DISSERTATION

DEVELOPMENT AND IMPACT OF A STAGE OF CHANGE BILINGUAL NUTRITION EDUCATION PROGRAM FOR HISPANICS

Submitted by

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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY TERRY TAYLOR ENTITLED DEVELOPMENT AND IMPACT OF A STAGE OF CHANGE BILINGUAL NUTRITION EDUCATION PROGRAM FOR HISPANICS BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTORATE OF PHILOSOPHY.

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ABSTACT OF DISSERTATION

DEVELOPMENT AND IMPACT OF A STAGE OF CHANGE BILINGUAL NUTRITION EDUCATION PROGRAM FOR HISPANICS

A nutrition education program, entitled *La Cocina Saludable - The Healthy Kitchen*, was designed based on the Stage of Change Model for Behavior Change and implemented in 10 counties in southern Colorado. The objectives were to improve the nutrition related knowledge, skills, and behaviors that lead to healthy lifestyles in a low-income Hispanic and migrant farmworker population. The content of the program included nutrition information designed to help mothers of preschool children provide for their children's nutritional needs. Specifically, the content areas included 1) *Make It Healthy* - nutrition principles including the Food Guide Pyramid; 2) *Make It Fun* - making food fun for children using color, texture, size, and shape; 3) *Make A Change* - modifying recipes and meals to lower fat, lower salt, lower sugar, and increase fiber; 4) *Make It Safe* - food safety principles; and 5) *Make A Plan* - budgeting and shopping tips to help stretch food resources. This population presents many obstacles for nutrition educators including limited resources, child care, transportation, time, language, culture, literacy, education, health beliefs, and in some cases, the transient nature of the population. Previous studies suggest that low-income Hispanics often show low intakes of vitamins A and C, calcium, iron, and protein. It follows that they show high rates of diabetes, obesity, infections, and enteric diseases. This program attempted to overcome these barriers by incorporating the use of a flexible program format carried out by abuela (Hispanic grandmother) educators using appropriate processes described in the Stages of Change Model for Behavior Change. The Stage of Change Model

categorizes changing individuals into five stages: precontemplation, contemplation, preparation, action, and maintenance. It is suggested that within each stage, individuals emphasize specific processes that help to move them to the next stage. The program design and materials were developed by thoughtful incorporation of these processes. The program was evaluated using a knowledge and skills pre-test, post-test, and six month follow-up survey which included selected elements from WIC and EFNEP program evaluations. An instrument for measuring movement through the five stages was also developed. Final results of the program's evaluation suggest that this type of program based on the Stages of Change Model and using abuela educators as peer educators is effective in changing selected nutrition related knowledge, skills, and behaviors leading to healthy lifestyles. Administration of similar programs should be thoughtfully planned and implemented. Additionally, development and use of a Stage of Change assessment tool suggests key considerations when attempting to measure stages relative to nutrition behaviors for this population.

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INTRODUCTION

Origin of Project

In 1993, the United States Department of Agriculture - Extension Service (USDA/ES) asked for help in addressing the nutrition needs of individuals who are eligible for the Special Supplemental Food Program for Women, Infants, and Children (WIC). The goal of the nutrition education initiative was to develop, deliver, and evaluate community-based intensive nutrition education projects in order to improve nutrition related behaviors that would lead to healthier lifestyles for the targeted populations. This project represents a portion of the resulting nutrition education program developed by Colorado State University Cooperative Extension and the University's Food Science and Human Nutrition Department. It targets the low-income Hispanic population of twelve counties in southern Colorado, including the subgroup of migrant farm worker families who are concentrated in the area.

Nutrition Education Needs in the U.S.

A national prevention strategy for improving the health of the American people is presented in *Healthy People 2000: National Health Promotion and Disease Prevention Objectives.* The goals of *Healthy People 2000* are separated into three areas: 1) increasing the span of healthy life, 2) reducing health disparities, and 3) achieving access to preventative services for all Americans.[1] The objectives designed to meet these goals are divided into 22 priority areas. Some of these priority areas directly address nutrition behaviors. Priority Area 8 (Educational and Community-Based Programs) recognizes the importance of community-based programs in changing health behaviors. Priority Area 2 (Nutrition) acknowledges the dietary factors which substantially contribute to preventable illness and premature death for Americans. What people eat may be the most significant controllable risk factor affecting long-term health for Americans.[2] According to *Healthy People 2000*, there are five major causes of death associated with dietary factors: coronary heart disease, some types of cancer, stroke, non-insulin-dependent diabetes

mellitus, and coronary artery disease.[3] Nutrition behaviors including reducing fat intake; increasing fruit, vegetable, and grain intake; increasing calcium-rich food intake; decreasing the prevalence of overweight; and increasing the number of people practicing sound weight-loss practices are emphasized in the nutrition goals. Unfortunately, overweight prevalence has increased substantially since 1980 and those who are exercising and dieting to reduce weight have decreased. Though diabetes incidence and colorectal cancer have increased, coronary heart disease, cancer, and stroke mortality is declining. Education related to these areas is evident in the recent development of useful nutrition labeling and an increase in the number of restaurants offering healthier choices.[1]

Many organizations and agencies contain a nutrition education component in their objectives. WIC is an entity of the U.S. Department of Agriculture (USDA), Food and Consumer Services (FCS). It serves more than 7 million people each month emphasizing the well being of young children and pregnant women.[4] WIC provides food, nutrition counseling, and assistance in accessing health services for their clients. Along with WIC, the Expanded Food and Nutrition Education Program (EFNEP), a program of the Cooperative Extension Services of the USDA, provides nutrition education for low-income families with young children.[4] Additionally, the U.S. Department of Health and Human Services, Administration for Children and Families funds the Head Start Program. Head Start is operated by local non-profit organizations and state or local agencies and exists in most counties in the United States. Nutrition education is included in Head Start's education of children between the ages of three and five and their parents. Head Start served 751,000 children in over 37,000 classrooms nationwide in 1995.[5] It is evident that education in nutrition related topics has been deemed important in serving young children and their families.

Problems in Nutrition Education for Low-Income Hispanics in Colorado

Colorado has a large Hispanic population representing approximately 45,000 individuals. About 14.0% of Colorado's total population is Hispanic compared to 10.4% for the U.S. as a whole.[6] These individuals are among the poorest in the state and pose many obstacles to effective nutrition education programs. These obstacles involve mainly limited financial resources on both the part of the agencies providing the education and on the part of the individuals being served. Low-income Hispanics have

demonstrated that the challenges of transportation, childcare, and free time needed for educational endeavors severely restrict the effectiveness of educational programs. Community agencies have found these obstacles difficult, if not impossible, to overcome. Additionally, scarce resources in community agencies themselves have limited their provision of solutions to the problem.

Limited financial resources also lead to broader challenges including low education levels, low literacy rates, and limited opportunities to learn English, if English is the second language. These additional obstacles further exacerbate the problems of effective education and compound the complex task of developing appropriate, well-received, and effective educational materials and programs. Reading level, translation issues, and complexity of content become related considerations for educators.

This project began with focus group discussions attempting to assess the needs for nutrition education in the targeted areas as well as to determine specifically the obstacles associated with providing nutrition education for this population. Initial focus group discussions with groups of Hispanics in Colorado suggested that there may be some opportunities for improvement in the nutrition education for this population which may improve the progress toward meeting health and nutrition goals. Obstacles to nutrition related knowledge and behavior improvements were suggested by focus groups with professionals, paraprofessionals, and the low-income Hispanic population itself in one area of Colorado. One obstacle was an abundance of printed materials, in both English and Spanish, which was written for a much higher literacy level than the targeted population possesses. Some of the Hispanics and many of the migrants cannot utilize these materials because they cannot read them. Creative educational materials are needed to motivate, retain, and maintain learning resulting in improvement in nutrition behavior.

A second major obstacle arising from the focus group discussions was the presence of conflicting nutrition information given out by the various community agencies. Consistent and accurate messages are required for people to believe what is being said and make attempts to put the messages into practice. Coordination and cooperation of the many community agencies that deliver nutrition education is critical for long-term success of any nutrition education endeavor. By including representatives from these agencies in the development and implementation of a program, establishment of an effective referral system, conveyance of consistent information, encouragement of mutual support between agencies, and

coordination and cooperation between agencies may be achieved, potentially leading to more effective programs.

The third major obstacle for this population was found to be in creating a desire to improve nutrition related behavior within the target populations themselves. The culture, background, experiences, and belief system must be determined and utilized in the development of any successful program. Program planners should consider the optimal communicator of the information and the best format in which to deliver the educational program in order to elicit optimal behavior change.

Finally, the problem of how to change specific health behaviors poses its own challenges for a nutrition education program. Behavior change does not come easily, especially behaviors involving health and nutrition which are so complexly immersed in culture, tradition, habit, belief, discipline, and personal likes and dislikes. In order for positive and permanent behavior change to occur, it may be that a well planned, culturally appropriate, theoretically based process is required.

Significance of Effective Nutrition Education

According to the Health Care Finance Administration, the estimated 1994 national health expenditures totaled $884 billion dollars representing $3,465 per person and almost 14% of the gross domestic product. Annual total spending on health care in the United States increased 5.5% in 1995 to $988.5 billion, which averages $3,621 per person. Medicare and Medicaid coverage together represented 23% of the health care expenditure. Other government programs covered an additional 13%. Private health insurance provided for approximately 31% of the expenditure and out-of-pocket payments totaled 19%.[7] Health care expenditures have grown significantly and are continuing to rise in an almost uncontrollable fashion. Total annual spending may reach one trillion dollars in the near future. Obviously, these figures do not adequately reflect human suffering.

Much of the health care expense goes to potentially preventable diseases and disorders, many of which involve behaviors related to nutrition. Poor or inadequate diets may lead to cardiovascular disease, cancer, obesity and related disorders, as well as osteoporosis, dental disease, diabetes, and a variety of metabolic ailments. Improper handling of foods can cause foodborne illnesses resulting in sickness, loss of time at work, waste, and even death. Poor nutritional behaviors can also complicate existing diseases

causing even higher mortality, morbidity, and costs for health care. The significance of nutrition related behaviors on basic survival, good health, children, family expenses, and communities as a whole is enormous. Effective education may be a critical factor in the solution to the health care dilemma.

In response to the request of the USDA Extension Service and after gathering information by focus group discussions from professionals, paraprofessionals, and representatives from the Hispanic and migrant farm worker populations, a nutrition education program was developed, materials were designed and produced, and a program was implemented in three distinct areas of Colorado. Briefly, the program used trained abuelas (Hispanic grandmothers) as peer educators to recruit class participants and teach a series of five nutrition education units to low-income Hispanic mothers of pre-school children. The program and all materials developed were based on the Stage of Change Model for Behavior Change. If a study utilizing abuelas as peer educators using a theory-based nutrition education program with minimal training and supervision as described in this project proved effective, similarly designed nutrition and health education programs could be developed in other areas. Perhaps similar target populations may also be assisted in overcoming the numerous educational needs of the communities throughout Colorado and other areas. Nutrition education programs which effectively improve behaviors related to nutrition would potentially improve the well being of the population, reduce the load on health care and assistance agencies, and achieve specific nutrition related goals of *Healthy People 2000*.

Purpose Statement

The primary purpose of this project was to develop a nutrition education program based on the Stage of Change Model for Behavior Change targeting low-income Hispanics, including the subgroup of migrant farm workers, in three areas of southern Colorado. Hispanic grandmothers (called abuela educators in this project) were used as peer educators to deliver a five section nutrition education program to mothers of preschool children. This project was designed to overcome many barriers to changing nutrition behavior by 1) coordinating all levels of state and local agencies working with this population in a unified venture of nutrition education; 2) obtaining information from the target populations themselves about needs, current habits, obstacles, and the most effective delivery system of nutrition education; and 3) using creative, theory-based, well received delivery methods of nutrition education tailored to the target populations. It

was projected that such a system of planned, theory-based intervention would lead to improvement in specific areas of nutrition-related knowledge and skills as well as positive changes in behaviors leading to healthier lifestyles among the targeted individuals.

A secondary purpose involved the redefinition of a successful program. Traditionally, the effectiveness of educational programs has been assessed by the resulting behavior change of the participants of that program. If the participants change their behaviors, the program is considered successful. If the participants do not change their behaviors, often the program is considered to be ineffective and is discontinued or revised. It has been well accepted that nutrition related behaviors are complexly embedded in culture, tradition, habit, emotion, psychological factors, and social ramifications. As is evident by the large number and variety of programs attempting to effect nutrition behavior change, these behavior changes are not easily accomplished. In accordance with the Stages of Change Model, a premise of this project was that movement toward change by the participants may be a significant step toward eventual and lasting behavior change at some point in the future well beyond the nutrition education program itself. If movement toward lasting behavior change is defined as movement to a higher stage of change, then a program which moves participants to a higher stage can be acknowledged as successful, even if the desired behavior change is not yet evident. With this in mind, the second objective of this project was to develop an instrument that would measure an individual's specific stage of change relative to selected nutrition behaviors and use this instrument to monitor movement through the stages resulting from participation in a nutrition education program.

Time Frame of Project

This project took place in three phases over three and one half years. The first phase began in 1993 and included initial focus group discussions and analysis of the responses, development of state and local advisory committees, and development and production of materials. The second phase included initial evaluation and revision of the materials, and recruitment and training of the abuela educators and evaluators. The final phase included the recruitment and teaching of class participants by the abuela educators and evaluation of results.

Theoretical Framework

It has been suggested that nutrition education programs may be more effective if they were guided by sound theory.[8] The theoretical framework on which the various aspects of this project were based is the Stage of Change Model for Behavior Change suggested by Prochaska and his colleagues.[9] This model suggests that individuals must move through a series of sequential stages beginning with not being aware of a problem behavior or having no intention of changing the problem to complete and lasting behavior change. These stages include precontemplation, contemplation, preparation, action, and maintenance. It is further suggested that individuals within each stage emphasize specific processes, or psychological tools, which assist them in changing their behavior. In developing this nutrition education program, it was assumed that within any group of participants, there are individuals in each of the five stages. The specific processes for each stage were thoughtfully incorporated into selected areas of the program format and material development to best move all individuals to their next stage of change as defined by the Stage of Change Model. With this model in mind, success of a nutrition education program may be redefined to include not only complete and lasting change in behavior itself, but also movement to a higher stage.

Assumptions and Limitations

This project addresses the low-income Hispanic population in a specified area of southern Colorado. It is assumed that the Hispanic population targeted in this project is composed of a blend of diverse individuals of Hispanic and non-Hispanic origins including Mexican-Americans, Native Americans, Cuban-Americans, Puerto Ricans, Guatemalans, and individuals from other Central and South American countries. Anglo-Americans are also included in the population since many have been incorporated into Hispanic families by marriage. The effectiveness of the project, if expanded to other areas in the state or to other states that may be composed of different populations of Hispanic or non-Hispanic individuals, is uncertain. It is also unknown whether similar results would be obtained in a non-Hispanic population.

Additionally, both abuela educators and participants for this project were selected from volunteers. There were no attempts to randomly select either the trainers or those being trained.

Literature Review

Colorado and the Project Areas

Population

Colorado has a total population of 3,294,394 spanning 104,247 square miles. This project is concentrated in twelve counties located in the south and southeastern regions of the state. Appendix I contains a map of the state including the project areas. Area 1 makes up the San Luis Valley including the counties of Alamosa, Saguache, Costilla, Rio Grande, and Conejos and the larger city of Alamosa. It currently has a population of 43,010. Pueblo, Las Animas, and Huerfano counties make up Area 2, which is located in the central section of the state. Pueblo and Trinidad are larger cities in this area. It has a population of 152,710. Area 3, with a population of 44,835, is located in the Arkansas River Valley and includes the counties of Crowley, Otero, Bent, and Prowers and the larger towns of Rocky Ford and Lamar. [6]

The 1996 population projection for Area 1, Area 2, and Area 3 is 46,695, 152,710, and 46,683, respectively (see Figure 1). The total project area makes up 7.3 percent of Colorado's population. Area 1, Area 2, and Area 3 are estimated to have 8.5%, 7.0%, and 7.3% of the total population in the preschool age group (ages 0-4 years), respectively. These estimates are consistent with the U.S. estimate for pre-school population as a whole. [6] Figure 2 shows the age distribution in each of the project areas compared with the US and Colorado.

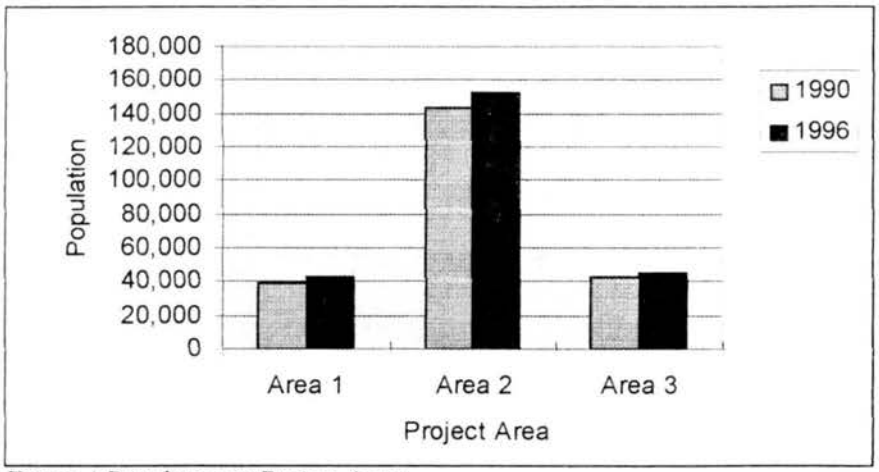

Figure 1 Population in Project Areas

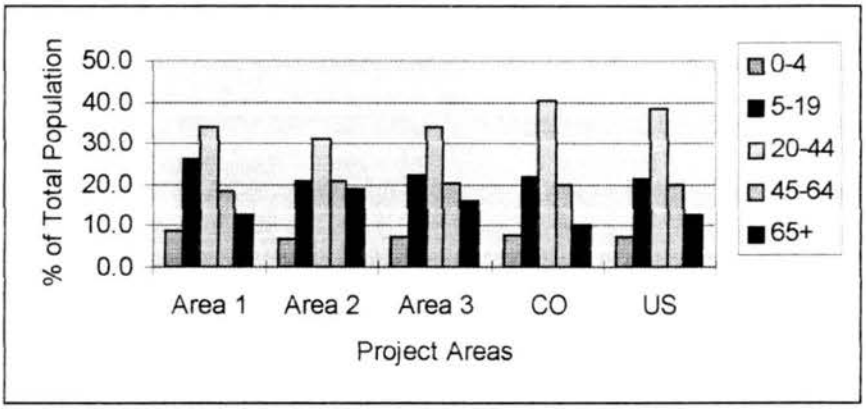

Figure 2 Age of Population in Project Areas

Household income including Size of Households

The 1996 projection for households with income less than $15,000 in the U.S. is 19.7% and in Colorado is 16.6%. Figure 3 shows the same projections for Area 1, Area 2, and Area 3 as approximately 39%, 22%, and 34%, respectively, which is substantially higher than either the national or state projection. These estimates illustrate that the project areas are very poor. The average household size (number of persons in a household) 1996 projections for the U.S. and for Colorado are 2.63 and 2.53, respectively. The same projections for Area 1, Area 2, and Area 3 are 2.77, 2.50, and 2.48, respectively, which is in line with both the state and national household projections. Approximately 11.7% of families in Colorado are below the national poverty level. It is estimated that 5.1% of families are below 50% of poverty level in Colorado.[6] Many of these families are located in the project areas targeted by this program.

Occupations and Income

About 18% of Colorado residents live in rural areas. There are 27,152 farms making up about 51% of the state's total land. A large majority of the land in the project areas is agricultural. Area 1 and Area 2 are also largely mountainous. Area 1 grows potatoes, peas, spinach, lettuce, carrots, mushrooms, cabbage, turnips, and onions. Areas 2 and 3 grow cantaloupe, onions, pinto beans, potatoes, pumpkin, squash, soybeans, tomatoes, watermelons, cabbage, flower seeds, and chili peppers. [10] Many individuals in these areas are occupied in some aspect of the agricultural business or agricultural support business.

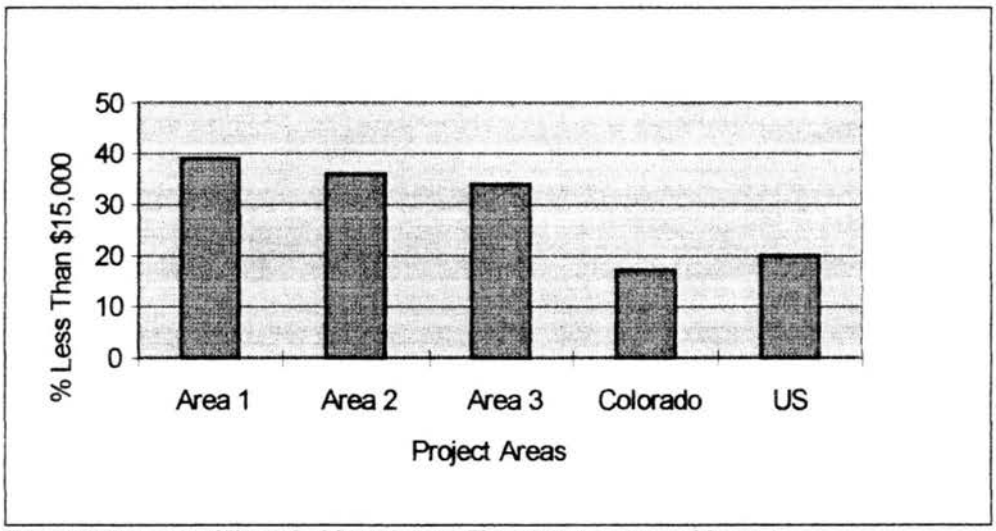

Figure 3 Percent of Households with Less Than $15,000 Annual Income

Education and Literacy Rates

Education levels in all three project areas are well below the state level. Figure 4 shows that 84.4% of the adult population in the U.S. have a high school diploma while in the project areas, the percentages range from only 65% to 76.9%. Overall, 27% of the adult population in the state are college graduates. In the project areas, the percentage ranges from 8% to 24.1% which is below the state average. [6]

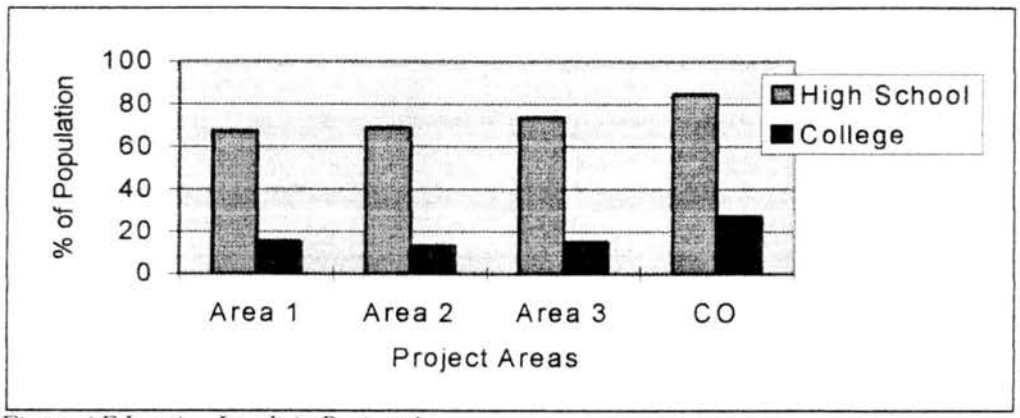

Figure 4 Education Levels in Project Areas

The Hispanic Population in Colorado

There is a large Hispanic population in Colorado representing an estimated 14% of the state. In comparison, Area 1, Area 2, and Area 3 are approximately 56%, 44%, and 30% Hispanic, respectively (see Figure 5). An estimated 10.4% of the United States is of Hispanic origin. Some individual counties are well above the average for the individual areas. Costilla and Conejos counties in Area 1 are 77% and 61% Hispanic, respectively. The counties in the project area with the lowest Hispanic population are Crowley (25%) and Prowers (26%) in Area 3. These counties are still well above both the U.S. and Colorado Hispanic population estimates.[6]

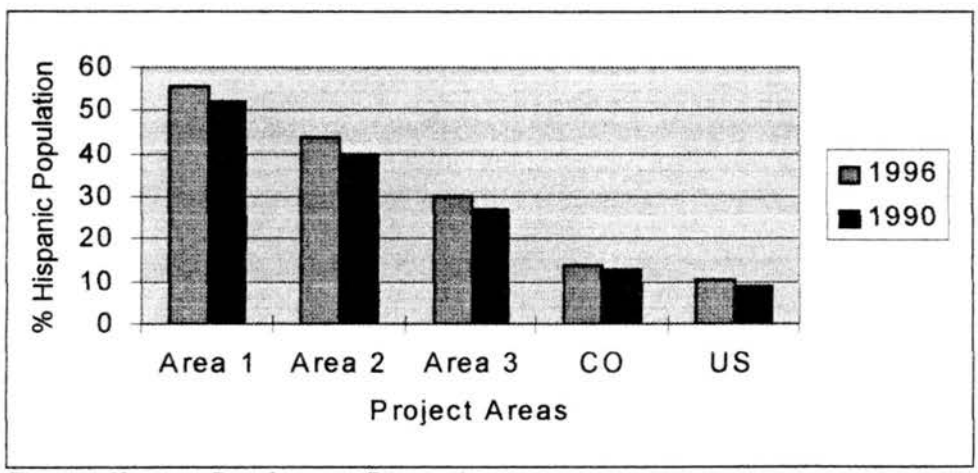

Figure 5 Hispanic Population in Project Areas

One of the most needy groups in the state is the population of low income Hispanic women, infants, and children in the southern counties, including the subgroup of migrant and seasonal farm workers. They are isolated because of language and cultural barriers, their rural and small town location, and, in the case of migrant farm workers, their transient and seasonal nature. This group is below the poverty level with limited access to the financial, educational, and food resources that are important for healthy lifestyles.

Conditions are very depressed in these specific areas of Colorado for Hispanics compared to the rest of the state. In the San Luis Valley (Area 1), 35% of the Hispanics live below 75% of the poverty level and 58% live below 150% of poverty level. In Colorado as a whole, 14.1% of Hispanics live below 75% of the poverty level and 33% live below the 150% of poverty level. Mean income for Hispanics living in the San Luis Valley is $12,115 compared to $22,188 for all Hispanics living in Colorado. Conditions are similar in the counties surrounding the city of Pueblo (Area 2) and in the Arkansas River Valley (Area 3). Unemployment rates for the counties in the project areas range from 3.5% in Bent County to 10.5% in Saguache County. Areas 1 and 2 are well above the state unemployment rates while Area 3 counties shows unemployment rates similar to the overall state rate.[6]

The Migrant and Seasonal Farmworker In Colorado

This project specifically includes the subgroup of Hispanic migrant farm workers in its target population. According to the Colorado Migrant Health Program, there are approximately 21,000 migrant farm workers working in agricultural activities in Colorado. These migrants migrate in and out of Colorado with the growing and harvesting seasons. An additional 29,000 farm workers have settled in the agricultural activities areas of the state and, though they no longer migrate, they do participate in agricultural. About 97% of these farm workers are of Hispanic origin. A small percentage are of Native American descent (2%) or white (1.8%). It is estimated that about 67% originate in Mexico, 21% in Texas, 11% in other states, and 1% in other countries such as Guatemala, Costa Rica, Belize, Honduras, Nicaragua, Panama, and the Caribbean Islands. Only 33% speak English fluently while 18% speak limited English leaving 48% speaking only Spanish. The average number of elementary school grades completed is six, either in their native country or in the United States. [10]

Migrant and seasonal farm workers represent one of the poorest groups in Colorado. The average family income for a migrant farm worker is $6,400 per year. For a settled seasonal farm worker, the average annual salary is $8,400 per year. Though some males (27%) travel by themselves with either no family or having left their families for the growing season in a more permanent residence or in their home country, it is estimated that 63% of the migrants are family units with an average of six persons per household. It is also estimated that 99% of these families are well below the poverty level for Colorado and the United States, which poses serious obstacles to obtaining optimal nutrition and nutrition education.[10]

Colorado migrants and their children have numerous health issues to combat. Their occupation leads to the highest work-related injuries of any occupation in the United States. They must live with drinking water that is well below U.S. standards and often substandard or non-existent field toilet facilities. The also suffer from many illnesses and disorders associated with pesticide exposure and poisoning including dermatitis, conjunctivitis, headaches, blurred vision, malaise, urinary tract infections, and anxiety as well as the unknown risks for cancers and birth defects. Additionally, lack of safe, clean housing, and lack of field sanitation imposes problems such as dehydration, heat exhaustion, stroke, and infections. Contagious diseases such as tuberculosis, streptococcus, hepatitis, sexually transmitted diseases, enteric diseases (Shigella, Giardia, Amebiasis, and other infectious and parasitic diseases) spread rapidly and easily. Individuals, especially children, in this population also suffer from nutrition related problems including anemia, failure to thrive, low resistance to infection, and hunger. Hispanics, in general, have been shown to have a genetic predisposition to diabetes, gallbladder disease, pterygium, and obesity which are complicated by their living and working conditions.[10-15]

Colorado migrants and seasonal farm workers have many barriers to obtaining adequate health care. Poverty compounds this problem by posing obstacles such as limited transportation, problems in obtaining childcare, the requirement of long working hours, and physical exhaustion. Language is often a significant barrier in itself as are low literacy rates and low levels of education. Agricultural producers are exempted from any obligation to provide health insurance or health services for their workers. Because of poor access to health care, individuals in this group suffer many health complications and often cannot obtain preventative or early treatment. Dental disease is the most prevalent disease condition among migrants. There is a higher incidence of complications of untreated illnesses, a lack of early prenatal care,

higher rates of high-risk pregnancies, and many untreated chronic diseases such as diabetes, hypertension, and obesity. Many of these problems can be alleviated or significantly reduced by improved sanitation and personal hygiene practices and fundamental nutritional knowledge and skills and improvement in health and nutrition related behaviors.

Food Intake of Hispanics

In order to develop a nutrition education program for improvement of nutrition knowledge, skills, and behaviors, it is important to understand the current nutrition behaviors and areas indicating a need for behavior change. Much of the research addressing the health status of Hispanics divides this population into three separate and distinct subgroups possessing specific issues; however, the groups do have similar characteristics. The subgroups include 1) Mexican-Americans originating in Central and South America; 2) Cuban-Americans originating in Cuba; and 3) Puerto Ricans. Both similarities and differences should be considered when developing nutrition education programs for the Hispanic population.

Breads, Cereals, Rice and Pasta Group

The USDA Food Guide Pyramid suggests six to eleven servings be consumed daily from the Breads, Cereals, Rice and Pasta Group.[16] *Healthy People 2000* recently added to the Nutrition Priority Area (Priority Area 8) of the *2000* objectives that at least 50% of the U.S. population meet the Food Guide Pyramid minimum standards of at least six servings from this food group. Currently, it is estimated that the average number of daily servings is only 5.8 servings suggesting a need for increasing the amount of these foods in the diet.[3]

Subgroups of Hispanics traditionally choose foods from this group differently which affects status of vitamins, minerals, carbohydrates, and protein. Kuczmarski et al., in a cross sectional study of three subgroups of Hispanic populations using food frequencies and 24-hour recalls, found that Cubans traditionally ate corn and flour tortillas, rice, and pasta.[17] The Mexican -Americans predominantly ate tortillas. The Puerto Ricans ate mainly bread. Murphy et al. suggested that 76% of 1-5 year old Hispanic toddlers consumed less than four servings of this group.[18] These toddlers were shown to consume only half the RDA for iron, but consumed thiamin and riboflavin in excess of the RDA that may represent, in

part, the replacement of tortillas for fortified breads and cereals as acculturation occurred.[19] Increasing the regular daily number of servings to six to eleven may be a benefit for this population.

Consumption of Fruits and Vegetables

The Food Guide Pyramid recommends two to four servings of Fruits and three to five servings of vegetables.[16] The U.S. Dietary Guidelines further recommend to choose a variety of foods from these groups. *Healthy People 2000* agrees with the five serving recommendation of fruits and vegetables daily and has added this objective to its goals. Currently, it is estimated that the average number of daily servings of fruits and vegetables is 4.1 servings for the U.S. population.[3] Recent national programs such as the *5-A-DAY for Better Health* program may be helping to improve fruit and vegetable consumption by using principles of social marketing and other behavior change theories.[20]

It has been suggested that Hispanic children generally do not eat enough fruits and vegetables. Basch et al., in a study of Hispanic children, found that the intake of fruits and vegetables was well below the recommendations. In this study, only 6.9% of the children reached the five serving goal.[21] Even those children in the highest percentile did not achieve the national goals. The study found that these children consumed very few dark leafy, green non-leafy, or dark yellow vegetables. They also found that fruits were eaten more often than vegetables, yet two thirds of the children still consumed less than two servings of fruit per day and only one child of the 205 studied consumed more than three servings of vegetables daily. In this study, fried vegetables (French fries) were excluded as a vegetable choice.

Of special concern in this study was the fact that fruit juice accounted for a very large proportion of the fruits and vegetable servings. Some fruit juices, such as apple juice, provide very little vitamin A and vitamin C compared to orange juice. Apple juice is a favorite of children. Kuczmarski et al. similarly found that citrus fruits, orange and green vegetables, and dark green and yellow vegetables were consumed in very low quantities limiting the sources of vitamin C, vitamin A, carotene, and folic acid.[17] Kuczmarski also found that acculturated Mexican -Americans used fruit flavored drinks (such as Tang and Kool Aid) often, which contributed vitamin C to the diet. Cubans and Puerto Ricans did not consume these drinks regularly. Increasing the number of servings of fruit to two to four and the number of servings of vegetables

to three to five as well as increasing the variety of fruits and vegetables chosen may be an important dietary behavior change for this population.

Milk, Yogurt and Cheese Group

The Food Guide Pyramid recommends two to three servings from the Milk, Yogurt, and Cheese Group. *Healthy People 2000* recommends that children over two years of age should increase their calcium rich food intake to meet the RDA guidelines for their age group for calcium. The Dietary Guidelines recommend that Americans consume no more than 30% of their total calories from fat and no more than 10% from saturated fat.[22]

Dairy products represent not only a good source of calcium, other micronutrients, and protein, but also can contain large amounts of saturated fat. The percent calories from fat and saturated fat has been shown to be high in Hispanic children. Basch et al. found that the consumption of saturated fat ranged from 10.3% to 16.5% of total calories from saturated fat with the mean of all Latino children in the study being 13.3%.[21] This study also found that milk and milk products were the greatest contribution to this saturated fat intake agreeing with the USDA Nationwide Food Consumption Survey which found that milk products made up almost 40% of children's saturated fat intake.[23] Basch et al. suggested that substitution of 1% milk for whole milk would reduce the saturated fat consumption by about 25%. Even the children with the highest saturated fat consumption would then fall below the recommended 10% of total calories. Low-fat milk still contains the same vitamin, mineral, carbohydrate, and protein content. Kuczmarski et al. found that the percentage of Hispanic adults using whole milk was greater than those using skim milk.[17] In the Hispanic culture, milk is primarily a beverage for children.[24] A reason for this lack of milk consumption may be that Hispanic adults have shown a high incidence of lactose intolerance.[25] Cheese, however, is a part of many Mexican dishes and is eaten more often than yogurt, pudding, and ice cream. Though many Hispanics are lactose intolerant to some degree, an increase in the number of servings from this group may be beneficial. With lactose intolerant individuals in mind, choices for this population can include yogurt, hard cheeses, small fish with bones, corn tortillas made the traditional way with lime, dried beans, and rice. It is also important to make low-fat choices from this group.

Meats, Poultry, Fish, Dry Beans, Eggs and Nuts

The Food Guide Pyramid recommends two to three servings of the Meats, Poultry, Fish, Dry Beans, Eggs and Nuts Group. As with the Dairy Food Group, foods in this group also potentially contain high amounts of total fat, saturated fat, and cholesterol. The American Heart Association recommends that cholesterol intake be less than 300 mg/day. [26]

Kuczmarski et al. found that 50% of the Mexican -Americans reported consuming protein rich foods more than one time per day.[17] In this subgroup, legumes were consumed more than one time per day. The Mexican-American adults reported eating more protein rich foods than either Cubans or Puerto Ricans. For Puerto Ricans and Cubans, eggs were consumed rarely in 75% of those surveyed. Cuban Americans reported consuming legumes, organ meats, and mixed dishes much less than Mexican-Americans or Puerto Ricans. The mean intake of total fat, saturated fat, monounsaturated fat, and cholesterol were accordingly higher in the Mexican-Americans than the other Hispanic groups.[17]Fiber intakes were also higher due mainly to the increased consumption of legumes.

The American Heart Association estimates that about 96.0 million American have blood cholesterol levels above 200 mg/dl. About 37.8 million adults have blood cholesterol levels above 240 mg/dl. They further estimate that 48.8% of Mexican-American male and 44.6% of Mexican-American female adults over 20 years of age have serum cholesterol levels of 200 mg/dl or more. In the same population, 17.5% of males and 16.1% of females have levels above 240 mg/dl. [26] Wise choices from the Meats, Poultry, Fish, Nuts, and Seeds group is necessary to obtain appropriate amounts of protein, vitamins, and minerals while limiting fat, saturated fat, and cholesterol.

Fats, Oils and Sweets

The Food Guide Pyramid recommends that foods from the top of the pyramid in the Fats, Oils, and Sweets group be eaten sparingly. In all studied Hispanic subgroups, lard was frequently used for frying foods. In the Mexican-American group, lard was also used in the making of flour tortillas. Sugar was found to be a frequent addition to milk and rice for children. [17]

Sodium and Salt

The U.S. Dietary Guidelines suggest that sodium and salt be consumed in moderation.[22] The RDA for sodium is less than 2400 mg/day. Salt and sodium are associated with hypertension in individuals who are salt sensitive.[27] Convenience foods and processed foods typically have a very high amount of sodium and salt. Healthy choices in all food groups can reduce the amount of salt in the diet.

Nutrition Related Health Status

The Hispanic population in the southwestern United States has many of the same health problems as those of the U.S. population in general. However, current research suggests that there is a higher prevalence for some health problems in the Hispanic population specifically. Many of these problems are thought to be nutrition related.

In the early 1970's, several studies found that nutritional status was adverse for preschool Mexican-American migrant farm children. Nutritional problem areas were vitamin A deficiency, low calorie intake, low height attainment related to nutritional factors, and increased infant mortality. [30,31] Chronic diseases such as obesity, diabetes, a variety of food safety issues, and dental caries have also been shown to be problems for this population.[14] More recently, the San Antonio Mexican-American Heart Study found many ethnic differences in health parameters and nutrition status indicators. [30] Similar trends were found in the Hispanic Health and Nutrition Examination Survey (HHANES).[31]

Diabetes

According to the National Center for Health Statistics, diabetes is the seventh leading cause of death in the U.S.[1] Each day, 1700 new cases are diagnosed leading to 625,000 new cases each year. According to birth certificate data in 1992, which tend to underrepresented diabetes deaths, diabetes directly contributed to 169,000 deaths.[13] Currently, it is estimated that the total number of diabetic cases in the United States is around sixteen million. Of this 16 million, approximately eight million are undiagnosed and eight million are diagnosed. It is also estimated that 800,000 individuals are diagnosed as insulin dependent diabetes (IDDM) and as many as seven and one half million are diagnosed non-insulin dependent diabetes (NIDDM). The total annual medical costs of diabetes are estimated to be $92 billion. Of

this amount, about $45 billion is estimated to be annual direct medical costs and $42 billion is estimated for annual indirect costs such as disability, work loss, and premature death.[13] The long term implications of diabetes are numerous and severe. They include heart disease, stroke, hypertension, blindness, kidney disease, nerve disease, amputation, dental disease, and complications in pregnancy.

