition message can be used to change nutrition knowledge. [32, 33, 34] It also supports previous research showing that peer-led youth theater can be used to change beliefs and behaviors. [26, 30, 31] This research adopted a novel approach in that it combined a participant-led theater process with a nutrition education message.

The success of this program can be attributed to many factors. The Church and Multicultural Center's staff were extremely supportive. The children involved were very enthusiastic about participating. The success may also be because the message used promoted the retention of, or the return to, recently held dietary beliefs and behaviors. Familiar beliefs and behaviors may be more likely to be adopted than new unfamiliar beliefs and behaviors. The Latino youth involved still primarily identified themselves as Mexican and the promotion of the traditional Mexican diet is a positive message. [4, 13]

The Multicultural summer camp staff provided breakfast and lunch to the youth intervention participants. Through special measures to make the meals culturally appropriate, the spirit of the dietary environment was supportive of the promoted behaviors because of the predominantly Latino presence. The program consisted predominantly of Latino peers and it was conducted in the summer. During the school year in the public school setting, the environment may not be as conducive. There are

limited traditional Latino food options available in the public school system in Guilford County, North Carolina. [41] Latino youth would be a minority group in most interventions in any public school in Guilford County, North Carolina. [41] Research has found that the percentage of a population that is Latino has an effect on the Latino youth of that population's behavior choices. [36]

Another factor in the success of the theater nutrition education program was the ability of theater to educate using multiple learning styles (audio, visual, tactile). The youth heard about the facts from the dietitian and then repeatedly during the rehearsal process as they learned lines and listened to fellow actors waiting for cues. They saw the information repeatedly with the dietitian's written materials and when reading the script every day learning lines. They also utilized a tactile learning mode when they had the opportunity to bring the nutrition concepts into a physical representation. Research has shown that using multiple modes of learning are more likely to result in a successful learning experience. [8, 23]

One reason that "traditional" nutrition education programs may be less successful in resulting in behavior change is lack of emotional arousal. It can be theorized, that if information is imparted but the target audience does not feel that it is important to them, they are unlikely to make changes. If, however, they feel a strong emotional response to the information, they are more likely to adopt new behaviors. There is more likely an emotional response to portraying a person who does not listen to health professionals, stays inactive, rejects traditional foods, consumes excessive non-nutrient dense foods and who loses their leg to diabetes than there is to hearing or reading about it.

Although this program had a number of positive outcomes, limitations must be addressed. The theater environment needs to feel safe and comfortable so participants can explore and take risks. This program was held in a gym that was an acoustically challenging environment. It made effective theatrical communication difficult. In addition were too many students involved at most times. A smaller group (12-20) would be more effective. The focus group work was critical in this learning process. A smaller group would also allow for more ensemble development. Another limitation was the considerable variability in attendance. A number of participants consistently attended; however, some individuals began the camp but did not stay all four weeks and some individuals joined the group well into the process. This attendance variability was unavoidable given the dynamics of the camp setting. Varying levels of English proficiency was also a limitation.

A very important limitation to consider was that survey administration methods varied between groups and within groups. The non-intervention group did not meet as a group at any time in the process, therefore all surveys with the non-intervention group were conducted in the respondents' homes. Because the non-intervention group was surveyed at the same time as the intervention was conducted, the same researcher could not administer both the non-intervention and intervention surveys. The non-intervention group received their survey verbally, individually, in their home from a Latina with whom they already had an established rapport and history. The intervention group administration was conducted in a group setting by a non-Latina with whom they had never met. Individuals in the group setting had differing levels of individual contact

based on need and individual's requesting of assistance. Data collected from parents were not analyzed due to small sample sizes (n=9). Many of the parents in the intervention group were willing to allow their children to participate but were unwilling to fill out surveys themselves.

The survey tool was designed for a seventh grade multicultural youth group. The multiple choice and fill in the blanks format was inappropriate for younger participants. The variability in age was an unexpected obstacle that was unknown prior to the first day of the summer camp program. Because the survey format was not appropriate for the younger participants individual interviews were incorporated. Mexican-American youth may have different past experiences with pretend and imaginative play. Pretend and imaginative play is a strong component in theater. Groups more familiar with imaginative play might have had different experiences with this learning methodology.

IMPLICATIONS FOR RESEARCH AND PRACTICE

The youths' exploration of concept and belief is the primary catalyst for behavior change in this education method. A step-by-step process is outlined in the theater manual developed as a result of this research that will be made available to the public. The facilitator needs to merely facilitate the process not be the process. If a facilitator initially identifies and incorporates the group's peer leaders, the process will progress naturally. The volume of work required for application of this educational method make it feasible in many educational settings. Any education professional or facilitator, regardless of previous theater experience, could utilize this novel nutrition education tool.

This research was intended to develop theater education using a nutrition message that would impact the knowledge, attitudes and behaviors of Latino youth. The program was conducted with only one group of Latino youth therefore these findings have limited generalizability. The same educational methodology needs to be tested with many groups led by different educators using the same nutrition information. Based on the findings of this study, theater nutrition education programs developed in school and community settings will promote positive nutrition knowledge attitudes and behaviors.

Figure 1. Dietary Predictors of Latino Youth Concept Model.

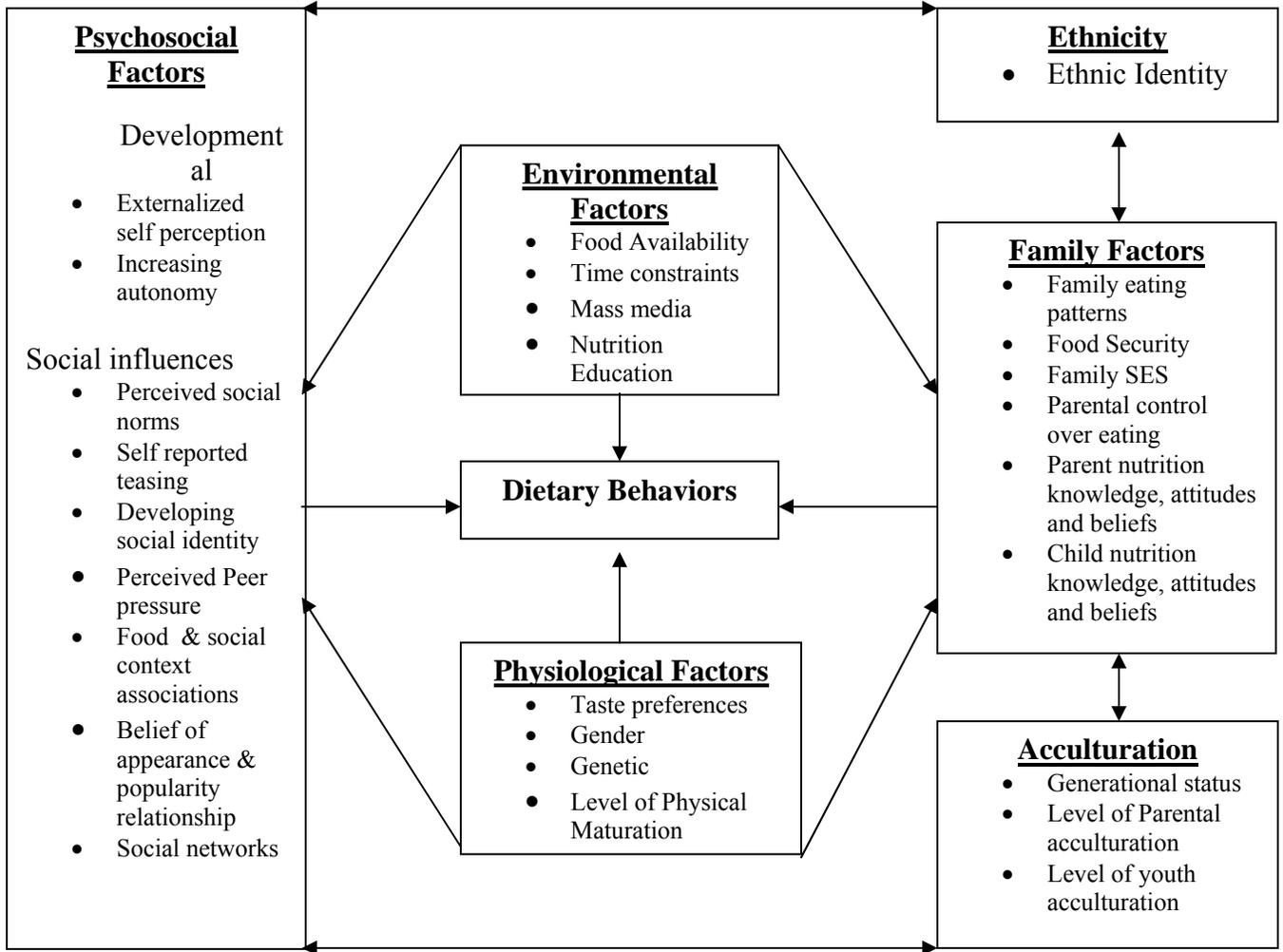


Table 1. Survey Components.