Hispanics have been shown to have a higher prevalence and risk for diabetes mellitus than other groups in the United States.[32] Compared with non-Hispanic whites, the rates of diabetes are estimated to be 120% higher for Mexican-Americans and Puerto Ricans. Cuban-Americans have from 50 - 60% higher rates than non-Hispanic whites. These data indicate that 1.3 million Hispanics over age 21 have diabetes representing over 10% of the total U.S. Hispanic population. Of Hispanics who are 64 - 74 years old, it is estimated that 33% have diabetes compared to only 17% of non-Hispanic whites in the same age group. In the younger age group of 45 - 74 years, 23.9% Mexican Americans have diabetes. This percentage does not include Cuban Americans or Puerto Ricans. It is also indicated that Mexican Americans have higher death rates from diabetes than non-Hispanic whites. The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), U.S. government's primary agency for diabetes research, has suggested that there are several variables that may contribute to diabetes for Hispanics. These include the degree of Native American ancestry, obesity (androgenal obesity), a westernized lifestyle, and the presence of hyperinsulinism. They also suggest that the severity of the diabetes problem in Hispanics is compounded by limited access to health care.[13]

Nutrition may affect diabetes in several ways. First, it is thought that there are certain nutrition behaviors that may lower the risk for diabetes, especially in a population who may have an increased predisposition to the disease. These behaviors include maintaining near-normal blood glucose levels; achieving optimal blood lipid levels; maintaining reasonable weight; preventing and treating renal disease, gastrointestinal autonomic neuropathy, hypertension, and cardiovascular disease; and improving overall health through optimal nutrition.[33] Though practicing these behaviors cannot guarantee prevention of diabetes, there is evidence for a reduction of intensity of the disease.

Obesity

There are many problems associated with obesity including an increased risk for hypertension and coronary heart disease, bone and joint disorders, gall stones, skin disorders, pulmonary diseases, adult onset diabetes mellitus (NIDDM), various cancers, pregnancy risks, surgical risk associated with an increased anesthesia need, greater risk of wound infections, and early death. In 1982-1984, the Hispanic Health and Nutrition Examination Survey (HHANES) found that a large percentage of Hispanics were overweight defined by a body mass index (BMI) > 85th percentile for 20-29 year olds which corresponds to a BMI > 27.8 for males and BMI > 27.3 for females .[34] The survey suggested that as many as 30% of Mexican-American males, 39% of Mexican-American females, 29% of Cuban-American males, 34% of Cuban - American females, 25% of Puerto Rican males, and 37% of Puerto Rican Females are overweight. The BMI measurements are substantially higher than those reported for non-Hispanic Americans. Additionally, they found that 10% of Mexican-American males, 11% of Cuban-American males, and 8% Puerto Rican males were severely overweight (BMI > 31.1) and 16% Mexican-American females, 8% Cuban-American females and 14% Puerto Rican females were severely overweight (BMI > 32.2). Nutrition choices can improve obesity and lower risk and associated health problems.

Cardiovascular Disease

Cardiovascular disease (CVD) is the leading cause of death for the U.S. population as a whole and for the Hispanic population for both males and females. For Hispanic males, 25.7% of all deaths are caused by CVD. For Hispanic females, 34% of all deaths is caused by CVD. [35] These rates compare to the slightly higher number of deaths caused by CVD for white males (40.5%) and white females (45.7%).[35] Physiological factors shown to be associated with CVD include obesity, ancestry, smoking, lack of exercise, and stress. Reducing these risk factors such as lowering body fat does not guarantee lack of CVD; however, an appropriate body fat percentage may lower the risk. *Healthy People 2000* includes a goal for reduction of the prevalence of obesity in the United States to less than 20%. [2]

High Cholesterol

According to the American Heart Association, 48.8% of Mexican-American male and 44.6% of female adults age 20 and over have serum cholesterol levels of 200 mg/dL or more.[26] These percentages compare to 53.6% of non-Hispanic white male and 53% of non-Hispanic white female adults. Further 17.5% of Mexican-American male and 16.1% of female adults over age 20 have a serum cholesterol level of greater than 240 mg/dL. This percentage is slightly less than non-Hispanic white male and female adults (19.6% and 22.5%, respectively).

Foodborne Illnesses

Food safety is an important factor for maintenance of good health. Food and cooking utensils can carry many different kinds of bacteria which cause a variety of diseases and disorders ranging from mild cases of diarrhea to serious and potentially fatal illnesses. Foodborne illnesses also include health problems resulting from consumption of numerous poisons, pesticides, herbicides, and other chemicals. It is estimated that microbial pathogens in food cause 6.5 - 33 million cases of human illness each year. Additionally, up to 9000 deaths annually can be linked to fungi, parasites, viruses, and bacteria found in food.[36] It is also estimated that one-third to one-half of all cases of diarrhea in the United States are caused by a foodborne organism and as much as 30% of all foodborne illnesses are probably caused by improper food handling in the home. These problematic behaviors include not keeping foods at the appropriate temperatures, not cooking food thoroughly, not keeping food areas and utensils clean, and not disposing of spoiled foods.[37] Not only does food poisoning cause potentially serious or even fatal health problems, it is estimated that foodborne illness cost $9.3 - $12.9 billion annually.[36]

According to Mendoza et al., all three Hispanic groups (Mexican-American, Cuban-Americans and Puerto Ricans) have shown a higher incidence of illness from chronic and acute pesticide exposure as well as bacterial gastrointestinal disease than non-Hispanic whites.[37] The migrant population is especially at risk for health problems related to pesticide poisoning and contaminated drinking water.[10] Arbab et al., in a study of the field water and sanitation, found that migrant farm workers had 20 times the diarrhea and other enteric diseases than similarly poor populations in urban areas. These suggest a need for food safety

and personal hygiene issues to be addressed in some type of migrant education.[38] Food safety considerations and education may help to lower the health risk.

Dental Caries

Diet and nutrition status play important roles in the development and health of teeth and oral tissue. Diet has a local effect on teeth. Dental caries (cavities) are associated with high sugar consumption. The bacteria that live on teeth metabolize sugars to acid, which eat away at tooth enamel. Nutrition has a systemic effect on the health of teeth. Nutrient status also affects bone, tooth, and oral tissue development and maintenance. Dental caries are major health risks for Hispanic children, especially the subgroup of migrant farm worker families.[10] Proper nutrition behavior related to child feeding, reducing sugar consumption and drinking fluoridated water can significantly improve dental health. Mendoza found that there were higher rates of dental caries and peridantitis in all three groups of Hispanics than non-Hispanic whites.[37]

Peer Education

Use of peer education has been extensive in developing countries and the United States for several years in an attempt to overcome high health care costs and personnel intensive programs and to better convey health messages to targeted populations. They have been called by numerous names including peer educators, lay workers, indigenous workers, and *promotoras*, and have played many roles in a variety of programs.[39-45] Evaluation of several programs indicates that there are extensive lists of both benefits and challenges in the use of peer educators in teaching nutrition and health information.

Peer educators and lay health workers have been used to a varying degree in programs in the United States as informal conveyers of messages. They have chatted with neighbors about specific health topics and have served as role models in various health behaviors.[43,45,47] Peer educators have also been used to deliver structured messages in more formal educational settings.[48,49] Generally, it appears that there are two main purposes for using a peer approach in health education. First, peer educators, by definition, are more or less members of the targeted population itself. This mutual membership may provide the peer educator with a unique understanding and empathy for the audience that is limited with non-members.

Indigenous workers, as members of the community they are targeting, possess the social, environmental, and ethnic qualities of the targeted population.[50] Sharing of the targeted audiences' communication methods including language and non-verbal communication is also important.[51] Kent and Smith described elements of a neighborhood to be 1) the presence of a support network of large extended families in a specific area, 2) isolation from other areas, and 3) homogeneity of the individuals in terms of ethnicity and shared problems. Peer educators are those individuals who are members of "the neighborhood." [52] The benefits of being a part of that neighborhood are largely due to the perception of the targeted individuals. Warrick et al. similarly found that the migrants in their study followed the customs and beliefs which were taught to them by their mothers or other female relatives suggesting that the respected mature females in the community were good communicators of health and nutrition information. [40] Chase et al. also used mature Mexican-American mothers experienced in taking care of families as nutrition aides for these reasons.[53] Choice of a peer as the educator may have many benefits; however, the most careful choosing may be hindered by the mere association of the worker with an agency. As the peer educator becomes more closely associated with the sponsoring agency, the perception of the "peer" status by the target population may change. The educators may be viewed more as agency representatives than members of the targeted group diminishing the benefits of the peer status.[50] Nonetheless, similar background, culture, language and experiences may provide a basis for more effective communication of the messages in ways to which the targeted audience will listen.

Warrick et al. in an evaluation of a prenatal education program for Hispanic migrant farm worker families using peer health workers, identified important factors for success. [40] They suggested that peer workers needed to be members of and accepted by the target community. They further suggested that the peer workers should represent minimal threat to the medical community. Vaughan suggested similar criteria for successful use of peer health workers: 1) The program should be in a distinct or isolated area; 2) The workers should pose no threat to established medical community; 3) The program should be low in cost; and, 4) The workers should have minimal interference with government bureaucracy. [54]

A second purpose for use of peer educators relates to the cost of the education. Generally, the cost of a peer educator is much less than a professional or paraprofessional educator employed by the

sponsoring agency. Peer educators are usually less educated, contracted, and employed on a part time or temporary basis.

Empowerment

Empowerement can be defined as the degree to which the peer educator is given responsibility and authority to perform their responsibilities in the program. Minimal empowerment limits the performance of the lay educator to very strict guidelines. Higher degrees of empowerment provide for much broader responsibilities and authority.[43] Strict guidelines may limit the important advantages of the relationship and similarity of the educator to the targeted population.[44] Less strict guidelines offers advantages of greater utilization of the peer educator's understanding of the targeted population, but may pose other problems. In a program involving prenatal education for migrant farm workers it was found that the empowerment of lay educators posed both benefits and associated problems for the program.[45] Benefits included the increase in self-esteem and sense of efficacy on the part of the lay educators. The educators began to see themselves as experts in the topic areas and wanted to learn more information. The downside of the success of empowerment included a kind of isolation from the targeted audience now that they had increased their own status in the community.

Administrative Issues

Recruitment and training pose substantial obstacles for any organization choosing peer educators as their main communicators of the messages. Giblin suggests that it is easier to recruit and select individuals who already possess the skills and characteristics required for the program than it is to train. He further suggests that personal characteristics be emphasized as well as skills. [43] Problems with work habits of indigenous workers have been reported and should be considered when supervision is planned.[52 55] Training should include preserving the essence of the indigenous worker as well as enhancing skills needed in the task.[44 54]

Training for peer educators varies as widely as the responsibilities. Few factors related to training exist in the literature. The effectiveness of the educator in the three areas of knowledge, delivery, and sensitivity is important to the peer educator's success.[41] One factor emphasized was that the training of the

worker should be simultaneous with the training of the worker's supervisors. This method has been suggested to instill a mutual valuing of skills and backgrounds.[42]

Training of the peer educators has been seen to increase the social status of the educator which may move the educator away from the target population and closer to the agency represented.[50] Training may also increase employment opportunities for the workers because of increased knowledge, skills and experience.[46] Warrick et al. also found that the "*promotoras*" used in a peer health worker program for improved their stature in the community and were often asked for advice in related topics by individuals in the community.[40]

The Stage of Change Model for Behavior Change

People change behavior both with use of psychotherapy and without formal psychotherapy. The latter is known as self-change. *How* an individual changes has been studied extensively in both arenas. Several questions arise. What exactly do individuals go through in order to change their behavior? Does everyone change in the same way using the same tools at the same time? Do individuals change addictive behaviors in the same way as non-addictive behaviors? Can the behavior change methods be utilized in educational programs? Can changers be assessed to indicate where in the change process they are?

Individuals have been shown to use self change strategies with alcohol abuse, smoking, obesity, fat intake, exercise habits, condom use, radon testing and opiate use to name just a few areas. [56] The Transtheoretical Model of Behavior Change, or the Stage of Change Model for Behavior Modification, attempts to explain how people intentionally change their behavior. Over the last decade, Prochaska and his colleagues have asked not only how do people change their behavior, but when does change take place, what tools specifically do they use, and what indicators can be used to predict change success. They developed a linear model which categorizes individuals into stages of change which follow a continuum beginning with not being aware of problem behavior or not being willing to change and moving through four stages ending with complete change over to the new, desired behavior.[57] Individuals in the change process were categorized in five stages: precontemplation, contemplation, preparation, action, and maintenance. Others have developed variations and expansions of this model. [58 59]

DiClemente and Prochaska originally identified four stages (precontemplation, contemplation, action, and maintenance) in a study of smokers quitting smoking on their own.[57] Though a fifth preparation stage was found, only the above four were consistently found.[60 61] A Stage of Change questionnaire suggested four highly reliable and statistically valid stages. Recent studies support the fifth preparation stage. [62]

In 1979, Prochaska identified ten processes used by changers in their change endeavor: consciousness raising, catharsis, choosing, conditional stimuli, contingency control, cognitive restructuring, contingency management, and helping relationships. Later, a revised ten-process model was confirmed including the processes of consciousness raising, dramatic relief, self liberation, social liberation, counter conditioning, stimulus control, self re-evaluation, environmental re-evaluation, reinforcement management, and helping relationships.[63] A 40-item questionnaire was used to measure the ten processes of change.

The ten processes that changers have shown to utilize in their self change have been shown to be specifically integrated with the stages of change[9 62] These studies consistently showed that individuals in the precontemplation stage used eight of the ten processes significantly less than people in any other stage. They did not process information about their problems as much as those did in other stages. They did not re-evaluate themselves and stated that they experienced fewer emotional responses to their problem behaviors. They did not talk to others about their problems and took very little action towards change. The reactions of the precontemplators were very different from those in the contemplation stage. These individuals were much more open to learning about their problem behavior (consciousness raising). They responded more to emotional techniques (dramatic relief) and were more likely to look at their own values, problems, and beliefs as well as be open to how their problem behavior affected their environment (self re-evaluation). The assessment of the processes suggested that as individuals move from not admitting to or recognizing their problem in the precontemplation stage to the contemplation stage, they used more of the cognitive and evaluative processes of change. As they proceeded into the preparation stage, they began to use processes that allowed them to control their environments and behavior such as counter conditioning and stimulus control. Commitment to change was seen consistently as they moved into the action stage. Here the processes of self-liberation, or will power, showed often. As individuals became successful in

their actions of change, more and more behavioral processes were used. Individuals successfully maintaining their new behavior used most of the processes consistently.

DiClemente et al. in a study of smokers confirmed these patterns by showing that smokers in the preparation stage were the least active in their change attempts and smokers in the preparation and action stage were the most active in almost every process.[62] There were significant differences in the contemplation, preparation, and action stages. The results suggested that contemplators were more active in gathering information and evaluating their smoking behavior differing from the preparation and action staged smokers who were more active in the actual changing of behavior, or the more behavioral processes. The process of self-liberation, which is a measure of commitment, gradually increased from the contemplation stage to the maintenance stage. Similar results were duplicated.[9]

Specifically, the stages of change and their corresponding processes of change are defined as follows:

Precontemplation Stage. In this first stage, the individual does not perceive the behavior to be undesirable or a problem. Alternatively, the individual may see the behavior for what it is, but do not intend to change the behavior to a more desired one. For example, a mother who prepares her tortillas with lard is in the precontemplation stage if she either does not understand that lard is a poor nutrition choice for good health. Alternatively, she may know that lard is not the best choice for good health, but is not intending to change because she feels that tortillas are made only with lard and neither she nor her family will eat them otherwise. Change is not an option. She needs convincing of the severity of the problem and the acceptability of tortillas made in a different and more healthful way.

Individuals in the precontemplation stage have been shown to use the process of change less than any other stage.[9] As precontemplators move into the contemplation stage, they begin to use the cognitive, affective, and evaluative processes more as follows:

- **Consciousness Raising:** Consciousness raising means increasing the level of awareness of the problem and the consequences of the problem. This information may include information related to health, nutrition, advantages or disadvantages of the new behavior, etc.
- **Social Liberation:** Social liberation creates alternatives to the desired behavior and attitudes toward the desired behavior in society and with respected others.

- **Helping Relationships:** Helping relationships are critical throughout the stages of change but are emphasized more in the earlier stages. Included in these relationships are friends, support groups, classmates, family members, etc.
- **Emotional Arousal:** Emotional arousal involves utilizing the emotional energy to give an impetus and resolution that a person should change an undesirable behavior to a desirable behavior. The health of family is often included in this process.

Contemplation Stage. In the contemplation stage, the individual may acknowledge that the behavior is a problem, and that change is probably a good decision, but is not willing to take the actual steps to change. Either the advantages of the current behavior are too great to give up or the disadvantages of the new behavior or getting to the new behavior are too negative to warrant change. Nonetheless, the individual is thinking about change and possibly learning about the problem and potential factors in changing. For example, the mother making the tortillas with lard may realize that lard is a poor choice for good health, but thinks that her family will never accept tortillas any other way. She may be looking for recipes of tortillas without lard or talking to others who have tried making tortillas in a different way. She may also be learning more about nutrition, the effects of saturated fats on health and factors involved in her own health or the health of her family. She needs information about nutrition, tortillas, lard, health, etc. and support in her consideration of change.

Individuals have been shown to emphasize the following processes in the contemplation stage:

- **Consciousness Raising:** Consciousness raising means increasing the level of awareness of the problem and the consequences of the problem. This information may include information related to health, nutrition, advantages or disadvantages of the new behavior, etc.
- **Self Re-evaluation:** Self re-evaluation is the assessing of how one feels and thinks about oneself with respect to a problem. In includes value clarification and analysis of a person's belief system, cultural traditions, and habits.
- **Emotional Arousal:** Emotional arousal involves utilizing the emotional energy to give an impetus and resolution that a person should change an undesirable behavior to a desirable behavior. The health of family is often included in this process.

- **Social Liberation:** Social liberation creates alternatives to the desired behavior and attitudes toward the desired behavior in society and with respected others.
- **Helping Relationships:** Helping relationships are critical throughout the stages of change but are emphasized more in the earlier stages. Included in these relationships are friends, support groups, classmates, family members, etc.

Preparation Stage. This stage represents individuals who have made a decision to change and are making preparations to do so. Preparation may include enrolling in a healthy cooking course or nutrition education class, telling people of the intent to change, making change a priority and committing to the attempt at a new behavior, setting a date and making a change plan. An unlimited number of actions can be included here depending upon the actual behavior being changed. For example, the mother making tortillas may try a few recipes of more healthy tortillas prepared without lard, talking to the family about concerns about saturated fat or good nutrition, telling others and the family of her intentions, etc. This individual needs support, practice in making a new kind of tortilla and more information on obesity, hypertension, heart disease and saturated fats.

Individuals in this stage have been shown to emphasize the following processes:

- **Commitment:** Commitment involves a choosing and committing to an act or a belief in the ability to change. Self-efficacy, or the belief in ability, is needed.
- **Helping Relationships:** This process is critical in this stage as well as the previous stages.
- **Self Re-evaluation:** This process continues in the preparation stage.

Action Stage. The action stage is the stage in which the individual actually attempts to change both the undesired behavior and their way of thinking about the behavior. People in this stage attempt to change, fail in their attempt and try again, often several times. They may even take steps to control their behavior indirectly, like controlling their environment. For example, the mother may begin making tortillas without lard and serving them to their family on a regular basis. She may make changes in the recipe and learn to overcome the protests or comments from her family. The mother still needs support, practice in making the perfect non-lard tortilla and reinforcement by information about limiting saturated fats for better health.

Individuals in the action stage have been shown to emphasize the following processes:

- **Reinforcement Management:** Reinforcement management involves rewarding one's self or being rewarded by others for making desired changes.
- **Stimulus Control:** Stimulus control is used to help individuals remember concepts or information needed for the new behavior. Stimulus control involves avoiding or countering stimuli that elicit problem behaviors: restructuring one's environment, avoiding high-risk cues, and developing new cues.
- **Countering:** Countering is the technique of substituting a desired healthy behavior for an unhealthy behavior.
- **Environmental Control:** Controlling the environment is important for continued success of the action staged individuals.
- **Reinforcement Management:** A variety of rewards (both internal and external) also assist in continued successful behavior.
- **Helping Relationships:** This process is critical in this stage as well as the previous stages.

Maintenance Stage. This stage is when the individual has adopted the new behavior on a consistent basis. There may be periodic failures, but the new behavior is the norm. For example, the mother now makes tortillas on a regular basis for her family.

Individuals in the maintenance stage have been shown to emphasize the following processes:

- **Helping Relationships:** Support is still critical in this stage to maintain the new behavior.
- **Self- efficacy:** Self-efficacy, or self confidence, assists the individuals in this stage in maintaining their successful behaviors.
- **Self-liberation:** This process allows the maintaining individuals to free themselves from their own previous concepts how they should be behaving.
- **Reinforcement Management**: Reward is still important in maintaining successful behavior change.

Termination. Termination is returning to the contemplation stage for the new behavior. The new, desired behavior is now the consistent practice. Returning to a less desirable is out of the question. For example, the mother now always makes tortillas using vegetable oil and never makes tortillas with lard.

These stages of change and associated processes have been consistently replicated across different types of problem behaviors. [63] [64]

The Spiral Pattern of Change

As is obvious in observations of changers, change is not a linear progress towards success. Rarely is the behavior change process perfect. There are many attempts and failures regardless of the behavior. These failures are termed relapse where a changer who is progressing through the stages relapses, or returns to a previous stage. It has been suggested that this relapse or recycling through the stages occurs frequently and that it is the rule rather than the exception. Prochaska and his colleagues have suggested that relapse is spiral in nature. Most relapsers return to a higher stage than the one in which they started. [65] [56] As they learn from their previous attempts and relapse, the next attempt to move to the next stage is easier, faster and more effective toward complete behavior change. Though many individuals get stuck in stages, particularly Precontemplation and Contemplation, relapse is a pattern which is normal, which may be necessary for successful change and which should be expected. Additionally, since relapsers most often return to a higher stage, progress is still being achieved.

Decisional Balance

Decisional balance refers to the relative weights given to the pros of the new behavior and cons of the new behavior. Prochaska and DiClemente suggested that these attitudes toward pros and cons are important factors in determining the change progress of self-changers. [66] Pros are defined as the advantages of a behavior. Cons are defined as the disadvantages of a behavior. For example, pros of lowering fat intake might include a more desirable physical appearance. Cons of lowering fat intake might include having to limit deserts and high fat snacks. Pros and cons of decisional balance were found to be indicators of a changer's commitment to change and the movement from precontemplation and contemplation stages to the more behavioral stages of preparation, action, and finally, maintenance. [67]

DiClemente et al., in a study of smokers, showed significant differences among precontemplation, contemplation, and preparation stage individuals with regard to decisional balance. [62] They found that precontemplation smokers emphasized the cons of not smoking and the pros of smoking behavior. Smokers

in the preparation and action stages emphasized the pros of smoking to a much lesser degree. The decisional balance against smoking shifted as smokers moved through the stages toward non-smoking. Later staged smokers began to emphasize the pros of the new non-smoking behavior much more than the cons of not smoking. This pattern was found in twelve other behavior change studies. [68]

Higher Level Processes: Experiential and Behavioral

Prochaska et al. suggested that higher level processes are associated with the processes of change and defined them as experiential processes and behavioral processes. [65] These higher level processes are composed of five change processes each. Experiential processes include consciousness raising, dramatic relief, environment reevaluation, social liberation and self-reevaluation. Behavioral processes include helping relationships, stimulus control, counter conditioning, reinforcement management, and self liberation. It has been found that changers in the precontemplation stage infrequently utilized both experiential and behavioral processes. Individuals in the contemplation stage were more likely to use experiential processes. Those in action and maintenance stages were more likely to use behavioral processes

Generalization of Model

The Stage of Change Model was originally investigated and validated with smokers attempting to change their smoking behavior. [9 62 63 69] The model has been expanded to many other problem behaviors including weight control; [70] nutrition counseling;[71] exercise behavior;[72 73] alcohol addiction; [75 76 77] resistance to mammography; [78] dietary fat reduction; [79 80 81] making New Year's resolutions;[82] cocaine use;[64] and psychotherapy outpatients. [60 61]

Assessing Stages of Change and Processes of Change Using Scales and Algorithms

The stages of change have been determined by using several methods. A Stage of Change Scale was developed using a 32 item questionnaire to determine 4 stages of change (Pre, Con, Act, Mai) and utilizing a 5-point Likert scale where 1 indicates strong disagreement and 5 shows strong agreement. [60] It assessed the clients readiness for involvement in change at the start of therapy. One self-report method

developed and validated by DiClemente et al. used mutually exclusive questions to give a discrete categorical measure of the stage. [62] In short, changers answered questions that categorized them into one of the five stages of change. The answers to the questions defined their stage relative to a specific behavior. A second type of assessment used a continuous measure to give separate scales for each of four stages: precontemplation, contemplation, action, and maintenance. The preparation stage was not considered a distinct stage.[61] Marcus et al. developed a stage of change, which included items representing the five stages of change.[72] Statements were used to describe the stages.

A Smoking Processes of Change Scale (SPC) was developed, validated, and used in categorizing smokers into stages of change.[63] The SPC included 40 questions to measure ten processes of change: conscious raising, dramatic relief, environment re-evaluation, social liberation, self re-evaluation, helping relationships, stimulus control, counter conditioning, reinforcement management self-liberation. Smokers used a Likert scale to rate the frequency with which activities or events occurred in last month. The instrument showed high reliability, internal validity, and predictive validity.

Velicer et al. developed a Smoking Decisional Balance Scale (SDB) which included 20 questions to assess ten pros and ten cons of smoking.[67] Subjects used a Likert scale to rate their agreement with items in the questionnaire. The pros and cons scales were found to have a high internal consistency. Similarly, Rossi et al. used an 8-item Likert format Decisional Balance Questionnaire (DBQ) for dietary fat reduction.[83] The questionnaire was confirmed by structural modeling techniques.

Rossi developed and validated a Stage of Change Algorithm for Dietary Fat Reduction to be used to assess an individual's readiness to change dietary fat behavior.[84] The algorithm was validated by comparison with the Dietary Fat Reduction Behavioral Survey which is a Likert scale format questionnaire assessing the use of high fat foods and the Dietary Fat Quick Screen Survey. This algorithm included six questions in a yes/no format branching according to the response. The algorithm categorized individuals into one of five Stages of Change.

Staged Matched Strategies for Behavior Change

For every problem behavior, there is no doubt a strategy, program, self help plan, or psychotherapy treatment which has been utilized to assist individuals in changing to a more desired

behavior. Many of these strategies are well designed, action oriented programs designed for individuals who are prepared to change their behavior. According to the Stages of Change Model, people who are prepared for change are individuals in the action and maintenance stages. Precontemplators, contemplators, and individuals in the preparation stage are not well prepared for changing their behavior. In action oriented programs, most of these early staged individuals either never enroll the program, do not participate in the program, or drop out shortly after they begin. Those who do remain often do not succeed. In short, these individuals are not yet ready to change their behavior and utilize programs designed for people who are ready. It has been suggested that a more effective strategy for these individuals in the earlier stages of change is utilizing appropriate processes. It was found that in an action and maintenance oriented smoking cessation program for cardiac patients, found that those individuals in action and maintenance stages were successful. Individuals in the precontemplation and contemplation were not successful. Of those in action and maintenance stages, 94% were still not smoking at the six month follow-up time period. Those in the precontemplation and contemplation demonstrated no significant effects from the program.

Recruitment

Traditionally, recruitment for nutrition education programs consists of posters, flyers, and other announcement type materials. According to the Stage of Change Model, these types of recruitment strategies are excellent for those individuals who have realized the problem behavior, who have committed to changing that behavior, and who have initiated the steps required for change. In short, these types of recruitment strategies are effective for those who are adequately prepared for change. These strategies require that an individual react by taking the action needed. They must call, sign up, show up, or take some other reaction step. Those who are ready for this kind of reaction are most probably in the preparation, action, or maintenance stages of changing their behavior. By definition, these individuals are already well on their way to permanent behavior change.[70]

According to the Stage of Change Model, these reactive type strategies are not effective for precontemplators or contemplators who either do not admit to or do not recognize their problem behavior, or who have not yet committed to changing the behavior. A reaction type recruitment strategy is less likely to work for these individuals because the action required (calling, signing up, and showing up) is too large

of a step for someone who is not intending to change their behavior. Better for these individuals is a proactive type recruitment strategy. Proactive strategies are used to recruit precontemplators and contemplators. With proactive recruitment, potential participants are actively sought after by program personnel. Individual personal contact is made. Much less reaction is needed by a potential participant because someone has approached them. They do not need to take a step toward the program. The program reaches out to them personally.

Methods

Overview of Project

The purpose of this project was to develop a nutrition education program, delivered by abuela (Hispanic grandmothers) educators, based on the Stages of Change Model for Behavior Change, and targeting low-income Hispanic mothers of preschool children in selected areas of southern Colorado. Prior to development, a needs assessment was conducted using a series of focus groups in the area. Using the results of the focus group discussions, the materials and content were developed. After development, the program was implemented and evaluated both at the end of the program and in a six-month follow-up study.

Objectives and Indicators

There were three main objectives for this project. The estimated number of abuela educators to be trained was 18 (6 per area). The estimated number of participants to be educated was 540 (180 per area).

Objective 1: The program will increase interagency cooperation related to nutrition education in order to reach an increased number of the low-income Hispanic population.

Indicators: State, Area 1, Area 2, and Area 3 advisory committees will form and meet quarterly with the purpose of giving advice to help implement the project.

Objective 2: Participating individuals will acquire the **knowledge and skills** that contribute to nutritionally sound diets and healthy lifestyles.

Indicators: Sixty percent of the participants will report or demonstrate increased **knowledge or skills** related to diet and lifestyle in two or more of the following areas:

1. **knowledge of nutrition and dietary needs of preschool children;**

▲ The participants will demonstrate an increase in knowledge of the foods in each of the food groups of the Food Guide Pyramid.The participants will demonstrate an increase in knowledge of the importance of snacks in a child's diet

2. **ability to plan nutritionally balanced meals/menus;**

▲ The participants will demonstrate an understanding of how to use the Food Guide Pyramid to plan nutritionally balanced meals or menus by demonstrating a knowledge of the recommended number of servings in each food group.

3. **ability to interpret food labels, select, buy, and/or prepare appropriate foods to meet their own nutritional needs and those of their families;**

▲ The participants will demonstrate an increase in the ability to read food package labels to choose foods with lower fat, salt, and sugars or higher fiber in foods.

▲ The participants will demonstrate an increase in the ability to choose high fiber foods.

4. **ability to handle food safely to prevent food-borne illness;**

▲ The participants will demonstrate an increase in the knowledge of the proper way to defrost frozen foods and the proper handling of suspect foods.

5. **ability to manage food budgets and related resources from food assistance programs such as Food Stamps, WIC, and CSFP.**

▲ The participants will demonstrate an increase in knowledge of specific techniques which may help to manage food budgets and related resources.

Objective 3: Participating individuals will acquire **behaviors** that contribute to nutritionally sound diets and healthy lifestyles.

Indicators: Sixty percent of the following numbers of target groups will report or demonstrate one or more improved **behaviors** related to diet and lifestyle in two or more of the following areas:

1. **Dietary intake of children;**

▲ The participants will change their selection of fruits, vegetables, meats or meat alternatives, dairy products or other calcium foods, grains and fats, oils and sweets to more closely represent the proportions of the Food Guide Pyramid.

2. **Planning nutritionally balanced meals/menus for children;**

- ▲ The participants will change their consumption of fruits, vegetables, meats or meat alternatives, dairy products or other calcium foods, grains, fats, oils and sweets to more closely represent the proportions of the Food Guide Pyramid.

3. **Food selection, purchasing, and/or preparation;**
   - ▲ The participants will demonstrate an increase in the number of times they read food labels to select foods with less salt, sugar or fat.
4. **Safe food handling;**
   - ▲ The participants will demonstrate a decrease in the number of times the perform an unsafe food handling practice.
5. **Number of weeks WIC or CSFP foods and/or Food Stamps last during the month;**
   - ▲ The participants will demonstrate an increase in the number of times they practice a money saving technique related to food and food resources.

Objective 4: Sixty percent of the participants will improve their stage of change defined by at least one stage toward the desired behavior change in two or more of the following areas:

- ▲ reduction in the feeding of high fat foods to children
- ▲ increase in the feeding of high fiber foods to children
- ▲ increase in making foods fun for children to eat
- ▲ increase in the use of a sanitizing solution when cleaning in the kitchen

Needs Assessments

Initially, ten qualitative focus group discussions were conducted with low-income Hispanic mothers of pre-school children and the results were analyzed. A detailed discussion of these results may be found elsewhere. [85] Briefly, the results of these focus group discussions emphasized practical applications of nutrition education by the targeted population and specifically included:

Content

- ▲ a focus on needs of children (not prenatal or infant needs)
- ▲ healthy eating habits for families (increased consumption of fruits, vegetables, milk, chicken and fish; less consumption of red meat; less consumption of pop, junk foods, fast foods, candy, and chips)
- ▲ instruction in healthy preparation techniques, including quick and easy recipes and use of commodity or WIC foods available to them
- ▲ instruction in how to get kids to eat (snack ideas, including children in the meal preparation, etc.)

Delivery Format

- ▲ interactive, hands-on, small group discussions
- ▲ cooking classes; home visits; demonstrations; tastings
- ▲ opportunities to share information
- ▲ less desirable: printed information, video tapes

Communicator of Message

- ▲ people who knew about nutrition; a specialist; someone who was respected for their knowledge of nutrition; abuelas (Hispanic grandmothers) who were trained
- ▲ someone from a reputable agency

Program Participants

This project utilized four levels of management and implementation and as well as the targeted class participants. The management and implementation levels included the Colorado State University Cooperative Extension agent for each of the three project areas, an abuela coordinator for each of the project areas, several abuela educators and abuela evaluators for teaching and evaluation of the nutrition education classes. Additionally, for each of the three areas, advisory committees were established to assist in development of the project, recruitment of the educators, and marketing of the program in the communities.

Colorado State University Cooperative Extension Agent

Colorado State University Cooperative Extension initiated this project in conjunction with the Department of Food Science and Human Nutrition at Colorado State University. Three area extension agents (one for each area) were invited to participate. These areas were chosen based on need of the area relative to the objectives of the project and the Hispanic population. Area 1, located in the San Luis Valley, was the site of the initial focus group discussions and program development. Area 2 and area 3 were recruited in the second year for implementation. Each area extension agent had a significant role in the development, planning, and implementation of the project in their area. They also participated in quarterly meetings and additional conference calls to maintain communication with the project directors at the university and to provide updates, discuss problems, and propose solutions and suggestions for improvement.

Advisory Committees

One state and three local advisory committees (one for each of the three areas) were formed to assist in the research, development, implementation, community awareness, and evaluation of this project. These committees were invaluable in determining community leaders, locating ideal abuela educators, gathering support from the community for the program, advertising the classes, and providing critical information about the communities themselves. The interagency cooperation generated with these committees helped to achieve one of the main USDA goals of the project. Appendix II shows a listing of each areas advisory committees as well as the overall state advisory committee.

Abuela Coordinator

Each extension agent hired an abuela coordinator to manage the day-to-day activities of the project in their area. The abuela coordinator recruited, interviewed, hired, and supervised each abuela educator and evaluators and made sure that all questionnaires and other paper work were completed and sent to the university. The abuela coordinator also performed such tasks as arranging for publicity in newspapers and on radio; organizing meetings with abuelas, advisory committees, and university representatives; filling in as educator or evaluator as necessary; making arrangements for abuela educator training sessions; etc.

Recruitment and selection. The abuela coordinator was recruited and selected by the area extension agent. The extension agents set the characteristics for the coordinator as being bilingual, having knowledge of the target population and the community, and having skills necessary for supervising the abuelas, substituting for abuela educators in emergency situations, and assisting abuela educators with their responsibilities.

Training. All abuela coordinators attended the training of the abuela educators and were additionally trained in managing the abuela educators and performing the administrative duties.

Pay. The abuela coordinator was paid a half-time salary through Colorado State University Cooperative Extension.

Abuela Educator

The focus group results indicated that this population desired a person whom they felt were experts in nutrition to be their communicator of the information. They recognized several community agencies as reputable, but also stated that a barrier to changing nutrition behaviors was in the contradictory and inconsistent information. It was also difficult to accept information when it went against their perception of nutritional truths. The focus group participants confirmed that the grandmother (abuela) in the Hispanic population is perceived as the nutrition, parenting, health, and child expert for the family. The abuela is respected and her suggestions are likely to be followed. Accordingly, the abuela was chosen as the message communicator in a peer education format and became known as the abuela educator.[87]

Responsibilities. Abuela educators were to be mature, bilingual, and capable of meeting the responsibilities of the job. The abuela educator had the responsibilities of organizing and teaching the individual classes including recruiting class participants, making all logistical arrangements for the class, acquiring the supplies necessary for teaching the class, coordinating with an abuela evaluator for administering of the pre-test and post-test of participants, and actual teaching of the class itself.

Recruitment and selection. The abuela educators were recruited using referrals from the area Colorado State University extension agent, the abuela coordinator, and members of the advisory committees. Announcements were also made in area newspapers and in public service announcements on local radio stations. Word of mouth and personal referrals proved to be the most effective means of

recruiting abuela educators. Once recruited, the potential abuela educator was assessed for appropriateness for the program and interviewed. She was also asked if she was willing to take on all the responsibilities required.

Training. The focus group results also indicated that if abuelas in the communities were to be used, training was essential. It was evident that the communicator had to be perceived as knowing the information and should be a representative of a reputable agency in the community known for accurate nutrition information. Each abuela educator was asked to participate in an abuela educator training program. The training was conducted over a two day period and included a full description of the program and program materials. Each unit was taught to the abuela educators in the same way that they were to teach their own classes to the participants. Other topics of discussion included cultural sensitivity, administrative issues, and tips on how to recruit participants, organize classes, secure locations, and solve transportation and childcare problems. A thorough review and formative evaluation of the abuela educator training can be found elsewhere. [86]

Pay. The abuela educators were originally paid $400 for teaching the complete five-unit program to forty participants. They were also given $100 for expenses such as childcare arrangements, supplies for the learning activities, and facility charges. Provisions were made for the rare occasion when expenses exceeded $100. In no case was the educator asked to pay for expenses out of their own pocket.

Abuela Evaluator

It was decided that the abuela evaluator would be separate from the educator for each class to help reduce bias in the evaluation process.

Responsibilities. The evaluators had the responsibility of ensuring that each participant completed an informed consent form, a demographics questionnaire, a pre-test during the first class session, and a post-test during the last class session. They were also responsible for getting all completed questionnaires to the abuela coordinator. It was found very important that the evaluators were organized individuals, bilingual, responsible and conscientious in their duties.