| Intervention Pre Survey | Intervention 4 week Post Survey | Intervention 4 week Post Interview | Non-intervention Pre Survey | Non-intervention 4 week Post Survey |
|---|---|--|---|---|
| Demographics Acculturation Nutrition Beliefs Dietary Behaviors Nutrition Knowledge | Demographics Acculturation Nutrition Beliefs Dietary Behaviors Nutrition Knowledge | | Demographics Acculturation Nutrition Beliefs Dietary Behaviors Nutrition Knowledge | Demographics Acculturation Nutrition Beliefs Dietary Behaviors Nutrition Knowledge |
| | Perceived Impact Participation Level | | | |
| | | Changes in Knowledge Changes in Belief Changes in Behavior Enjoyment of Process | | |
| | | | | Awareness of Intervention Other Nutrition Education |

Table 2. Changes in Knowledge^a

| | Intervention Group (n=19) | | Non-Intervention Group (n=19) | |
|---|----------------------------------|------------|--------------------------------------|------|
| | Pre | Post | Pre | Post |
| Do you think the American diet (hamburgers, hotdogs, French fries and pizza) is healthy? | | | | |
| Yes, it is very healthy | 26% | 11% | 26% | 26% |
| It is healthy | 16% | 11% | 6% | 21% |
| It is not very healthy | 11% | 21% | 16% | 21% |
| It is not at all healthy | 10% | 20% | 5% | 5% |
| I do not know | 37% | 37% | 47% | 27% |

^a Post intervention fewer youth intervention members thought that the American diet (defined by participants to be hamburgers, hotdogs, French fries and pizza) was healthy and more intervention youth knew the American was not healthy. Similar pattern were not seen in the non-intervention youth group.

Table 3. Increases in Knowledge. ^a

| Knowledge Area | Correct % Pre | Correct % Post |
|----------------------------------|----------------------|-----------------------|
| Role of Fiber | 25 | 45 |
| Risks of Fried Foods | 5 | 20 |
| Risks of Saturated Fats | 20 | 35 |
| Serving Size of Fruit | 15 | 25 |
| Recommended Fruit Serving | 25 | 60 |

^a Although the overall knowledge score did not increase significantly specific changes in knowledge were observed. Increases in ability to correctly answer 5 questions that were selected, which had greater percent changes, out of the 10 knowledge survey questions are shown in this table.

Table 4. Postproduction Interviews: Quotes from Latino Youth Theater Participants.

| |
|--|
| “I learned people could get diabetes. I had never heard of the word. I am aware of it now.” |
| “Hamburgers make you fat.” |
| “To not eat a lot of chips and fries and greasy foods.” |
| “Sugary foods can give you diabetes.” |
| “Foods with a lot of fat can lead to disease.” |
| “Don’t eat fat foods. And if you eat fat foods you get diabetes or cancer.” |
| “At first I thought diabetes wasn’t real but then I learned that diabetes was real.” |
| “ I learned about food, and that you should not eat too much fat sugar.” |
| “I learned you shouldn’t be eating fatty foods or else you could get diabetes” |
| “You should eat more healthier foods like fruits and vegetables.” |
| “If you eat too much you will get a heart attack and other diseases.” |
| “If you eat a lot of junk food you will die.” |
| “Hamburgers, I eat one every Saturday. Eat only one a week.” |
| “I eat a burger a month.” |
| “I eat vegetables and fruits now.” |
| “My Dad always used to buy us hamburgers to eat, sometimes twice a day, and now he only buys one a week.” |
| “I eat more healthy foods like vegetables and fruits.” |
| “I eat a lot of fruit at home.” |
| “ I started eating more vegetables and fruits.” |
| “I eat a little bit [of junk food] not a lot.” |
| “I eat a lot of vegetables and fruit.” |

Table 5. Changes in Attitudes ^a

| How much do you like to eat vegetables? | Intervention Group | | Non-Intervention Group | |
|--|---------------------------|------------|-------------------------------|------|
| | Pre | Post | Pre | Post |
| I love them | 16% | 37% | 32% | 26% |
| They are ok | 47% | 37% | 42% | 42% |
| I do not like them | 37% | 26% | 26% | 32% |

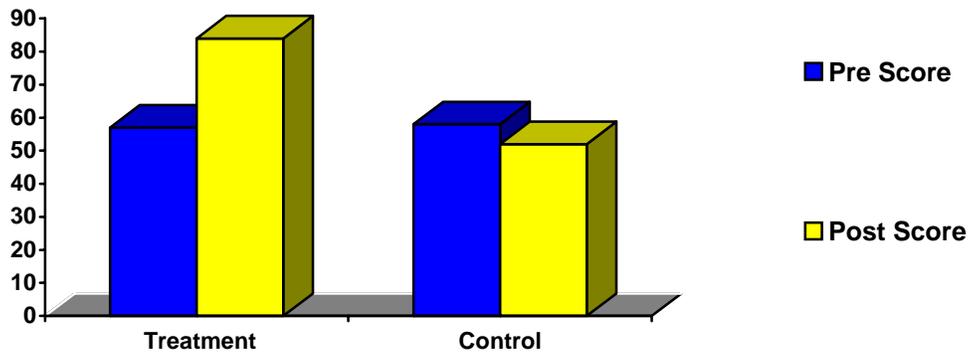
^a More intervention youth respondents reported loving vegetables post production. Similar increases in loving vegetables were not seen in the non-intervention youth group.

Table 6. Changes in Reported Youth Intake and Intended Intake of Fruit, Vegetable, Bean and Sugar. ^a

| Are you planning to or trying to eat more... | Intervention Group | | Non-intervention Group | |
|---|---------------------------|--------------|-------------------------------|-------------|
| | Pre (% Yes) | Post (% Yes) | Pre (% Yes) | Post (%Yes) |
| Fruits (N=16) | 81% | 95% | 74% | 76% |
| Vegetables (N=16) | 50% | 74% | 84% | 65% |
| Beans (N=19) | 19% | 63% | 37% | 41% |
| Or less Sugar (N=19) | 44% | 84% | 68% | 70% |

^a More intervention youth respondents reported positive dietary behaviors and intended behaviors post intervention. Similar increases were not seen in the non-intervention youth group.

Figure 2. Improvements in Modified Healthy Eating Index Score.^a



^a Youth respondents in the intervention group had an increase in their modified healthy eating index score post intervention. Similar increases in the modified healthy eating index score were not observed at the post survey for non-intervention youth.

REFERENCES

1. US Census Bureau. Available at:
<http://www.census.gov/prod/2003pubs/p20545.pdf>. Accessed November 1, 2004.
2. Guilford County Census. Available at:
<http://quickfacts.census.gov/qfd/states/37/37081.html>. Accessed November 1, 2004.
3. Lin H, Bermudez OI, Tucker KL. Dietary patterns of Hispanic elders are associated with acculturation and obesity. *J Nutr.* 2003;133:3651-7.
4. Neuhouser ML, Thompson B, Conrado GD, Solomon CE. Higher fat intake and lower fruit and vegetables intakes are associated with greater acculturation among Mexicans living in Washington State. *J Am Diet Assoc.* 2004;104:51-7.
5. World Health Organization. Available at: <http://www.who.int/en/> Accessed November 1 2004.
6. Center of Disease Control. Available at: <http://www.cdc.gov/> Accessed November 1 2004.
7. Colby SE, Haldeman L. Eating behaviors and level of food insecurity among Latino immigrants in Guilford County, North Carolina. *American Public Health Association 131st Annual Meeting Proceedings.* November 15-19, 2003. San Francisco, CA.

8. Birnbaum AS, Lytle LA, Story M, Perry CL, Murray DM. Are differences in exposure to a multicomponent school-based intervention associated with varying dietary outcomes in adolescents? *Health Educ Behav.* 2002;29:427-43.
9. Brinberg D, Axelson ML, Price S. Changing food knowledge, food choice, and dietary fiber consumption by using tailored messages. *Appetite.* 2000;35:35-43.
10. Choi NG, Smith J. Reaching out to racial/ethnic minority older persons for elderly nutrition programs. *J Nutr Elder.* 2004;24:89-104.
11. Monroe KR, Monroe KR, Hankin JH, Pike MC. Correlation of dietary intake and colorectal cancer incidence among Mexican-American migrants: the multiethnic cohort study. *Nutr Cancer.* 2003;45:133-47.
12. Himmelgreen DA, Perez-Escamilla R, Martinez D, et al. The longer you stay, the bigger you get: length of time and language use in the U.S. are associated with obesity in Puerto Rican women. *Am J Phys Anthropol.* 2004;125:90-6.
13. Satia-Abouta J, Patterson RE, Neuhouser ML, Elder J. Dietary acculturation: applications to nutrition research and dietetics. *J Am Diet Assoc.* 2002;102:1105-18.
14. Romero-Gwynn E, Grivetti L, McDonald R, Stanford G, Turner B, West E, Williamson E. Dietary Acculturation among Latinos of Mexican Descent. *Nutr Today.* July/August 1993:6.
15. Drewnowski A, Specter SE. Poverty and obesity: the role of energy density and energy costs. *Am J Clin Nutr.* 2004;79:6-16.

16. Gordon-Larsen P, Harris KM, Ward DS, Popkin BM. Acculturation and overweight-related behaviors among Hispanic immigrants to the US: the National Longitudinal Study of Adolescent Health. *Soc Sci Med.* 2003; 57:2023-34.
17. Popkin BM, Udry JR. Adolescent obesity increases significantly in second and third generation U.S. immigrants: the National Longitudinal Study of Adolescent Health. *J Nutr.* 1998;128:701-6.
18. Artinian NT, Schim SM, VanderWal JS, Nies MA. Eating patterns and cardiovascular disease risk in a Detroit Mexican American population. *Public Health Nurs.* 2004;21:425-34.
19. Bermudez OI, Falcon LM, Tucker KL. Intake and food sources of macronutrients among older Hispanic adults: association with ethnicity, acculturation, and length of residence in the United States. *J Am Diet Assoc.* 2000; 100:665-73.
20. Colby SE, Haldeman L. Eating behaviors and level of food insecurity among Latino immigrants in Guilford County, North Carolina. *American Public Health Association 131st Annual Meeting Proceedings.* November 15-19, 2003. San Francisco, CA.
21. Abood DA, Black DR, Birnbaum RD. Nutrition education intervention for college female athletes. *J Nutr Educ Behav.* 2004;36:135-7.
22. Ma J, Betts NM, Horacek T, Georgiou C, White A, Nitzke S. The importance of decisional balance and self-efficacy in relation to stages of change for fruit and vegetable intakes by young adults. *Am J Health Promot,* 2002;16:157-66.

23. Achterberg C, Miller C. Is one theory better than another in nutrition education? A viewpoint: more is better. *J Nutr Educ Behav.* 2004;36:40-2.
24. Baranowski T, Cullen KW, Nicklas T, Thompson D, Baranowski J. Are current health behavioral change models helpful in guiding prevention of weight gain efforts? *Obes Res.* 2003;11:23S-43S.
25. Snow S, D'Amico M, Tanguay D. Therapeutic theatre and well-being. *Arts Psychotherapy.* 2003;30:73-82.
26. Gray B. This is the Story of Wicked: Community Drama Theatre with At-Risk Aboriginal Australian Youth. *Arts Psychotherapy.* 1997;24:275-279.
27. Mabala R, Allen KB. Participatory action research on HIV/AIDS through a popular theatre approach in Tanzania. *Eval Prog Plan.* 2002;25:333-339.
28. Schindel DN, Oughtred K. Museum Theatre as a Catalyst for Inclusivity Embracing a multicultural community through the production of Harvest Ceremony: Beyond the Thanksgiving Myth. *SOTA.* 2001;7-13.
29. Garcia L. Uncovering Hidden Stories: Pre-service teachers explore cultural connections. *SOTA.* 2002;14:5-9.
30. Zimmer PM. Borrowing a Cup of Culture: An Example of Creating an Original Cross-Cultural Theater for Youth Production. *SOTA.* 2001;12:19-21.
31. Nelson B, Colby R, McIlrath M. Having Their Say: The Effects of Using Role with an Urban Middle School Class. *Youth Theatre J.* 2000;15:59-69.
32. Harris T, Griep K. [Interview] The National Theater for Children. Minneapolis, MN. Available at: www.nationaltheater.com. Accessed February 26, 2003.

33. Keenan DP, Williams E, Mathur S. [Interview] The Food Stamp Nutrition Education Program/Rutgers, The State University of New Jersey. New Brunswick, NJ. Available at:<http://rutgers.nifsnep.org>. Accessed February 26, 2003.
34. Perry CL, Zauner M, Oakes JM, Taylor G, Bishop DB. Evaluation of a Theate Production About Eating Behavior of Children. *J Sch Health*. 2002;72:256.
35. Taylor T, Serrano E, Anderson J, Kendall P. Knowledge, skills, and behavior improvements on peer educators and low-income Hispanic participants after a stage of change-based bilingual nutrition education program. *J Community Health*. 2000;25:241-62.
36. Umana-Taylor AJ. Ethnic identity and self-esteem examining the role of social context. *J Adolescence*. 2003;11.
37. Webb NM, Mastergeorge A. Promoting effective helping behavior in peer-directed groups. *Int J Educ Res*. 2003;73-97.
38. Lieberman M, Gauvin L, Bukowski WM, White DR. Interpersonal influence and disordered eating behaviors in adolescent girls-The role of peer modeling, social reinforcement, and body-related teasing. *Eating Behav*. 2001;2:215-237.
39. Misra R, Aguillon S. Predictors of Health Behaviors in Rural Adolescents. *Health Ed*. 2001;101:22-32.
40. Spolin, V., Sills P. *Improvisation for the Theater*. 3rd Edition.
41. Bailey, R., Director of The Center for New North Carolinians, Greensboro NC, Personal Communication to S. Colby, 2004: Greensboro.

EPILOGUE

Two weeks ago she had been in a small town with red clay floors and fruit trees growing in the yard. Now she was in a loud Church gymnasium listening to an excited young American woman speaking rapidly in a foreign language. Her new friends were helping her to understand and communicate. Anxious, a little scared and very excited, she was beginning a journey that this group of new Mexican-American youth would later aptly name “Crossing Borders”.

The journey that brought all involved to “Crossing Borders” began with the question “What are the needs and status of the newly arriving Latino immigrants in Guilford County?” Needs assessment surveys revealed that nutrition education and the retention of the traditional Latino diet offered many benefits including improved overall diet quality and reduced food insecurity related hunger. This indicated that nutrition education needed to be conducted promoting the retention of the traditional healthy Latino diet. In order to conduct nutrition education using this message, the factors involved in the acculturation of the traditional Latino diet needed to be understood. The field research in Mexico combined with in-depth interviews revealed that the adolescent was the driving force of acculturation for the newly arrived Latino family. Therefore, Latino youth need to be the target audience for the nutrition education that promoted the

traditional healthy Latino diet. Due to specific educational needs of an adolescent target population and the complex emotional nature of the topic, a unique opportunity to develop the novel method of peer-led theater nutrition education was discovered. This theater education work was conducted with a group of children in a multicultural summer camp associated with a catholic church in High Point, North Carolina. Arriving the first day I had no idea what to expect. I had a group of kids between the ages of 8-14 years old. At any given time I would have groups of 27-39 children depending on daily camp attendance. Each day for four weeks I had the children for 90 minutes. The gym was loud, hot and an acoustic nightmare. The majority of children were from Mexico and were fully bilingual. Although some of the children had lived in the US all of their lives, others had been in the US for varying lengths of time. One child had only come to the US two days before the camp began. Two of the children did not speak English and relied on their peers for interpretation.