Recruitment and selection. The evaluator was recruited in the same fashion as the abuela educator. Often the abuela evaluators were selected after the training program if it was determined that they would be better at evaluation than the actual teaching of the classes.

Training. The evaluator also went through the abuela educator training to become oriented to the program and participated in an additional two hours of training in the evaluation process itself. They were trained on the logistics of acquiring the paper work, completing the questionnaires, and working with the participants.

Pay. Originally, the evaluator's pay structure was according to the number of participants who successfully completed the evaluations. It was found that a more acceptable pay structure was to pay evaluators on an hourly basis. The pay scale was changed to $6.00 per hour, which included not only actual evaluation time, but travel time as well. This hourly format proved to be a much more equitable and cost effective payment structure for the evaluators.

Class Participants

The class participants recruited for this project were Hispanic mothers of pre-school children who were eligible for the WIC supplemental food program. A variety of women participated in the classes. Since this project was sponsored by the Colorado State University and the University's Cooperative Extension as a community nutrition education program, all interested individuals were allowed to participate. Most participants fit the targeted profile. A few participants were grandmothers who were major care providers of their pre-school grandchildren, older teenage sisters who were major care providers of their pre-school siblings, and eight men who were the major care providers of their children. Those individuals who were not care providers for pre-school children were allowed to participate, but were not included in the evaluation of the program. No attempt was made to randomize the groups. Individual classes were selected by the abuela educator teaching the class.

Recruitment and selection. Each abuela educator had the responsibility of recruiting the participants for their own classes. Proactive recruitment was used by the abuela educators with the assistance and referral from the advisory committee members, the extension agent, the abuela coordinator and agency representative supportive of the program. Reactive recruitment was also used in the form of

flyers, posters, notices, etc. The abuela educators were allowed to develop their own notices as well as use those provided by the project coordinators. All interested individuals were allowed to participate. Only those participants who fit the profile of Hispanic mothers of pre-school children and other major care providers of pre-school children (males, grandparents, and teenage siblings) were evaluated.

Pay. The participants were not paid for their participation in the classes. They were given a 5-piece set of kitchen utensils (described later) as incentives to complete all five units.

Control Group Participants

A control group was used for comparison with the program participants to determine if the test itself or other environmental factors had any impact on the participants. The same survey was used as was used for the program participants. The control group was composed of low-income Hispanic individuals including migrant farm workers who were similar to the participants in the target areas. The control group was located in Weld county, located in the northeastern part of the state. This removed location was chosen to minimize the likelihood that the nutrition information from the program would influence the control group participants. It was also difficult to conduct a control group evaluation in the target areas due to the lack of control of recruitment of participants by the abuela educators. The project areas in southern Colorado are made up of small and close knit communities. The chance of a program participant being recruited for both the control and the class would be high and difficult to control. A completely different area appeared to be a better option for the control group. The individuals chosen for the control group were very similar to the participants of the target area.

Recruitment and selection. The control group participants were recruited and selected from the waiting areas of a WIC clinic and adjacent medical clinic in Weld county. There was no attempt at randomly selecting the control group. Individuals in the waiting area were asked to participate if they fit the targeted profile.

Pay. The control group was paid $10 for completing the pre-test and an additional $10 for completing the post-test.

Program Content

It was determined from the focus group discussions that the content should address the desire of the participants for their families to have healthy eating habits including decreased consumption of fruits, vegetables, and milk; eating a balanced diet; increased consumption of fish and chicken; decreased consumption of large quantities of red meat; decreased consumption of pop, junk foods, fast foods, candy, and chips; and decreased fat consumption. The participants also emphasized that they wanted help in getting their children to eat more healthfully, especially in snack items. They also wanted to learn better preparation and shopping techniques to not only prepare healthier foods, but to also better utilize limited food resources.

Accordingly, five content areas were developed:

- *Make It Healthy*: This unit discussed basic nutrition information, including a description and tips on using the USDA Food Guide Pyramid. Food groups, serving sizes, and added fats and sugars were explained. The proper use of the Food Guide Pyramid was demonstrated using a breakfast, lunch, dinner, and snacks scenario.

- *Make It Fun*: This unit provided applicable tips for preparing healthy foods and meals for children and for encouraging children to choose these foods over less healthy ones. Fun and creative ideas were proposed for food preparation including the making of sandwiches in shapes of animals and vehicles using fruits and vegetables; making easy, fast and healthy snacks; and making healthy substitutions for "junk" foods generally chosen by children. The concept of varying the color, size, shape, and texture of foods to increase children's interest was discussed and practiced.

- *Make A Change*: This unit discussed the modification of foods and meals to reduce fat, sugar, and salt and increase fiber. Specific techniques for elimination or reduction of fat, sugar and salt were explained. Ideas for more healthy substitutions were discussed. Ways to increase fiber in the diet were explained.

- *Make It Safe:* This unit focused on important food safety issues and guidelines. Keeping hot foods hot, cold foods cold, and eating and preparation areas clean were emphasized. Proper defrosting methods were explained. Tips for checking foods while shopping were discussed. Finally, the recipe for a bleach sanitizing solution was explained and demonstrated.

- *Make A Plan:* The final unit explained ways to make food resources last longer so that better quality foods or additional food could be acquired. The messages in this unit emphasized money saving shopping techniques. Participants learned and practiced reading package and shelf labels. The also learned wise uses of coupons

Materials

Flip Chart

The 11" X 17" flip chart was made up of 35 pages of color photographs and diagrams that directly corresponded to each page of the *Resource Guide*. The focus group results during the development stage of the project clearly indicated that this population desired teaching materials that included colorful, realistic photographs of common foods that were fun and attractive to view. They did not particularly like cartoons or unprofessional drawings. Five to thirteen pages were dedicated to teaching the messages for each of the five units. Each separate page was devoted to one message containing from two to six sub-messages described in detail.

The pictures in the flip chart were actual photographs designed by a professional food stylist and photographers. Great care was taken to ensure that the photographs were as professionally made as possible. For example, the food stylist used several tricks to enhance the photographs such as using glycerin to create shine on the fruit and vegetables, using food coloring to enhance the colors, and using marshmallow cream in place of milk in the cereal bowl. Foods were chosen specifically in consideration of the food choices of the target population. WIC and supplemental foods were used when possible. In accordance with copyright laws, brand names were removed or hidden on all containers leaving notations of "light", "low fat", etc. for teaching purposes.

Each of the five units began with an Introduction Page that provided a brief overview of the messages to come in the unit. Following the Introduction Page, were several Message Pages that specifically outline the information being presented in applicable type messages. The Summary Page followed which again summarized what was presented in the unit.

Creative designing was utilized in the layout of the flip chart. The bottom of each page contained a page number encased in a silhouette of the specific kitchen utensil assigned to that unit and used in the learning activities associated with that topic. The page number corresponded to the *Resource Guide* to help the abuela educators keep their place. Additionally, the Introduction Page was surrounded by a thick colorful border unique to each unit. Borders include wood, granite, sandstone and two colorful southwester fabric designs. Each Message Page of the unit had the same border inverted to a square at the center of the page tying the pages of unit together. The Summary Page also had a large photograph of the specific kitchen utensil devoted to that unit with the intention of tying in the learning activity utilizing that incentive to the messages presented in the unit. As much color was used in the flip chart development as possible including bright colorful items used in the photographs such as plates, foods, and containers.

The *La Cocina Saludable Resource Guide*

The *La Cocina Saludable Resource Guide* served as both a script for the abuela educators and a text from which they could study and review the information they were to teach. It was translated into Spanish for those abuelas teaching Spanish speaking audiences

The *Resource Guide* included two basic parts: A Teaching Page and a Background Page. It was designed to assist the abuela educator in easily and effectively teaching the nutrition education classes and to minimize the training required. Eventually, both Spanish and English translations were available to meet the language needs of both the abuela educators and the participants.

Each right hand page (The Teaching Page) served as a script for the abuela educator. Since prior teaching experience was not a requirement for an abuela educator, it was important to make the job of teaching as simple as possible. Additionally, according to the focus group results, consistency in the nutrition education was an important consideration in the program. With a script in hand, each abuela educator could read or follow carefully the information as it was laid out.

Each left-hand page of the *Resource Guide* (the Background Page) corresponded to the right hand page script, but gives background information to the items in the script. Not only did the Background Page serve as a study aid for the abuela educator during the training and in preparation for the teaching, it also served as readily available information for items on the teaching page. If an abuela educator read "osteoporosis" on the teaching page, but had forgotten exactly what this disease entailed, she could simply look to the adjacent Background Page on the left and read a brief synopsis of osteoporosis.

Located at the top of each page was a header to assist the abuela educator in keeping her place as she taught her classes. There were three items of information included in the header. As previously discussed, the left hand side was entitled "Background Page." The right hand page was entitled "Teaching Page." These notations were found in the header. Also included in the header was the title of the corresponding page in the flip chart. There were 35 pages in the flip chart, each with a title describing the information on that page. Finally, the flip chart page number was printed in the header as "FC PAGE 1," "FC PAGE 2," etc. Identifying the flip chart pages was important in helping the abuela educator to keep on track and use the correct page of the flip chart corresponding to the script and background information.

Each page of the *Resource Guide* also contained a footer that includes the page number of the *Resource Guide* itself. The *Resource Guide* was based largely on the Stage of Change Model for Behavior Change. Many of the processes emphasized by individuals moving from one specific stage to the next stage were used in the program. It was assumed that individuals from all five stages would be participating in each class group; therefore, as many processes of change as possible were used to address as many stages of change as possible. The *Resource Guide* assisted the abuela educators in using these processes of change in effective ways.

As the main visual aid, the flip chart devoted one page to each message in the topic area for the unit. Each of the thirty-five pages of the flip chart contained a main message and several sub-messages designed to reinforce the main message. The messages of each flip chart page were organized into a consistent delivery system described in the following discussion. The *Resources Guide* was designed to guide the abuela educator through this delivery system in an easy-to-follow manner utilizing consistent headings, subheadings, symbols, and wording found throughout the entire guide.

Each Teaching Pages was divided into four sections included: Start The Discussion, State The Facts, Use The Flip Chart, Check The Learning. Each of the sections were designed to address the processes of change for individuals in each of the fives stages as described in the following discussion.

The "Start The Discussion" section of the resource guide. Each Teaching Page began with the "Start the Discussion" section. For each flip chart page, the abuela educator started the discussion of the topic by asking one or more questions designed to address the various stages of change in which individuals in the class might have been.

For Individuals in the Precontemplation Stage:

The "Start the Discussion" questions were designed to get the precontemplators thinking about their current behaviors which are involved in the topic for that flip chart page. Questions asking what the participants' children usually eat for snacks and how do these foods fit into the Food Guide Pyramid were used. Without determining existing behavior, behavior change is impossible. Precontemplators were asked to begin thinking about their current behavior in detail during this initial section.

Denial has been suggested to be an important factor that holds individuals in the precontemplative Stage. People deny their responsibility to change, their ability to change, and their need to change. Individuals in this stage also tend to defend their right to behave as they do. Often through denial and defense, there is active resistance to change and rationalization for not changing. Assistance from an outside source is required to get beyond this point. The processes emphasized by individuals in the precontemplation stage were utilized in this section of the guide as follows:

- **Consciousness raising.** One of the main processes thought to be emphasized in moving beyond the precontemplative stage to contemplative stage is consciousness raising. The questions posed in this section as well as the discussion that results from the questions helped to raise the awareness of the areas which need changing in their behavior and why change is important. Consciousness raising involves learning about the problem behavior, increasing the awareness of the consequences of the behavior and realizing that control over this behavior is possible.

- **Social Liberation.** The process of social liberation is also emphasized in precontemplators when moving to the next stage. The change process of social liberation involves the creation of choices for individuals other than their undesired behavior. The discussion resulting from this section naturally led to other higher staged individuals in the class discussing their attempts, successes, failures, questions, obstacles and solutions associated with the behavior change. Self-help groups are good examples of social liberation activities. These groups provide an environment where changing is thought of as positive and is specifically supported. The discussion resulting from the questions in this initial section for each flip chart page began the development of a type of self-help group, began the discussion of alternative behaviors, and began the utilization of the change process of social liberation. Precontemplators began to realize that there were actually others on their side in changing behavior.
- **Helping Relationships.** The use of the process of helping relationships was utilized at this point as individuals in higher stages began recognizing the individuals in the precontemplation stage. A natural situation occurred where those already convinced of the ease and worth of the new behavior began supporting those not yet convinced. Additionally, others in the group who had progressed from precontemplation began to recognize the denials and defenses common to individuals in this stage. Holes in defenses were gently created by people who had been, but were no longer there.

For Individuals in the Contemplation Stage:

By definition, contemplators are already aware to some extent that they have a problem behavior and are thinking about changing. They are often attempting to understand the causes of their behavior and specifically how to change. Individuals in this stage can be eager to talk about their behavior and to tell what they have recently learned about the consequences of the behavior or steps in change. The processes emphasized by individuals in the contemplation stage were utilized in this section of the guide as follows:

- **Consciousness raising.** Consciousness raising is still very important to those in the contemplation stage. Even more knowledge is required to effectively prepare for action. Asking contemplators direct questions about their behaviors helped in making their current

behavior more concrete. The discussion that resulted from the questions posed in this section helped in validating their concerns, struggles, and ability to change. Higher staged participants had much information to share with eager to learn contemplators.

- **Self re-evaluation.** A main process used by contemplators is that of self re-evaluation. Self re-evaluation is the assessing of how one feels and thinks about oneself with respect to a problem. Values begin to be clarified and an individual's belief system begins to be analyzed and often challenged as do cultural traditions and habits. In the class meetings, the questions in this section and the resulting discussion helped to begin the process of self re-evaluation. Many answers were based on cultural and family traditions that had been passed from generation to generation. Habits were discovered as they were compared to the behavior of other classmates. Often individuals in the contemplation stage began to compare the consequences of the success of individuals in a higher stage with their own consequences of the existing behavior. Contemplators began to look at those in higher stages and visualize themselves there as well. This self re-evaluation was an important process in moving people to the next stage of preparation.
- **Emotional arousal.** Emotional arousal is a second process emphasized by contemplators as they move to the preparation Stage. Emotional arousal involves utilizing emotional energy to fuel the changing of the behavior. As participants answered the questions in this section, emotion was brought out as the discussion turned to family, children, disease of loved ones, pressures related to the behavior, frustration in changing, and anger at the thought of either being asked to change or of not having known the harmful effects of their undesired behavior for so long. The discussion invariably turned to stories of children and grandchildren, the child raising abilities of their relatives and friends, disease states of people they loved, and many more questions relating to the topic. One potential barrier to change is that the consequences of the behavior are often distant and unrealistic. As the individuals in the class began discussing the topic by answering the questions in this initial section, the reality of the consequences became more personal. Invariably, someone in the group knew someone who

had felt the consequences of diabetes, heart disease, foodborne illness, or other nutrition related disease.

- **Helping relationships.** Helping relationships are also important during the contemplative stage. The empathy exhibited by those in higher stages is eagerly accepted by individuals in the contemplative stage. During this initial discussion of the questions, empathy was extended and received. The empathy revolved around the struggle to changes, the obstacles encountered, the resistance by family members, etc. These initial relationships developed by open-ended discussion of the questions often grew to powerful helping relationships for movement through the stages of change.

For Individuals in the Preparation Stage:

Thoughtful and effective preparation is critical for behavior change. The preparation stage is the stage where individuals thoughtfully prepare to change. Individuals in the preparation stage have already decided to change and are doing something to take steps toward that change. Individuals in this stage become increasingly more confident that their decision to change made in the contemplative stage is the correct decision. The specific questions in the "Start The Discussion" section about each behavior were designed to help individuals in the preparation stage sort out what steps should be taken. For example, the question asking how foods fit into the Food Guide Pyramid helped these individuals determine what areas specifically needed to be changed in order to change snack behavior. The processes emphasized by individuals in the preparation stage were utilized in this section of the guide as follows:

- **Helping relationships.** As with the previous stages, the process of helping relationships is very important in moving individuals from the preparation stage to the action stage. The discussion resulting from these questions assisted in securing these relationships. Those in the preparation stage acted as support to those in the lower stages by talking about the information they have recently acquired. Individuals in the action and maintenance stages served as support for those in the preparation stage. Stories of success, failure, tips and tricks, testimonies and encouragement were very helpful and often came out in the discussion of the questions.

- **Self re-evaluation.** Self re-evaluation continues for these individuals in this stage as well. As the issues were discussed, individuals in the preparation stage compared their behavior and ideas on the new behavior with both those who were in higher stages as well as those in lower stages. Individuals in the preparation stage emphasize more the hopeful future and positive aspects of the new behavior rather than the difficulties and obstacles of the past old behavior. The comparison and self re-evaluation begins to shift with this positive attitude in mind.
- **Commitment.** Commitment is also an important process that is emphasized as individuals move from the preparation to the action stage. This process involves not only the willingness to take action toward change, but the self-confidence in the ability to take the needed steps. As the participants in the preparation stage discussed their recent steps toward behavior change and described their successes (as well as failures and overcoming of obstacles), higher levels of commitment began to be formed. They received acknowledgment and support for their gathering of information related to the behavior. The commitment expressed by higher staged individuals reinforced their own commitment.
- **Helping relationships.** Helping relationships are very important in this stage as well. The concept of going public increases the chance of success in changing behavior. During this initial discussion, individuals in the preparation stage were presented with the opportunity to let others in the class know that they were truly in the preparation stage and that they intended to change.

For Individuals in the Action Stage:

Individuals in the action stage are already making new behavior changes related to the topic. Asking specific questions related to the current behavior encouraged the positive behavior and showed where there was failure. The questions allowed evaluation of progress toward consistent behavior change. The processes emphasized by individuals in the action stage were utilized in this section of the guide as follows:

- **Reinforcement management.** Individuals in the action stage use several processes to move to the next stage of maintenance. The first process is reinforcement management.

Reinforcement management involves rewarding one's self or being rewarded by others for making the desired changes. As individuals in the action stage answered the questions in the "Start The Discussion" section, they were often rewarded for their success and encouraged to move past the failures. As they talked about their successes, they rewarded themselves by their own broadcast of success.

- **Stimulus or environmental control.** These individuals may also use the process of stimulus or environment control during the resulting discussion of the "Start The Discussion" questions. Hints to controlling behaviors in the environment, other people in their lives, and the various cues to the old behavior were brought up in the discussion as those in the maintenance stage discussed their behavior change and other individuals in the action stage discussed their successes and failures.
- **Countering.** Countering is the process of change in which healthy responses are substituted for the unhealthy responses. Individuals in the action stage can use countering effectively in their behavior change progress. Removing undesirable behavior without providing positive substitute behavior is often not effective. The process of countering attempts to find this appropriate healthy substitute. In the initial discussion which followed the "Start The Discussion" questions, specific countering techniques were utilized by successful changers. Nutrition and health are intimately tied to cultural values and traditions. An attitude or thought about a specific behavior may be the very obstacle preventing successful change. The discussion that resulted from these initial questions helped in substituting one thought for a more positive thought potentially leading to successful behavior change.
- **Helping relationships.** Helping relationships are still critical to the individuals in the action stage. As previously discussed, important relationships developed as a result of the initial discussion on the various topics.

For Individuals in the Maintenance Stage:

Individuals in the maintenance stage already behave in the desired way. These questions in this section allowed for reinforcement of their changed behavior. The questions also allowed them to support

those in other stages. Their answers designated these individuals as role models for others in lower stages and demonstrated that success in this behavior change was actually possible. The desired behavior of these individuals was reinforced as they realized that they were successful at the desired behavior. The processes emphasized by individuals in the maintenance stage were utilized in this section of the guide as follows:

- **Helping relationships.** These individuals continued to use helping relationships to remain in the maintenance stage where the desired behavior is performed on a regular and consistent basis. Support is still critical in maintaining the behavior and lowering the risk of relapse to a previous stage.
- **Self efficacy.** The process of self-efficacy was also emphasized here. As the individual in the maintenance stage discussed their successful behavior change and often gave their testimony of how they arrived at this stage, their self-efficacy increased as did their confidence in maintaining their new behavior.

The "State The Facts" section of the resource guide. After the "Start The Discussion" section there is the "State The Facts" section on each Teaching Page. The "State the Facts" sections gave a brief background and introduction to the desired behavior change. It drew the big picture and gave good, convincing reasons for changing behavior.

For Individuals in the Pre-Contemplation Stage:

The processes emphasized by individuals in the pre-contemplation stage were utilized in this section of the resource guide as follows:

- **Consciousness raising.** As discussed, precontemplators either do not know that their current behavior is undesirable or they do not care about the consequences of their behavior. This section helped precontemplators become aware that the undesired behavior is actually undesired and a change to the desired behavior is a better choice. It helped to both increase the awareness effectively using the process of consciousness raising and offered convincing evidence for change. For example, explaining that foods in a group provided the body with protein increased the awareness of the necessity of foods in this group. The "State The Facts"

statements for this flip chart page go on to explain what protein does to the body and the consequences of not eating enough protein.

- **Helping relationships.** Helping relationships were fostered as the basic facts were discussed and individuals from the various higher stages made their comments and added to the discussion.

For Individuals in the Contemplation Stage:

The processes emphasized by individuals in the contemplation stage were utilized in this section of the guide as follows:

- **Consciousness raising.** The "State The Facts" section helped to tip the scale for contemplators. In general, contemplators have recently begun to think about changing to the desired behavior, but do not intend to change in the near future. As previously discussed, contemplators require even more knowledge to prepare themselves for action. This section gave solid evidence for the desirability of changing in some cases, as well as specific information about the undesired existing behavior itself and its consequences. Individuals in this stage increased their awareness of the new behavior effectively utilizing the consciousness raising process. The information stated here served as an introduction to the details to come in the next section.
- **Self re-evaluation.** During the "State The Facts" section, contemplators were given information to which they could compare their behavior. Their belief system could begin to be analyzed and perhaps altered as they heard the basic facts. It may be possible that cultural traditions and beliefs, which can foster negative behaviors, were challenged by the factual information. These responses utilized the process of self re-evaluation that is important in movement to the preparation stage.
- **Emotional arousal.** The process of emotional arousal was also used in this "State The Facts" section. In some cases, statistics were given about the consequences of the undesired behavior addressed on the flip chart page. Examples included the number of children in the US who are hungry and malnourished, the percentage of Hispanics who suffer from diabetes

or heart disease, the number of individuals who suffer from food borne illnesses, etc. Along with these statistics were specific signs and symptoms or long term consequences. As the individuals in the contemplation stage realized the reality of the effects of the undesired behavior and the severity of the problem, emotions were aroused and the contemplator was moved toward the preparation stage. The facts elicited personal stories and experiences from the class participants which served to make the consequences of the undesired behavior more personal and evoke less "this could never happen to me" attitudes.

- **Helping relationships.** During this section, helping relationships were fostered, which, as previously discussed, also helped to support contemplators in their movement toward the preparation stage.

For Individuals in the Preparation Stage:

The processes emphasized by individuals in the preparation stage were utilized in this section of the guide as follows:

- **Commitment.** The "State The Facts" section reinforced the newly made decision to change by providing supporting evidence and information about the new behavior. The process of commitment was supported as individuals in this stage developed self-confidence and willingness to take action. They received more supporting evidence that their decision was a good one.
- **Self re-evaluation.** These individuals were given more information to continue with the process of self re-evaluation. As they heard the details of the behavior, they reevaluated themselves in relation to what they knew. Since individuals in this stage emphasize the future with the new behavior, the information they received during the "State The Facts" section helped them to create that future image and compare their present situation accordingly.
- **Helping relationships.** As with the other stages, helping relationships are critical for individual in the preparation stage. The discussion, resulting from the information provided in this section, fostered these relationships.

This section prepared the participant for the details of the information to come in the next section and supported the information they had acquired in their preparation steps to this point. One important aspect of taking steps to behavior change is learning the details associated with both changing the behavior and the consequences of not changing the behavior. This section provided these details.

For Individuals in the Action Stage:

The "State The Facts" section supported the individuals in the action stage by giving more information to show that their decision to change was a good one. The information reinforced their current behavior change steps.

The information and resulting discussion in the "State The Facts" section assisted the individuals in this stage in changing their way of thinking about their behavior. Instead of perhaps viewing the steps needed for behavior change and the disadvantages of the new behavior as burdensome, these individuals begin to better see the value and advantages of the new behavior. People in this stage often attempt to change their behavior and can fail several times before arriving at the maintenance stage. The information in this section helped to encourage and motivate for repeated attempts with increased determination as they became more and more convinced of the merits of success. The processes emphasized by individuals in the action stage were utilized in this section of the guide as follows:

- **Reinforcement management.** These individuals also gain ammunition for their own self-rewards as needed in the process of reinforcement management. The facts they received in this section served as rewards as they realized the details of the consequences of the changed behavior. Such rewards include longer, healthier, disease free lives, healthier children, improved finances, etc. Further discussion with others in the group also helped to reinforce action toward changed behavior as others acknowledged their success and steps.
- **Countering.** The details presented in this section began to show individuals in the action stage what behaviors could be substituted for the undesirable existing behaviors utilizing the process of countering.

- **Helping relationships.** As with the other stages, helping relationships remain important for this stage. The discussion resulting from the facts presented in this section helped to foster these relationships.

For Individuals in the Maintenance Stage:

The processes emphasized by individuals in the maintenance stage were utilized in this section of the guide as follows:

- **Self-efficacy.** The "State The Facts" section added to the existing knowledge of individuals in the maintenance stage further reinforcing and setting in concrete their new behavior. Individuals in this stage gathered more information related to their behavior change in this section. This information helped to increases their self-efficacy needed for maintaining the behavior and lowering the risk of relapsing to a previous stage thereby supporting the process of self-efficacy.
- **Helping relationships.** Helping relationships were also fostered as the individuals in the maintenance stage were supported in their continued behavior change.

The "Use The Flip Chart" section of the resource guide. The next section on the Teaching Page was "Use The Flip Chart." Here the information related to the behavior was broken down into small, distinct, simple messages. When put together, they provided a sound foundation for changing to the new behavior. The actual steps needed for the new behavior were simply and logically outlined. Additionally, the messages and steps related directly to the flip chart teaching tool so that a visual interpretation and visual message could be seen. For example: On the Teaching Page for Meat, Beans and Eggs under this section were two messages. Message #1 stated the desired behavior of eating 2-3 servings of these foods each day. Further, a way to measure success in achieving the behavior was given. A box enclosing a list of the serving sizes for commonly eaten foods in this group followed as well as a statement to count the number of servings of these foods eaten each day. Message #2 state that these foods provided the body with protein. This further supported the behavior by giving a justification for the new behavior. Message #4 and #5 similarly justified the new behavior by stating that these foods provided vitamins and minerals and briefly explaining the function of these nutrients in the body. Finally Message #5 more specifically

described the desired behavior by suggesting that individuals choose foods from this group which were low in fat. Again, a way to measure success was given by listing high fat foods and providing a list of low-fat foods.

For Individuals in the Precontemplation Stage:

In this section, the processes utilized by individuals in the precontemplation stage were utilized as follows:

- **Consciousness raising.** As discussed earlier, individuals in the precontemplation stage either do not know that their behavior is undesirable and a new behavior would be better or they have not been sufficiently convinced that changing their behavior is worth the time and effort they perceive it to require. This section raised awareness of the new behavior utilizing the consciousness raising process and justified the new behavior by simply and explicitly explaining the behavior in small messages and showing specifically how to achieve the new behavior and why that new behavior was more desirable. The details presented in this section increased the awareness of the individuals in the precontemplation stage that change was actually possible and within the control of the individual. Additionally, precontemplators tend to use rationalization to maintain their pre-contemplative state. They explain their behavior in terms of what appear to be sound reasons for why they behave as they do. The simple facts offered in the "Use The Flip Chart" section attempted to put holes in these explanations. Another defense of the precontemplator is that of denial. The facts presented in this section were straightforward and based on scientific evidence and measurable behavior goals. For example, a message in the Make a Change Unit suggested to reduce the fat in meals, snacks and recipes. It proceeded to simply define what was meant by low-fat foods and how to easily achieve this goal. Precontemplators in this area of eating low fat foods often rationalize that choosing low fat foods is too difficult, too expensive, to time-consuming, and unpleasant for both themselves and for their families. Further, they deny that they eat high fat diets. The information in this section described high-fat and low-fat foods in a measurable way.

- **Helping relationships.** The process of helping relationships was also utilized here as higher staged individuals discussed their successes in achieving some of the stated goals. Invariably individuals offered additional suggestions and examples of how to achieve the desired behavior. As precontemplators saw the success and positive attitudes of others, defenses began to be broken down.
- **Social liberation.** The process of social liberation was also utilized here by describing choices for alternative positive behaviors. As others in the group validated that these steps worked and were possible to achieve, the precontemplator was assisted in moving to the contemplation stage. As precontemplators heard that others similar to themselves were trying ideas presented, movement was facilitated.

For Individuals in the Contemplation Stage:

- **Consciousness raising.** As discussed, contemplators need accurate information to help increase their awareness of the problem behavior and move them to the preparation stage with a true commitment to change. The information given in the "Use The Flip Chart" section provided this needed information. The contemplator increased awareness of the need for the new behavior by learning the facts thus utilizing the process of consciousness raising. The contemplators could begin to define goals for behavior change as they learned ways to measure the desirable behavior. The also learned how to monitor behavior change success.
- **Self re-evaluation.** Self re-evaluation follows an increased awareness of the facts surrounding a behavior. As the contemplators learned more about the behavior, they could begin to evaluate where they were in relation to the desired behavior. For example, as they learned that the recommended daily number of servings of fruit for their children is 2-4 servings, they could begin to evaluate their fruit consumption behavior of their children accordingly. They began to make decisions based on their newly learned information whether they intend to change or not. These decisions were based on what they have learned about the consequences of changing and the reactions they expect as a result of the change.

- **Helping relationships.** Helping relationships, critical to the contemplator, were fostered as the discussion of the details continued.

For Individuals in the Preparation Stage:

This section provided specific information to assist the individual in the preparation stage in preparation for change. The messages and steps in the "Use The Flip Chart" section were direct, simple, and informative to a level that was not trivial yet not overwhelming in terms of amount and detail of information. In this section, the processes emphasized by individuals in the preparation stage were utilized as follows:

- **Self re-evaluation.** Self-reevaluation continues in the preparation stage. By giving specific, measurable facts about the new behavior, more information was learned by which to evaluate accurately. Self re-evaluation helps to put in concrete the decision to change. Here individuals were better able to begin focusing on the positive aspects of the new behavior than on the negative aspects of the old behavior. Self re-evaluation took place as individuals began to evaluate themselves relative to what they expected to become rather than on what they had done in the past.
- **Commitment.** Commitment, or willpower, was increased with the information in the "Use The Flip Chart" section by the provision of specific information and outlining the specific behavior steps needed. As participants learned how easy change was, how important nutrients were to the health of their children, how available specific foods could be, etc., they increased their commitment to change. Prochaska suggests several commitment techniques in his book, Changing for Good: [88]
    a. *Take small steps*. This section breaks down the desired behaviors into very small, defined, measurable steps.
    b. *Set a date*. This section gives measurable information that can be used to set goals for changing the behavior.

c. *Go public.* This section helps the individuals in the Preparation Stage to discuss concerns, fears, questions, etc. and then to actually voice the desire to change. A person is more likely to go public if all the information is available.

d. *Create a plan of action.* The information here provides the information that can be used to develop a plan of action. A person who does not know exactly what to do will have difficulty in making a plan.

- **Helping relationships.** As discussed, helping relationships are very important in this stage and were still being developed as individuals progressed through the class.

For Individuals in the Action Stage:

During the "Use The Flip Chart" section, individuals in the action stage were assisted in their move to the maintenance stage with the utilization of these processes:

- **Countering.** Countering is when individuals learn to substitute a healthy behavior for the problem behavior. Tips on these substitutions were outlined during this section. Ways to substitute low-fat food choices for higher-fat food choices, ways to substitute food which is fun for kids to eat for ordinary foods, and ways to substitute safe foods for children for unsafe foods were discussed. Included in this process of countering was counter thinking, which helped individuals replace the ways they had always thought about the behavior with alternatives. Traditions, cultural habits, family habits, etc. were addressed here.
- **Environment control.** Another process of environment control is addressed by individuals in the action stage. This section offered these individuals ways to control the environment to make change more likely. Tips on how to avoid problem behaviors were discussed, such as avoiding shopping hazards in grocery stores. Cues for desired behavior were also discussed, such as making shopping lists and keeping spray bottles of bleach available in the kitchen.
- **Reward.** Finally, the reward process was discussed to help individuals in the action stage move ahead. The positive aspects of various desired behaviors were discussed in the section offering both internal and external rewards for changed behavior.

For Individuals in the Maintenance Stage.

In this section, the processes emphasized by individuals in the maintenance stage were utilized as follows:

- **Helping relationships.** The "Use The Flip Chart" helped the individuals in the maintenance stage maintain. Helping relationships were continually being developed. These individuals were encouraged in their successful behavior as they learned more about the behavior itself.

The "Check The Learning" section of the resource guide. The next section was the "Check The Learning" section which had the purpose of review and reminder of the main points of the messages for that flip chart page. Here, there were several questions that were designed to get the participants to state the main behavior objectives and justification for these behaviors in their own words.

For Individuals in the Pre-Contemplation Stage:

During this section, individuals in the precontemplation stage had the opportunity to test their knowledge of the desired behavior and justification for that behavior. Here, they were asked to respond to questions designed to test their newly acquired information. By testing their level of awareness, they potentially could increase it. These individuals also had opportunities for continued development of helping relationships as they worked together to recall the information they had just learned.

For Individuals in the Contemplation Stage:

Contemplators use the process of self re-evaluation to move to the preparation stage. Here, these individuals were given specific questions to evaluate their knowledge and attitudes about the new behavior as compared to their current behavior.

For Individuals in the Preparation Stage:

This section gave individuals in the preparation a concrete way to increase their commitment to the new behavior. By demonstrating their ability to correctly answer the questions about the new behavior, self-efficacy and self confidence in knowing the information was potentially increased.

For Individuals in the Action Stage:

Since the individuals in the action stage rely heavily on the process of reinforcement management process, this section was an important part of the behavior change process. Learning of the information is critical to the changing behavior. By providing an opportunity for action staged individuals to receive acknowledgment and reward for answering correctly the questions in this section, movement to the maintenance stage was encouraged. As the abuela educators showed them approval of learning the information, these individuals in the action stage were rewarded.

For Individuals in the Maintenance Stage:

This section reinforced the ongoing behavior of the individuals in the maintenance stage by giving them an opportunity to show what they knew and consistently practiced.

For Individuals in All Stages:

Individuals in all stages utilize the element of decisional balance. The pros and cons of decisional balance have been identified as important factors in behavior change.[66] The emphasis that an individual in the change process puts on pros and cons of the old behavior verses the new behavior may be an indicator of the individual's decision to move from a lower stage to a higher stage.[67] Pros are defined as the positive elements of the new behavior. These are thought to encourage change. The cons are defined as the negative elements of the new behavior and are thought to be barriers to change. An example of a pro to the change behavior might be the physical appearance resulting from the weight loss after changing to a lower fat diet. The cons of changing fat intake behavior might be the giving up or limiting deserts and high fat snacks. It has been also been found that scores for pros and cons for changing behavior follow a characteristic pattern in which the cons of the behavior outweigh the pros in earlier stages and the pros of changing behavior outweigh the cons in later stages.[68]

Table Top Food Guide Pyramid

This teaching tool is a cardboard diagram which folds into a freestanding table top Food Guide Pyramid. It was designed to be used by the abuela educators in conjunction with the flip chart and the *Resource Guide* and supports the questioning, discussion, and various sections of the class.

Incentives

There were five incentives included in the *La Cocina Saludable* program, one for each of the five units. Each incentive contained the red *La Cocina Saludable* logo and was chosen to be useful both in the learning activity associated with the unit and in the kitchen at the participant's home. The incentive for "Make It Healthy" was a 2-quart pitcher/mixing bowl and wooden spoon. It was used in the learning activity involving the making of a low-fat tuna salad and fruit salad. The "Make It Fun" section contained a measuring cup which was used in the making of a non-fat yogurt fruit and vegetable dip. The incentive for "Make A Change" was a measuring spoon set. It was used in the making of frozen no-cook peanut butter cookies. The "Make It Safe" section talked at length about cooking foods until they were completely cooked and other food safety practices. The incentive for this section was a spatula/flipper reminding the participants to cook food thoroughly. The measuring spoon and pitcher were also used from the previous sections to facilitate the making of a sanitizing bleach solution. Finally, the "Make A Plan" section contained a canvas shopping bag incentive which could be used during grocery shopping.

One of the key pieces of information gained from the focus group discussions conducted in the development stage of the program was the desire for useful items related to nutrition rather than what many perceived to be useless and unimportant flyers and pamphlets they often received during nutrition education programs. The focus group members stated that flyers were sometimes difficult to read either because 1) they were in English and the receivers could only read Spanish, 2) the level of reading was too difficult to comprehend or 3) the Spanish version was not translated correctly making it difficult to read, or 4) the receivers could not read, did not want to take the time to read, or were just not interested in gaining information in this way. One migrant farm worker focus group member even went so far as to say that the flyers usually ended up "*para el banyo*" or "for the bathroom" meaning that they were useful as toilet paper. The consensus among focus group participants was that they felt most people would rather have household or kitchen items that would help them be healthy or would be useful in the home. The following processes were applied with utilization of the incentives:

- **Reinforcement management.** Individuals moving from the action stage to the maintenance stage use the process of reinforcement management. This process involves rewarding one's

self or being rewarded by others for making changes. The incentives served as a reward for taking the important steps of participating in the classes. Participants received one kitchen utensil for each unit they completed. Additionally, all participants also received certificates of completion of the La Cocina Saludable nutrition education program that served as an incentive to many of the participants.

- **Stimulus control.** A second process utilized by individuals moving from the action stage to the maintenance stage is stimulus control. Stimulus control helps participants remember the concepts of the training and involves, in part, developing cues in the environment for new behavior. The incentives served as these cues for the participants in several ways. First, the incentives were keyed to the flip chart pages. Each unit contained a graphic of the specific incentive designated for that section. The graphic was a part of the pagination on the flip chart pages. Second, the review page for each section contained the designated incentive as a part of the photograph to help participants link the incentive to the concepts taught in that section. Third, the learning activities used in each specific section involved use of the designated incentive. Finally, the kitchen utensils were chosen to work together to help participants remember the new behaviors taught in the program.

Program Format

Group discussions and learning activities. The *La Cocina Saludable* program was designed to be group interactive, fun, social, and full of discussion. This goal was achieved by providing the abuela educators with specific probing questions to ask at predetermined points in the session. The questions were designed to support specific processes important in each stage of change. Additionally, the questions were designed to achieve group discussion among the participants in the class. The following processes were utilized in the group discussions and learning activities:

- **Helping relationships.** By sharing ideas, concerns, obstacles, successes, failures, and stories about their lives and families during the group discussions and learning activities, helping relationships were developed. Helping relationships are critical in movement of individuals to each successive step. For the precontemplator, helping relationships are critical in their

movement to the contemplation stage. The helping relationships allowed the precontemplators to view their behaviors as others around them did. The result of this external view perspective potentially was to help the precontemplator begin to lower their defenses to considering change. The participants in the classes were generally individuals in all stages of change. Each of them had been in a previous stage and so the defenses fooled few people in the class. The discussion helped to nurture these relationships offering the needed assistance in moving to the next stage.