Pre surveys assessing knowledge, attitudes and behaviors, and anthropometrical measurements were collected from the theater group and control group. We then started the four-week theater nutrition education process. The first step was to create a safe emotional environment where the children felt free to explore and take risks. Peers were taught not to laugh at or judge someone for what they were doing. We discussed how it felt to be in the space in front of their peers and being sensitive to those emotions. We focused on respect, encouragement, and acceptance.

We used Viola Spolin theater games to get the kids on their feet and comfortable interacting. They began to express themselves and communicate in a creative

environment. The process in the beginning was focused on the creation of an ensemble. Slowly basic theatrical concepts were introduced. The environment was difficult to modify. We struggled to create a warm intimate setting. It is important when using space that is used by children for other non-theater activities to be able to make small modifications to create a different physical environment. This transition of the physical space is an important step in creating the emotional state needed to take risks and create an environment that promotes the suspension of disbelief. The gym was large, open, and an acoustic nightmare. To try and create a safe, warm, personal environment we had the kids break into smaller groups and make up, bring to its feet, rehearse and present stories that had beginnings, conflicts, and resolution that were centered around provided props.

I found that although this group of kids was very eager to volunteer to participate, they had no experience with this form of creative play. In talking to a number of theater professionals about working with Latino youth, they have had similar experiences. There seems to be cultural differences in the way children play that made the concept of theatrical play a novel experience for this group. As youth, they had not had the same experiences as many American youth have had with pretend tea parties and elaborate superhero adventures. Because this form of pretend play was new to this group of children, it made my involvement a very moving experience. I was able to watch them embrace new ideas and enjoy taking the risks of exploring creative play.

Slowly we began to incorporate nutrition concepts into the process. First, I brought in children's stories that involved food. As a group we discussed the different roles food can play in our lives. In small groups, they directed, rehearsed, and presented

the stories they created to the whole group. We continued with more group discussions bringing in additional nutrition facts. The youth discussed some of the barriers they identified that might prevent someone from adopting healthy dietary behaviors. Again in small groups the kids made up, rehearsed and presented stories centered on the identified barriers. By doing this, each group had the opportunity to explore different possible resolutions to the barriers. As a group we could then discuss the presented solution strategies.

In this process the children were empowered. They had the knowledge. It was their opinions and thoughts that were important. They were in charge of their own creations. I was merely a facilitator, a guide. This was a peer-led theater process. They were exploring and creating their own worlds around topics I brought to the table. At this point, as a group, we discussed the purpose of theater. We focused on theater as a communication tool. Theater can provide a way for others to see and understand a different view of a world they may not previously have understood. We took the nutrition facts about the risks of dietary acculturation and the development of obesity and diabetes and put it into a story format.

The fully bilingual script was written using the children's words. The process incorporated activities to improve language skills, reading skills and writing skills. The children also expanded their visual art skills when they painted backdrops that represented each scene. They learned basics of theatrical production. The play was presented at the end of the camp ceremony in front of the rest of their peers and their

family members. It was not Broadway. It was barely elementary school quality, but it changed the lives of the children who created it.

Follow-up surveys assessing knowledge, attitudes, and behaviors, and anthropometric measurements were collected from the theater and control groups. Improvements were noted in knowledge, attitudes, and reported behaviors of the youth that participated in the theater nutrition education program. As a nutritionist, I was happy that this process was able to convey the knowledge that their traditional diets were healthier than “American” foods (group identified as hotdogs, hamburgers, pizza, and French fries). They also learned that “American” foods were associated with the development of diabetes and obesity. It is important to me as a nutrition professional to know that it changed how they felt about food. From now on when they think about stopping for a burger it will elicit a different emotional response. They will probably still grab fast food or complain about something their Mom makes, but they will do it with a different perspective and hopefully less often. Their parents also gained the knowledge that traditional foods they already knew how to cook were a healthy choice for their family. This knowledge empowered the parents. This will increase the likelihood that they will retain more of their healthy traditional foods. If newly arrived Latino families retain more of their traditional foods, their health may be improved. Although the changes seen in knowledge, attitudes, and behaviors were important, other equally important outcomes were less easily assessed. What impact does it have when a child creates a piece of art that shows what they feel and think and then shares it with the world? What impact does it have on those who get to glimpse of this worldview? I think

all of us who were involved gained valuable perspectives about what a person experiences when crossing borders.

LIMITATIONS

Although the intervention was overall a very positive endeavor, a number of limitations were encountered. The physical gymnasium environment for the intervention was not conducive to a quality theater process. It was an acoustic nightmare. Many times the space was shared with other groups, compounding this problem. It was easy for youth participants to become distracted in this setting.

The number of total participants was much too large. The group almost always had over 32 participants present. Such a large group makes focus group and discussion work much less effective. Large groups are also not as effective for developing a close theater ensemble. Additionally, the participants were very undisciplined and hard to manage. They were not in a school setting. A school setting may have provided inherent increased structure. They spent the rest of the day in the same area running around with friends and playing. This made group discussion hard to keep focused and activities hard to explain and begin. A school setting would have provided a smaller, more organized group. It would also have provided more comparison groups with which to experiment. Alternative educational methods, indicated by the classroom teacher, could be used to compare to the theater nutrition education.

The variability in attendance also hindered the development of an ensemble. Many of the participants who were enjoying and contributing to the process could not be included in data analysis because of attendance issues. If a respondent missed only one

day but it happened to be a pre or post survey day, they could not be included in analysis. A larger sample would have been statistically advantageous. Observations of participants not able to be included in analysis indicated that the theater process was positively impacting them. The inclusion of these respondents in data analysis would have strengthened the statistical significant relationships found and possibly revealed additional statistical relationships.

Survey administration methods varied between groups. The control group was surveyed individually and the intervention group was surveyed as a group. The same researcher could not survey both groups because they occurred in the same period of time. The control group received their survey verbally, individually, in their home from a Latina with whom they already had an established rapport and history. The intervention group administration was conducted in a group setting by a non-Latina with whom they had never met.

Responses could also have been biased by impressions of what the interviewer would want to hear based on cultural assumptions. Respondents may not have felt as comfortable telling a non-Latina American that the American diet was not healthy as they would a Latina and vice versa. The previous contact with the community interviewer may have also biased the control group responses in that they already felt they knew what she felt about the American diet. The community interviewer also had a difficult time not engaging in conversation and providing feedback as the survey was administered due to the nature of the questions and similarities in cultural experiences. Respondents enjoyed

conversing with the community interviewer. This was difficult to eliminate while maintaining rapport.

The survey tool was designed for a seventh grade multicultural youth group but due to unexpected summer camp demographics was administered to participants in as low as second grade. Students in elementary school (2nd -5th grade) may never have even seen a multiple-choice format. The limitations in survey tool design may have prevented actual measurement of many outcome variables.

Specific aim three, to assess the extent that peer-led theater play can change family member's nutrition knowledge, attitudes and behaviors is not addressed in these articles because of limitations encountered. Parents in the theater group were willing to let their child participate but were not willing to fill out the forms themselves. Many who did fill out pre surveys would not fill out post surveys. This resulted in very small sample sizes. A known Latina community member was surveying the adults in the control group. The adults in the theater group were being approached by an unknown non-Latina American. They may have been comfortable allowing their children to participate because they are accustomed to allowing their child to participate in American institutions in the public school system. Also, a few of the participants in the theater youth group were siblings thereby decreasing the already small sample size in the adult theater group. The presence of siblings was mirrored in the control group decreasing the sample size of parents in the control group as well.

FUTURE WORK

Despite the many limitations discussed, the intervention had positive outcomes. Based on these findings, the manual developed in this process needs to be tested on a wide scale and against other education methodologies. If a large state-wide grant is obtained and an intervention is developed for use in the public school system most of the limitations discussed above will be neutralized. A nutrition education handout could be developed on a specific topic. Ideally, a statewide program then could be implemented. One third of the schools would receive no nutrition education. One third of the schools would receive the nutrition education handout and be asked to develop an appropriate lesson plan and teach the material (more traditional approach). The teachers would be asked to document their lesson plan and teaching activities. The remaining third of schools would be asked to use the theater education manual and the nutrition education handout to develop a school production on the material. Pre and post testing would be used to assess changes in knowledge, attitudes and behaviors.

This research taught me many things. I learned the importance of intervention planning and survey development. It was hard to lose possible insight because of how a question is worded. I learned that I love working with the Latino population. I also learned that although it is a very fulfilling pursuit to work with young children I work better older children. This research process only strengthened my loves of research, theater, nutrition and teaching.