- **Social liberation.** Social liberation is a process emphasized as precontemplators move to the contemplation stage. The group discussions and activities in this program helped to foster this process. Social liberation involves a freedom from restricting attitudes of society about behavior change. By discussing the pros and cons of the desired behaviors in each of the sections, as well as the obstacles, difficulties, successes, failures, and attitudes, individuals could begin to realize that others were in the same situation and were supporting their behavior changes. At least part of their environment allowed freedom to behave in the new way.
- **Self re-evaluation.** As individuals in the contemplation stage moved to the preparation stage, they emphasized the process of self re-evaluation. Self re-evaluation is assessing how one feels and thinks about oneself with respect to a problem. It necessarily includes the clarification and analysis of one's belief system. The questions found in the Resource Guide served to guide this evaluation. Self re-evaluation also took place naturally as the spontaneous discussions occurred among the participants and with the abuela educator. The group discussions and learning activities helped to foster this process. As participants discussed the concepts and issues which arose in the training, they began to evaluate their standing in relation to the desired behavior, their success or lack of success in behavior change, their standing in relation to each other, their health status and the health status of their family.
- **Emotional arousal.** The group discussion at times became emotional leading to effective use of the process of emotional arousal by the participants. As the discussions followed the questions in the Resource Guide, participants began to talk about their children and families,

the health problems of people they know or their own health problems, the state of their communities, etc. The more personal and serious the discussion becomes, the more emotional energy could be utilized as an impetus for change. This process of emotional arousal helped to move specifically the contemplators to the preparation stage by helping them to seriously commit to changing their behaviors.

Program Implementation and Management

Several administrative issues required thoughtful planning and revision as the project progressed. Important administrative issues included personnel; recruitment of abuela educators, abuela evaluators and participants; training for abuela educators and evaluators; organization of class details such as location, child care, transportation, supplies; evaluation; and class conduction.

Recruitment of abuela educators and participants. The *La Cocina Saludable* program used both proactive and reactive recruitment strategies in an attempt to attract individuals in all stages. Reactive strategies such as flyers, posters, radio announcements, and newspaper articles were used with the goal of recruiting individuals in the later stages of change who were prepared for and committed to change. With proactive recruitment in mind, an important responsibility of the abuela educator was to recruit her own class participants. Several strategies were utilized. They recruited from within their own families and groups of friends and acquaintances. Many participants in each class either knew the abuela educator personally or someone else in the class who knew her. Additionally, the Colorado State University Cooperative Extension agents, the abuela coordinator, and members of the Advisory Committees submitted names of individuals appropriate for the classes. The abuela educator personally sought out these individuals and attempted to convince them to participate in the class. As the classes continued, the participants of the classes themselves were an important proactive recruitment vehicle. Using both proactive and reactive recruitment strategies helped to get not only the individuals who were ready for change, who were actively changing and who had been consistently successful in their behavior change, it also helped to recruit individuals who were not yet convinced of the need for and desirability of change.

Additionally, since nutrition behavior is made up of many different kinds of behavior within a topic area, the use of both proactive and reactive recruitment strategies was important. Those individuals

who were in later stages for one set of behaviors may have been in early stages for other behaviors. Adding proactive recruitment strategies to the traditional reactive strategies helped to increase the number of participants in the classes for a wide range of behaviors.

Class location. The program materials were designed to be portable, require no electricity or special equipment, and accommodate any teaching situation. The learning activities were also developed so that there was no requirement of kitchen facility or running water. Any location that was convenient for the participants was a potential class meeting location.

Language of class. *La Cocina Saludable* materials are written in both English and Spanish. Bilingual abuela educators chose the language for each of their classes according to the needs of those particular participants.

Other class arrangements. Each abuela educator had the responsibility of making her own guidelines associated with childcare and transportation and assisting in solving these problems for her participants.

Empowerment of the abuela educators. One of the key aspects built into the program was the empowerment of the abuela educators. They were given some control over where they offered their classes, how they recruited their participants, the order in which they taught the units, and the number of class meetings they conducted. Some limitations and guidelines were given regarding these elements in order to maintain the integrity of the program. Flexibility was allowed to encourage the abuela educators to plan the best format possible for each individual class group. It was felt that with this flexibility, more participants could be reached and retained. The flexibility was also included to give the abuela educators some ownership in the program and in their individual classes.

Evaluation Overview

There were four areas of evaluation involved in this project: 1) an evaluation of the effect of the abuela training program, 2) an evaluation of the nutrition education program delivered to the participants, 3) an evaluation of the change in behavior of the class participants, and 4) an evaluation of the movement in stage of change of the class participants. The evaluation of the abuela training and participation was conducted separately and is discussed elsewhere. [86] The evaluation of the participants change in knowledge

and skills, change in behavior, and movement through the stages of change are discussed in the following sections.

Evaluation Instruments

Demographics

A demographics questionnaire was developed to determine the characteristics of the class participants. The questionnaire was translated into Spanish. These questionnaires can be found in Appendix III.

Survey for Knowledge and Skills Assessment

As requested by the USDA Extension Services, a survey instrument was developed which included identical questions from the existing Colorado Women, Infants, and Children Special Supplemental Food Program (WIC) and the Colorado Expanded Food and Nutrition Education Program (EFNEP) questionnaires. A pilot questionnaire was used initially and evaluated. A test/re-test methods was used to test the reliability of the questionnaire assuming a null hypothesis of no correlation. The population for the test included a group of 37 Hispanic mothers and female relatives in a Denver area Head Start facility. A Pearson product moment coefficient of correlation was conducted. An r value of .70 or better was considered acceptable. The correlation value for the test instrument was 0.72. After assessing the effectiveness of the survey on class participants, it was decided that the WIC and EFNEP questions did not effectively measure the desired elements of the program. The survey was revised to better reflect the course content. The final instrument was also assessed for reliability resulting in an r value of 0.83. This instrument was used to assess the change in knowledge and skills for the class participants. A Spanish version was also developed. Results for this final survey version are reported in the results section of this paper.

Survey for Behavior Change Assessment

A survey for self-reported behavior related to the class topic areas was developed. This instrument based on the behavior survey used by the Colorado WIC program. As with the knowledge and skills

survey, a pilot test was conducted. The survey was evaluated and revised to better meet the needs of the project. A Spanish version was also developed. Results for the final survey version are reported in the results section of this paper.

Assessment of Diet Behavior

The 24 Hour Diet Recall form used by the WIC program was used to assess the diet behavior for this project. The form was also translated into Spanish.

Stage of Change Assessment

A tool for measurement of the participants' stage of change relative to four specific nutrition behaviors was developed. The behaviors measured included 1) decreasing use of low fat foods, 2) increasing use of high fiber foods, increasing use of fun foods, and 4) increased use of a bleach sanitizing solution. An initial survey was developed, tested, and revised. The resulting survey was also tested and revised. This final version was translated into Spanish. Data for the final survey version are reported in the results section of this paper.

Informed Consent

This project was approved by the Office of Regulatory Compliance, Human Research Committee. The approved consent form was completed by all participants. A copy of this form is located in Appendix III. A bilingual evaluator translated the consent forms to the Spanish-only speaking participants.

Statistical Methods

Assessment of Demographic Data

Using the demographics survey found in Appendix III, a profile of the class participants was developed. Due to the similarities in participants from the three project areas, data was pooled and reported as one group. Class participant characteristics can be found in the results section of this paper.

Assessment of Change in Participant Knowledge/Skills and Self Reported Behavior

The change in the knowledge/skills and self reported behavior of the participants was evaluated using a repeated measures design with two groups and three time periods. Because the groups were of different sample sizes and different numbers of individuals were measured over time, a sequence of t-tests for the repeated measure analysis was used. Two-sample t-tests comparing the change over time in the participant group to the change in the control group were used in order to compare knowledge, skills, and self reported behavior of the participants and control. In order to determine if the change in knowledge and skills of the participants was different over the three time periods (ENTRY, EXIT, and FOLLOW-UP), a sequence of t-tests as used. For the knowledge/skills portion, the survey was scored using the percent of total questions answered correctly. The response variables for the paired t-test included not only the total knowledge/skills score, but also the subcategories using the specific questions related to the objectives of the program as established by the USDA. These subcategories were 1) knowledge of nutrition and dietary needs of pre-school children, 2) ability to plan nutritionally balanced meals/menus, 3) ability to interpret food labels, select, buy, and/or prepare appropriate foods to meet their own nutritional needs and those of their families, 4) ability to handle food safely to prevent foodborne illness, and 5) ability to manage food budgets and related resources from food assistance programs such as Food Stamps, WIC, and Colorado Supplemental Food Program (CSFP). The behavior portion was scored by assigning one to five points to the Likert scale rating system with one being the most negative statement and five being the most positive statement. The score was determined using the percent achieved by the participants of the best possible score. Response variables for the behavior portion included not only nutrition behavior, but also the subcategories of 1) food selection and preparation for children, 2) safe food handling, 3) food selection and purchasing, and 4) stretching the food budget. The knowledge/skills questions and behavior questions were combined into one survey. The survey was administered in person to the participants at the ENTRY time period before the beginning of the classes and at the EXIT time period immediately after the classes were completed, and was sent to the participants via mail with instructions for completion six months after the end of the classes for the FOLLOW-UP assessment. For the FOLLOW-UP assessment, the participants were asked to complete the survey and mail it back to the University. Participants returning the completed survey were sent five dollars for their time and

efforts. (It is important to note that the participants completed the FOLLOW-UP survey without the assistance of the abuela evaluators. Potentially, someone other than the participant could have completed the survey or the participant could have found the information from another resource. It was decided that personal gathering of FOLLOW-UP information was not feasible for this project.) Control group participants were chosen from the waiting area of a WIC clinic and county medical clinic. It was not feasible to use abuela evaluators for the post-test assessment for the control group. The participants would not be returning to the clinic at the two-week time period and the possibility of finding all of the control group participants at their homes was not likely. A 52% return rate through the mail was achieved for the control group's post-test survey. A control group comparison was not used for the FOLLOW-UP surveys because of the difficulty in finding control group participants after six months.

Assessment of 24 Hour Diet Recall

Using the Colorado WIC diet recall form, 24 hour diet recall data was gathered at the ENTRY time period, the EXIT time period, and the six month FOLLOW-UP period. Each participant's data was first evaluated on its completeness by using a pre-determined criterion of at least two meals reported. If the recall included two meals, the food and serving amount was coded according toe the Expanded Food and Nutrition Education Program (EFNEP) 24 Hour Recall data set. The coded information was then entered into the EFNEP nutrition analysis computer program resulting in a diet summary report for each participant. The servings of bread, servings of vegetables, servings of fruit, servings of dairy, servings of meat, servings of other, total calories, grams of protein, grams of fat, grams of carbohydrates, RE of vitamin A, milligrams of vitamin C, milligrams of vitamin B6, milligrams of iron, milligrams of calcium, and grams of fiber at the ENTRY was compared with the values at the EXIT time period using paired t tests. The values at ENTRY and at EXIT were compared to those found at the FOLLOW-UP time period for those participants who returned the FOLLOW-UP survey using paired t tests.

Assessment of Participant Movement Through The Stages of Change

The Stage of Change instrument was used to assess the stage of change of each participant at the beginning of the class (ENTRY) and the end of the class (EXIT) for four nutrition behaviors: decreased use

of high fat foods, increased use of high fiber foods, increased use of fun foods for children, and increased use of a sanitizing bleach solution. The instrument was scored using 5 = Maintenance Stage, 4 = Action Stage, 3 = Preparation Stage, 2 = Contemplation Stage, and 1 = Precontemplation Stage. The questions were arranged so that the participants would stop the survey once they had reached their self reported stage for the specific behavior. Results were reported describing the percentage of participants in each stage at ENTRY and EXIT. Additionally, the number of participants moving up (toward Maintenance Stage) 1 stage, 2 stages, 3 stages, and 4 stages as well as the number of participants moving down (toward Precontemplation Stage) 1 stage, 2 stages, 3 stages, and 4 stages was determined. A Z value was calculated to determine if the number of participants moving up was significantly different than the number of participants moving down. It is important to note that reliability and validity of this instrument was not determined. The data acquired from this portion of the test was used to only determine the important elements in the development of an instrument for assessing stage of change for nutrition related behaviors for this population.

Limitations to the Evaluation of the Project

There were several limitations in the evaluation of this project that should be noted and may impact the project results.

Participant selection. A convenience sample was used and does not reflect a random sample of the project communities or areas. Participants were recruited by the abuela educators and other project personnel. It is not assumed that their results can be used to represent the entire population of low-income Hispanics in the areas. The fact that they chose to participate in the nutrition education classes make them different from those who did not choose to participate. This difference is assumed acceptable, however, because a similar audience will be addressed in future projects. Future participants will also be choosing to participate in similar nutrition education programs.

Behavior information. Only self-reported behaviors were evaluated. It is evident that participants may respond to the behavior questions according to what they expect to be the correct answers rather than their actual behavior. Improvement in these areas may reflect more increased knowledge than actual behavior improvement.

Diet recall information. The diet recall data acquired reflects self-reported information from the participants. It was obvious that for this population, taking tests or answering surveys was not a popular activity. The participants consistently reported their dislike for test taking, difficulty in taking tests, and feelings of being threatened by the tests. Completing the 24 hour diet recall forms proved cumbersome and time consuming for the participants. Many participants did not take the time necessary to complete them accurately. Additionally, even less time and accuracy was seen when participants completed these at home both in the FOLLOW-UP assessment and in the post-test assessment of the control group.

Abuela evaluators. Though, abuela evaluators were used in order to reduce the bias of the evaluation process and attempt to achieve as accurate response as possible from the participant, it is apparent that both advantages and disadvantages inherent in the use of peers for evaluation. Advantages included that there may have been a reduction of bias by having a different person conduct the evaluation than the abuela educator. It was felt that the most accurate responses would be achieved if an evaluator who did not intimidate, who spoke the same language, and who was respected by the participants conducted the evaluation. However, by using abuela evaluators, other limitations may have been incurred in the evaluation process. The abuela evaluators received limited training in the evaluation procedures and had little opportunity for practice and refining of their technique. They also may not have understood the importance of accurate and consistent evaluation in the research method. The limited time in each class also may have led to less attention being given to the evaluation process by both the abuela evaluator and the participants. Finally, it appeared that using peers as evaluators also establishes a situation in which the participants did not want to answer negatively in front of their peers leading to potentially socially desirable answers rather than honest self reported behavior.

Control group. The control group was similar to the participants in terms of demographic characteristics, yet they were from a different part of the state. It was felt that choosing a control group from the same areas as the classes were being taught would increase the likelihood of having a participant in both the control group and in a class. Since the abuela educators had the responsibility of recruiting their class participants, and the communities in the project areas are very small, a different region of the state was chosen. It is recognized that there may be differences between the control group and the participants affecting the comparison of survey scores between the two groups.

Additionally, the post-test survey was administered to the control group via mail which is a different assessment format than that of the participants which had the advantage of assistance from the abuela evaluators. This difference should be noted when making comparisons between the control group scores and the participant group scores.

Follow-up assessment. The FOLLOW-UP Survey was conducted through the mail because of the difficulty in personal follow-up surveying of all of the participants. Difficulties in completing the follow-up survey could not be addressed by program personnel. Other individuals in the family may have assisted in answering the questions or affected the responses. In addition, it is unknown if the responses were only from their own knowledge of the information and not from other sources of information.

Results

Recruitment and Participation

Advisory Committees

Advisory Committee members were recruited and utilized to guide the development and implementation of *La Cocina Saludable*, as well as to recruit both abuela educators and low-income Hispanic mothers of preschool children for the classes.

Objective 1: The program will increase interagency cooperation related to nutrition education in order to reach an increased number of the low income Hispanic population.

Indicator: State, Area 1, Area 2, and Area 3 Advisory Committees will form and meet quarterly with the purpose of giving advice to help implement the project.

A state advisory committee was organized which included fourteen members from Colorado State University and local and state health agencies. This committee met quarterly to discuss the development, progress, and implementation of the program. The individual members can be seen in Appendix II. Additionally, an advisory committee in each of the three project areas in southern Colorado was organized to assist in the specific project communities. Area 1 was formed during the first year of the project and maintained a committee of 16 members. Area 2 and Area 3 advisory committees were formed during years 2 and 3 of the project and had 23 members on each committee. These committees also met periodically to discuss the project. The advisory committee members were invaluable in assisting with the project, interacting with other community agencies, and recruiting required personnel and participants.

Abuela Educators and Participants

Using both proactive and reactive recruitment methods, the abuela educators recruited 836 individuals into the *La Cocina Saludable* program in the three project areas. Table 1 shows a summary of

the recruitment and participation for the program. Some of the participants began the program, but did not complete all five units of study or did not complete the ENTRY and/or EXIT surveys. These individuals are not included in the evaluation of the program. The individuals who did complete all of the sessions were informed about the various resources available to them such as WIC, EFNEP (in applicable areas), SHARE Colorado, BOCES, Food Stamps, etc. According to the abuela educators, attrition of class participants occurred for a multitude of reasons including schedule conflicts, childcare, and transportation problems, lack of desire to learn nutrition, or lack of interest in *La Cocina Saludable* itself.

Table 1 Recruitment and Completion of Participants to the Program

	No. of Participants
Completed ENTRY and EXIT Survey and Included in Evaluation Results	337
Started Program - Did Not Complete All 5 Units and/or Survey (Includes Participants in Pilot Portion of Project)	499
Total Participants Reached	836

Demographic Characteristics of Participants

A demographic questionnaire was given to each participant during the first session before the abuela educators began teaching. A variety of individuals participated in the *La Cocina Saludable* program. Figures 6-12 illustrate the variety of the program participants. The program specifically targeted low-income Hispanic mothers of pre-school children; however, there was some variation in the individuals who were interested in the program and any interested individual was allowed to participate.

Age of Participants

Figure 6 shows the percentage of participants in age categories. The program was directed to mothers of pre-school children, but mothers of older children were equally interested in the information. Most of the older women were primary care providers of grandchildren, or expected to be taking care of their grandchildren in the future. Though some elementary and junior high school children did participate, they were not included in the evaluation. However, they did appear to enjoy the program and learned important information for their own future parenting.

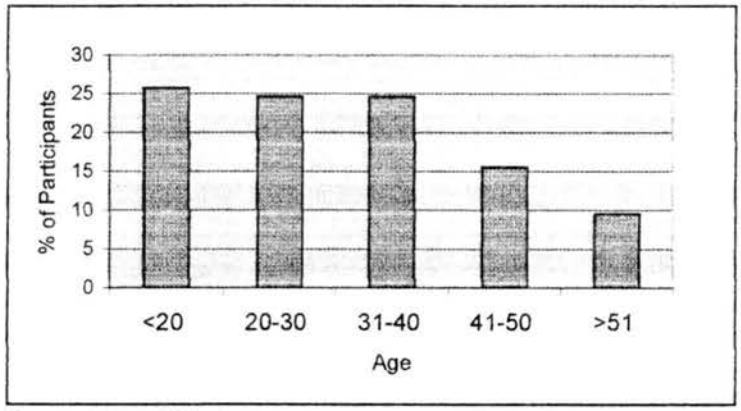

Figure 6 Age of Participants

Occupation and Annual Income

Occupation and annual income information was sometimes difficult to obtain from the participants. Many migrant farm workers did participate in the program but were reluctant to disclose their migrant status and many people were not willing to disclose their income. Figure 7 shows a comparison of occupation levels. Most of the participants were either not employed or working in non-professional jobs such as manual labor, farming, part-time work, etc. Some professionals including teachers, accountants, and managers did participate in the classes. Figure 8 illustrates categories of annual income of the participants. The project areas represented some of the poorest counties in Colorado. These numbers were consistent with Colorado census data.

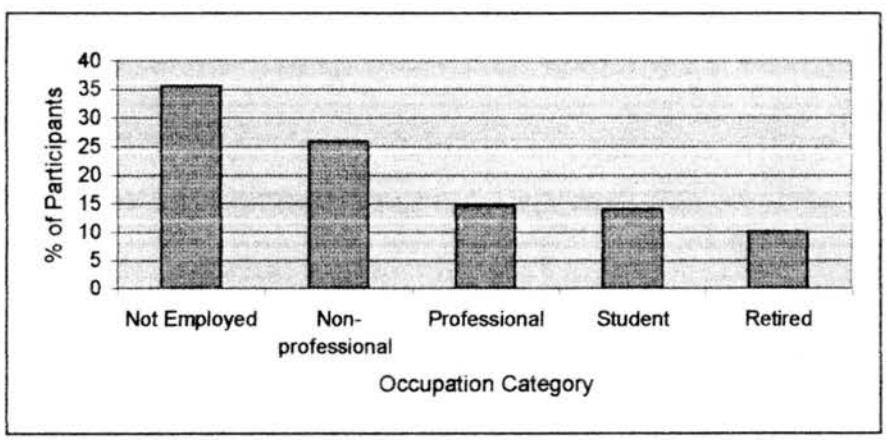

Figure 7 Occupation Categories of Participants

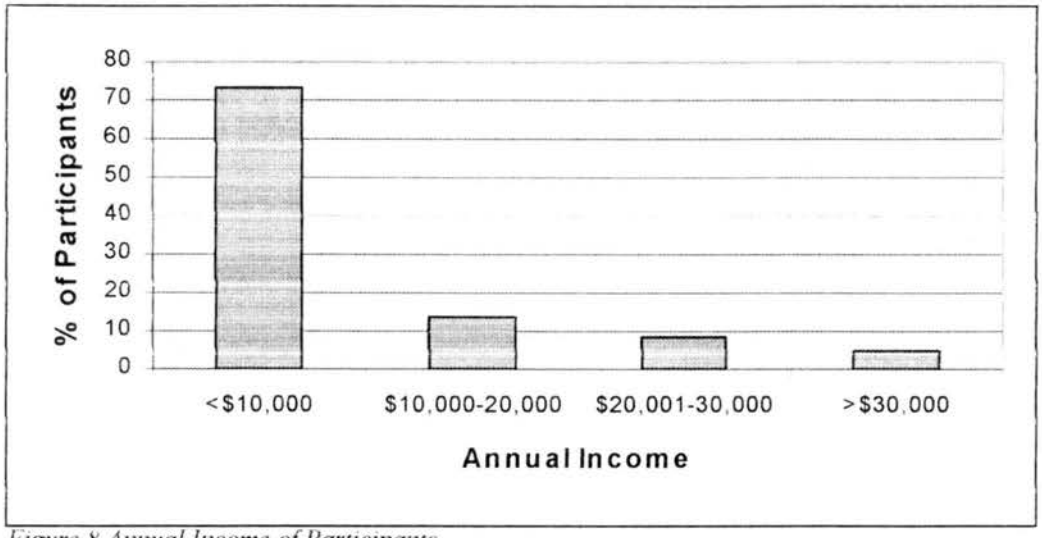

Figure 8 Annual Income of Participants

Age of Children

Though most of the participants were mothers or potential mothers of pre-school children, several grandmothers did participate. Grandmothers listed their grandchildren's ages that are represented in this data rather than their adult children. Many of those who did list only their older children talked more about their grandchildren suggesting that more young children may be affected by the program than these numbers represent. The grandparents were very interested in the information because they were the major care providers for the children of the family, as is often the case in Hispanic communities. Eight men participated in the program as well. They stated that they also were the major care providers for the children and were very committed to learning the information. Figure 9 shows the age distribution of the children of the participants.

Education Level

Figure 10 depicts education categories of the participants. Though a majority of the participants had not completed high school or had only a high school diploma or GED, there were many participants who had completed at least some college or who had earned some type of vocational certificate or a college degree. Less than 1% had achieved a degree higher than a bachelors degree. There are small community colleges in both Area 1 and Area 2 increasing the likelihood of come college or certificate of training.

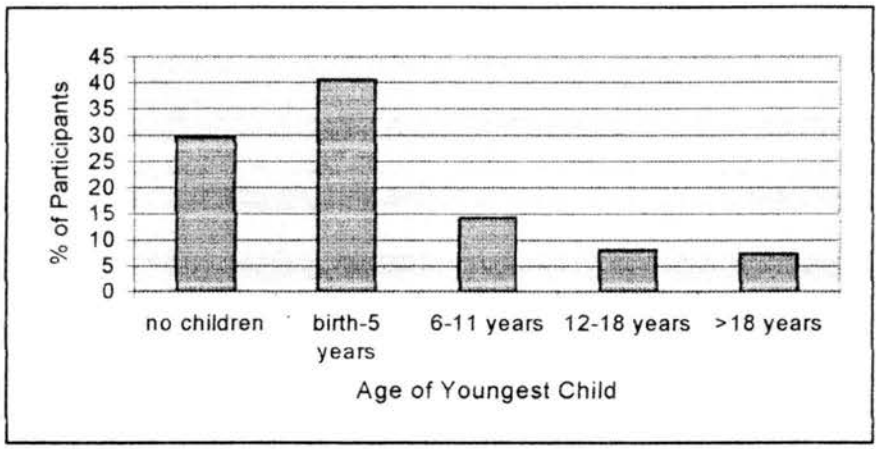

Figure 9 Age of Participants' Children

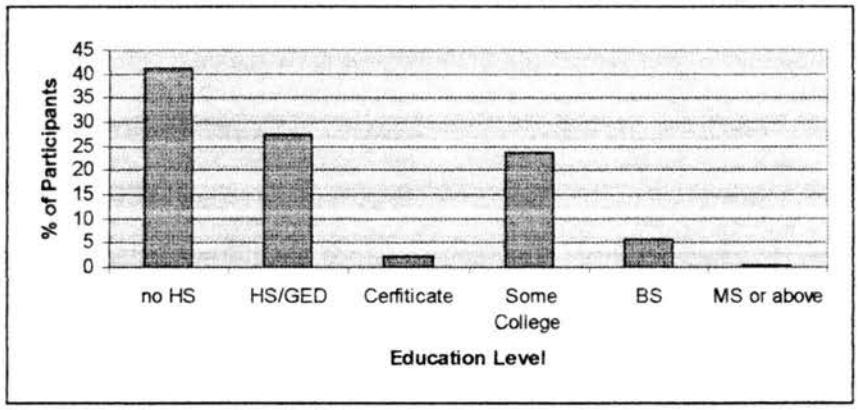

Figure 10 Education Level of Participants

Language Usage

Figure 11 shows the percentage of participants who spoke Spanish in their home. The participants were distributed evenly. Figure 12 shows that a majority of participants spoke English fluently.

Differences Between Areas

Area 3 participants spoke more Spanish in the home, were more likely to be first or second generation in the U.S., had been in the U.S. for a shorter amount of time, had a lower education level and were younger than participants in either Area 1 or Area 2. These trends were expected since Area 3 had more farmland than the other two areas attracting potentially more migrant farm workers. Area 2 participants had significantly lower incomes than Area 1 and lower occupational levels than both Area 1

and Area 3 (mainly more unemployment). This trend is expected because of the larger urban area in Area 2 (Pueblo) and fewer opportunities for farm work employment. Since the participants in the three areas were similar, results were pooled and are discussed as one participant group.

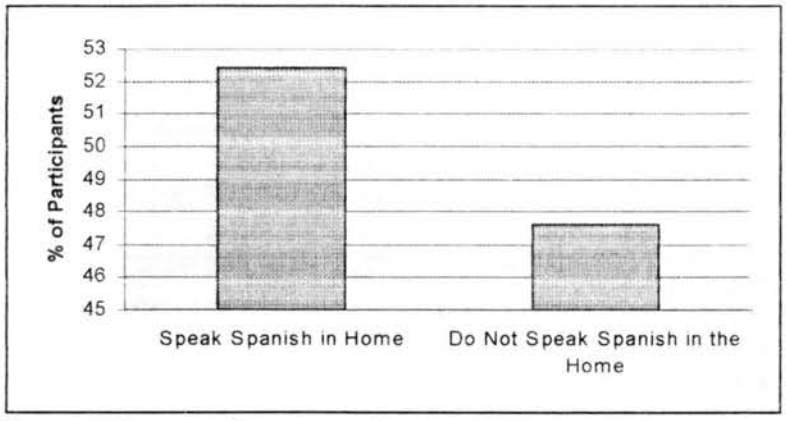

Figure 11 Percent of Participants Speaking Spanish in the Home

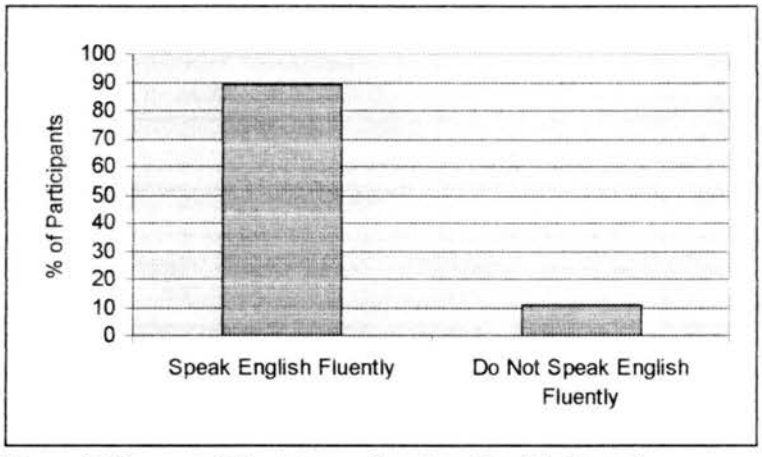

Figure 12 Percent of Participants Speaking English Fluently

Program Implementation and Management

Personnel

The Colorado State University Cooperative Extension agent in each of the three areas hired one program coordinator to manage the abuela educators, evaluators, and day-to-day workings of the program. Between the three areas, 45 abuela educators were recruited, hired, and trained. Five abuela evaluators were

recruited and trained; however, at times the coordinator or Extension agent was required to conduct the evaluation due to a shortage of evaluator position and scheduling difficulties.

Pay Structure for the Abuela Educators and Evaluators

Paying the abuela educators equitably for their time posed several challenges. Originally, the abuela educators were paid an honorarium of $500 for recruiting and teaching 40 participants the complete five unit program and obtaining both an ENTRY and EXIT completed survey. It was expected that an average of four classes would be taught each with an average of ten participants. Expenses including supplies, room fees (when necessary), childcare expenses, etc. were estimated to total approximately $100 for the four classes. The abuela educators discovered that often this pay structure was inequitable. A considerable amount of work was required to recruit the class participants and often the participants would not come to the classes, they would only come to a portion of the classes, or the would not complete the ENTRY or EXIT survey. The abuela educators found themselves spending time for which they would not be paid. The pay structure was then revised to consider the recruitment time and attrition issues. The abuela educators were then paid a part of their $400 when the participant was recruited, came to the first class session, and completed the ENTRY survey. The remainder of the payment for that class was paid upon receipt of the EXIT survey. This structure appeared to be somewhat more equitable. The pay structure ultimately was revised to an hourly rate using a time sheet. This final pay structure seemed to work best for this type of recruitment and class conduction. The pay structure for the abuela evaluators was similar. They were paid a specific amount for every completed ENTRY/EXIT survey they turned in to the coordinator. This pay structure was also revised to an hourly rate.

Class Logistics

Originally, the program was designed to be taught in five units over five meeting sessions each unit requiring two hours to complete; however, as part of the project design, the abuela educators were given flexibility in determining their own class format. It was felt that this flexibility left to the discretion of the educators would help to overcome some of the scheduling issues inherent in this population. Guidelines were established stating that the classes must be conducted in at least two separate meetings and each

meeting was to last at least one hour per unit covered. Many abuela educators felt that the fewer times they met, the better would be their retention of participants. Most classes were conducted in two, three, or four sessions. Occasionally, an abuela educator attempted to cover all five sessions in one meeting; however, this was not allowed and the participants from these classes were not counted in the results.

It was also found that the first session took much longer than the estimated one and one half hours due to the length of the unit itself and the requirement of offering the ENTRY survey during this class. The abuela educators were given the flexibility to rearrange the order of the units with the requirement that Unit 1 (*Make It Healthy*) was always taught before the other two food units (*Make It Fun* and *Make A Change*).

As with the number of sessions, length of sessions, and order of units, the abuela educators were given the flexibility of scheduling their classes and determining the best meeting location. The educators were very creative in their meeting sites. Meeting sites included public school class rooms, meeting rooms at local churches, homes of either the abuela educator or one of the participants, beauty parlors, parks, community centers, libraries, backyards, bowling allies, Head Start sites, and WIC offices. Those abuela educators specifically recruiting migrant farmworkers conducted their classes in fields, barns, and migrant camp locations. The flexibility given to the abuela educators seemed to increase their ability to recruit participants and organize classes. Location of the classes was important due to the limitations in transportation in the participant population. The abuela educators were discouraged from transporting participants in their own cars.

Childcare for the children of participants while they were in the classes was another significant obstacle for the abuela educators. As with the other aspects of the class, the educators were given freedom to deal with this obstacle as they wanted. Here, the educators were also very creative. Many educators recruited older children to baby-sit in a near by room while the class was being conducted. Often VCR's, movies, and toys or games were brought in to entertain the children. Several classes were conducted in neighborhood parks while children played close by. One abuela educator did not allow children to come to the classes at all which significantly reduced the number of participants who were willing to take the classes. Other educators allowed children to be present in the classes while they were being taught which presented significant distractions for the rest of the participants.

The language (Spanish or English) of the class varied with the needs of the participants and the abilities of the abuela educator. Most abuela educators were bilingual and could conduct classes in either Spanish or English. Some educators were reluctant to conduct Spanish classes because of the difficulty in translating the English version of the *Resource Guide* into Spanish as they were teaching the class. Accordingly, a Spanish version of the *Resource Guide* was developed for the abuela educators. When the Spanish version was made available, many more Spanish only classes were conducted. Occasionally, an abuela educator would conduct one class in both languages. This was reported to be difficult and confusing for both the participants and abuela educators.

Impact of Program

Separate portions of the ENTRY/EXIT Survey assessed change in knowledge/skills and change in behaviors. It was assumed that the change in behavior also included a change in knowledge/skills, and that participants potentially answered in the way they knew they should behave rather than how they actually behaved. As explained previously, there were two similar versions of this survey. A control group assessment was conducted in Larimar County, which is in the northern part of the state. Though the control population was some distance from the targeted population, they possessed similar demographic characteristics. The same ENTRY and EXIT Survey was given to the control population. The ENTRY Survey was conducted in person at either a medical clinic or its adjacent WIC site. The EXIT Survey was mailed two weeks later and the participant was asked to return the completed survey by mail. There was a 52% return of the questionnaires.

Objective 2: Participating individuals will acquire the knowledge and skills that contribute to nutritionally sound diets and health lifestyles.

Indicators: Sixty percent of the participants will report or demonstrate increased knowledge or skills related to diet and lifestyle.

At least 60% of the participants reported or demonstrated increased knowledge or skills in the areas of Balanced Meals (81% of participants) and Food Labels & Shopping (68% of participants) immediately following the classes. Eighty one percent of participants increased their total scores for all knowledge and skills areas combined. (See Table 2.) Table 3 suggests that at least 60% of the participants

increased their knowledge and skills in all areas after six months. It is important to note that the follow-up surveys were conducted through the mail and that it is recognized that participants may have had assistance either by other people or by other resources in answering the knowledge questions. Even if this occurred, the scores do indicate that the participants were aware of the nutrition topics and knew where to find the correct answers. Additionally, Table 4 suggests that the knowledge and skills scores increased significantly ($P<0.05$) after the class completion when compared to the control group scores for the total knowledge scores of all indicator areas combined and for the areas of Nutrition Knowledge, Balanced Meals, and Food Labels & Shopping. Table 5 suggests that at the six-month follow-up period, all knowledge and skill indicator areas increased significantly when compared to the ENTRY scores.

Table 2 Percentage of Participants Who Improved Knowledge and Skills Scores by at Least 10% Between ENTRY Survey and EXIT Survey listed by Program Indicators

	Total Knowledge/ Skills	Nutrition Knowledge	Balanced Meals	Food Labels & Shopping	Food Safety	Resource Management
Program (n=337)	81	52	81	68	27	40

Table 3 Percentage of Participants Who Improved Knowledge and Skills Scores by at Least 10% Between ENTRY Survey and FOLLOW-UP Survey listed by Program Indicators.

	Total Knowledge/ Skills	Nutrition Knowledge	Balanced Meals	Food Labels & Shopping	Food Safety	Resource Management
Program (n=81)	81	60	74	59	80	48

Objective 3: Participating individuals will acquire behaviors that contribute to nutritionally sound diets and health lifestyles

Indicators: Sixty percent of the participants will report or demonstrate one or more improved behaviors related to diet and lifestyle.

Immediately following the classes, 99% of the participants reported and improvement in only the Food Selection and Preparation content area and this improvement was significant when compared to the control group participants. A different trend was seen at the six month follow-up period. Six months after the completion of the classes, at least 68% of participants reported improvement in all areas of nutrition related behavior. Table 6, Table 7, Table 8, and Table 9 illustrate these results.

Table 4 Comparison of ENTRY and EXIT Mean Knowledge and Skills Scores of the Program Participants and the Control Group (% Score ± SD)

	ENTRY SCORES	EXIT SCORES	CHANGE
Total Knowledge/Skills Scores			
Control ± SD (N=52)	25.71 ^{aA} ± 14.97	26.98 ^{aA} ± 22.94	*
Program ± SD (n=337)	32.98 ^{aB} ± 28.53	80.78 ^{bB} ± 25.44	
Food Safety Indicator			
Control ± SD (N=52)	56.90 ^{aA} ±13.97	58.69 ^{aA} ±18.35	p=0.242
Program ± SD (n=337)	56.20 ^{aA} ±15.26	61.19 ^{bB} ±12.31	
Resource Management Indicator			
Control ± SD (N=52)	66.19 ^{aA} ±30.48	71.90 ^{aA} ±21.09	p=0.055
Program ± SD (n=337)	66.27 ^{aA} ±20.81	77.98 ^{bB} ±17.39	
Nutrition Knowledge Indicator			
Control ± SD (N=52)	58.17 ^{aA} ± 16.56	54.44 ^{aA} ± 17.34	*
Program ± SD (n=337)	53.12 ^{aA} ± 17.82	65.92 ^{bB} ± 18.83	
Balanced Meals Indicator			
Control ± SD (N=52)	10.31 ^{aA} ± 14.70	14.20 ^{aA} ± 28.24	*
Program ± SD (n=337)	24.68 ^{aA} ±33.88	86.20 ^{bB} ± 23.37	
Food Labels & Shopping Indicator			
Control ± SD (N=52)	56.73 ^{aA} ± 17.60	43.71 ^{bA} ± 5.15	*
Program ± SD (n=337)	57.64 ^{aA} ± 17.76	72.17 ^{bB} ± 17.07	

Same lower case letter represents no significant difference in mean ENTRY and EXIT scores within each row.
Same upper case letter represents no significant difference in mean ENTRY and EXIT scores within each column.
** = change from ENTRY and EXIT scores of participants is significantly different than change in ENTRY and EXIT scores of control (p <.05)*

Table 5 Change in Knowledge and Skills Mean ENTRY, EXIT, & FOLLOW-UP Scores for Program Participants (% Score ± SD)

	ENTRY	EXIT	P1	FOLLOW-UP	P2	P3
Total Knowledge/ Skill Score (n=81)	39.72 ± 25.92	86.74±20.51	<0.001	82.36±22.20	<0.083	<0.001
Nutrition Knowledge Indicator (n=81)	53.00 ± 17.04	66.50 ± 18.76	<0.001	67.35 ± 15.82	0.712	<0.001
Balanced Meals Indicator (n=81)	27.71 ± 33.67	89.06 ± 24.79	<0.001	83.96 ± 30.55	0.111	<0.001
Food Labels & Shopping Indicator (n=81)	57.61 ± 18.44	72.68 ± 17.79	<0.001	73.46 ± 14.66	0.713	<0.001
Food Safety Indicator (n=81)	55.31 ± 15.98	59.75 ± 11.25	0.005	86.63 ± 14.79	<0.001	<0.001
Resource Management Indicator (n=81)	67.81 ± 19.96	77.88 ± 17.19	<0.001	79.38 ± 16.04	0.511	<0.001

P1 = significance of difference between ENTRY and EXIT, P2 = significance between EXIT and FOLLOW UP;
P3 = significance of difference between ENTRY and FOLLOW UP; significances were tested with paired t-tests.

Table 6 Percentage of Participants Who Improved Self Reported Behavior Scores by at Least 10% Between ENTRY Survey and EXIT Survey listed by Program Indicators.

	Total Behavior	Food Selection and Preparation	Food Safety	Food Resources	Stretching Food Budget
Program (n=337)	22	99	23	18	22

Table 7 Percentage of Participants Who Improved Self Reported Behavior Scores by at Least 10% Between ENTRY Survey and FOLLOW-UP Survey listed by Program Indicators.

	Total Behavior	Food Selection and Preparation	Food Safety	Food Resources	Stretching Food Budget
Program (n=81)	75	98	81	68	69

Table 8 Comparison of the ENTRY and EXIT Mean Behavior Scores of the Program Participants and the Control Group (% Score ± SD)

	ENTRY	EXIT	CHANGE
Total Behavior Score			
Control ± SD (N=52)	63.33 ^{aA} ± 8.82	66.19 ^{aA} ± 13.91	p=0.606
Program ± SD (n=337)	53.09 ^{aB} ± 21.60	57.19 ^{bB} ± 20.98	
Food Selection & Preparation Indicator			
Control ± SD (N=52)	70.10 ^{aA} ± 12.19	70.57 ^{aA} ± 16.64	*
Program ± SD (n=337)	63.86 ^{aB} ± 15.41	70.39 ^{bA} ± 13.15	
Food Safety Indicator			
Control ± SD (N=52)	55.24 ^{aA} ± 14.59	60.79 ^{aA} ± 22.24	*
Program ± SD (n=337)	50.41 ^{aA} ± 16.03	50.43 ^{aB} ± 14.24	
Food Resources Indicator			
Control ± SD (N=52)	55.24 ^{aA} ± 26.80	54.76 ^{aA} ± 31.56	p=0.766
Program ± SD (n=337)	45.40 ^{aB} ± 25.55	43.86 ^{aA} ± 23.46	
Stretching Food Budget Indicator			
Control ± SD (N=52)	72.54 ^{aA} ± 17.18	71.90 ^{aA} ± 20.27	P=0.070
Program ± SD (n=337)	64.37 ^{aB} ± 17.23	68.11 ^{aA} ± 15.22	

Same lower case letter represents no significant difference in mean ENTRY and EXIT scores within each row.
Same upper case letter represents no significant difference in mean ENTRY and EXIT scores within each column.
** = change in ENTRY and EXIT mean scores of participants is significantly different than change in ENTRY and EXIT scores of control ($p<.05$)*

24 Hour Recall Information

The only significant change in any of the 24 hour diet recall categories was an increase in the number of servings of foods for the "OTHER" group on the Food Guide Pyramid (p=0.02). It is important to note that completing this information was the most difficult for both the participants and the abuela evaluators.

Table 9 Change in Behavior Subcategory Mean ENTRY, EXIT & FOLLOW-UP Scores for Program Participants (% Score ± SD)

	ENTRY	EXIT	P1	FOLLOW	P2	P3
Total Behavior Scores (n=81)	56.57 ± 11.38	59.68±10.57	0.002	76.63±11.41	<0.001	<0.001
Food Selection & Preparation Indicator (n=81)	63.15 ± 13.68	73.85 ± 11.70	<0.001	73.85 ± 11.70	<0.001	<0.001
Food Safety Indicator (n=81)	49.17 ± 16.10	50.43 ± 14.24	0.983	83.83 ± 18.12	<0.001	<0.001
Food Resources Indicator (n=81)	46.00 ± 25.14	42.81 ± 22.41	0.200	72.75 ± 26.48	<0.001	<0.001
Stretching Food Budget Indicator (n=81)	63.33 ± 14.58	69.79 ± 10.45	<0.001	80.08 ± 13.81	<0.001	<0.001

P1 = significance of difference between ENTRY and EXIT; P2 = significance between EXIT and FOLLOW UP;
P3 = significance of difference between ENTRY and FOLLOW UP; significances were tested with paired t-tests.

Socio-Demographic Factors Affecting Score

A One-way ANOVA was performed to determine if demographic variables had any effect on the various subcategories of scores. Occupation level had a significant effect on only Knowledge/Skill improvement, but not behavior change. All other demographic variables seemed to have no effect on the test scores. These results may suggest that the program is useful for a variety of ages, backgrounds, education levels, origins, etc. which is important for any community program.

Stage of Change Assessment

An assessment was developed in an attempt to determine at which stage of change each Participant reported themselves at the onset of the classes and then at the end of the classes. A measurement tool specifically designed for these nutrition topics was not found in the literature. Several versions of a stage of change questionnaire were developed and piloted on the participants. Each version was revised after assessing the results and ease of use for the participants. Copies of the test versions can be found in Appendix III. Though the assessment tool was not shown to be valid, several factors were found to be important when developing and using a tool for measuring the stage of change in this population and with nutrition related behaviors. Stages of Change was assessed for using less fat, using more fiber, using techniques to make food fun for children, and using a bleach sanitizing solution for cleaning. Figure 13,

Figure 14, Figure 15, and Figure 16 show the percentage of participants who reported being in each of the five stages of change in both the ENTRY and EXIT surveys.

Figure 17, Figure 18, Figure 19, and Figure 20 show the movement through the stages of change for decreased use of high fat foods, increased use of high fiber foods, increased use of fun food techniques for children, and increased use of a bleach sanitizing solution, respectively. The charts show the percentage of participants who moved up one stage toward the Maintenance (+1), up two stages toward the maintenance stage (+2), etc. as well as down one stage toward the precontemplative Stage (-1), down two stages toward the precontemplative stage (-2), etc. All movement comparisons were measured between the ENTRY and the EXIT survey. A Z statistic was calculated to determine if the proportion of participants who improved their stage of change was significantly different than the proportion of participants who moved backwards through the stages. The Z scores for the change in stage by participants for decreased fat use, increased fiber use, increased use of fun foods, and increased use of a sanitizing solution were $Z=6.6$, $Z=3.07$, $Z=5.8$, and $Z=7.2$, respectively. A Z statistic greater than 1.96 suggests that a larger proportion of those who changed change positively, i.e. moved forward through the stages, than those who changed negatively or regressed back through the stages. The following data represent only observed responses and do not suggest that the measurement of the stage of change for these participants is accurate. These results were used to draw conclusions related to instrument design and usage. Further validation of the instrument is required.

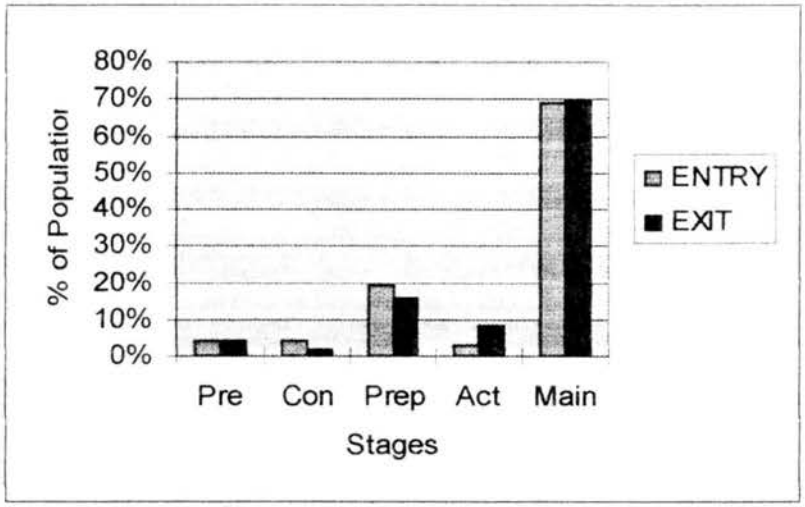

Figure 13 Stage of Change of Participants for Decreased Consumption of High Fat Foods

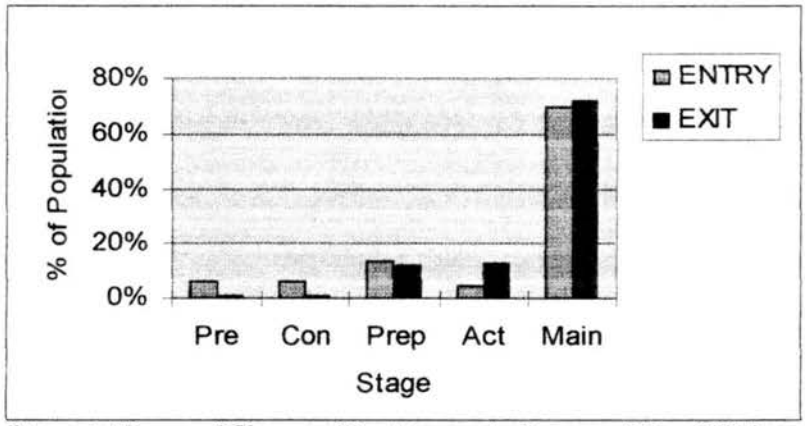

Figure 14 Stages of Change of Participants for Increased Use of High Fiber Foods

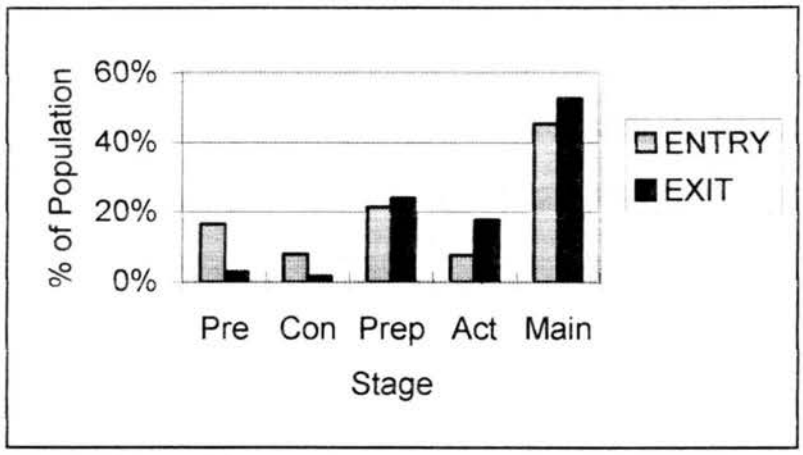

Figure 15 Stages of Change of Participants for Increased Use of Fun Foods

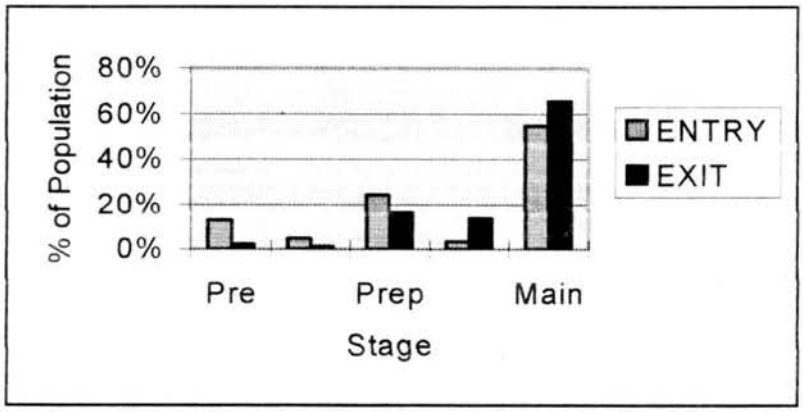

Figure 16 Stage of Change of Participants for Increased Use of Bleach Solution

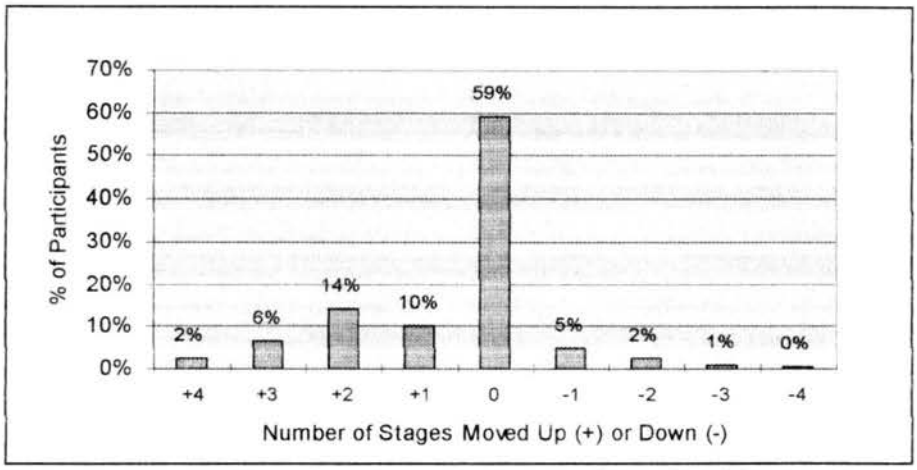

Figure 17 Movement Through the Stages for Decreased Use of High Fat Foods

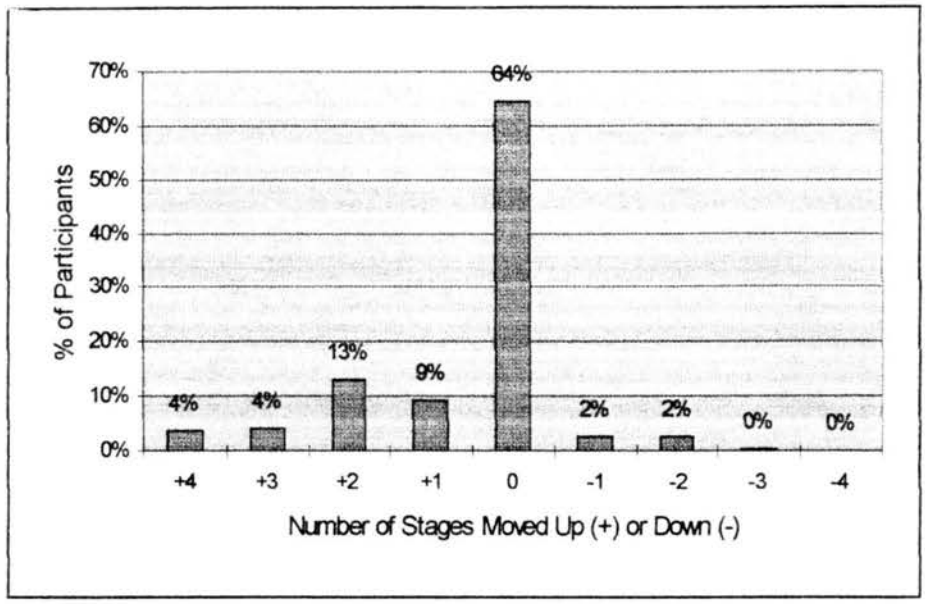

Figure 18 Movement Through the Stages for Increased Use of High Fiber Foods

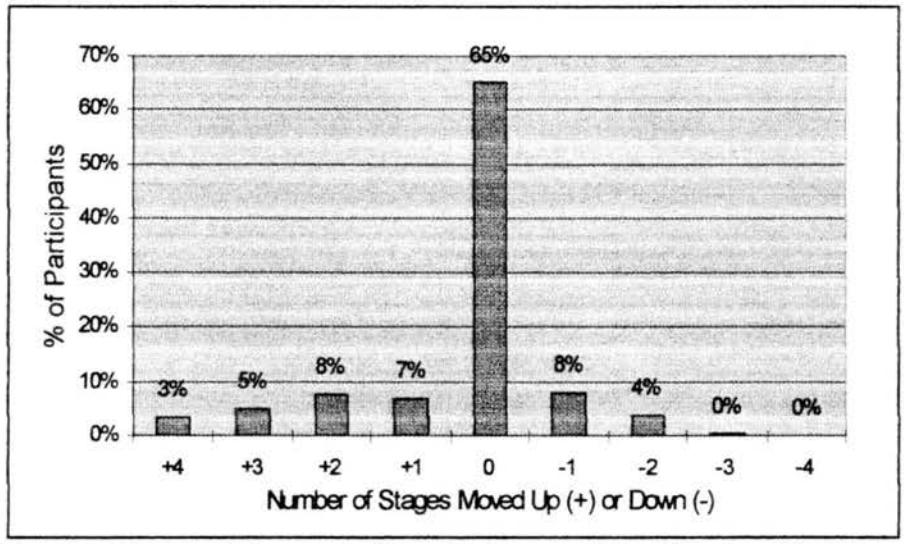

Figure 19 Movement Through the Stages for Increased Use of Fun Food Techniques

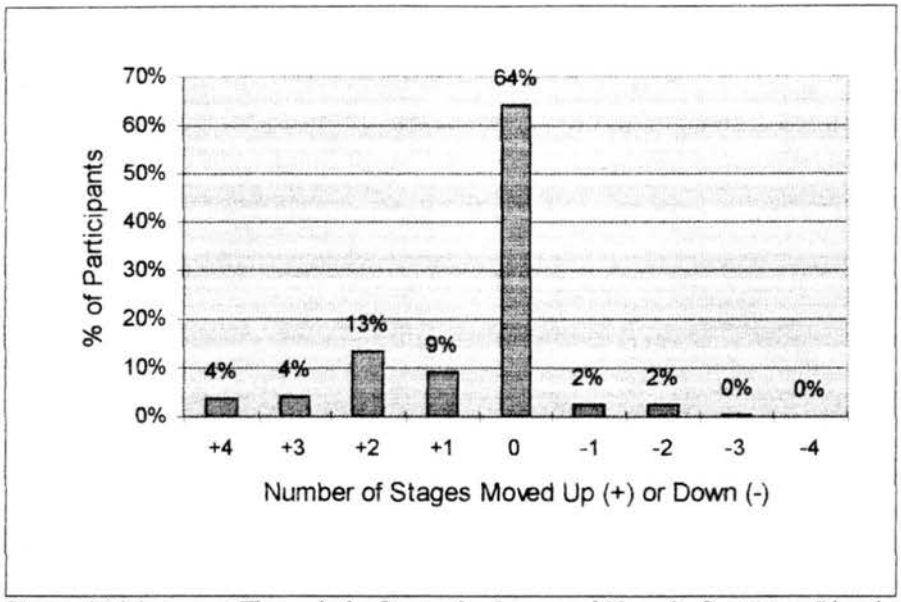

Figure 20 Movement Through the Stages for Increased Use of a Sanitizing Bleach Solution

Discussion

There are four main areas of this project that warrant discussion: 1) using the Stages of Change Model for Behavior Change; 2) the impact of the project on nutrition related knowledge, skills, and behavior; 3) issues related to assessing the movement through the stages of change in nutrition related behaviors; and 4) administrative issues involving using abuelas as peer educators. These four areas are discussed in the following sections.

Using the Stage of Change Model in Development of a Nutrition Education Program

In using the Stage of Change Model as a theoretical framework around which a nutrition education program is to be developed, several considerations appear to be important.

- There are advantages in ensuring that each of the five stages of change is represented in the class group (i.e. using multi-staged classes).
- Several elements related to the class content and structure should be thoughtfully designed so that the processes of change for each stages are optimally used. Examples include probing questions, relevant discussion, decisional balance, factual information, and learning activities
- Key factors in program implementation such as recruitment strategies, communicator of the messages, and training of peer educators should be addressed when planning the program design and implementation.

Multi-Staged Classes

It appears to be useful to include participants in each of the five stages of change in the class when using the Stage of Change Model as the theoretical basis for the educational program. Participants from one stage offer assistance in utilization of the specific processes for class members in other stages. For example, precontemplative and contemplative individuals have been shown to use the process of social liberation where they become freed from social norms and expectations of their peers and respected others. In *La*

Cocina Saludable, higher staged participants (maintenance and action) who had successfully attempted the behavior change in question appeared to offer the lower staged individuals this liberation. As the higher staged participants were rewarded for their successes, either by the abuela educator or the class as a whole, the lower staged individuals began to let go of their negative attitudes about the new behaviors leading to reluctance to change, especially those attitudes concerned with "what others will think."

Another example of the benefit of using multi-staged classes in this study is in the use of the process of reinforcement management in the action and maintenance stages. As these higher staged class members discussed their successes in the specified behavior changes, they received reinforcement in the form of recognition, approval, and praise for their behavior change success. This reinforcement appeared to come not only from the abuela educators, but also from peers in the higher stages and those in the lower stages who may have been looking up to them for their success. The internal reward of the higher staged members that they were successfully putting to practice what was being taught further reinforced their change behavior. There are many other examples where class members in one stage supported or enhanced the processes utilized by class members in other stages; therefore, it may be that a multi-staged class combination is ideal for optimal utilization of the processes of change.

Elements of the Class Conduction and Course Content

In a Stage of Change based nutrition education program, the class structure and course content should support the processes of change as much as possible. Several elements can be incorporated into the educational program to achieve the goals. Table 10 outlines these elements.

Table 10 Program Development Using the Stage of Change Model

PRECONTEMPLATION (PRE)

(Individuals in the Precontemplation Stage use the processes significantly less than individuals in the other stages.)

Helping Relationships

- *Start The Discussion*, *State The Facts*, and the learning activities foster helping relationships potentially important in all stages.

Consciousness Raising

- The *Start The Discussion* questions begin increasing awareness of the problem behavior.
- The *State The Facts* information begins to give convincing evidence for changing problem behavior.
- The specific details in the *Use The Flip Chart* section further begins to increase the awareness of the big picture problem and possibility of control of the behavior.

Social Liberation

- Higher staged participants begin the liberation of lower staged individuals from traditions and cultural expectations and norms.
- Use of communicator (abuela) begins to liberate individuals from traditions and cultural expectations.

Emotional Arousal

- *Start The Discussion* questions refer to family, children and emotional issues.
- *State The Facts* information begins the process of utilizing emotional topics and facts related to children, family, disease, etc. Discussion leads to personal stories by participants.

CONTEMPLATION

Helping Relationships

- *Start The Discussion*, *State The Facts*, and the learning activities foster helping relationships potentially important in all stages.

Consciousness Raising

- *Start The Discussion* questions increase awareness of problem and effects of problem.
- *State The Facts* section provides convincing evidence for advantages of changing.
- The *Use The Flip Chart* section gives details to increase awareness of problem and steps that can be taken to change behavior.

Social Liberation

- Higher staged participants help to liberate lower staged individuals.
- Use of communicator (abuela) helps to liberate from traditions and cultural expectations.
- The *Use The Flip Chart* sections describes choices for alternative positive behaviors that are validated by higher staged individuals.

Emotional Arousal

- *Start The Discussion* questions refer to family, children and emotional issues.
- *State The Facts* information utilizes emotional topics and facts related to children, family, disease, etc. Discussion leads to personal stories by participants.

Self Re-evaluation

- The *Start The Discussion* questions begin self re-evaluation about problem behavior.
- The *State The Facts* information provides a criterion by which individuals can evaluate their current behavior, belief system, and values.
- The learning activities help individuals evaluate their attitudes and beliefs about their ability to perform behaviors.
- The learning activities help individuals evaluate their attitudes and beliefs about taste, ease of preparation, acceptability, etc. of foods.
- The *Check The Learning* sections provides a means of evaluating knowledge and attitudes about the new behaviors and what they have recently learned in the class.

Environmental Re-evaluation

- *State The Facts* provides information by which participants can evaluate the effect of their behaviors on the environment and those in their environment.

PREPARATION

Helping Relationships

- *Start The Discussion*, *State The Facts*, and the learning activities foster helping relationships potentially important in all stages.

Self-reevaluation

- By giving specific, measurable facts about the new behavior, a criterion is established by which individuals can evaluate their attitudes, beliefs, and behaviors.
- Discussion elements in all sections encourage self re-evaluation related to knowledge and skills.
- Learning activities help individuals re-evaluate their skills and abilities, as well as beliefs about the difficulty in preparation, taste, appearance, etc.
- Higher staged individuals continue to evaluate their ability to maintain the new behaviors as they discuss the obstacles of other participants in the class.

Commitment

- Discussion of recent steps and successes helps to increase commitment in *Start The Discussion* section.
- *State The Facts* information provides supporting evidence for change.
- *State The Facts* and *Use The Flip Chart* provide small, specific, measurable steps for changing behavior.
- Learning activities increase self-efficacy or belief in ability to behavior in the suggested way.

ACTION

Helping Relationships

- *Start The Discussion*, *State The Facts*, and the learning activities foster helping relationships potentially important in all stages.

Reinforcement Management

- The *Start The Discussion* section helps to provide reinforcement to individuals attempting behavior changes.
- Individuals gain ammunition for their own self regards in *State The Facts* section as they hear about the benefits of their recently changed behaviors.
- Individuals are rewarded by others in the class for their attempts and successes at change as the discussion progresses.
- The positive aspects of the desired behaviors are discussed in the *Use The Flip Chart* section offering both internal and external rewards.
- All participants receive Certificates of Completion, which is an important reward for some individuals.
- Kitchen utensil incentives reinforce behavior change.
- The *Check The Learning* section provides an opportunity for individuals to receive acknowledgement for their recent acquisition of knowledge and skills.
- The learning activities provide an opportunity for individuals to demonstrate their acquisition of skills and knowledge about the specific behaviors.

Stimulus Control

- Suggestions for remembering the concepts are provided in the content.
- Suggestions for avoiding problem behaviors are provided in the content.
- Kitchen utensils are provided for each of the five units and used in the learning activities for that unit. The utensils are designed to be a cue to the positive behaviors suggested in the program.

Countering

- Specific tips are provided in the content, which suggest ways to substitute new, positive behaviors for old, less desirable behaviors.
- Specific countering suggestions are practiced in the learning activities.

MAINTENANCE

Individuals in the maintenance may use all of the processes of change as needed to maintain their new behaviors.

Helping Relationships

- *Start The Discussion*, *State The Facts*, and the learning activities foster helping relationships potentially important in all stages.

Consciousness Raising

- Though these individuals know much about their behaviors, continued learning supports maintenance of new behaviors and progress toward Termination.

Social Liberation

- By being in a class with other higher staged individuals and the abuela educator, additional social alternatives and continued freedom from traditional and cultural expectations discovered.

Self Re-evaluation

- Opportunity is provided for continued evaluation of behaviors and knowledge about the behaviors as these individuals participate in discussions with lower staged individuals.

Emotional Arousal

- Emotions can run high in the discussions, which helps maintain positive behaviors.

Commitment

- As individuals watch the struggle of others and realize how far their own struggle has brought them, commitment to maintain the behavior is fostered.

Reinforcement Management

- The *Check The Learning* provides an opportunity to demonstrate their knowledge and skills related to the behaviors.

Environmental Control

- Tips related to controlling the environment are suggested. This assists in avoiding relapse.

Countering

- Tips for countering the undesired behaviors are suggested. This assists in avoiding relapse.

Questions. By using thoughtfully constructed questions throughout the class, the consciousness raising, self re-evaluation, and reinforcement management processes can be utilized effectively for the appropriate stages. In *La Cocina Saludable*, the "Start The Discussion" questions, which begin each topic area, effectively provided a basis on which precontemplators could begin to become aware of their behaviors and possible alternatives. The questions also provided a mechanism for precontemplators, contemplators, and those in the preparation stage to evaluate their behavior utilizing the process of self re-evaluation. Furthermore, the questions also provided a means for higher staged individuals (action and maintenance) to demonstrate their success in the specified behavior changes that utilize the reinforcement management process.

Discussion. A nutrition education program that includes discussion allows the incorporation of other processes important in movement through the stages. For example, in this study, discussion provided an opportunity for lower staged individuals (precontemplation and contemplation) to hear the success stories of those class participants already in the higher stages. The discussion helped to utilize both the social liberation process and the process of emotional arousal. Lower staged individuals began to see that the new behaviors being suggested were accepted by their peers and the abuela educator who was proposing the change. Many times, the discussion included stories of children and family members who either changed a specified behavior or avoided the negative consequences of the old behavior. Many stories revolved around the unpleasant or sometimes tragic consequences of not making the recommended nutrition behavior changes. Accounts of elderly mothers with diabetes, challenges of obese sisters, a husband's triple by-pass surgery, or the inevitable histories of loved ones lost to potentially preventable

disease often provided a basis for increased emotion. This process of emotional arousal has been found to be extremely important in the increase in stage by lower staged individuals.[89 77] Discussion also appeared to foster helping relationships as participants began to get to know each other and share their successes, failures, and life stories related to the nutrition information. Helping relationships have been suggested to be critical for self change in all five stages.[88]

Decisional balance. The concept of decisional balance has also been suggested to be important in the Stage of Change Model.[68 83] It appears that lower staged individuals place more emphasis on the cons of changing to the new desired behavior, and the pros of remaining with the existing undesired behavior. For example, Precontemplators might place more emphasis on the negative points that their families might not eat a tortilla made with vegetable oil because of the difference in texture and taste. They like her traditional lard-laden tortillas better. The advantage of the low cost lard ingredient compared to the higher priced oil might also be emphasized. On the other hand, a participant in the maintenance stage for the same low-fat behavior suggestion might emphasize the health benefits of the more healthful tortillas made with oil over the potential health consequences of lard consumption. By listing the pros of the suggested behaviors and the cons of the undesired behaviors in the course content, lower staged individuals may be enlightened while higher staged individuals may be reinforced. Instead of stating only what to do in behavior change, addressing the decisional balance aspect of change may help prepare individuals for change. As suggested in several Stage of Change based studies, many programs which were only designed for people who were ready for change (i.e. later staged individuals) were not as successful for those individuals in the earlier stages who were not yet convinced that change is good.[89 82 72]

Factual information. Consciousness raising is obviously a major component of any educational program and is key in a Stage of Change based design. Lower staged individuals in their progress toward change use the consciousness raising process which include facts, statistics, and details regarding the consequences of both the existing behavior and the suggested improved behaviors to move them to the next stages. In the complex behaviors associated with nutrition, however, it may be that there are several levels or layers of consciousness raising which vary with successive stage. For example, precontemplators who are not yet aware or convinced of the benefits of a lower fat diet may need just the basic facts related to the fat consumption behavior. As individuals progress through the stages, becoming more committed to

change, they may require more information, a broader base of information, and/or greater detail about fat consumption to continue their progress toward the maintenance stage. In comparison, a behavior such as smoking behavior is rather simple. The precontemplator obviously requires an increased awareness that smoking is unhealthy and may lead to a variety of diseases and disorders. Additionally, the smoker may need to hear statistics, details of the consequences of smoking behavior, and techniques for quitting. The end behavioral goal, however, is still changing a smoking behavior to a non-smoking behavior, both of which are easily defined and assessed as individuals either smoke or do not smoke. Fat intake is much more complex, is not easily defined, and is difficult to precisely assess. For example, how does a participant assess fat intake if she consistently consumes 1% milk and consistently prepares tortillas with lard? Does she practice low fat behavior or high fat behavior? In what stage of change should she be placed for fat consumption? An individual could potentially be in the precontemplation stage for lard consuming behavior and the maintenance stage for milk consuming behavior. Individuals may not be able to determine the amount of fat they consume which may also lead to inaccurate stage determination. Do individuals truly know how much fat they consume? As found in a study where the Stage of Change Model was applied to dietary fat reduction, individuals were not able to accurately place themselves in a stage for fat consumption behavior because of their lack of awareness of just what constitutes a low-fat diet.[80] The consciousness raising process must become both broader in scope and more detailed as the individuals progress through the stages. The first concentrate on fat consumption as a general topic and then broaden to a multitude of facts relating to multitude of fat consuming behaviors. Once the precontemplative individual begins to acknowledge general fat consumption behaviors and recognize the potential consequences of a high fat diet, the consciousness raising objective needs to then focus more on the individual elements of fat consumption. This complexity may alter the use of the Stage of Change Model in nutrition related behaviors similar to fat consumption. The previous research using the Stage of Change Model has suggested that consciousness raising process is emphasized by earlier stages (precontemplation and contemplation). For complex nutrition related behaviors such as fat consumption, it may be that individuals in all five stages significantly use the consciousness raising process, but the level and type of information needed by each stage is different. Further investigation into this concept may be warranted for optimal

utilization of the Stage of Change Model for educational program development addressing nutrition behaviors.

Additionally, as suggested by Sandoval, the entry, relapse and re-entry into the stage progression from Precontemplation to Maintenance may not follow either a linear or cyclical pattern for nutrition behaviors as has been suggested for other behaviors.[71] A person may enter the progression at one point for one fat consumption behavior (such as milk consuming behavior) and at a completely different point for another behavior (such as meat consuming behavior). Relapse and re-entry into the progression can occur to a varying degree and may be difficult to define. Is eating more cheese regularly considered the same level of relapse as returning to regular consumption of whole milk? As the consciousness raising process increases the amount of information that the participant learns and covers more detail regarding specific behaviors related to fat consumption, relapse and re-entry for significant fat consuming behaviors may become more similar, regardless of the stage of change.

Learning activities. Learning activities, both experiential and behavioral, appear to be important in the utilization of several of the processes of change. First, learning activities support the consciousness raising in terms of providing opportunities for individuals to actually prove to themselves that the suggested behaviors are possible, easy, and desirable. The initial focus group discussions suggested that barriers to changing some nutrition behaviors for this population included lack of time for preparation of "healthy" foods, lack of skill in cooking and using unfamiliar "healthy" foods, and the perceived differences in taste, texture, and appearance of "healthy" foods leading to families not accepting the foods as well as food waste. By providing opportunities to try recipes, to learn preparation skills, to experience unfamiliar foods, and to taste their creations, these obstacles may be overcome.

Many other processes of change besides consciousness raising were utilized during learning activities in the *La Cocina Saludable* program. For the higher staged participants, the self-efficacy process, or belief in one's ability to carry out the behavior, was fostered. For example, mothers who initially stated that they were not very creative with food preparation for their children, realized that they could make foods fun and could create interesting foods for their children during the "Make It Fun" learning activities.

The learning activity portion of the class was also a key component that fostered the helping relationship process. The initial focus group discussions suggested that the participants wanted classes

which were fun and social. The learning activity component provided this element and relationships were easily developed.

Finally, the process of self re-evaluation was utilized in the learning activities. Self re-evaluation is where the participants re-evaluate their existing attitudes and beliefs about a specified behavior. If the attitudes and beliefs are different because of the new knowledge and experiences, then it is possible that ultimate behavior change is progressed. The learning activities provided the opportunity to re-evaluate attitudes about ease of preparation, taste, family acceptance, etc. for a variety of nutrition related behaviors. Participants who stated that they could not tolerate the taste of low fat yogurt, realized that it made many acceptable tasting foods, such as tuna salad and fruit salad. These foods were tested in the learning activities for the "Make A Change" unit.

Factors in Program Implementation

Key factors in program implementation may facilitate use of several processes of change as well as other concepts supported by the Stage of Change Model. These factors include recruitment, the choice of communicator of the nutritional message, and training.

Recruitment. Recruitment, though not a process in itself, may impact the success of behavior change programs.[56] Proactive recruitment methods where there is a one-on-one invitation extended to potential participants was used in *La Cocina Saludable*. The abuela educators, and sometimes advisory board members, recruited individuals who did not realize that they had nutrition behavior problems, or who were not yet convinced of the necessity or benefits of change. Several times participants admitted that they were participating in the classes only because their friend or family member, the abuela educator, had asked her to come. By using proactive recruitment, more individuals who were not prepared for change may have been included in the classes. Reactive recruitment methods were also used in the form of flyers, newspaper ads, radio announcements, and notices in public places and in agencies providing nutrition education. These techniques were effective in recruiting participants who were already prepared to change and who were interested in more knowledge and skills to assist them. Evidence of responses to both types of recruitment methods was seen in the introductions made at the beginning of the classes. The program Stage of Change assessment results and in-class observations suggest that all stages of change were represented in the

classes. The use of peer educators who were respected members of the community offered a valuable recruitment tool. They had the capacity to carry out both proactive and reactive recruitment increasing the likelihood that all five stages were represented in the classes.

Communicator of the messages. Along with being in a position of effectively using proactive recruitment techniques to include more early staged participants in the classes, the choice of an abuela (Hispanic grandmother) as the communicator of the message assisted in the utilization of other processes of change. First, it has been suggested that early staged individuals emphasize the process of social liberation. This important process allows early staged participants to see that respected leaders in the community and in nutrition related activities have adopted and are condoning the new behaviors. For example, an abuela educator who encourages the use of oil rather than lard in preparing tortillas frees precontemplators to do the same without fear of being criticized for going against cultural tradition. The initial focus group discussions verified that young Hispanic mothers listen to their grandmothers and similarly respected older women in their families and communities. Since many nutrition behaviors are tied to family preferences, customs, traditional ways of doing things, and how their mothers and grandmothers did it, approval from the abuela is important. Without this approval, it is suspected that precontemplators would not even consider change of some nutrition related behaviors and would remain permanently in this first stage.

Training of educators. Finally, training the educators in the Stage of Change Model itself may help them to emphasize the processes of change needed to move participants through the stages. The abuela educator training in *La Cocina Saludable* did not include any training in the Stage of Change Model. The abuela educators have since expressed an interest and a desire for this training. It has even been suggested to include in the *Resource Guide* notations for the abuela educators reminding them of the various processes being used.

Impact of a Nutrition Education Program Based on the Stage of Change

The results suggest that the project was successful in achieving knowledge and skills improvement. When ENTRY scores were compared to the EXIT scores for both the total survey and the knowledge/skills indicators, the program participants improved their survey scores after attending *La Cocina Saludable*, while the control group did not. This trend occurred in all cases with the exception of

the subcategory of food safety. Though the program participants improved their score for this category significantly, the difference between the improvement of the participants and the improvement of the control group was not significant ($p=0.242$). A trend toward significance ($p=0.055$) was found for the subcategory of resource management. When total test score was considered, the control group did not improve, while the program participants improved their test scores by a mean of 31.93 percentage points. A trend toward significance was also found when observing the total knowledge and skills portion of the survey. The control group did not improve significantly, while the participants improved their knowledge and skills score by a mean of 47.8 percentage points. The subcategory of providing balanced meals for families demonstrated the highest improvement score (mean score improvement of 61.52 percentage points) reflecting the knowledge gained in awareness and use of the Food Guide Pyramid. It is interesting to note that both the control group and the participants demonstrated a fairly high ENTRY score for the food safety, resource management, and the nutrition knowledge subcategories of the survey possibly reflecting that members of both groups have been involved in various nutrition education programs such as WIC, EFNEP, or Head Start, which traditionally teach these topics. A slightly higher control group score in these areas may reflect that all control group members were chosen from a WIC office setting and adjacent medical clinic for this population. The positive improvement in knowledge and skills is expected immediately after an educational intervention.