Appendix A

NEEDS ASSESSMENT CONSENT FORMS

FORMA DE CONSENTIMIENTO

Título De Proyecto: Se necesita una evaluación de nutrición para Latinos en el Condado de Guilford

La universidad de Carolina del Norte en Greensboro se refiere a cómo las familias Latinas en el Condado de Guilford están viviendo y comiendo. Estamos preguntando a residentes del condado de Guilford que tienen por lo menos un niño bajo edad de 12 años que vive en su casa para contestar a preguntas sobre su situación vida, comiendo hábitos, y conocimiento de la nutrición, actitudes y comportamientos. El propósito de este estudio es aprender más sobre los comportamientos de la salud y de la nutrición del Latinos que vive en el condado de Guilford. Los resultados de este estudio serán utilizados para beneficiar la salud y el bienestar de familias en su comunidad.

Si usted esta de acuerdo a participar en este estudio, pediremos que usted conteste a un cuestionario de 45 minutos sobre su situación vida, comiendo hábitos, y conocimiento de la nutrición, actitudes y comportamientos. También tomaremos su peso y su medida. Esta encuesta será conducida en su casa o en otra localización cómoda para usted. No hay riesgo a usted para participar en este proyecto.

El total que estamos pidiendo son 45 minutos de su tiempo. Debido a su generosidad en darnos su tiempo y ayuda, le compensaremos con \$10.00. Sepa por favor que usted puede retirarse del estudio o rechazar contestar a cualquier pregunta en cualquier momento. por favor Siéntase libre de hacer cualquier pregunta acerca de esta encuesta en cualquier momento. Su participación en este estudio es totalmente voluntario. Toda la información que estamos recogiendo es terminantemente confidencial. No utilizaremos su nombre o el nombre de su niño en ningunas publicaciones o informes de

este proyecto - usted seguirá siendo totalmente anónimo. , sin embargo, proveeremos de usted la información sobre su entrevista por su requerimiento.

La investigación y esta forma del consentimiento han sido aprobadas por la universidad de Carolina del Norte en el comité examinador institucional de Greensboro, que asegura que la investigación que implica a gente sigue regulaciones federales. Preguntas con respecto a sus derechos como participante en este proyecto pueden ser contestadas llamando a Dr. Beverly Maddox-Britt en (336) 334-5878.

Si usted tiene algunas preguntas o preocupaciones por el proyecto de investigación, siéntase por favor libre entrar en contacto con la directora de este estudio, Lauren Haldeman en (336) 256-0311. Apreciamos profundamente su ayuda y cooperación en conducir este estudio. Cualquier nueva información que se convierta durante el proyecto le será proporcionada si la información pudo afectar su buena voluntad de continuar la participación en el proyecto. Firmando abajo, usted está acordando participar en el proyecto descrito a usted por _____.

_____ / / _____
Firma del participante **Date**

_____ / / _____
Firma del testigo **Date**

Appendix B

MEXICO FIELD RESEARCH CONSENT FORMS

Información Del Consentimiento

Título De Proyecto: Una comparación entre los hábitos dietéticos de una familia mejicana que vive en México y de una familia Mexicana que vive en el condado de Guilford.

La universidad de Carolina del norte en Greensboro se refiere a cómo las familias Latinas en el condado de Guilford están viviendo y el comiendo. Estamos observando las comienzas y hábitos de un niño de 12 años y de familias que viven en México central. También estamos haciendo observaciones en los comienzas y hábitos de un viejo niño de 12 años y de su familia que son de la misma área en México central que ahora vive en el condado de Guilford. También estamos preguntando por su situación viva, comiendo hábitos, y conocimiento de la nutrición, actitudes y comportamientos. El propósito de este estudio es aprender más sobre los cambios en los patrones de la dieta que ocurren como familias del aculturación de México a los Estados Unidos. Los resultados de este estudio serán utilizados para beneficiar la salud y el bienestar de familias en la comunidad del condado de Guilford.

Si usted estado acuerdo a participar en este estudio, observaremos a su familia por tres días. Documentaremos todos sus hábitos relacionados con la alimentación diario en su hogar, en el almacén y en su comunidad. También pediremos que usted conteste a un cuestionario de 45-minutos sobre su situación de vida, comiendo hábitos, y conocimiento de la nutrición, actitudes y comportamientos. Mediremos alturas y los pesos de todos los miembros de la familia. No hay riesgo a usted para participar en este proyecto.

Debido a su generosidad en dar nos su tiempo y ayuda, compensaremos a su familia con \$10.00. Sepa por favor que usted puede retirarse del estudio o rechazar contestar a cualquier pregunta en cualquier momento. Siéntase por favor libre hacer cualquier pregunta acerca de este examen en cualquier momento. Su participación en este estudio es totalmente voluntaria. Toda la información que estamos recogiendo es terminantemente confidencial. No utilizaremos ningún nombre de un miembro de la familia en ninguna publicación o informes de este proyecto. Utilizaremos cualquier cinta magnética para audio, videocinta o cuadro tomado terminantemente para la presentación

profesional de los resultados del estudio. Proveeremos de usted la información sobre su participación por su requerimiento.

La investigación y esta forma del consentimiento han sido aprobadas por la universidad de Carolina del norte en el comité examinador institucional de Greensboro, que asegura que la investigación que implica a gente sigue regulaciones federales. Preguntas con respecto le enderezan como un participante en este proyecto puede ser contestado llamando a Dr. Beverly Maddox-Britt en (336) 334-5878 en los Estados Unidos o el Sonia Velasco en 52/66/99892000 en México.

Si usted tiene algunas preguntas o preocupaciones por el proyecto de investigación, siéntase por favor libre entrar en contacto con al supervisor de este investigador del principio, Lauren Haldeman en (336) 256-0311. Apreciamos profundamente su ayuda y cooperación en conducir este estudio. Cualquier nueva información que se convierta durante el proyecto le será proporcionada es la información pudo afectar su buena voluntad de continuar la participación en el proyecto. Firmando abajo, usted está acordando participar en el proyecto descrito a usted por la firma del _____.

| | |
|--|-------|
| _____ | _____ |
| Firmas de los participantes del adulto | Fecha |

| | |
|--------------------------------------|-------|
| _____ | _____ |
| Firmas de los participantes del niño | Fecha |

| | |
|-------------------------|-------|
| _____ | _____ |
| De la fecha del testigo | Fecha |

Appendix C

MEXICO FIELD RESEARCH INTERVIEW

Latino Mothers
Focus Group Guide

I am so glad you are all here. Please feel free to say what ever you want to. I am going to ask you some question. The first question is-

1. Do you feel like you cook and eat the same amount and types of food as you did in Mexico?

How about-

Fruit
Vegetables
Tortillas
Beans
Meat
Milk
Fat
Bread
Rice
Sweets
Drinks
Snacks

Prompt- How is it different?

2. Do you feel like the types and levels of activities here in the United States are the same as the types and levels of activities you did in Mexico?

Prompt- How is it different?

3. Do you feel like kids here in the United States eat the same amount and types of food as kids in Mexico do?

How about-

Fruit
Vegetables
Tortillas

Beans
Meat
Milk
Fat
Bread
Rice
Sweets
Drinks
Snacks

Prompt- How is it different?

4. Do you feel like the types and levels of activities kids do here in the United States are the same as the types and levels of activities kids do in Mexico?

Prompt- How is it different?

5. What are some specific foods/dishes you use to prepare in Mexico?

6. Do you still prepare specific foods/dishes you use to cook in Mexico?

Prompt- If not, why?

7. How do you think your child feels about those foods/dishes?

8. Are there any other foods that you don't make that you would consider traditional Mexican foods?

IF yes, continue to 9. If no skip to 12.

9. How do you think your child feels about traditional Mexican foods?

10. How do you think your child feels about American foods?

11. What else do you think is different between here and Mexico?

12. Is there anything else you think we need to know we haven't thought to ask to understand how and why the way a person eats changes as they move from Mexico to the United States?

13. How would you feel about your child being in a school theater play that encourages traditional healthy Mexican Foods?

Now I am going to show you some pictures from Mexico and tell you about what the pictures are of. Please feel free to react to the pictures, tell me what you think, and if it is the same as it is here in the US.