A different trend occurred when comparing the ENTRY and EXIT survey scores for the self-reported behavior in general and behavior subcategories. When total behavior scores were considered, there was no significant change immediately after the *La Cocina Saludable* program. The control group also did not show any significant score change. The control group did demonstrate a significantly higher survey score (by approximately 10 percentage points); however, there was no significant difference in the score change at EXIT in either groups. A similar trend was found when considering just the subcategory involving use of food resources ($p=.766$) and stretching the food budget ($p=.070$). It was interesting to note that for the food safety subcategory, the improvement of the control group was significantly higher than that of the program participant group. There was a significant score improvement in the program participant group for the subcategory involving food selection and preparation. Here, the participants started at a significantly lower level than the control group and improved to meet the control group.

The small improvement in behavior scores may reflect the difficulty to demonstrate nutrition-related changes in the short time (two to five weeks) of a nutrition education program. Time is required to assimilate the information, put the information into practice, and succeed enough to report positively on survey. This time requirement is consistent with the Stage of Change Model suggesting that individuals may be moving through the stages of change toward action or maintenance.

A different trend was seen when the six-month FOLLOW-UP scores were considered for the program participants. The results suggest that knowledge and skill improvement was retained over the six month period. For all knowledge and skills subcategories, the FOLLOW-UP scores were significantly higher for the program participants when compared to the ENTRY scores. The scores for the subcategory involving food safety issues significantly improved between the EXIT survey after the program completion and the six-month FOLLOW-UP survey.

Self-reported behavior also improved during the six month period following the program. For behavior total score and all behavior subcategories, the FOLLOW-UP score was significantly higher than both the ENTRY and the EXIT scores before and after the program suggesting that given the six months, behavior did change. This trend could reflect the movement of individuals through the stages of change, which was initiated or supported by the program.

All FOLLOW-UP surveys were completed by participants and sent through the mail leaving room for assistance from family members or friends in the completion of the survey. Though this assistance is definitely a possibility, the successful completion of the survey could in itself serve as an additional stimulus for improvement and reminder of the program information. Additionally, the survey asked only for self-reported information on behavior. It is unknown whether true behavior change took place. Only direct observation could document actual improvement, which was not feasible for this project. However, the score improvement may reflect an increase in knowledge of the nutrition information which is a step toward true behavior change.

The diet recall information was inconclusive. This population demonstrated a genuine dislike for filling out the information required for the analysis of diet. Many of those who did finish the information did so incompletely. Many participants did not complete this portion at all. A further problem with the diet recall assessment was in the evaluators' reluctance to complete this portion and in their lack of training.

There was no significant change in diet either immediately after the program or at six months. Future programs using peer educators from this population may find additional training helpful in achieving better diet recall information. The training should include both information on how to accurately acquire the information as well as the significance of gaining accurate information.

A One-way ANOVA was performed to determine if the demographic variables had any effect on the survey subcategories. Only education level and occupation level had a significant effect on only the knowledge and skill improvement. There was no effect on behavior change at either the EXIT or the FOLLOW-UP time period. This trend may be due to a greater ability in taking tests or a higher reading level is associated with higher education or occupation category. The trend also suggests that this program affects individuals of all ages, education levels, occupation levels, and language usage similarly. A program which addresses a wide range of individuals may be useful and preferred for communities.

Assessing Movement Through the Stages of Change in Nutrition Related Behaviors

Assessing the stage of change of an individual as defined by the Stage of Change Model in nutrition behaviors is a complex task. Nutrition behaviors involve many factors that determine the attitudes about and intentions to change. These factors are somewhat different than for more clear behaviors such as smoking or exercise adherence. In this study, five main factors were shown to be important in the attempt to develop an assessment instrument for measurement of the stage of change for four selected nutrition related behaviors in a low-income Hispanic population. The process of instrument development and testing revealed the following areas for consideration:

- The test format should be familiar and accepted by the targeted individuals, understandable in its flow and design, and constructed so that resulting stage reflects behavior and behavior intentions rather than issues with the testing instrument itself.
- The reading ability of the targeted individuals should be considered so that the subtle differences between stages of change can be distinguished.
- The time perspective of the targeted individuals should be considered so that the time element of each stage can be accurately estimated.

- The cultural tendencies and characteristics of the targeted individuals should be considered so that true behavior and behavioral intentions can be distinguished from socially desirable responses.
- The targeted individual's knowledge and skills related to the behavior in question must be ensured to achieve accurate stage placement.

Test Format

Several different types of assessment formats have been used for a variety of behaviors.[61 63 73 81 83] These assessment tools range from straight forward designation of stage using clear and precise determination, as was used in smoking, to a 31-item questionnaire used to assess the stage of change for exercise adherence and dietary fat intake.[63 73 90] The results of this study indicated that these participants strongly opposed test taking. They enjoyed the class instruction and activities, but complained about the 17-item knowledge and behavior questionnaire. Reasons stated for this opposition included inability to do well on tests as demonstrated by their past experience, dislike for school, low reading levels, difficulties because of English as a second language, and unwillingness to spend the time required for the test. Refusal to answer questions has been found to be an obstacle in other studies.[91 92] Many of the participants simply chose the first answer on the page (placing them in the maintenance stage) without reading the question. A comparison of the answers to the behavior portion of the survey demonstrated that these individuals were not in maintenance at all. No statistical analysis was conducted. In the development of future assessment tools, it may be effective to design the tool so that it does not resemble a test. Alternatives may include games, interviews, or other non-threatening strategies.

Reading Ability of Participants

The ability of the participants to read the Stage of Change Survey greatly impacted the survey's ability to assess the stage of change of a participant. The survey was developed so that single words differentiated the stages. Participants were asked to distinguish between time periods using words such as "since", "before", and "starting." An inability to distinguish between these words may have resulted in inaccurate reporting of stages.

Time Perspective

The Stage of Change Model defines each stage in terms of an intention to change a selected behavior within a specific time frame. [9] The first test version stated these time frames using the 30 day, one month, and six month periods as defined by the model. Using comments from the abuela educators and evaluators, it was decided that there was difficulty on the part of the participants to foresee six months into the future. The abuela evaluators began explaining the time periods in terms of seasonal events such as planting, harvesting, snow fall, summer, etc. These suggestions were incorporated into the final version of the assessment tool with the hope of making it more accurate in establishing the stage of the participant for the particular behavior. It is unknown whether this revision improved the accuracy of the assessment; however, the abuela evaluators did report that the questions were more easily understood. Future study is warranted to determine the perception of time for this population and the terms used to describe the time element for the stages of change.

Cultural Tendencies and Characteristics

There are several cultural tendencies generally characteristic of the Hispanic population which may affect the stage of change assessment responses by the participants. These include the tendencies for answering "yes" to perceived authority out of respect (yea-saying tendencies). Additionally, answering in the most social desirable way by expressing values considered central to the Hispanic culture is characteristic to this culture. Familism is a key concept for Hispanics and they have been shown to answer so that their relationship to the family is presented in the best light possible.

Yea-saying tendencies. Much evidence has been found for the "yea-saying" tendencies in several ethnic groups, including Hispanics. This tendency is also termed acquiescence or extreme response style. [91] [93] It has been suggested that this characteristic comes from a desire to show respect to people perceived as being in positions of authority. In the assessment of the stage of change, this tendency can result in inaccurate responses. In the assessment tool used in this study, the first question in each of the four stage of change questions asked for a "yes" or "no" response. The "yes" response placed the participant in either the Maintenance or Action stage. A subsequent "yes" placed the participant in the Maintenance stage. The

results of the survey placed a large percentage of participants in the Maintenance stage. This tendency may explain this large proportion.

Familism. Lisansky documented the important value of familism in the Hispanic culture.[94] The basis of this value relates to the desire of Hispanic parents to act in the best interest of their children as well as the desire to be perceived as acting in the best interest of their children. With this value in mind, the answers given by the participants may have been skewed toward that which is expected or thought to be in the best interest of children rather than representing actual behaviors. For example, it is commonly known that a lower fat food is a better choice for good health. An affirmative answer to "Do you consistently choose low fat foods for your children?" may be influenced by a desire to be perceived as a good parent rather than reflect actual behavior. Marin et al. found this value present in less acculturated Hispanic smokers.[95]

Knowledge and Skills

Perhaps the most important factor in accurate assessment of stage of change is that of the participant's knowledge of the topics being addressed. Without an accurate definition of the behavior in question, assessment of the stage of change cannot be made. Responses to nutrition related questions may be more complicated and difficult to evaluate than responses to other behaviors such as smoking or exercise adherence. An individual can easily answer whether they have smoked or exercised as defined by a specific criterion in the last 6 months, and if they plan to do so in a specified time in the future. It is not difficult to assess smoking or exercise adherence behavior. Nutrition related behaviors are very different. For example, in order to accurately answer the question related to high fat food consumption, the Participant must 1) know which foods are high in fat and which are not, 2) determine how much of a high fat food is considered acceptable, 3) analyze whether the inclusion of splurges (i.e. birthday cake, occasional donuts, etc.) is necessary, 4) make judgement decisions when some high fat foods are eaten regularly, yet other high fat foods are religiously avoided. In reality, the Participant may be in one stage of change for one high fat food and a different stage of change for another high fat food. It has been found that consumers have a low level of nutrition knowledge about dietary fat.[96] Greene, et al., in a study of fat behavior, also suggested that individuals have difficulty in determining the amount of fat they consume.[81]

In this study, a participant who was questioned about consuming a high fat diet had to rely on her knowledge of what exactly constitutes a high fat food. If the participant believed that bread and pasta are high in fat (as did many of the participants), and they regularly ate those foods, their answers placed them in the precontemplative stage for this behavior. A brief definition of the terms in question was added to each assessment question in the final version of the stage of change instrument. This addition to the test did appear to reduce the number of problems for the abuela evaluators, but it is unknown whether it increased the accuracy of the results.

The addition of an explanation of terms did potentially alter the determination of the effectiveness of the classes in moving participants to a higher stage by in itself being an educational intervention. A potential solution to this dilemma might be to use a post-pre evaluation design where the participants are asked to answer the stage of change questions at the end if the classes as well as determine what their answers would have been prior to the intervention, knowing what they know now. In this way, the test itself is not affected by an explanation of terms, but the participants have acquired the necessary knowledge and skills to accurately answer the questions. This evaluation design may also positively impact the tendency for "yea-saying" and answering the questions in the way that is more socially desirable. The participants may be less intimidated by prior negative behaviors if their new behaviors have improved. Further study in this type of evaluation is warranted to accurately assess the stages of change for this population and in nutrition related behaviors.

Administrative Issues for Peer Educators

Administrative issues can be critical elements in the success or failure of an educational program, especially when using peer educators as communicators of the message. The findings of this program suggest several important areas for consideration when using peer educators in a nutrition education program for low-income Hispanics.

- Recruitment of both personnel and participants for a nutrition education program should include both proactive and reactive recruitment strategies to optimize the choice of educators. Peer educators should be recruited with specific characteristics in mind.

- The pay structure should be detailed, written, explained, equitable, and free from potential abuse when using members of the targeted population as peer educators.
- Training for the peer educator should include information related to all areas of the educator's responsibility such as community resources, recruitment techniques, class logistics and management ideas, etc.
- When using the Stage of Change Model for the education program, the educators should be trained in the theoretical model itself to best utilize the elements of the model in the class conduction.
- There may be advantages and disadvantages in empowering peer educators to act somewhat independently in the administration of their own classes.

Personnel and Participant Recruitment

Personnel choices are important factors in the success and failure of any program. The abuela coordinator in each of the three project areas had the responsibility of overseeing the day-to-day operations of the project. The administration challenges of *La Cocina Saludable* suggested that the optimal abuela coordinator was a woman who was bilingual, bicultural, and possessed good organization skills as well as an understanding and empathy for the abuela educators and participants in the program. Good people skills were essential. It became obvious that the abuela coordinator needed to have an understanding of the community and have skills of resourcefulness in getting tasks accomplished and initiative to tackle the numerous challenges that were posed each day. Occasionally, the coordinator was required to fill in as an educator or evaluator in emergency situations, so her thorough training in all areas of the program were essential.

Recruitment of the abuela educators was conducted using both proactive and reactive recruitment as with the participants themselves. The advisory committee members and community agency representatives recruited individuals fitting the profile of the abuela educator into the program. Flyers, newspaper ads, and media announcements were also made. After the first group of educators had been trained, they began to recruit their friends and relatives as both educators and Participants for the classes. Word-of-mouth proved the best means of recruitment.

Prochaska discusses the important concept of recruitment for behavior change programs suggesting that many programs recruit mainly individuals who are ready for change, leaving out those Precontemplative and Contemplative individuals who are not convinced of their problem or who are not ready for change.[70] In *La Cocina Saludable*, both proactive recruitment methods and reactive recruitment methods were used in an attempt to recruit higher staged individuals who were ready for change as well as lower staged individuals who were not ready for change.

Reimbursement for Abuela Educators and Evaluators

There were several challenges associated with the pay structure of the abuela educators and evaluators. The abuela educators were given the responsibilities of recruiting participants, organizing the class details, and teaching the classes. Though the abuela educators were considered to be volunteers, they were paid a small stipend. All expenses including supplies for the learning activities and mileage were paid in addition. Several problems regarding pay did occur. Originally, abuela educators were paid only for those pre-tests and post-tests that were turned in completed. The largest obstacle occurred when participants started, but did not complete the five-unit class. Retention of participants in the program, as with many other community education programs, was a significant problem. Paying educators for the full amount for participants who dropped out proved too costly. Not paying educators for dropouts proved frustrating to the educators because a large part of the time intensive work as an educator was in the initial recruitment of participants. This pay structure also led to other problems. Occasionally, the abuela educators would try to teach the entire program in one or two class sessions instead of the required three to five sessions in hopes that the participants would finish the program and they could be paid accordingly. The pay structure also occasionally led to the abuela educators recruiting non-qualified participants such as middle school, junior high school children and elderly individuals with no child care responsibilities in order to meet their participant recruitment goal.

An additional problem with the pay structure was the desire for the educator to prepare meals rather than taste samples used in the experiential learning activities. When supplies were purchased in meal quantities rather than taste quantities, the cost of supplies for all five units of a class could exceeded the $100 supply allotment. Often the abuela educator attempted to feed the children of participants as well as

the participants, which increased the cost even more. A detailed supply list in per person or per small group amounts may solve this problem. When food is used in activities, an explanation of the exact quantities allotted for each participant may be a simple way of eliminating the overestimation of supply needs by the educator.

There were other problematic issues related to the reimbursement of the abuela educators. Money was a significant motivation for the abuela educators and evaluators. It was difficult to convince the educators that they were only being paid a stipend for their service and that the job would not offer a significant or permanent income source. Overseeing the abuela educators and ensuring that accurate numbers were reported were sometimes difficult tasks for the abuela coordinators and extension agents. A more detailed system of documentation of the abuela educator activities was implemented after the project began to help alleviate the management problems. As seen in other programs using peer workers, work habits when pay is minimal should be considered when supervision of the workers is being planned. [55 51]

Training

It was suggested that more involved training be conducted for the abuela educator and evaluator to help eliminate administrative problems and make expectations clear. Recommendations for this training include more intensive discussions in areas such as 1) information about community resources; 2) recruitment techniques; 3) ideas for class logistics such as location of class facilities, child care management, transportation for participants, and purchasing of supplies for the classes. Additionally, a more detailed explanation of the Stage of Change theoretical basis for the program development was thought to be valuable. As the abuela educators learned more about the Stage of Change Model around which the program was developed, they tended to teach their classes with this model in mind. It is proposed that understanding this model in even more depth would assist the educators in utilizing the processes of change suggested in the model enhancing the effectiveness of the program. Additionally, it may be prudent to further train the abuela evaluators in the theoretical basis of the program to emphasize the importance of the evaluation process and accuracy of their assessment of the participants. In *La Cocina Saludable*, the training of the abuela coordinator in the program information and procedures occurred simultaneously with the abuela educators and evaluators themselves. This method was suggested by Callan and Franklin and

seemed to have similar benefits in this program. [42] It was evident in all the abuela coordinators that the special skills, empathy for the targeted population, and unique understanding of the community and culture of the participants were well respected by the coordinators and other program staff.

Empowerment of Abuela Educators

One of the goals of *La Cocina Saludable* was to empower the abuela educators to act somewhat independently in the administration of their own classes with the supposition that their insight into the needs, situations, attitudes of the participants, as well as their own resourcefulness would help to overcome many of the barriers facing more structured programs. There proved to be both advantages and disadvantages in this empowerment. For example, guidelines were given for the abuela educators to follow regarding the number of classes they could teach to get in all five sessions and the length of each session, but they were given the flexibility to determine the number and length of classes within the guidelines. The guidelines stated that the units must be taught in two to five sessions and that each unit should take one to one and one half hours. Some abuela educators tried to teach everything in only one session stating that it would be too difficult to get their participants to return for additional classes. The educators felt that the barriers for taking classes were great and it was too difficult to fit more than one session into the schedules of the Participants. Those educators who consistently would not follow the time guidelines were dismissed from the program. Here, the empowered educators were a hindrance to the program. On the other hand, guidelines were also given regarding the length of time required to teach each of the five units. The educators found that, except for the first unit, which was extremely long, it took about one and one half hour to teach the information and conduct the learning activity. The first unit on the Food Guide Pyramid was much longer than the others. Additional time was taken for the ENTRY Survey as given during this first meeting. The empowered abuelas took the liberty of rearranging the order of the units beginning with the much shorter section on food safety. This rearrangement seemed to work well.

The empowerment also gave the abuela educators the freedom to schedule times, locations, child care, and transportation arrangements for each of their classes. The educators used many creative solutions for these obstacles. Some of the more creative solutions included conducting the classes in a neighborhood park where child care was taken care of by the nearby play ground, conducting classes in a beauty parlor

where several women met at one time, and scheduling adjoining rooms in church Sunday school area so that the class could be conducted in one room while the participants' children watched videos in the other. Some abuela educators conducted classes at the work site field for hard-to-reach migrant farm workers during lunch breaks or took the class to the participants' homes when transportation was limited. These classes consisted of neighbors and family members. The flexibility given to creative and resourceful abuela educators seemed to achieve the program goals of overcoming many of challenges in offering nutrition education to this population.

The abuela educators gained self-esteem, self-confidence, and some prestige in the community, as has been seen in other peer education programs. [40] Some educators began to see themselves as nutritional experts, which potentially has both positive and negative effects. Many abuela educators asked for documentation of their training and participation in the program to help in career advancement. Similar results were found in previous peer education programs. [40 46] Certificates of Completion were given to the educators/evaluators after the training program and Certificates of Appreciation were given to all educators/evaluators who participated in the program. Letters of reference and recommendation were written when requested and appropriate. These benefits of the training and participation in the program, in some cases, improved the social status of the abuela educator which may have moved the educator away from the target population and closer to the agency she was perceived by the target to represent. This result was also seen in D'onofrio's study of peer educator utilization.[50]

Conclusions and Recommendations

Impact of a Nutrition Education Program Based on the Stages of Change

Meeting of Program Objectives

Objective 1: The program will increase interagency cooperation related to nutrition education in order to reach an increased number of the low income Hispanic population.

Impact: A state advisory committee was formed. Appendix II lists the committee members. Meetings were held periodically to keep the committee informed and to solicit their advice and input regarding the progress and results of the project. Additionally, an advisory committee was established in each of the three project areas. As with the state committee, regular meetings were conducted to gain their support for and assistance with the project in their area. It appeared that the program format including initial focus group discussions, regular advisory committee meetings, continuous consulting with advisory board members on the various issues throughout the program development and implementation, and the regular communication with the advisory committee members facilitated interagency cooperation in the areas of nutrition education for each of the communities.

Objectives 2: Participating individuals will acquire the **knowledge and skills** that contribute to nutritionally sound diets and healthy lifestyles.

Impact: A majority of the participants reported or demonstrated increased knowledge or skills in at least two topic content areas immediately following the nutrition education classes and at six months following the class completion. These improvement scores appeared to be significant when compared to the control group participants not participating in the program.

Objective 3: Participating individuals will acquire behaviors that contribute to nutritionally sound diets and healthy lifestyles.

Impact: A majority of the participants also reported improved nutrition related behaviors at the six month follow-up period.

Objective 4: Sixty percent of the participants will improve their **stage of change** defined by the Stage of Change Model by at least one stage toward the desired behavior change in two or more of the following areas: reduction in the feeding of high fat foods to children; increase in the feeding of high fiber foods to children; increase in making foods fun for children to eat; increase in the use of a sanitizing solution when cleaning in the kitchen.

Impact: It is unknown whether participants improved their stage of change as a result of the program; however, several elements were determined to be critical for consideration when developing a measure of stage of change for the low-income Hispanic population . Further work is needed on instrument development for use with this population and for use in measuring stage of change in nutrition related behaviors.

Using the Stage of Change Model in Development of a Nutrition Education Program

The positive results in terms of improvement in knowledge, skills, and self-reported behavior change suggest that a nutrition education program based on the Stage of Change Model was effective in achieving knowledge, skills, and behavior improvement objectives.

Recommendations

The following recommendations are suggested for future nutrition education programs based on the Stages of Change Model.

1. Increase the utilization of the processes of change by training the educators in the Stage of Change Model. A greater awareness of the Stage of Change Model, the processes involved in this model, and the ramifications of using processes to encourage behavior change may allow for greater utilization of these processes by the educators.

2. Develop a Processes of Change Coding System for the *Resource Guide*. To assist in this awareness, it is suggested to develop a coding system for the stages and processes appropriate for each stage and incorporate the system into the *Resource Guide*. Such a coding system would remind the

educators as they taught the classes to emphasize, probe for, and reinforce the process utilization for the various staged individuals. Perhaps an elementary discussion of the Stage of Change Model itself and additional *Background Page* explanations would benefit the educators.

3. Systematically follow a Stage of Change Model development plan when developing an educational program based on this model. Table 11 provides a Stage of Change Model development plan for use in developing an educational program based on the Stage of Change Model. The plan provides reminders for use of the appropriate processes for each of the five stages of change.

Table 11 Using the Stage of Change Model in Program Development

Precontemplation	**Recruitment**
(PRE)	▲ Use proactive recruitment for those potential participants who are not yet ready to change their behavior. ▲ Provide incentives for class participation other than behavior change. **Decisional Balance** ▲ List pros of suggested behaviors and cons of existing behaviors in course content. ▲ Acknowledge cons of suggested behaviors and pros of existing behaviors. ▲ Provide solutions or rebuttals to cons of suggested behaviors. **Consciousness Raising** ▲ Provide key facts in course content to raise awareness. ▲ Provide specific details and examples in course content. ▲ Provide a "Pre-test" for awareness of key facts at beginning of course or unit. ▲ Allow opportunity for group discussion to incorporate facts and details from other class members. **Social Liberation** ▲ Ensure that there are higher staged class members for behaviors to be changed. ▲ Select communicator of message (educators) who is respected by class members. ▲ Provide opportunity for higher staged class members to demonstrate their new behavior attempts and success through use of probing questions.

	Emotional Arousal (Dramatic Relief) ▲ Provide opportunity for participants to tell stories about the consequences of avoiding suggested behaviors and remaining with undesired behaviors. ▲ Provide statistics and other factual information related to consequences of undesired behaviors. ▲ Use probing questions to facilitate discussion of children, family members, friends, etc. ▲ Use detailed stories illustrating consequences of undesired behaviors.
Contemplation (CON)	**Self Re-evaluation** ▲ Conduct experiential learning activities to provide opportunities for participants to re-evaluate their attitudes regarding abilities, obstacles, beliefs, and knowledge. ▲ Ask assessment type questions and ensure answers are provided, either by more knowledgeable class members or by educator. ▲ Ensure that specific information is provided in course content that allows self-assessment, including information which is simple, concrete, and measurable. **Environmental Re-evaluation** ▲ Provide information to assist in evaluation of the behavior of those in the environment or the environment itself.
Preparation (PREP)	**Recruitment** ▲ Use reactive recruitment techniques for those participants who are more ready to take steps to change behaviors. ▲ Provide incentives related to changing behavior. **Decisional Balance** ▲ List Pros of new behavior and cons of old behavior. **Self Liberation** ▲ Offer challenges to participants to take small outlined steps toward behavior change. ▲ Provide opportunities for participants to set goals and then follow up on progress toward goals.

	Commitment
	▲ Provide small, measurable steps toward achieving the goals.
	▲ Discuss successes and solutions to obstacles or setbacks to increase commitment.
	▲ Provide convincing evidence for advantages of change.
Action	**Reinforcement Management**
(ACT)	▲ Provide opportunities for participants who are somewhat successful at behavior change attempts to be recognized for both their attempts and successes.
	▲ Provide incentives and rewards for successful new behavior changes and behavior change attempts.
	▲ Provide opportunities for internal rewards by incorporating opportunities for successful completion of behavior change tasks in learning activities, questions, demonstrations, etc.
	Countering
	▲ Include concrete ideas for substitution of desired behaviors for old behaviors in course content and activities.
	Environmental (Stimulus) Control
	▲ Provide tips on cues to both the undesired behaviors and the suggested behaviors.
	▲ Provide physical, take-home cues or reminders for new behaviors.
	▲ Provide ideas for controlling the environment to support the new behaviors in course content and activities.
	▲ Provide concrete pictures and images which represent the suggested behavior change.
Maintenance	**Reinforcement Management**
(MAINT)	▲ Encourage demonstration and discussion of successful and maintained behavior change by incorporating these individuals in the teaching of class and demonstrating of learning activities.
	▲ Provide recognition of course completion.
All Stages	**Helping Relationships**
	▲ Provide many opportunities for development of helping relationships including activities, discussions, questions and answers, etc. in a fun, and stimulating environment.

	Consciousness Raising ▲ Provide a progressively more detailed information relative to the specific behaviors so that lower staged individuals can see the significance of behavior change in the big picture and higher staged individuals can utilize details to increase and maintain successful behavior change.

Assessing Movement Through the Stages of Change in Nutrition Related Behaviors

Assessing an individual's stage of change for nutrition related behaviors may be more complex than assessing more discrete and more easily measured behaviors such as smoking. Obviously, accurate assessment of the stage relative to a specific behavior is necessary for assessment of the movement through the stages resulting from an educational program. Nutrition behaviors are complex, difficult to measure, and involve a wide variety of individual behaviors. This set of specific nutrition behaviors must be defined in order to be assessed. For example, dietary fat reduction is an important nutrition behavior for nutrition related health improvement. However, dietary fat reduction is composed of a variety of fat consumption behaviors. For an individual to improve dietary fat consumption behavior and ultimately improve health, many, not just one, of the individual's fat behaviors must be improved. With this idea in mind, the stage of change for each (or at least several) of the significant fat consumption behaviors must be measured.

Recommendations

The following recommendations are suggested for future projects in which the stage of change is assessed for nutrition related behaviors in a nutrition education program.

1. Determine the significant individual behaviors which will make the most impact in the health area in question. Then, assess the stage of change for each single behavior. Breaking the larger behavior area, such as fat reduction, into several significant single behaviors may be necessary for nutrition behaviors. These single behaviors may be different for each individual. Once the single behaviors are determined, assess the stage of change before and after the educational program. Many of the studies to date have measured broader nutrition topics, such as fat consumption, rather than the individual behaviors

making up fat consumption patterns. Stage of change assessment appears to be more useful and applicable for simple, single behaviors.

2. Use an interview technique rather than a written survey for assessment of stage of change for this population. It is suggested that for this population of low income Hispanic mothers of pre-school children, including migrant farm workers, the best method of gaining the most accurate information in assessing the stage of change for nutrition related behaviors is the interview technique. The factors, which define each stage, require that the individual know the definition of the behavior in question. Further, the individual must understand the time frame and the level of intention for change that defines each stage. An interview by a trained evaluator may increase the accuracy of the responses by assisting the individual in defining these important factors. An interview format may also assist in overcoming any language or literacy obstacles.

Administrative Issues Involved in Using Abuela Educators in Nutrition Education

Several issues are involved in using abuelas as peer educators in a nutrition education program in Hispanic communities.

Recommendations

The following recommendations are suggested for future projects in which abuelas are used as peer educators in a nutrition education program.

1. Increase training of abuela educators in following areas: Stage of Change Model use in program development; logistics and administration of program; importance of evaluation. The more the educator understands the theory used as the basis of the program, the more she can utilize the various factors in that theory. Training in the theory may help in even more utilization of this theory. Additional training may also be helpful in the logistics and administration of the program. It is suggested that all elements related to administration of the program be listed specifically in writing and included in the training of the educators. It appears that the more instructive the initial training is, and the more the educator must put in writing, the fewer problems arise. Finally, emphasize the importance of evaluation to

all educators and explain how the evaluation results will be used. Perhaps even involving the abuela educators in the development of the evaluation tool so that full support may be gained.

2. Take care to keep the abuela educators as peer educators rather than bringing them into the sponsoring agency in order to maintain the benefits of the peer relationship to the targeted population.

In order to gain the full benefits of the abuela as the educator, it is suggested that the educators be kept separate from the sponsoring agency. Specifically, the abuela as the educator serves the purpose of representing the Hispanic population's traditions and cultures for the young mothers. If the abuelas merely represent the sponsoring agency, rather than the Hispanic population, utilization of several of the processes in the program may be compromised. The abuela educator may become separate from and perceived as different than the population in which she serves.

3. Structure pay policies and procedures so that equitable pay is given for appropriate work. Problems with pay may compromise many of the benefits of using abuelas as educators. Rapid and equitable pay for work must be established to ensure continued success of the program.

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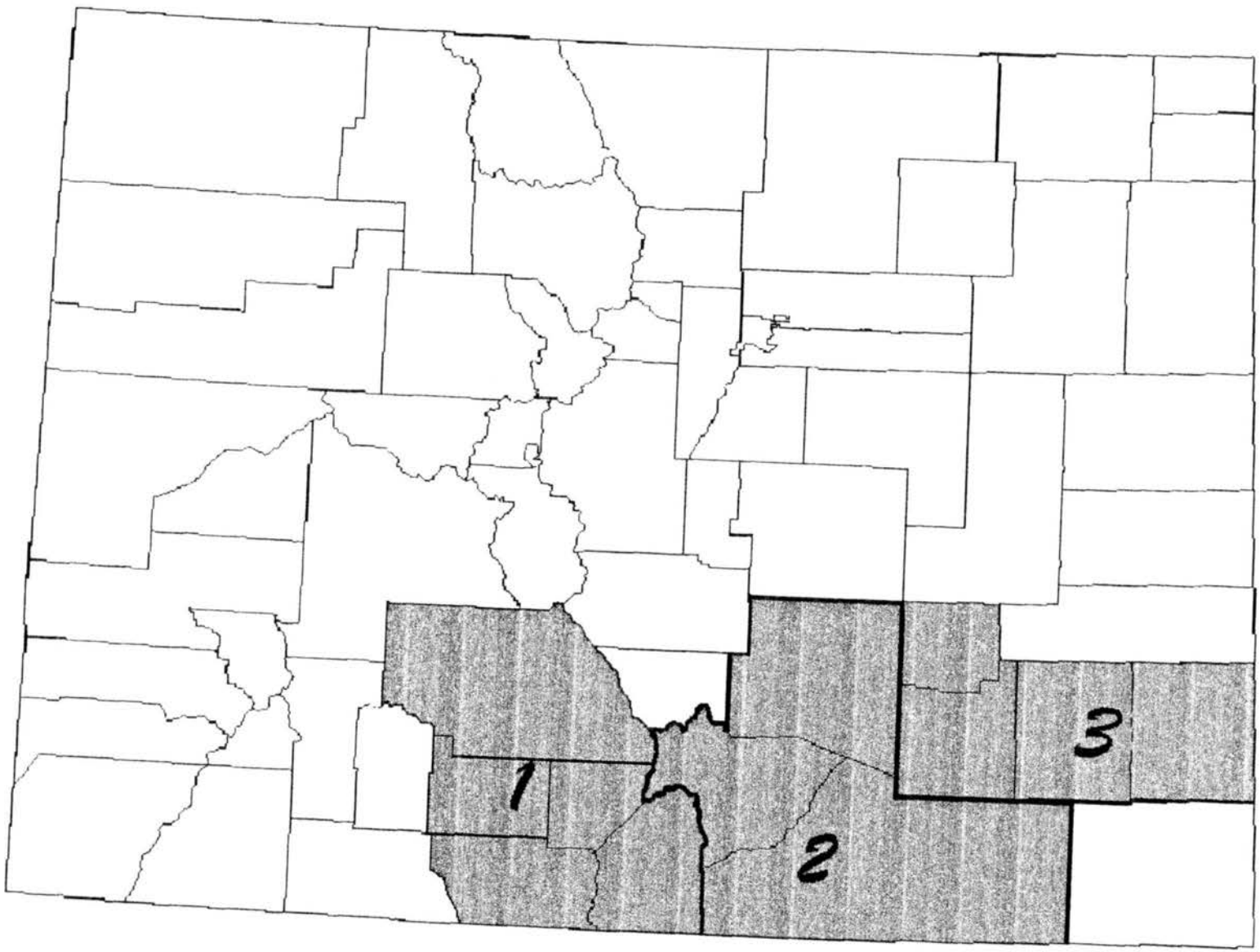
Appendices

Appendix: I Map of Colorado and Project Areas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Appendix II: Advisory Committees

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Ruth Garcia
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SLV - Board of Cooperative Services
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Pueblo Community Health Center
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Area 2 - Local Advisory Committee
(continued)

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Gloria Chavez
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Dawn Williamson
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Area 3 - Advisory Committee

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Associated Charities
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Kid's Korner Day Care
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Theresa Camacho
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Donna Guido, Director
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Rocky Ford, CO

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Rocky Ford, CO

Prowers County Nursing Service
Lamar, CO

Prowers County WIC Program
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Liz Ybarra
Bent County School District
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Appendix III: Evaluation Instruments

COLORADO STATE UNIVERSITY
INFORMED CONSENT FOR PARTICIPATION IN RESEARCH PROJECT
(NUTRITION EDUCATION PROGRAM PARTICIPANTS)

PROJECT TITLE: Using Distance Learning and Abuelas to Teach Low-Income Hispanics and Migrants

PRINCIPAL INVESTIGATOR: Jennifer Anderson, Ph.D, R.D. and Pat Kendall, Ph.D, R.D.

CO-INVESTIGATOR: Terry Taylor, M.A.

CONTACT NAME AND PHONE NUMBER FOR QUESTIONS/PROBLEMS:
Jennifer Anderson, Ph.D., R.D. (303) 491-7334
Department of Food Science and Human Nutrition

SPONSOR OF PROJECT: United States Department of Agriculture

PURPOSE OF RESEARCH: The overall goal of this project is to develop a nutrition education program that targets low-income Hispanic women and children with special emphasis on migrant farm worker families in specific areas of Southern Colorado. Because there is little nutrition education available for professionals in this geographically isolated area, professionals, paraprofessionals, and volunteers (Abuelas or Hispanic grandmothers) will be targeted for nutrition education training. They in turn will assist in the nutrition education of Hispanic women and children and migrant farm worker families who live in these areas.

PROCEDURES TO BE FOLLOWED: Individuals will participate in a nutrition education program for 2 to 5 weeks with a class duration of 2 to 3 hours. The classes will be taught by a trained nutrition educator. Prior to the beginning of the classes and then at the end of the class, a separate evaluator will administer a questionnaire and ask you to respond to the questions. In approximately 6 months, the evaluator will administer the questionnaire to you again and ask you to respond to the questions for a follow up evaluation. Your answers will assist us in determining the strengths, weaknesses, and effectiveness of the education program.

The classes will consist of presentations by the educator, learning activities that you will participate in, and cooking demonstrations. The classes are designed to be fun, interesting, and enjoyable.

You will not be paid for your participation; however, you will receive several items containing nutritional messages and several recipe cards which you may keep.

RISKS: This project is for educational research only. There are no known risks.

I understand that it is not possible to identify all potential risks in an experimental procedure, but I believe that reasonable safeguards have been taken to minimize both the known and the potential, but unknown, risks.

BENEFITS: This project will help in the development of nutrition education materials and delivery methods which consider the customs, norms, beliefs, and values of the Hispanic people. In doing so, knowledge, attitudes, skills, and behaviors will be acquired that contribute to nutritionally sound diets and a healthy lifestyle for Hispanic women and children in this area.

CONFIDENTIALITY SAFEGUARDS: No one will have access to any identifying information, such as name or address, except the investigators and the educators, and your name will not be used in any data analysis. Final reporting for the project will not disclose any names or other identifying information in order to maintain confidentiality.

LIMITATION OF LIABILITY: Because Colorado State University is a publicly-funded, state institution, it may have only limited legal responsibility for injuries incurred as a result of participation in this study under a Colorado law known as the Colorado Governmental Immunity Act (Colorado Revised Statutes, Section 24-10-101, et seq.). In addition, under Colorado law, you must file any claim against the University within 180 days after the date of the injury.

In light of these laws, you are encouraged to evaluate your won health and disability insurance to determine whether you are covered for any injuries you might sustain by participating in this research, since it may be necessary for you to rely on your individual coverage for any such injuries. If you sustain injuries which you believe were caused by Colorado State University or its employees, we advise you to consult an attorney.

Questions concerning treatment of subjects' rights may be directed to Celia S. Walker at 303-491-1563.

PARTICIPATION: I understand that my participation in this research is voluntary. If I decide to participate in the study, I may withdraw my consent and stop participating at any time without penalty or loss of benefits to which I am otherwise entitled.

I have read and understand the information stated and willingly sign this consent form. My signature also acknowledges that I have received, on the date signed, a copy of this document containing 2 pages.

_____
Participant name (printed)

_____ _____
Participant Signature Date

_____ _____
Investigator or Co-investigator Signature Date

PARENTAL SIGNATURE FOR MINOR SUBJECT

I authorize _____ (print name) to become a subject for the described research. The nature and general purpose of the project has been satisfactorily explained to me by _____ and I am satisfied that proper precautions are to be observed.

_____
Minor's Date of Birth

_____
Parent/Guardian Name (printed)

_____ _____
Parent/Guardian Signature Date

PERSONAL INFORMATION
(Please Print)

Name: _____

Address: _____

Where were you born? _____

How long have you lived in this area? _____

Where were your parents born? _____

Do you speak Spanish fluently? _____ yes ____ no

Do you speak Spanish in your home? _____ yes _____ no
How much education do you have?

____ High School Diploma
____ Associate Degree
____ Masters Degree
____ Other: _____
____ Some College Credit
____ Bachelor Degree
____ Certificate: _____

Have you ever used any of the following community services? (Check all that apply.)

____ WIC
____ EFNEP
____ SHARE Colorado
____ Head Start
____ USDA Commodities Food Program
____ BOCES
____ Migrant Health Services
____ Other: _____

USE
Eat Well FL
Entry

What is your age?

____ under 20 years
____ 20 - 30 years
____ 31 - 40 years
____ 41 - 50 years
____ 51 - 60 years
____ over 60 years

Do you eat meat? ____ yes ____ no

Explain: _____

What is your annual income? ____ less than $10,000
____ $10,000 to $20,000
____ $20,001 to $30,000
____ over $30,000

#5
EWFL

What do you do for a living? _____

LA COCINA SALUDABLE
LA INFORMACIÓN PERSONAL DE LA PARTICIPANTE

Nombre: _____

Dirección: _____

Teléfono: _____

¿Donde nació Ud.? _____

¿Por cuanto tiempo ha vivido Ud. en esta area/region? _____

¿Donde nacieron sus padres? _____

¿Habla Ud. español en su casa? _____Si _____No

¿Habla Ud. ingles bien? _____Si _____No

¿Qué tanto escuela ha cumplido Ud.?

_____Colegio
_____Dos anos de la universidad tecnica
_____Maestria
_____Otro: _____
_____Pocas clases en la universidad
_____Licenciado (en la universidad)
_____Certificado: _____

¿Ha usado Ud. cualquier de estos servicios?

_____WIC
_____EFNEP
_____SHARE Colorado
_____Head Start
_____Estampas para comidas/Food Stamps
_____Comestibles suplementales del USDA
_____BOCES
_____Servicios de salud para imigrantes
_____Otro: _____

¿Cuantos años tiene Ud.?

_____bajo de 20 años
_____20-30 años
_____31-40 años
_____41-50 años
_____51-60 años
_____más que 60 años

¿Cuanto dinero gana Ud. cada año?

_____menos que $10,000
_____$10,000 a $20,000
_____$20,001 a $30,000
_____más que $30,000

¿Qué hace Ud. para trabajo? _____

¿Cuantos niños tiene Ud.? _____

¿Qué son las edades de sus ninos? _____ _____ _____ _____ _____

(ENTRY/EXIT/FOLLOW-UP Survey – Version 2)

LA COCINA SALUDABLE
The Healthy Kitchen

NUTRITION SURVEY

DATE: _____ **TOWN:** _____

PARTICIPANT NAME: _____
(Please Print)

PARTICIPANT PHONE NUMBER: _____

This material is based upon work supported by the Extension Service, U.S. Department of Agriculture, under special project number 93-0507; XCM-185, 500, 2/95.

RVSD04/96 **version 2**
contevv3.doc

Please answer the following questions and check the box that best applies.

How often...	Do not do	Seldom	Some-times	Most of the time	Almost always
1. do you compare food prices to save money?					
2. do you eat low-fat food instead of a regular food?					
3. do you leave cooked foods out of the refrigerator for more than two hours?					
4. do you thaw frozen foods on the counter or in the sink?					
5. do you add salt to your foods?					
6. do you use the Nutrition Facts on the food label to make food choices? #9					
7. do you consider using a variety of textures, colors, shapes or sizes to make food fun for children?					
8. do you use a solution of bleach and water to sanitize when you clean in the kitchen?					
9. do you run out of food, food money or Food Stamps? #3					
10. do you shop with a grocery list? #4					

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11. The safest place to thaw frozen food is *(Circle the answer you choose.)*

a. on the counter at room temperature
b. in a warm oven
c. in the refrigerator
d. on top of the oven or stove
e. I don't know

12. Which of the following foods is the best snack choice for Vitamin A?

a. milk
b. meat
c. tortillas
d. carrots
e. I don't know

13. Which of the following foods is the best snack choice for Vitamin C?

a. oranges and peppers
b. cheese and milk
c. rice and beans
d. fish and beef
e. I don't know

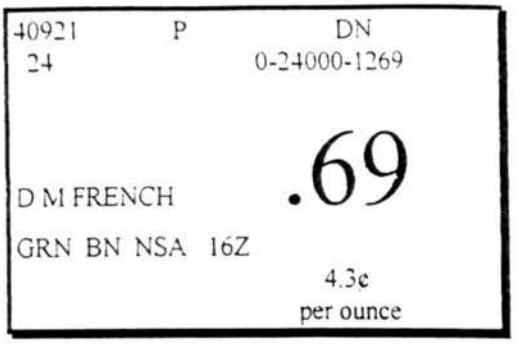
14. Check all of the foods on the list below which are good sources of fiber.

_____ dried beans
_____ fruits
_____ yogurt
_____ cheese
_____ whole wheat bread
_____ brown eggs
_____ corn tortillas
_____ whole grains
_____ tuna
_____ vegetables
_____ chicken with skin on
_____ beef
_____ corn
_____ potatoes

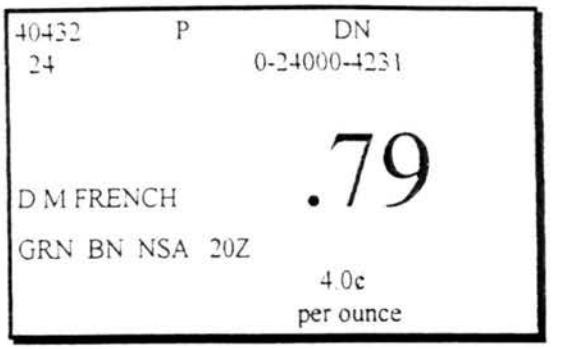
15. Look at the following shelf labels for 2 different cans of green beans.

Which brand of green beans is a better buy?

_____ A
_____ B
_____ I don't know



A



B

16. Look at the following food labels found on 2 different packages of food.

Which food is a better choice when you consider the amount of fat per serving?

_____ A
_____ B
_____ I don't know

Nutrition Facts
Serving Size 5 Crackers (14g)
Servings Per Container About 33

A

Amount Per Serving	
Calories 60	Calories from Fat 15
	% Daily Value
Total Fat 1.5 g	2%
Saturated Fat 0g	0%
Polyunsaturated Fat 0g	
Monounsaturated Fat 0.5g	
Cholesterol 0mg	0%
Sodium 150mg	6%
Total Carbohydrates 10g	3%
Dietary Fiber 1 g	2%
Sugars 0g	
Protein 1g	

Nutrition Facts
Serving Size 5 Crackers (14g)
Servings Per Container About 33

B

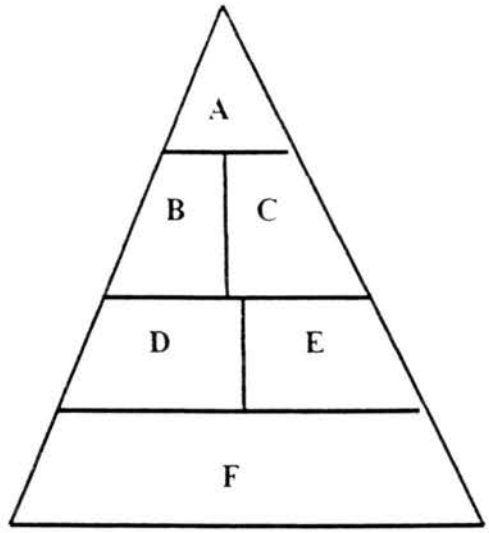
Amount Per Serving	
Calories 200	Calories from Fat 140
	% Daily Value
Total Fat 15 g	23%
Saturated Fat 0g	0%
Polyunsaturated Fat 0g	
Monounsaturated Fat 0.5g	
Cholesterol 0mg	0%
Sodium 150mg	6%
Total Carbohydrates 10g	3%
Dietary Fiber 1 g	2%
Sugars 0g	
Protein 1g	

17. This is the Food Guide Pyramid.

1. Name the major foods found in each section of the Food Guide Pyramid. List each section's major foods under the "Food in Group" column.

2. Then tell how many servings are recommended from each group. List the number of servings under the "Recommended number of servings" column.

Use this diagram of the Food Guide Pyramid below to identify the sections on the Pyramid.



New MyP

ABCDEF

Pyramid Section	Major Foods in the Group	Recommended number of servings
A		
B		
C		
D		
E		
F		

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24-HOUR DIET RECALL

- Please write down everything you had to eat and drink yesterday, from the time you got up in the morning until the time you went to bed.
- Do not forget to write how the food was prepared (fried, baked, boiled, etc.).
- Be as complete as possible. Include food and drinks you had between meals, too!
- If you do not know exactly the amount of a food, describe its size. (For example, a piece of cheddar cheese which was 1 inch long by 2 inches thick by 1 inch wide.)

Serving Abbreviations:

TBSP = Tablespoon	c = cup
tsp = teaspoon	lb = pound
oz = ounce	sl = slice

What time did you eat the food?	Describe the food item.	How much was eaten?
EXAMPLE: 7:00 a.m.	orange juice	4 oz
	egg, scrambled	1 egg
	with butter	1 tsp.

Is this the way you usually eats ? ____yes ____no

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LA COCINA SALUDABLE
The Health Kitchen

CUESTIONARIO

FECHA: _____ LUGAR: _____

EL NOMBRE DE LA PARTICIPANTE: _____
(Use Letras de Molde)

Ese material es apoyado por el Servicio Extension, el Departamento de Agricultura de los E.E.U.U., el número del proyecto 93-0507; XCM-185, 500, 2/95.

Favor de preguntar a la participante las siguientes preguntas y marcar el cuadrado correcto:

Que tan seguido ...	Nunca	Casi Nunca	A Veces	Muchas veces	Casi Siempre
1. compara Ud. los precios de la comida antes de comprarla?					
2. come Ud. la comida menos en la grasa en cambio de la comida "regular"?					
3. deja Ud. la comida cocinada a fuera del refrigerador por mas que dos horas?					
4. descongela Ud. la comida en la mesa o en el refrigerador?					
5. anade Ud. la sal a su comida?					
6. usa Ud. las etiquetas ("Nutrition Facts") para escoger la comida?					
7. considera Ud. la variedad, la textura, el color, la forma, o el tamano para escoger la comida divertida para los ninos?					
8. usa Ud. blanqueador (como "Chlorox") con agua para limpiar su cocina?					
9. no tiene bastante dinero y las estampas de comida, para comprar la comida?					
10. tiene Ud. una lista de la comida cuando va a la tienda?					

11. Se deben descongelar la comida: *(Marque la respuesta correcta)*

a. en la mesa, el mostrador
b. en el horno caliente
c. en la refrigeradora
d. arriba de una estufa o un horno
e. No sé

12. Marque la comida que es la mejor bocada ("snacks") cuando considera Ud. la vitamina "A"?

a. el leche
b. el carne
c. las tortillas
d. las zanahorias
e. No sé

13. Marque la comida que es la mejor bocada cuando considera Ud. la vitamina "C"?

a. las naranjas y las pimientas
b. el queso y el leche
c. arroz con frijoles
d. el pescado y el carne
e. No sé

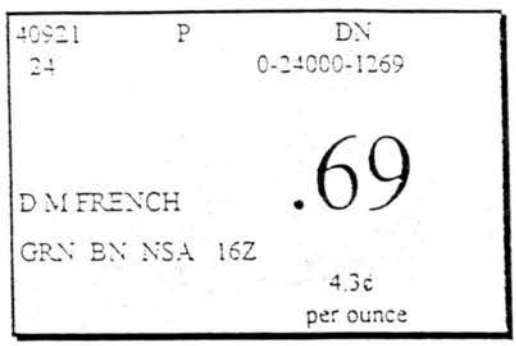
14. Marque las comidas en la siguiente lista que tiene mucha fibre:

_____ frijoles secados	_____ los granos integros
_____ la fruta	_____ el atún
_____ el yogurt	_____ los vegetales/las verdaduras
_____ el queso	_____ el pollo con el pellejo
_____ el pan trigo	_____ el carne
_____ los huevos	_____ el maiz
_____ las tortillas de maiz	_____ las patatas/las papas

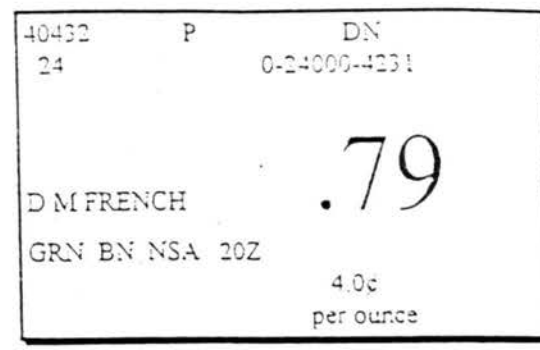
15. Examine estas dos etiquetas para ejotes.

¿Cual es la mejor compra?

_____ A
_____ B
_____ No sé



A

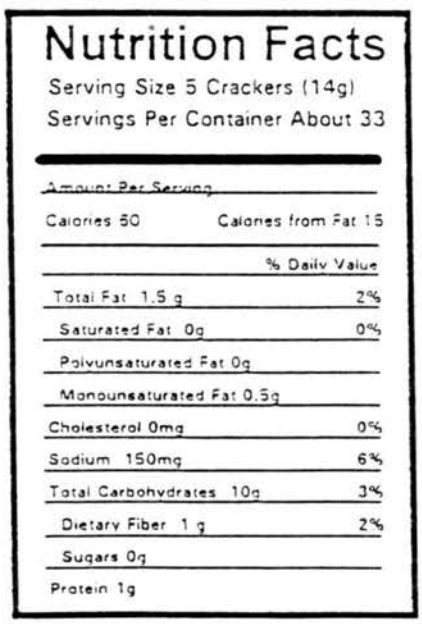


B

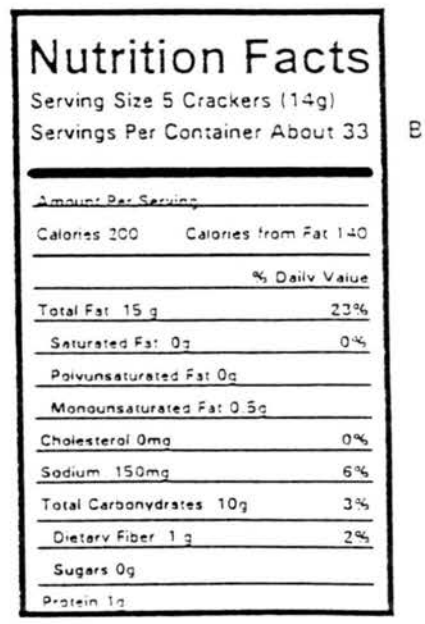
16. Examine Ud. estas dos etiquetas que están encontradas en dos paquetes distintas.

Cuando considera Ud. la cantidad de grasa en las dos comidas, ¿cual de estas es la mejor compra?

_____ A
_____ B
_____ No sé



A



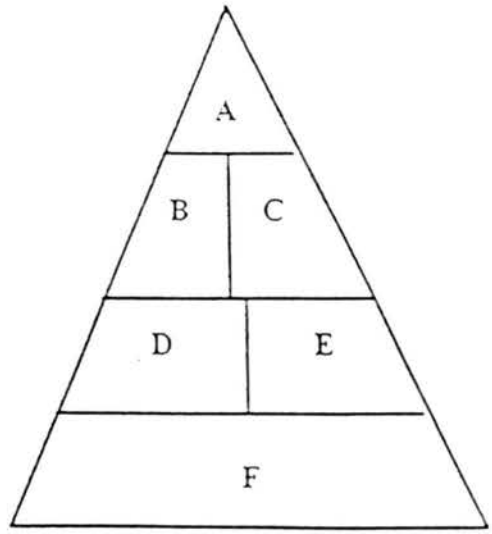
B

17. Esa es la Piramide Guia de Comidas.

1. ¿Qué son los grupos (secciones) principales de las comidas en la Guia Piramide? Haga una lista de los grupos de las comidas abajo de la columna "Grupos de comida de la guia."

2. ¿Cuantas porciones/servidas son recomendadas por cada grupo? Haga una lista con el número de las porciones/servidas recomenndadas abajo de la columna "Porciones recomendadas."

Aquí es la Piramide para referencia.



Sección de la Piramide	Grupos de comida de la guia	Porciones recomendadas
A		
B		
C		
D		
E		
F		

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EL DÍARIO DE COMIDA DE 24 HORAS

- Por favor, escriba todo que comío y bebío ayer, desde el tiempo que se levantó en la mañana hasta que se acostó en la noche.
- No olvide escribir como fue preparada la comida.
- Es muy importante que este diario sea completo.
- Si no sabe Ud. cuanto comió, describa el tamaño. (Por ejemplo, un pedazo de queso "cheddar" fue una pulgada larga, dos pulgadas denso, y una pulgada ancho.)

Se puede usar las siguientes marcas para indicar la cantidad de comida/bebida que consumió:

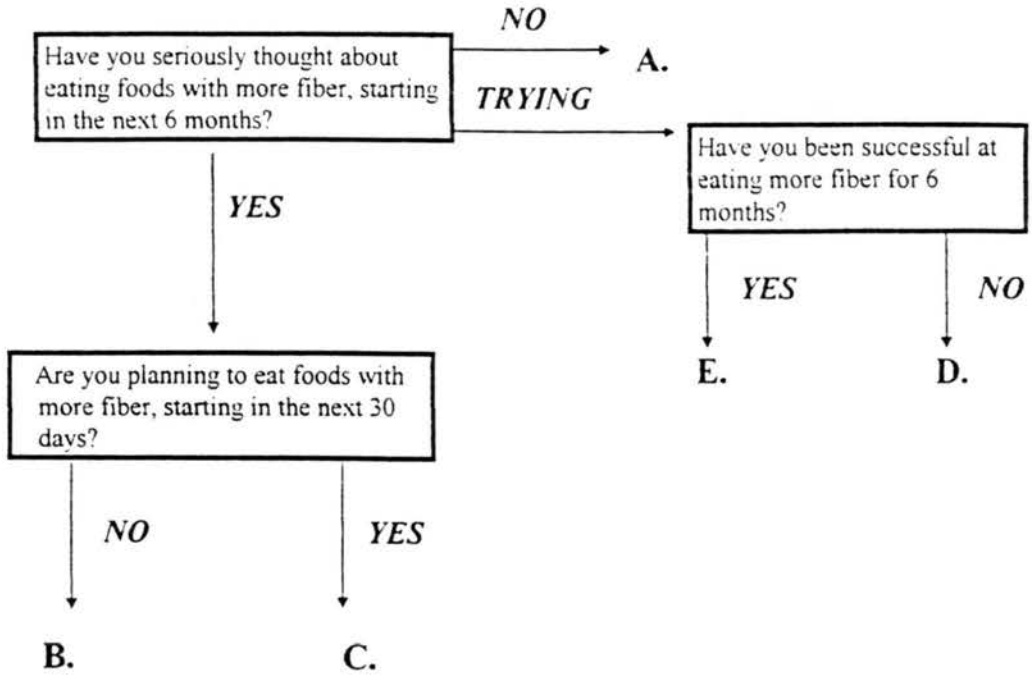
cucharada de medida = Cd	taza = t
cucharadita = c	libra = lb
onza = oz	rebanada = rd

¿A qué hora comió Ud.?	Describe la comida, por favor.	¿Qué tanto comió Ud.?
Ejemplo: 7:00am	jugo de naranja	4 oz
	huevos revueltos	1 huevo
	cocinados en mantequilla	1 c

¿Come el nino usualmente asi? _____ Si _____ No

Stage of Change Evaluation Instruments

Question #1: Fiber



Version 1

High fiber foods include: **rice** **cereals**
oatmeal **pasta**
noodles **whole grains**
fruits **vegetables**

Begin by answering question #1.

#1. Are you going to start to eat more foods with high fiber before winter?

If your answer is "no", circle A.

A

If your answer is "yes", answer question #2.

#2. Are you going to start in the next month **and** are you taking steps to do this now?

Yes, I am planning to start in the next month.
and
I am taking some steps to do this now.

B

No, not in the next month.
or
I am not really taking any steps to eat more now.

C

If you are trying to eat more now, answer question #3.

#3. Have you consistantly eaten more foods with high fiber almost every day since last winter?

Yes, I have consistantly eaten more of these foods since last winter.

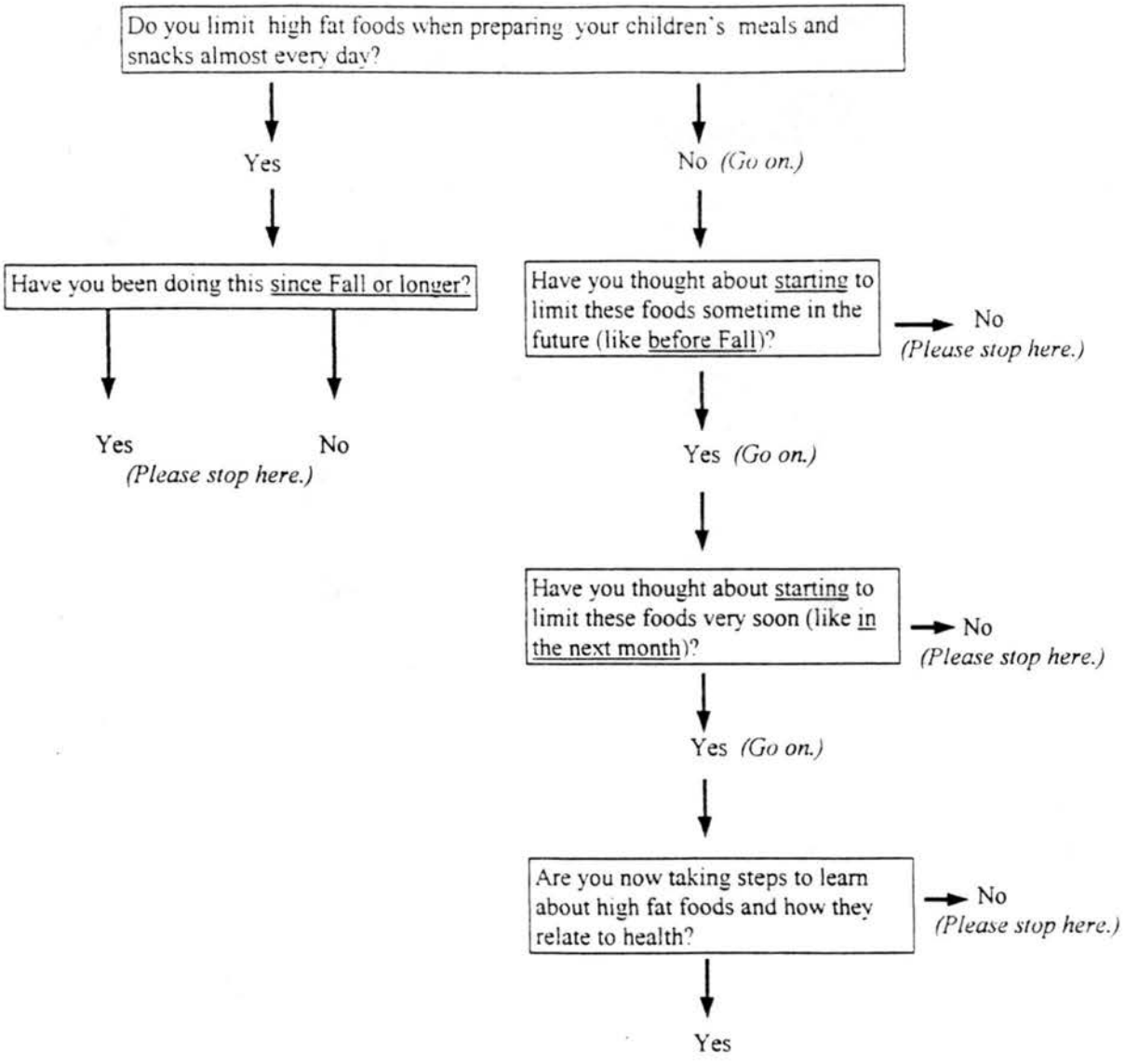
D

No, I have not consistantly eaten more since last winter.

E

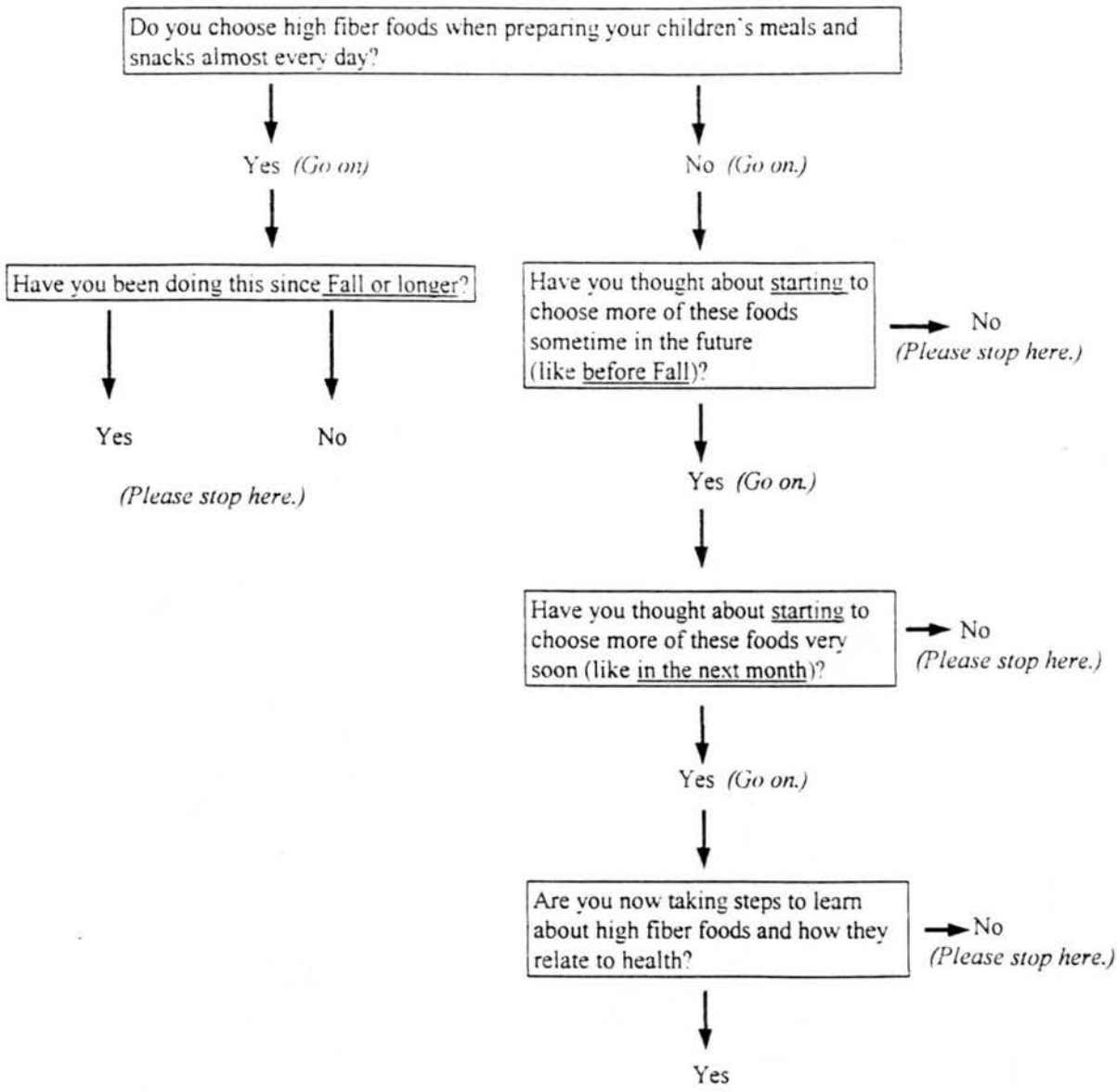
Version 2

18. High fat foods include: **whole milk** **sour cream** **lard**
fatty meats **cream cheese** **cream**
ice cream **fried foods** **mayonnaise**
meat drippings added to vegetables



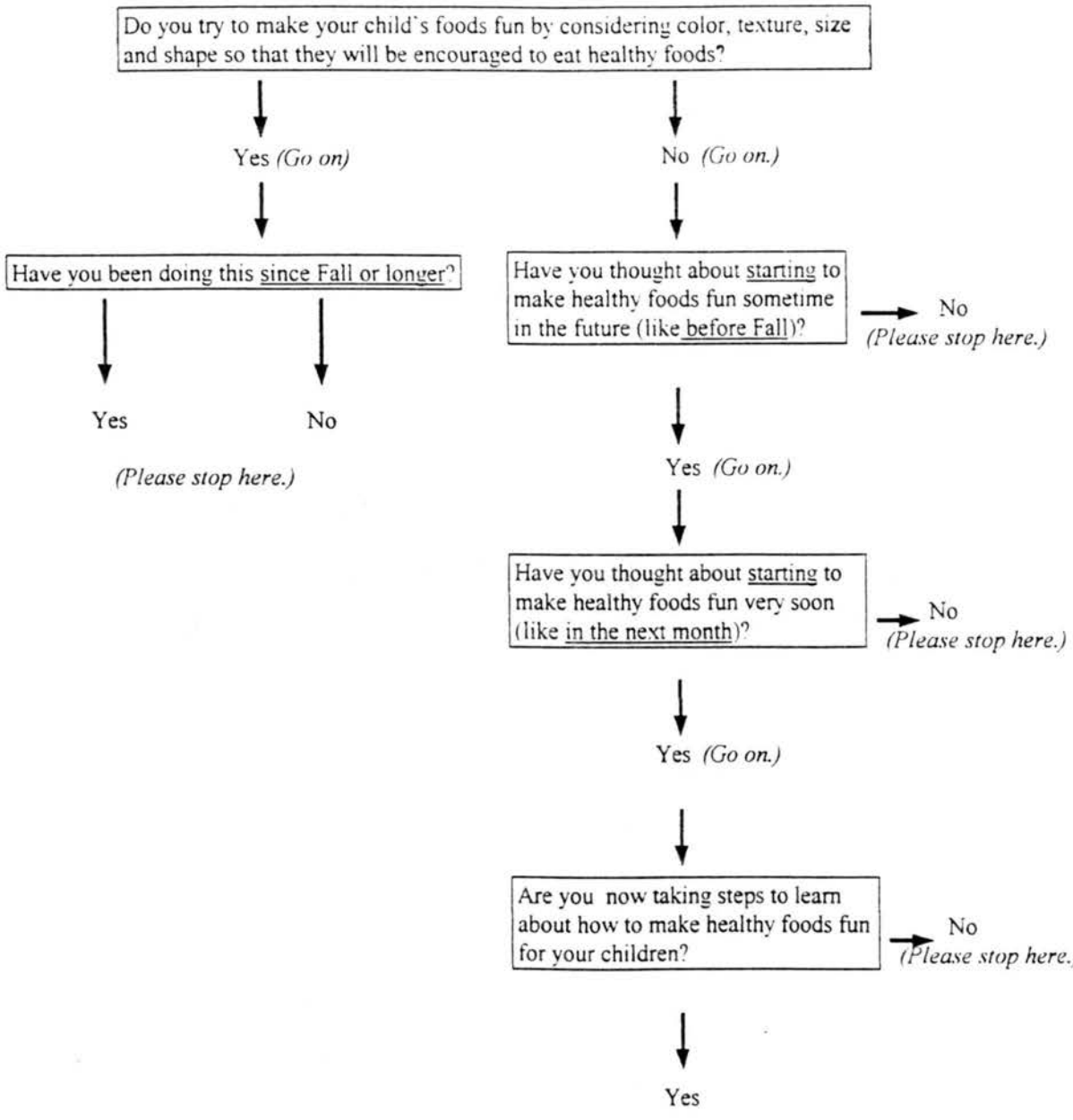
Version 3 rvsd03/96

19. **High fiber foods include:** **cereals** **oatmeal** **corn tortillas** **pasta** **noodles** **whole grains** **fruits** **vegetables** **dried beans**



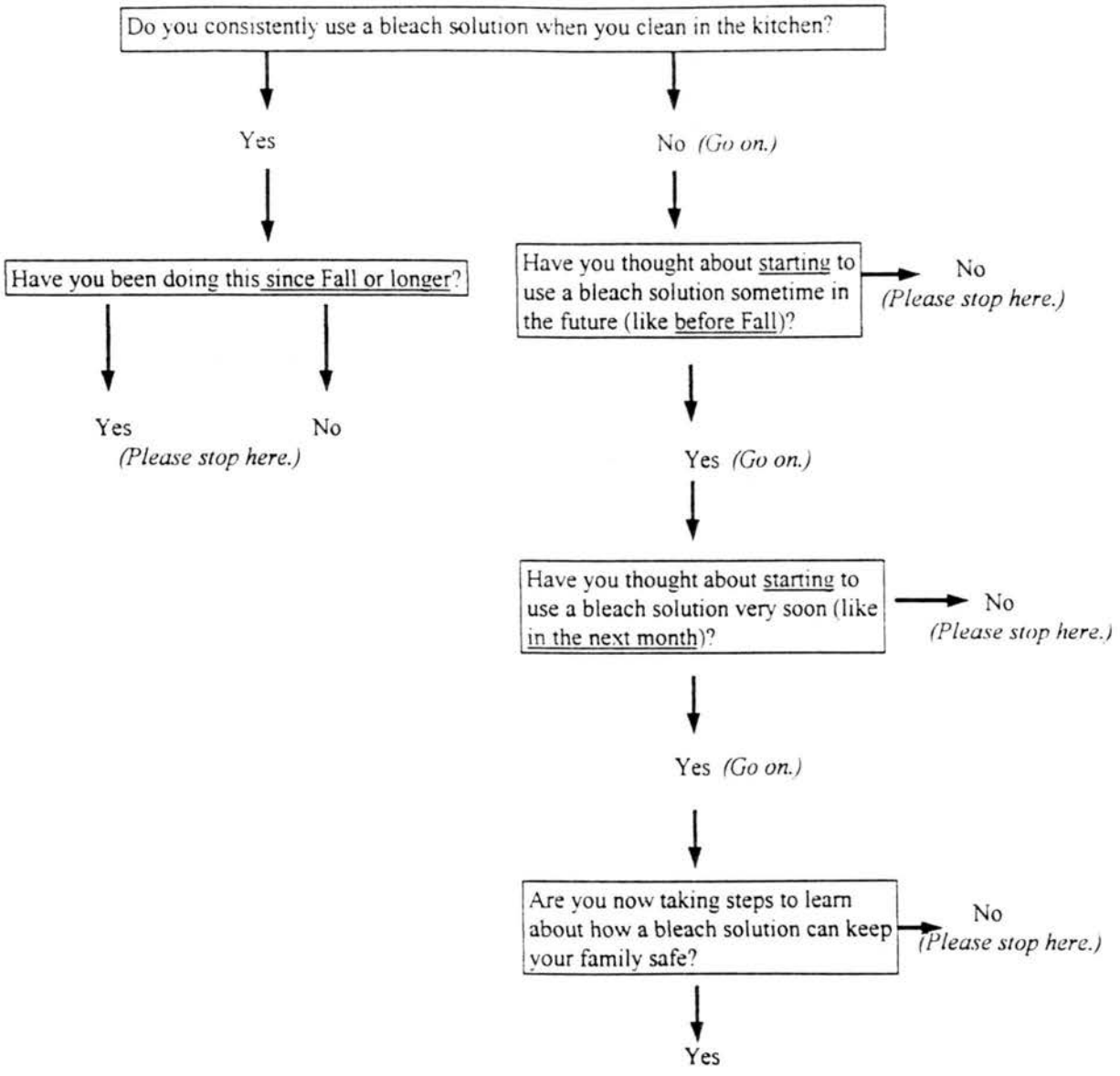
Version 3 rvsd03/96

20. Sometimes children do not want to eat healthy foods. They can be encouraged to eat more of these foods if the foods are fun to eat. You can make foods fun to eat choosing the foods based on the color, texture, size and shape of the food.



rvsd03/96

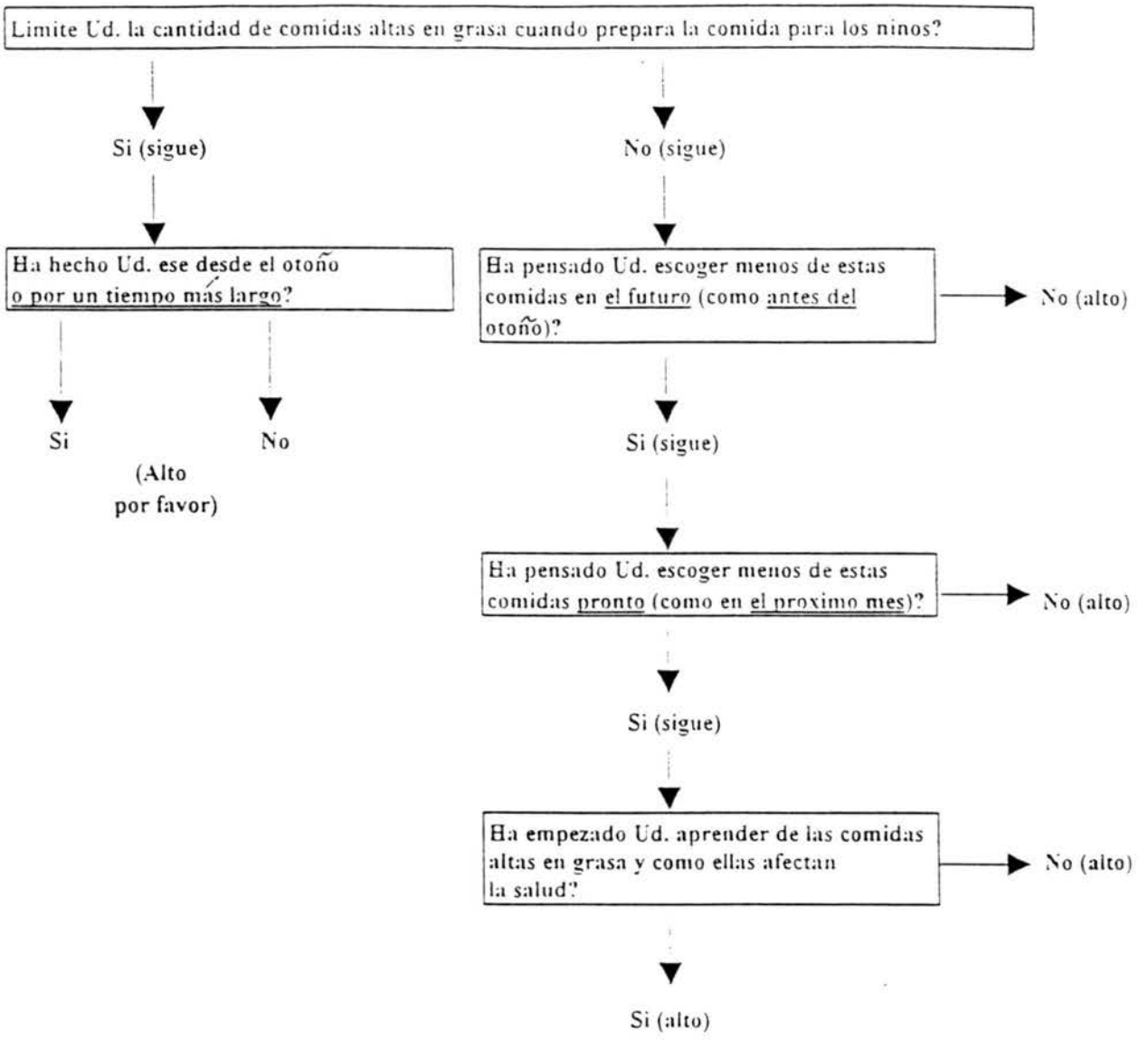
21. A sanitizing solution is made by mixing a small amount of chlorine bleach with water. The solution can be used to kill germs and bacteria which can make your family sick.