PICTURES

Thank you so much for your time. Please don't talk about the ideas discussed here with anyone until after December 2004. It can mess up the research and projects we are trying to do here at the University. Do you have any other questions about the research?

Latino Youth
Focus Group Guide

I am so glad you are all here. Please feel free to say what ever you want to. I am going to ask you some question. The first question is-

1. Do you feel like you eat the same amount and types of food as you did in Mexico or you think other kids who live in Mexico eat right now?

How about-

Fruit
Vegetables
Tortillas
Beans
Meat
Milk
Fat
Bread
Rice
Sweets
Drinks
Snacks

Prompt- How is it different?

2. Do you feel like the types and levels of activities here in the United States are the same as the types and levels of activities you did in Mexico or you think other kids who live in Mexico have right now?

Prompt- How are they different?

3. What are some specific foods/dishes your mom use to cook in Mexico or what specific foods/dishes do you think moms in Mexico make?

4. Does your mom still prepare the specific foods/dishes she use to cook in Mexico?

Prompt- If not, why?

5. How do you feel about those foods/dishes?

6. How do you think your friends feel about those foods/dishes?

7. How do you think non-Latinos feel about those foods/dishes?

8. Are there any other foods that your mom doesn't make that you would consider traditional Mexican foods?

IF yes, continue to 9. If no skip to 12.

9. How do you feel about traditional Mexican foods?

10. How do you think your friends feel about traditional Mexican foods?

11. How do you think non-Latinos feel about traditional Mexican foods?

12. What else do you think is different between here and Mexico?

13. Is there anything else you think we need to know we haven't thought to ask to understand how and why the way a person eats changes as they move from Mexico to the United States?

14. How would you feel about being in a school theater play that encourages traditional healthy Mexican Foods?

Now I am going to show you some pictures from Mexico and tell you about what the pictures are of. Please feel free to react to the pictures, tell me what you think, and if it is the same as it is here in the US.

PICTURES

Thank you so much for your time. Please don't talk about the ideas discussed here with anyone until after December 2004. It can mess up the research and projects we are trying to do here at the University. Do you have any other questions about the research?

Appendix D

INTERVENTION CONSENT FORMS

Desarrollo de un juego del teatro como forma educativa del consentimiento del participante del grupo del teatro del adulto de la herramienta de la nutrición
Conducida a través de la universidad de Carolina del Norte en Greensboro

Nombre Del Padre o Mama

Nombre Del Niño

Dirección Casera

Teléfono

El propósito de esta investigación es determinar la eficacia del juego del teatro como herramienta de la educación de nutrición en conocimiento de aumento y promover el cambio positivo del comportamiento. Le pedirán completar un examen antes de que su niño comience un programa del teatro del verano. Le pedirán atender a un funcionamiento público de un juego que su niño estará adentro. Antes de que usted atienda al juego le pedirán completar un examen. Tres meses después de que el juego usted será pedido para completar un examen. Pedirá la información sobre sus prácticas de la nutrición, creencia, conocimiento, información general de la familia, y recogerá la información sobre peso y altura. Si usted no desea en cualquier momento contestar cualquier cosa, usted puede elegir no respuesta una pregunta, todas las preguntas, o parada participando en el programa enteramente. Su opción a no participar en parte o todo este trabajo no afectará la participación de su niño en cualquier otra parte de su programa del verano.

La investigación y esta forma del consentimiento han sido aprobadas por la universidad de Carolina del Norte en el comité examinador institucional de Greensboro, que asegura que la investigación que implica a gente sigue regulaciones federales. Preguntas con respecto a las sus derechas como participante en este proyecto pueden ser contestadas llamando a Dr. Beverly Maddox-Britt en (336) 334-5878. Preguntas con respecto a la investigación sí mismo serán contestadas por el Dr. Lauren Haldeman llamando (336) 256-0311. Cualquier nueva información que se convierta durante el proyecto le será proporcionada si la información pudo afectar su buena voluntad de continuar la participación en el proyecto.

La investigación y esta forma del consentimiento han sido aprobadas por la universidad de Carolina del Norte en el comité examinador institucional de Greensboro, que asegura que la investigación que implica a gente sigue regulaciones federales. Preguntas con respecto a las sus derechas como participante en este proyecto pueden ser contestadas llamando a Dr. Beverly Maddox-Britt en (336) 334-5878. Preguntas con respecto a la investigación sí mismo serán contestadas por el Dr. Lauren Haldeman llamando (336) 256-0311. Cualquier nueva información que se convierta durante el proyecto le será proporcionada si la información pudo afectar su buena voluntad de continuar la participación en el proyecto.

Mi firma abajo indica he leído y entiendo que el antedichos y yo estamos eligiendo participar en este proyecto de investigación.

Firma _____

Fecha _____

Desarrollo de un juego del teatro como padre educativo de la herramienta de la nutrición de una forma de menor importancia del consentimiento del participante del grupo del teatro que participa

Investigación conducida a través de la universidad de Carolina del Norte en Greensboro

Nombre Del Padre o Mama _____

Nombre Del Niño _____

El propósito de esta investigación es determinar la eficacia del juego del teatro como herramienta de la educación de nutrición en conocimiento de aumento y promover el cambio positivo del comportamiento. Se está invitando a su niño que participe en un juego centrado en la dieta mexicana tradicional sana. Trabajarán con un instructor del teatro por 90 minutos al día por cuatro semanas durante su programa del verano y presentarán un funcionamiento público en el final del programa del verano. Habrá publicidad y promoción del juego que puede implicar los cuadros y la otra representación de los medios de su niño. Serán pedidos para completar un examen antes de que comiencen, en el final del proceso y de tres meses después del juego. Pedirá la información sobre sus prácticas de la nutrición, creencia, conocimiento, información general de la familia, y recogerá la información sobre peso y altura. Podemos también utilizar la grabación de cinta, la fotografía, y grabar durante este trabajo. Si su niño no desea en cualquier momento contestar cualquier cosa pueden elegir no respuesta una pregunta, todas las preguntas, para no participar en una actividad específica o para no parar el participar en el programa enteramente. Su opción a no participar en parte o todo este trabajo no afectará su participación en cualquier otra parte de su programa del verano.

La investigación y esta forma del consentimiento han sido aprobadas por la universidad de Carolina del Norte en el comité examinador institucional de Greensboro, que asegura que la investigación que implica a gente sigue regulaciones federales. Preguntas con respecto a las sus derechas como participante en este proyecto pueden ser contestadas llamando a Dr. Beverly Maddox-Britt en (336) 334-5878. Preguntas con respecto a la investigación sí mismo serán contestadas por el Dr. Lauren Haldeman llamando (336) 256-0311. Cualquier nueva información que se convierta durante el proyecto le será proporcionada si la información pudo afectar su buena voluntad de continuar la participación en el proyecto.

Entiendo que las respuestas de mi niño serán mantenidas terminantemente confidenciales y que ningunos de los datos lanzados en este estudio identificarán mi nombre o cualesquiera otros datos, descripciones o caracterización identificables. Entiendo que mi niño puede continuar su participación en este proyecto en cualquier momento o rechazar responder a cualquier pregunta a la cual elijan no contestar. Mi niño es un participante voluntario y no tiene ninguna responsabilidad o responsabilidad de la puesta en práctica, de la metodología, de las demandas, de la sustancia o de los resultados resultando de este proyecto de investigación. Estoy también enterado que mi decisión para no permitir que participe mi niño no dará lugar a ningunas consecuencias adversas o tratamiento dispar debido a esa decisión.

Mi firma abajo indica he leído y entiendo que el antedichos y yo estamos eligiendo dejamos a mi niño participar en este proyecto de investigación.

Firma _____

Fecha _____

Desarrollo de un juego del teatro como forma del consentimiento del participante del grupo del teatro de la nutrición de un menor de edad educativo de la herramienta

Investigación conducida a través de la universidad de Carolina del Norte en Greensboro

Su Nombre

Nombre De Su Padre

Su Escuela

Estamos intentando ver si podemos utilizar un juego para ayudar con cómo la gente come. Quisiéramos que usted fuera una parte de nuestro estudio. Primero usted contestaría a algunas preguntas. Entonces usted ayudaría a hacer un juego. Entonces usted contestaría a más preguntas. Veríamos cómo es alto usted es y cuánto usted pesa, pero ninguno otro descubrirá. Si hay cualquier pregunta usted no desea contestarle no tuvo que. Usted puede parar en cualquier momento. En el extremo demostraremos el juego a sus amigos y familia. Usted puede ayudarnos hacia fuera con el juego y no estar en etapa. Usted puede estar en los cuadros que pudieron estar en el periódico o en la TV si usted desea a y sus padres dicen que es aceptable, o usted no lo haga tuvieron que. Si usted no desea hacer cualquiera de el que sea aceptable y usted puede todavía estar en el resto de su programa del verano. Sus padres tienen que decir que es aceptable para que usted consiga hacer el juego con nosotros.

Sé que nadie sabrá lo que digo o hago a menos que lo desee a. Sé que puedo parar el ser una parte de esto cualquier momento deseo y nada no sucede la mala voluntad si lo hago. Entiendo todas las cosas escritas aquí y yo quiera que fuéramos una parte del juego.

Firma _____

Fecha _____

Desarrollo de un juego del teatro como forma educativa del consentimiento del participante del grupo de control del adulto de la herramienta de la nutrición

Conducida a través de la universidad de Carolina del Norte en Greensboro

Nombre Del Padre

Nombre Del Niño

Dirección Casera

Teléfono

El propósito de esta investigación es determinar la eficacia del juego del teatro como herramienta de la educación de nutrición en conocimiento de aumento y promover el cambio positivo del comportamiento. Le pedirán completar un examen antes de que su niño comience, cuatro semanas más adelante, y tres meses después del programa del verano de su niño. Pedirá la información sobre sus prácticas de la nutrición, creencia, conocimiento, información general de la familia, y recogerá la información sobre peso y altura. Si usted no desea en cualquier momento contestar cualquier cosa, usted puede elegir no respuesta una pregunta, todas las preguntas, o no participar en el programa de investigación enteramente. Su opción a no participar en parte o todo este trabajo no afectará la participación de su niño en cualquier otra parte de su programa del verano.

La investigación y esta forma del consentimiento han sido aprobadas por la universidad de Carolina del Norte en el comité examinador institucional de Greensboro, que asegura que la investigación que implica a gente sigue regulaciones federales. Preguntas con respecto a las sus derechas como participante en este proyecto pueden ser contestadas llamando a Dr. Beverly Maddox-Britt en (336) 334-5878. Preguntas con respecto a la investigación sí mismo serán contestadas por el Dr. Lauren Haldeman llamando (336) 256-0311. Cualquier nueva información que se convierta durante el proyecto le será proporcionada si la información pudo afectar su buena voluntad de continuar la participación en el proyecto.

Entiendo que mis respuestas serán mantenidas terminantemente confidenciales y que ningunos de los datos lanzados en este estudio identificarán mi nombre o cualesquiera otros datos, descripciones o caracterización identificables. Entiendo que puedo continuar mi participación en este proyecto en cualquier momento o rechazar responder a cualquier pregunta a la cual elija no contestar. Soy un participante voluntario y no tengo ninguna responsabilidad o responsabilidad de la puesta en práctica, de la metodología, de las demandas, de la sustancia o de los resultados resultando de este proyecto de investigación. Estoy también enterado que mi decisión a no participar no dará lugar a ningunas consecuencias adversas o tratamiento dispar debido a esa decisión.

Mi firma abajo indica he leído y entiendo que el antedichos y yo estamos eligiendo participar en este proyecto de investigación.

Firma _____

Fecha _____

Desarrollo de un juego del teatro como forma del consentimiento del participante del grupo de control de la nutrición de un menor de edad educativo de la herramienta

Investigación conducida a través de la universidad de Carolina del Norte en Greensboro

Su Nombre

Nombre De Su Padre

Su Escuela

Estamos intentando ver si podemos utilizar un juego para ayudar con cómo la gente come. Quisiéramos que usted fuera una parte de nuestro estudio. Primero usted contestaría a algunas preguntas. Entonces usted contestaría cuatro semanas más adelante a más preguntas. Veríamos cómo es alto usted es y cuánto usted pesa, pero ninguno otro descubrirá. Si hay cualquier pregunta usted no desea contestarle no tuvo que. Usted puede parar en cualquier momento. Si usted no desea hacer cualquiera de el que sea aceptable y usted puede todavía estar en el resto de su programa del verano. Sus padres tienen que decir que es aceptable para que usted haga esto.

Sé que nadie sabrá lo que digo o hago o cualquier cosa sobre mí. Sé que puedo parar el ser una parte de esto cualquier momento deseo y nada no sucede la mala voluntad si lo hago. Entiendo todas las cosas escritas aquí y yo quiera que fuéramos una parte de este estudio.

Firma _____

Fecha _____

Desarrollo de un juego del teatro como padre educativo de la herramienta de la nutrición de una forma de menor importancia del consentimiento del participante del grupo de control que participa

Conducida a través de la universidad de Carolina del Norte en Greensboro

Nombre Del Padre

Nombre Del Niño

Dirección Casera

Teléfono

El propósito de esta investigación es determinar la eficacia del juego del teatro como herramienta de la educación de nutrición en conocimiento de aumento y promover el cambio positivo del comportamiento. Pedirán su niño completar un examen antes de que su niño comience, en el final de, y tres meses después de su programa del verano. Pedirá la información sobre las prácticas de la nutrición de su niño, creencia, conocimiento, información general de la familia, y recogerá la información sobre peso y altura. Si su niño no desea en cualquier momento contestar cualquier cosa su niño puede elegir no respuesta una pregunta, todas las preguntas, o no participar en el programa de investigación enteramente. La opción de su o su niño a no participar en parte o todo este trabajo no afectará su participación en cualquier otra parte de su programa del verano.

La investigación y esta forma del consentimiento han sido aprobadas por la universidad de Carolina del Norte en el comité examinador institucional de Greensboro, que asegura que la investigación que implica a gente sigue regulaciones federales. Preguntas con respecto a las sus derechas como participante en este proyecto pueden ser contestadas llamando a Dr. Beverly Maddox-Britt en (336) 334-5878. Preguntas con respecto a la investigación sí mismo serán contestadas por el Dr. Lauren Haldeman llamando (336) 256-0311. Cualquier nueva información que se convierta durante el proyecto le será proporcionada si la información pudo afectar su buena voluntad de continuar la participación en el proyecto.

Entiendo que mis respuestas serán mantenidas terminantemente confidenciales y que ningunos de los datos lanzados en este estudio identificarán mi nombre o cualesquiera otros datos, descripciones o caracterización identificables. Entiendo que puedo continuar mi participación en este proyecto en cualquier momento o rechazar responder a cualquier pregunta a la cual elija no contestar. Soy un participante voluntario y no tengo ninguna responsabilidad o responsabilidad de la puesta en práctica, de la metodología, de las demandas, de la sustancia o de los resultados resultando de este proyecto de investigación. Estoy también enterado que mi decisión a no participar no dará lugar a ningunas consecuencias adversas o tratamiento dispar debido a esa decisión.

Mi firma abajo indica he leído y entiendo el antedichos y yo estamos eligiendo permitir que mi niño participe en este proyecto de investigación.

Firma _____

Fecha _____

Desarrollo de un juego del teatro como padre educativo de la herramienta de la nutrición de una forma de menor importancia del consentimiento de los medios del grupo del teatro que participa

Conducida a través de la universidad de Carolina del Norte en Greensboro

| | |
|------------------|-----------------|
| _____ | _____ |
| Nombre Del Padre | Nombre Del Niño |
| _____ | _____ |
| Dirección Casera | Teléfono |

El propósito de esta investigación es determinar la eficacia del juego del teatro como herramienta de la educación de nutrición en conocimiento de aumento y promover el cambio positivo del comportamiento. Se está invitando a su niño que participe en un juego centrado en la dieta mexicana tradicional sana. Trabajarán con un instructor del teatro por 90 minutos al día por cuatro semanas durante su programa del verano y presentarán un funcionamiento público en el final del programa del verano. Habrá publicidad y promoción del juego que puede implicar los cuadros y la otra representación de los medios de su niño. Le y su niño pedirán completar un examen antes de que su comienzo del niño, en el final del proceso y de tres meses después del juego. Pedirá la información sobre sus prácticas de la nutrición, creencia, conocimiento, información general de la familia, y recogerá la información sobre peso y altura. Podemos también utilizar la grabación de cinta, la fotografía, y grabar durante este trabajo. Si su niño no desea en cualquier momento contestar cualquier cosa su niño puede elegir no respuesta una pregunta, todas las preguntas, para no participar en una actividad específica o para no parar el participar en el programa enteramente. La opción de su o su niño a no participar en parte o todo este trabajo no afectará su participación en cualquier otra parte de su programa del verano.

La investigación y esta forma del consentimiento han sido aprobadas por la universidad de Carolina del Norte en el comité examinador institucional de Greensboro, que asegura que la investigación que implica a gente sigue regulaciones federales. Preguntas con respecto a las sus derechas como participante en este proyecto pueden ser contestadas llamando a Dr. Beverly Maddox-Britt en (336) 334-5878. Preguntas con respecto a la investigación sí mismo serán contestadas por el Dr. Lauren Haldeman llamando (336) 256-0311. Cualquier nueva información que se convierta durante el proyecto le será proporcionada si la información pudo afectar su buena voluntad de continuar la participación en el proyecto.

Soy un participante voluntario y no tengo ninguna responsabilidad o responsabilidad de la puesta en práctica, de la metodología, de las demandas, de la sustancia o de los resultados resultando de este proyecto de investigación. Estoy también enterado que mi decisión a no participar no dará lugar a ningunas consecuencias adversas o tratamiento dispar debido a esa decisión.

Doy el permiso para que el cuadro, la semejanza y el nombre de mi niño sean utilizados en publicidad y la promoción de este trabajo del teatro (un cuadro de su niño puede estar en el papel, en las noticias locales o en un aviaador que anuncia el juego).

Firma _____ Fecha _____

Appendix E

INTERVENTION HANDOUT

The Mexican diet is healthy.

When people from Mexico move here they have more of a chance of getting too heavy and getting diseases like diabetes, heart disease and some cancers.

When people move here they change the way they eat.

In Mexico they eat more-

- **Fruit**
- **Veggies**
- **Beans**
- **Corn tortillas**

In Mexico they eat less-

- **Fast foods**
- **Food made to stay on the shelf**
- **Desserts**
- **Snacks**

In Mexico they drink lots of drinks made with fresh fruit and milk and less fake fruit drinks like Sunny D, Capri Sun, and Kool Aid.

Fruits and Veggies help to keep us from getting sick and getting diseases like diabetes, heart disease and cancer.

We need 3-5 servings of veggies a day. We need 2-4 servings of fruit a day. A serving of veggies is one handful cooked or two handfuls raw. One small piece of fruit or 4 ounces of juice is a serving.

Vitamin and mineral are things we get in foods that help our body in lots of ways. There are many that we could not stay alive if we did not get.

Corn tortillas are low in fat and have vitamins and minerals.

Beans have fiber that help us to feel full and help keep our blood sugar normal.

Fiber is stuff that helps keep our blood from getting too gunked up with fat and helps keep our insides clean.

Many foods made to stay on the shelf, fast foods, snacks, and desserts (like twinkies, starburst, sodas, French fries, hamburgers, little Debbie snack cakes and potato chips) are high in sugar, saturated fat, trans fat and calories.

If we get more calories than we need we gain weight. Being heavy makes us much more likely to get diseases like diabetes, heart disease, and some cancers.

Sugar adds calories and no good things that help our bodies. For people with **diabetes their bodies have a hard time keeping the amount of sugar in the blood at the right levels. If there is too much sugar in your blood it hurts your body like your *eyes* (can make you go blind), your *heart* (can make your heart stop), your *kidneys* (you can end up having to have needles put in to pull the blood out of your body and clean it and then put it back in) or your *feet and legs* (you could end up having your feet or legs cut off).**

Saturated fat and trans fat clogs the parts where the blood flows (Heart disease**). It looks just like chicken grease that has stayed in a frying pan over night and when it goes around a curve it sticks there. As that happens again and again it builds up and gets hard and then the blood can't get through to your heart (**heart attack**) or brain (**stroke**). When we look at the arteries of kids who have died in accidents we already see that if they eat a lot of saturated or trans fat there arteries are already starting to get clogged up.**

We can all learn something from the Mexican diet and try to eat more fruits, vegetables and beans and less “junk” food.

La dieta mexicana es sana.

Cuando la gente del movimiento de México aquí ella tiene más de una ocasión de conseguir demasiado pesada y de conseguir enfermedades como la diabetes, la enfermedad cardíaca y algunos cánceres.

Cuando la gente se mueve aquí ella cambia la manera que ella come.

En México comen más-

- **Fruta**
- **Vehículos**
- **Habas**
- **Tortillas del maíz**

En México comen menos-

- **Alimentos de preparación rápida**
- **Alimento hecho para permanecer en el estante**
- **Postres**
- **Bocados**

En México beben porciones de bebidas hechas con la fruta fresca y la leche y de menos jugos de fruta falsos como D asoleada, Capri Sun, y la Kool Aid.

Las frutas y Veggies son altos en cosas como phytochemicals, vitaminas, y minerales.

Phytochemicals es las cosas que hemos encontrado en frutas y veggies que la ayuda protege el cuerpo. Conseguimos la cosa que puede lastimar nuestro cuerpo llamado radicales libres cada día. Pueden lastimar el cuerpo. Si el cuerpo no puede lucharlos apagado o fijarse cuando lo lastiman podemos conseguir el cáncer. Necesitamos 3-5 porciones de veggies al día. Necesitamos 2-4 porciones de fruta al día. Una porción de veggies es un puñado cocinado o dos puñados crudos. Un pedazo pequeño de fruta o de 4 onzas de jugo es una porción.

La vitamina y el mineral son cosas que conseguimos en los alimentos que ayudan a nuestro cuerpo en porciones de maneras. Hay muchos que no podríamos permanecer vivos si no conseguimos.

Las tortillas del maíz son bajas en grasa y tienen vitaminas y minerales

Las habas tienen fibra que nos ayudan a sentirnos subsistencia completa y de la ayuda nuestro normal del azúcar de sangre.

La fibra es la materia que ayuda a subsistencia que nuestra sangre de conseguir gunked también para arriba con la grasa y las ayudas mantienen nuestros interiores limpios.

Muchos alimentos hechos para permanecer en el estante, los alimentos de preparación rápida, los bocados, y los postres (como twinkies, starburst, sodas, papases fritas, hamburguesas, pocas tortas del bocado de Debbie y virutas de patata) son altos en azúcar, grasa saturada, grasa del transporte y calorías.

Si conseguimos más calorías que nos necesitamos ganamos el peso. Siendo marcas pesadas nosotros mucho más probablemente para conseguir enfermedades tenga gusto de la diabetes, de la enfermedad cardíaca, y de algunos cánceres.

El azúcar agrega las calorías y ningunas buenas cosas que ayudan a nuestros cuerpos. Para la gente con diabetes sus cuerpos tienen un rato duro el mantener de la cantidad de azúcar la sangre en los niveles derechos. Si hay demasiada azúcar en su sangre que lastima su cuerpo como sus ojos (puede hacer que usted va persiana), su corazón (puede hacer su parada del corazón), sus riñones (usted puede terminar encima de tener que hacer agujas poner adentro para sacar de la sangre su cuerpo y para limpiarla y después para ponerla detrás adentro) o sus pies y piernas (usted podría terminar encima de hacer sus pies o piernas cortar).

La grasa saturada y la grasa del transporte estorba las piezas adonde fluye la sangre (enfermedad cardíaca). Parece justa como la grasa del pollo que ha permanecido en una cacerola que freía sobre noche y cuando circunda una curva él se pega allí. Como ésa sucede se acumula y consigue repetidas veces difícilmente y entonces la sangre no puede conseguir a través a su corazón (ataque del corazón) o al cerebro (movimiento). Cuando miramos las arterias de los cabritos que nos han muerto en accidentes ya vea que si comen muchos de saturado o del transporte de la grasa las arterias allí están comenzando ya a conseguir estorbado para arriba.

Podemos todos aprender algo de la dieta mexicana e intentar comer más frutas, los vehículos y las habas y menos alimento de la "chatarra".

Appendix F

INTERVENTION INTERVIEW GUIDE

1. What did you like about being in the play?
2. What did you not like about being in the play?
3. What would you change?
4. Did you learn anything by doing the play?
(If yes) What did you learn?
5. Did it change anything about what you believe?
(If yes) What was it?
6. Did it change anything about how you eat?
(If yes) What changed?