Version 3 rvsd03/96

18. Las comidas altas en grasa incluyen:

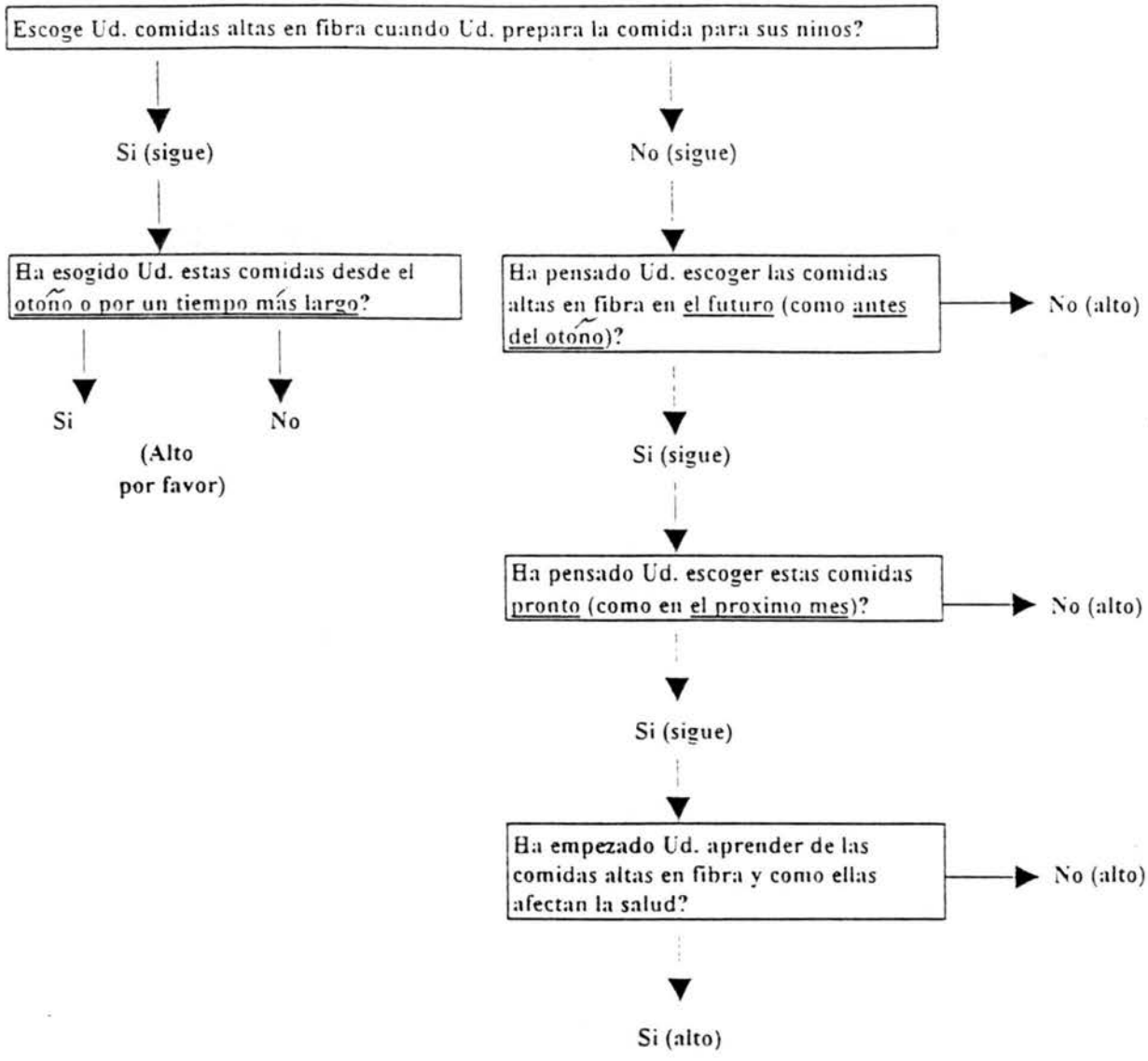
leche ("regular")		manteca (de cerdo)
carne gordo	queso de nata	crema
helado	aceite	mayonesa
las comidas fritas		chicharrones



4/12/96

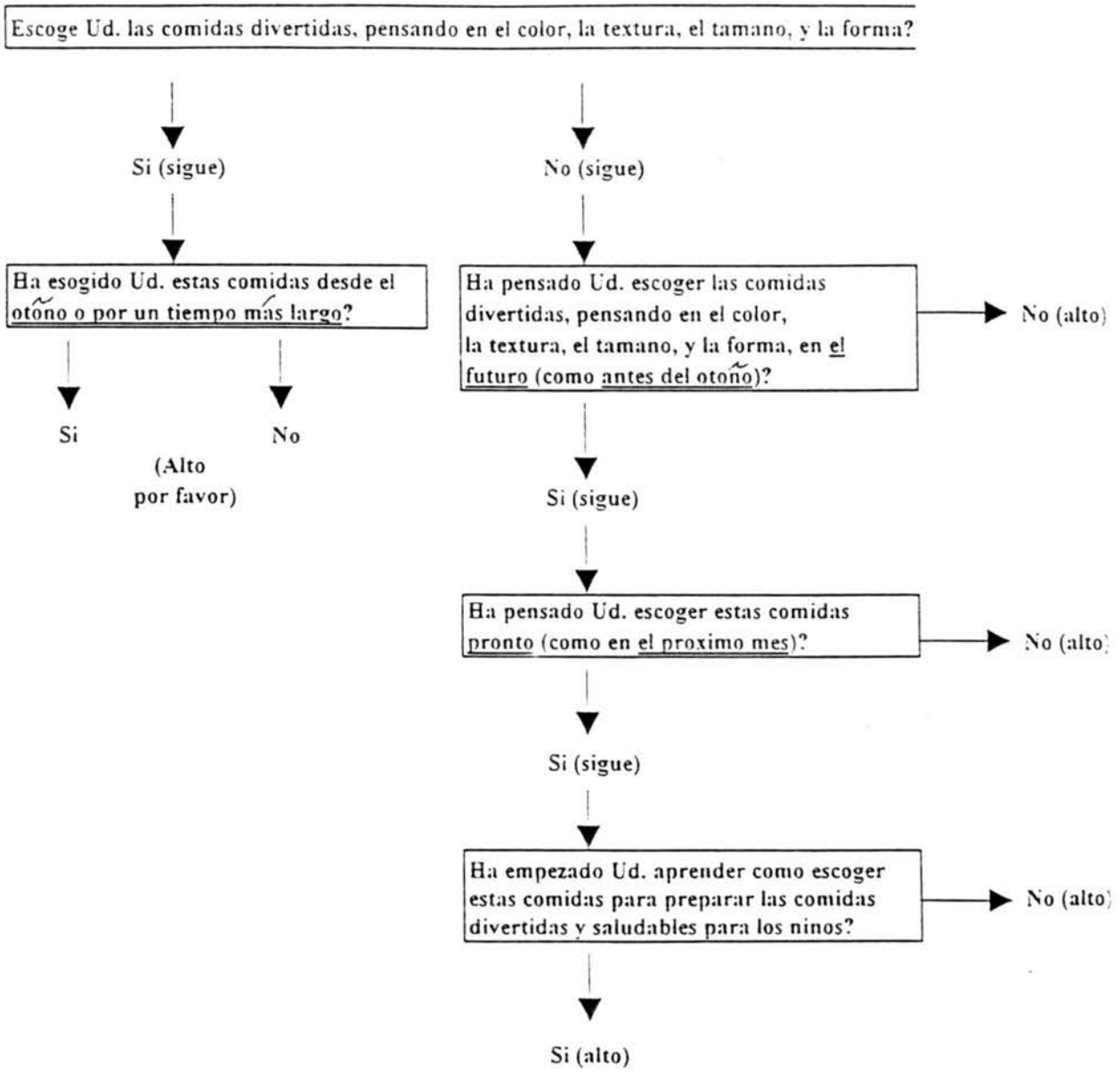
19. Las comidas altas en fibra incluyen:

arroz	cereales	avena
pasta	fideos	granos integrales
fruta	vegetales/verduras	
frijoles		



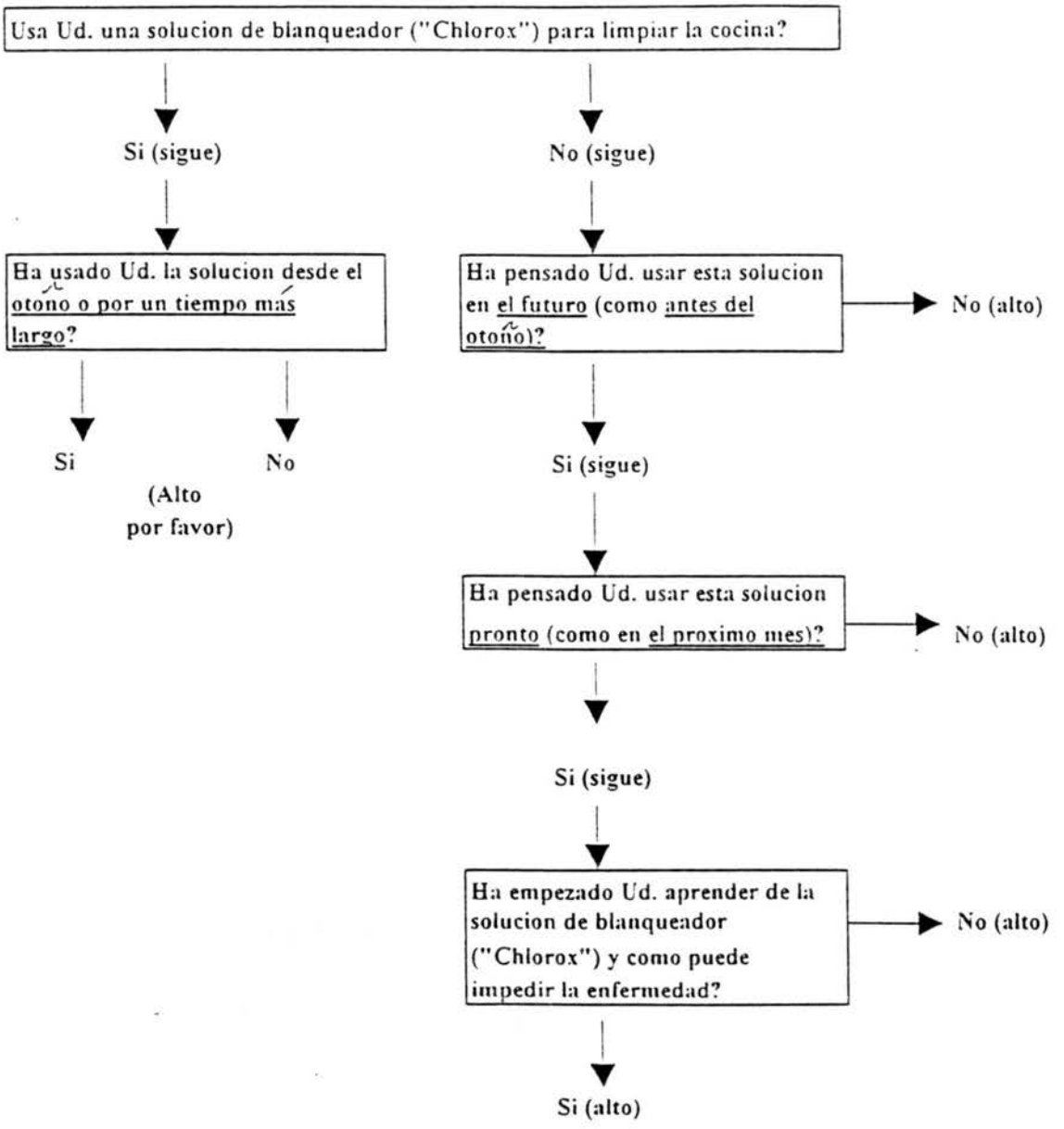
4/12/96

20. A veces los ninos no quieren comer las comidas saludables. Si Ud. escoge las comidas mas divertidas, pensando en el color, la textura, el tamano, y la forma, Ud. puede encoregirlos comer mas comidas saludables.



4/12/96

21. Se puede hacer una solucion de blanqueador cuando mezcla un poco de blanqueador (como "Chlorox") con agua. Se puede usar esta solucion para matar bacteria. La bacteria puede causar la enfermedad.



4/12/96

Appendix IV: Professional Paper Manuscripts

Using the Stage of Change Model to Develop a Nutrition Education Program for Low-Income Hispanic Mothers

Terry Taylor, Ph.D., Jennifer Anderson, Ph.D., R.D., Patricia Kendall, Ph.D., R.D.

INTRODUCTION

The changing of nutrition related behaviors is often difficult due to the complexity of the behaviors themselves and their relationship to cultural and family traditions, attitudes, beliefs, norms, habits, likes and dislikes, and nutrition knowledge and skills. This difficulty is evident by the large numbers of nutrition education programs designed to change behaviors and the continuous attempts by several government and health related agencies attempting nutrition behavior change. As suggested by Achterberg and Clark, [1] there is a need for more than just learning theory usage in the development of effective nutritional education programs and interventions. A combination of both learning theory and behavior change theory specifically designed for nutrition behaviors may be important in gaining complete and lasting nutrition behavior change and ultimately achieving health improvement goals.

One attempt at combining aspects of several psychological theories is the Stage of Change Model for behavior change. [2] This model, when used as a basis for development of nutrition education programs, may hold promise in achieving nutrition behavior change goals. Though this model has been studied in a variety of behavior changes, few studies have used the model as a foundation for program development. The purpose of this paper is to provide a brief overview of the Stage of Change Model and report on the use of the model in the development of the *La Cocina Saludable - The Healthy Kitchen* nutrition education program.

Background to Stage of Change Model. The Stage of Change Model (or Transtheoretical Model) for Behavior Change [3] attempts to explain how people intentionally change their behavior. Prochaska and his colleagues asked not only how do people change, but when does change take place, what psychological or behavioral tools do changers emphasize, and what indicators can be used to predict their change success. This model categorizes individuals into stages describing their readiness for change. Five consecutive stages follow a continuum beginning with not being aware of a problem behavior or not being willing to change and

ending with complete and lasting change to the new, desired behavior. The five stages include Precontemplation, Contemplation, Preparation, Action, and Maintenance. Further, it has also been suggested that individuals use specific processes unique to each stage. [4] The processes include consciousness raising, emotional arousal, self liberation, social liberation, counter conditioning, stimulus control, self re-evaluation, environmental re-evaluation, reinforcement management, and helping relationships. These psychological processes have been studied to determine specifically how individuals in each stage move through the stage sequence toward lasting change. [4]

Change is not necessarily a linear progression towards success. Rarely is the behavior change process perfect and without setbacks. In the Stage of Change Model, these setbacks are collectively termed relapse and describe a changer (a person who is attempting change) who returns to one of the previous stages in the progression towards Maintenance. [5,6] It has been suggested that relapse is a normal and perhaps necessary part of self change and should be expected.

Another aspect of the Stage of Change Model is the decisional balance factor that describes the changer's perception of pro's and con's of both the old and new behavior. It is suggested that the decisional balance is different for early staged individuals than it is for those in the later stages. [7] Those individuals in the earlier stages may emphasize the pros of the old behavior and the cons of changing. Individuals in the later stages may emphasize the cons of the old behavior and pros of the new behavior. Capitalizing on an individual's decisional balance appropriately may assist them in their change attempts

The Stage of Change Model was originally studied and validated for smoking behavior. [3] Since then the model has been investigated in a variety of self-change behaviors including weight control, [8] nutrition counseling, [9] exercise behavior, [10, 11] alcohol addiction, [12, 13, 14] resistance to mammography, [15] dietary fat reduction, [16, 17] and a variety of issues in psychotherapy. [18]

METHODS

Description of the Project. An initial nutrition education needs assessment was conducted prior to development of the program and is discussed elsewhere. [19] Using the results of these discussions as a basis,

a nutrition education program, entitled *La Cocina Saludable - The Healthy Kitchen*, was developed, which used abuelas (Hispanic grandmothers) as peer educators to deliver a five unit nutrition education program. The targeted population included low-income Hispanic mothers of pre-school children in three multi-county areas of the state. Educational materials included 1) a free-standing, colorful flip chart, 2) a three-dimensional Food Guide Pyramid model teaching aid, 3) the *La Cocina Saludable Resource Guide* to be used as both a text and script for the Abuela Educator, and 4) five different kitchen utensil incentives. All materials were developed in both English and Spanish. Five content areas were addressed:

- *Make It Healthy*: This unit discussed basic nutrition information, including a description and tips on using the USDA Food Guide Pyramid.
- *Make It Fun*: This unit described applicable tips for preparing healthy foods and meals for children and for encouraging children to choose these foods over less healthy ones.
- *Make A Change*: This unit explained how to modify recipes and meals to reduce fat, reduce sugar, reduce salt, and increase fiber.
- *Make It Safe*: This unit discussed important food safety issues and guidelines including cleanliness, cooking food, and storing food.
- *Make A Plan*: This unit explained ways to make food resources last longer including shopping tips, package nutrition label use, comparative shopping using shelf labels, and wise coupon use.

For each of the five topic units, experiential and behavioral learning activities were utilized to reinforce, demonstrate, and practice the concepts explained in the lessons. Opportunities for taste tests, observing demonstrations, trying recipes, and social interaction were provided.

The project was evaluated using a pre-test, post-test, and follow-up design to determine change in selected knowledge and skills, change in selected behaviors, and movement through the stages of change as defined by the model. An Entry, Exit, and Follow-up Survey was given to each participant before, after, and six months following the nutrition education classes. Separate evaluators were used to reduce bias in evaluation. Participants (N=337) showed significant increase in knowledge, skills, and self-reported

behaviors both at the completion of the classes and at six months following the classes. A detailed discussion of the results of both materials and the evaluation are discussed elsewhere. [20]

Development of Materials Using the Stage of Change Model. Elements of the Stage of Change Model were used in development of each of the material pieces in the program. Each teaching aid was based upon the content of the *La Cocina Saludable Resource Guide*. The *Resource Guide* included both an informational reference section and a script from which the Abuela Educators could deliver a consistent and accurate message with little training, practice, or nutrition or teaching experience. A corresponding reference section supported the messages in the script. The *Resource Guide* was arranged so that for facing pages, the left side (Background Page) contained the informational reference and its facing right page (Teaching Page) contained the script. In this way, the Abuela Educator could easily obtain additional information as she was teaching to help explain the concepts.

Each set of Teaching and Background Pages corresponded to one page on the flip chart and represented one nutritional message in the unit. Each message was divided into five subsections, each designed to utilize one or more of the processes of change for class participants in the corresponding stage. These sections included: "Start The Discussion", "State The Facts", "Use The Flip Chart", "Check The Learning", "Review The Messages." The table top Food Guide Pyramid teaching aid was developed to assist the Abuela Educator in teaching the food group concepts. Behavioral and experiential learning activities also addressed many of the processes of the Stage of Change Model. Each unit contained learning activities designed to support the messages. Table 1 illustrates how these sections and the learning activities specifically addressed the processes of the model.

Development of Program Implementation Approach. The Stage of Change Model was not only used as the basis for material development, it was also used as the basis for program implementation including recruitment, choice of communicator of the messages, and class structure. The implementation factors provided significant opportunities for use of several processes of change. Table 2 outlines use of these implementation factors in the program.

DISCUSSION

In using the Stage of Change Model as a theoretical framework around which a nutrition education program is to be developed, several points appear to be important for consideration. These considerations include 1) ensuring that each of the five stages of change is represented by one or more participants in the class; 2) including several elements in the class content and structure so that the processes of change for each stages are optimally used; and 3) addressing key factors in program implementation.

Multi-Staged Class Groups. It appears to be useful to include at least one participant from each of the five stages of change in the class when using the Stage of Change Model for an educational program. Participants from one stage offer assistance in utilization of the specific processes for participants in other stages. For example, Precontemplative and Contemplative individuals have been shown to use the process of Social Liberation where they become freed from social norms and expectations of their peers and respected others. In *La Cocina Saludable*, higher staged Participants (Maintenance and Action) who had successfully attempted the behavior change in question appeared to offer the lower staged individuals this liberation. As the higher staged Participants were rewarded for their successes, either by the Abuela Educator or the class as a whole, the lower staged individuals began to let go of their negative attitudes about the new behaviors leading to reluctance to change, especially those attitudes concerned with "what others will think." Another example of the benefit of using multi-staged classes in this study is in the use of the process of Reinforcement Management for individuals in the Action and Maintenance stages. As these higher staged class members discussed their successes in changing the specified behaviors, they received reinforcement in the form of recognition, approval, and praise for their behavior change success. This reinforcement appeared to come not only from the Abuela Educators, but also from peers in the higher stages who empathized and those in the lower stages who may have been looking up to them for their success. The internal reward of the higher staged members who were successfully putting to practice what was being taught further reinforced their behavior change. There are many other examples where class members in one stage supported or enhanced the processes utilized by class members in other stages; therefore, it may be that a multi-staged class combination is ideal for optimal utilization of the processes of change.

Elements of the Class Conduction and Course Content. In a nutrition education program based on the Stages of Change model, the class structure and course content should support the processes of change as much as possible.

A first consideration is the use of thoughtfully constructed questions throughout the class. In doing so, the Consciousness Raising, Self Re-evaluation, and Reinforcement Management processes can be utilized effectively for the appropriate staged individuals. In *La Cocina Saludable*, the "Start The Discussion" questions, which began each topic area, effectively provided a basis on which Precontemplators could begin to become aware of their behaviors and possible alternatives. The questions also provided a mechanism for Precontemplators, Contemplators, and those in the Preparation stage to evaluate their behavior utilizing the process of Self Re-evaluation. Furthermore, the questions provided a means for higher staged individuals (Action and Maintenance) to demonstrate their success in the specified behavior changes thus utilizing the Reinforcement Management process.

A second consideration is in providing extensive opportunities for discussion. A nutrition education program which includes discussion allows the incorporation of many processes important in movement through the stages. For example, in this study, discussion provided an opportunity for lower staged individuals (Precontemplation and Contemplation) to hear the success stories of those class participants already in the higher stages. The discussion helped to utilize both the Social Liberation process and the process of Emotional Arousal. Lower staged individuals began to see that the new behaviors being suggested were accepted by their peers and the Abuela Educator who was proposing the change. Many times, the discussion included stories of children and family members who changed a specified behavior and avoided the negative consequences of the old behavior. Other stories revolved around the unpleasant or sometimes tragic consequences of not making the recommended nutrition behavior changes. Accounts of elderly mothers with diabetes, challenges of obese sisters, a husband's triple by-pass surgery, or the inevitable histories of loved ones lost to potentially preventable disease often provided a basis for increased emotion. This process of Emotional Arousal has been found to be extremely important in the stage movement by lower staged individuals. [21, 12] Discussion also appeared to foster helping relationships as

Participants began to get to know each other and share their successes, failures, and life stories. Helping relationships have been suggested to be critical for self change in all five stages. [22]

The concept of decisional balance has also been suggested to be important in the Stage of Change Model. [7, 23] By listing the Pros of the suggested behaviors and the Cons of the undesired behaviors in the course content, lower staged individuals may be enlightened while higher staged individuals may be reinforced. Instead of stating only what to do in behavior change, addressing the decisional balance aspect of change may help prepare individuals for change. As suggested in several Stage of Change based studies, many programs which were only designed for people who were ready for change (i.e. later staged individuals) were not as successful for those individuals in the earlier stages who were not yet ready for change. [24, 25, 10]

Consciousness raising is obviously a major component of any educational program and is key in the Stage of Change Model. Lower staged individuals in their progress toward change use the consciousness raising process extensively to move them to the next stage. Examples of the Consciousness Raising component include facts, statistics, and details regarding the consequences of both the existing behavior and the suggested improved behaviors. In the complex behaviors associated with nutrition, however, it may be that there are several levels or layers of consciousness raising which vary with successive stage. For example, Precontemplators who are not yet aware or convinced of the benefits of a lower fat diet may need just the basic facts related to fat consumption behavior. As individuals progress through the stages, becoming more committed to change, they may require more information, a broader base of information, and/or greater detail about fat consumption to advance their progress. In comparison, a behavior such as smoking behavior is less complex. The Precontemplator obviously requires an increased awareness that smoking is unhealthy and may lead to a variety of diseases and disorders. Additionally, the smoker may need to hear statistics, details of the consequences of smoking behavior, and techniques for quitting. The end behavioral goal, however, is still changing a smoking behavior to a non-smoking behavior, both of which are easily defined and assessed by individuals either smoking or not smoking. Fat intake is much more complex, is not easily defined, and is difficult to precisely assess. For example, how does a participant assess fat intake

if she consistently consumes 1% milk and consistently prepares tortillas with lard? Does she practice low fat behavior or high fat behavior? In what stage of change should she be placed for general fat consumption? An individual could potentially be in the Precontemplation Stage for lard consuming behavior and the Maintenance Stage for milk consuming behavior. Additionally, individuals may not be able to accurately determine the amount of fat they consume which may also lead to incorrect stage determination. As found in a study where the Stage of Change Model was applied to dietary fat reduction, individuals were not able to accurately place themselves in a stage for fat consumption behavior because of their lack of awareness of just what constitutes a low-fat diet. [26] The Consciousness Raising process must become both broader in scope and more detailed as the individuals progress through the stages. The focus first should concentrate on fat consumption as a general topic and then broaden to a multitude of facts relating to a multitude of fat consuming behaviors. Once the Precontemplative individual begins to acknowledge general fat consumption behaviors and recognize the potential consequences of a high fat diet, the Consciousness Raising objective needs to then focus more on the individual elements of fat consumption. This complexity may alter the use of the Stage of Change Model in nutrition related behaviors similar to fat consumption. The previous research using the Stage of Change Model has suggested that Consciousness Raising process is emphasized mainly by earlier stages (Precontemplation and Contemplation). For complex nutrition related behaviors, it may be that individuals in all five stages significantly use the Consciousness Raising process; however, the level and type of information needed by each stage may be different. Further investigation into this concept is warranted for optimal utilization of the Stage of Change Model for nutrition education program development.

Learning activities, both experiential and behavioral, appear to be important in the utilization of several processes of change. First, learning activities support the Consciousness Raising process in terms of providing opportunities for individuals to actually prove to themselves that the suggested behaviors are possible, easy, and desirable. The initial focus group discussions suggested that barriers to changing some nutrition behaviors for this population included lack of time for preparation of "healthy" foods, lack of skill in cooking and using unfamiliar "healthy" foods, and the perceived differences in taste, texture, and appearance of "healthy" foods leading to families not accepting the foods and food waste. By providing

opportunities to try recipes, learn preparation skills, experience unfamiliar foods, and taste their creations, these obstacles may be overcome. Other processes were utilized during learning activities. For the higher staged participants, the Self Efficacy process (belief in one's ability to carry out the behavior) was fostered. For example, mothers who initially stated that they were not very creative with food preparation for their children, realized that they could make foods fun and could create interesting foods for their children during the "Make It Fun" learning activities. Helping relationships were fostered extensively throughout the learning activities effectively utilizing this process.

Finally, the process of Self Re-evaluation was utilized in the learning activities. Self Re-evaluation is where individuals re-evaluate their existing attitudes and beliefs about a specified behavior. If the attitudes and beliefs change because of the new knowledge and experiences, then it is possible that ultimate behavior change may progress. The learning activities provided the opportunity to re-evaluate attitudes about ease of preparation, taste, family acceptance, etc. for a variety of nutrition related behaviors. Participants who stated that they could not tolerate the taste of low fat yogurt, realized that it made many acceptable tasting foods such as tuna salad and fruit salad after trying samples in the learning activities for the "Make A Change" unit.

Factors in Program Implementation. Key factors in program implementation may facilitate use of several processes of change as well as other concepts supported by the Stage of Change Model. These factors include recruitment, the choice of communicator of the nutritional message, and training.

Recruitment may impact the success of behavior change programs. [6] The Abuela Educators recruited individuals who did not realize that they had nutrition behavior problems, or who were not yet convinced of the necessity or benefits of change. Several times Participants admitted that they were participating in the classes only because their friend or family member, the Abuela Educator, had asked her to come. By using proactive recruitment, more individuals who were not prepared for change may have been included in the classes. Reactive recruitment methods were also used in the form of flyers, newspaper ads, radio announcements, and notices in public places and in agencies providing nutrition education. These techniques were effective in recruiting Participants who were already prepared to change and who were

interested in more knowledge and skills to assist them. Evidence of responses to both types of recruitment methods was seen in the introductions made at the beginning of the classes. The results of the Stage of Change evaluation and in-class observations suggest that all stages of change were represented in the classes.

The choice of an abuela (Hispanic grandmother) as the communicator of the messages assisted in the utilization of other processes of change. First, it has been suggested that early staged individuals emphasize the process of Social Liberation. This important process allows early staged participants to see that respected leaders in the community and nutrition related activities have adopted and are condoning the new behaviors. The initial focus group discussions verified that young Hispanic mothers listen to their grandmothers and similarly respected older women in their families and communities. Since many nutrition behaviors are tied to family preferences, customs, traditional ways of doing things, and how their mothers and grandmothers did it, approval from the Abuela is important. Without this approval, it is suspected that Precontemplators would not even consider changing some nutrition related behaviors and would remain in this first stage permanently.

Finally, training the educators in the Stage of Change Model itself may help them to emphasize the processes of change needed to move Participants through the stages. The Abuela Educator training in *La Cocina Saludable* did not include any training in the Stage of Change Model. Many educators have since expressed an interest and desire for this training. It has even been suggested to include in the *Resource Guide* notations for the Abuela Educators reminding them of the various processes being used.

CONCLUSION

The success of La Cocina Saludable, in terms of improving knowledge, skills and self reported behavior change after six months suggests that a program based on the Stage of Change Model is an effective means of effecting behavior change in selected nutrition behaviors. Important factors may include ensuring that all stages are represented by the class participants, specifically addressing theprocesses of the stages of change in a multitude of ways throughout the program, and utilizing these processes in the program implementation approach. Similarly developed programs my be a step in the combination of

learning a behavior change theory specifically designed for nutrition education programs in the attempt to effect lasting nutrition behavior change.

Table 1 Using the Stage of Change Model in the Development of a Nutrition Education Pogrom

Precontemplation (PRE)	**Recruitment** ▲ Use proactive recruitment for those potential participants who are not yet ready to change their behavior. ▲ Provide incentives for class participation other than behavior change. **Decisional Balance** ▲ List pros of suggested behaviors and cons of existing behaviors in course content. ▲ Acknowledge cons of suggested behaviors and pros of existing behaviors. ▲ Provide solutions or rebuttals to cons of suggested behaviors. **Consciousness Raising** ▲ Provide key facts in course content to raise awareness. ▲ Provide specific details and examples in course content. ▲ Provide a "Pre-test" for awareness of key facts at beginning of course or unit. ▲ Allow opportunity for group discussion to incorporate facts and details from other class members. **Social Liberation** ▲ Ensure that there are higher staged class members for behaviors to be changed. ▲ Select communicator of message (educators) who is respected by class members. ▲ Provide opportunity for higher staged class members to demonstrate their new behavior attempts and success through use of probing questions. **Emotional Arousal (Dramatic Relief)** ▲ Provide opportunity for participants to tell stories about the consequences of avoiding suggested behaviors and remaining with undesired behaviors. ▲ Provide statistics and other factual information related to consequences of undesired behaviors. ▲ Use probing questions to facilitate discussion of children, family members, friends, etc. ▲ Use detailed stories illustrating consequences of undesired behaviors.

Contemplation (CON)	**Self Re-evaluation** ▲ Conduct experiential learning activities to provide opportunities for participants to re-evaluate their attitudes regarding abilities, obstacles, beliefs, and knowledge. ▲ Ask assessment type questions and ensure answers are provided, either by more knowledgeable class members or by educator. ▲ Ensure that specific information is provided in course content that allows self-assessment, including information which is simple, concrete, and measurable. **Environmental Re-evaluation** ▲ Provide information to assist in evaluation of the behavior of those in the environment or the environment itself.
Preparation (PREP)	**Recruitment** ▲ Use reactive recruitment techniques for those participants who are more ready to take steps to change behaviors. ▲ Provide incentives related to changing behavior. **Decisional Balance** ▲ List Pros of new behavior and cons of old behavior. **Self Liberation** ▲ Offer challenges to participants to take small outlined steps toward behavior change. ▲ Provide opportunities for participants to set goals and then follow up on progress toward goals. **Commitment** ▲ Provide small, measurable steps toward achieving the goals. ▲ Discuss successes and solutions to obstacles or setbacks to increase commitment. ▲ Provide convincing evidence for advantages of change.
Action (ACT)	**Reinforcement Management** ▲ Provide opportunities for participants who are somewhat successful at behavior change attempts to be recognized for both their attempts and successes.

	▲ Provide incentives and rewards for successful new behavior changes and behavior change attempts. ▲ Provide opportunities for internal rewards by incorporating opportunities for successful completion of behavior change tasks in learning activities, questions, demonstrations, etc. **Countering** ▲ Include concrete ideas for substitution of desired behaviors for old behaviors in course content and activities. **Environmental (Stimulus) Control** ▲ Provide tips on cues to both the undesired behaviors and the suggested behaviors. ▲ Provide physical, take-home cues or reminders for new behaviors. ▲ Provide ideas for controlling the environment to support the new behaviors in course content and activities. ▲ Provide concrete pictures and images which represent the suggested behavior change.
Maintenance (MAINT)	**Reinforcement Management** ▲ Encourage demonstration and discussion of successful and maintained behavior change by incorporating these individuals in the teaching of class and demonstrating of learning activities. ▲ Provide recognition of course completion.
All Stages	**Helping Relationships** ▲ Provide many opportunities for development of helping relationships including activities, discussions, questions and answers, etc. in a fun, and stimulating environment. **Consciousness Raising** ▲ Provide a progressively more detailed information relative to the specific behaviors so that lower staged individuals can see the significance of behavior change in the big picture and higher staged individuals can utilize details to increase and maintain successful behavior change.

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Description of *La Cocina Saludable - The Healthy Kitchen* Nutrition Education Program

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Introduction

Effective nutrition education programs require scientifically sound, theoretically based, and well-received nutrition education materials that are appropriate for the populations to which they are targeted. It is evident in *Healthy People 2000: National Health Promotion and Disease Prevention* that effective nutrition education is perceived as a necessary element in achieving the health goals for the American population. [1] Priority Area 8 of these goals addresses educational and community-based programs which recognize the importance of community-based programs in changing health behaviors. These objectives specifically related to community nutrition education include increasing family discussion of health issues, establishing community health promotion programs, and increasing health promotion programs for racial and ethnic minority populations. Additionally, Priority Area 2 (Nutrition) addresses the issues relating to the dietary factors which may contribute to preventable illnesses and premature death. What people eat may be the most significant controllable risk factor affecting long-term health for Americans. [2] The nutrition goals include reducing prevalence of and/or death from coronary heart disease, cancer, stroke, diabetes, high blood cholesterol, high blood pressure, iron deficiency, overweightness, and growth retardation. Additionally, the goals include improvement in the American diet that includes reducing dietary fat, increasing complex carbohydrate and fiber-containing foods, increasing calcium intake, decreasing salt and sodium intake, and increasing breastfeeding. Further, the goals strive from increased nutrition education, assessment, counseling and referrals. [1]

Many organizations and agencies contain a nutrition education component in their objectives. The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is an entity of the U.S. Department of Agriculture (USDA), Food and Consumer Services (FCS). It serves more than 7 million people each month emphasizing the well being of young children and pregnant women. [3] WIC provides

food, nutrition counseling, assistance in accessing health services for their clients and nutrition education. Along with WIC, the Expanded Food and Nutrition Education Program (EFNEP), a program of the Cooperative Extension Services of the USDA, provides nutrition education for low-income families with young children. Additionally, the U.S. Department of Health and Human Services, Administration for Children and Families funds the Heads Start Program. Head Start is operated by local non-profit organizations and state or local agencies and exists in most counties in the United States. Nutrition education is included in Head Start's education of children between the ages of three and five and their parents. Head Start served 751,000 children in over 37,000 classrooms nationwide in 1995. [4] It is evident that education in nutrition related topics has been deemed important in serving young children and their families.

Problems in Nutrition Education for Low-Income Hispanics in Colorado.

Colorado has a large Hispanic population representing approximately 45,000 individuals. About 14.0% of Colorado's total population is Hispanic compared to 10.4% for the U.S. as a whole. [5] These individuals are among the poorest in the state and pose many obstacles to effective nutrition education programs. These obstacles involve mainly limited financial resources on both the part of the agencies providing the education and on the part of the individuals being served. Low-income Hispanics have demonstrated that the challenges of transportation, childcare, and free time needed for educational endeavors severely restrict the effectiveness of educational programs. Community agencies have found these obstacles difficult to overcome. Additionally, scarce resources in community agencies themselves have limited their provision of solutions to the problem.

Limited financial resources also lead to broader challenges including low education levels, low literacy rates, and limited opportunities to learn English, if English is the second language. These additional obstacles further exacerbate the problems of effective education and compound the complex task of developing appropriate, well-received, and effective educational materials and programs. Reading level, translation issues, and complexity of content become related considerations for educators.

In 1993, the United States Department of Agriculture/Extension Service (USDA/ES) asked for help in addressing the nutrition needs of individuals who are eligible for the Special Supplemental Food

Program for Women, Infants, and Children (WIC). The goal of this nutrition education initiative was to develop, deliver, and evaluate community-based intensive nutrition education projects in order to improve nutrition related behaviors that would lead to healthier lifestyles for the targeted populations. This project represents a portion of the resulting nutrition education program in response to this initiative. The primary purpose of this project was to develop a nutrition education program based on the Stage of Change Model for Behavior Change.[6] The targeted population was that of low-income Hispanic mothers of pre-school aged children, including migrant farmworker families, in three separate areas of Colorado. This report describes in detail the materials of the resulting *La Cocina Saludable – The Healthy Kitchen* nutrition education program.

Methods

Initially, ten qualitative focus group discussions were conducted with low-income Hispanic mothers of pre-school children and the results were analyzed. A detailed discussion of these results may be found elsewhere.[7] Briefly, the results of these focus group discussions emphasized practical applications of nutrition education by the targeted population and specifically included:

Content

- a focus on needs of children (not prenatal or infant needs)
- healthy eating habits for families (increased consumption of fruits, vegetables, milk, chicken and fish; less consumption of red meat; less consumption of pop, junk foods, fast foods, candy, and chips)
- instruction in healthy preparation techniques, including quick and easy recipes and use of commodity or WIC foods available to them
- instruction in how to get kids to eat (snack ideas, including children in the meal preparation, etc.)

Delivery Format

- interactive, hands-on, small group discussions
- cooking classes; home visits; demonstrations; tastings

- opportunities to share information
- less desirable: printed information, video tapes

Communicator of Message

- people who knew about nutrition; a specialist; someone who was respected for their knowledge of nutrition; abuelas (Hispanic grandmothers) who were trained
- someone from a reputable agency

These focus group results laid the foundation for the design, development, and implementation of *La Cocina Saludable - The Healthy Kitchen* nutrition education program. The materials, class format, and implementation plan were based on the Stage of Change model for Behavior Change [6] in an effort to utilize sound learning and behavior change theory and psychological tools as much as possible in the program. A detailed description of the program development using this model is located elsewhere. [8]

Target Population

The target population of this program was that of low-income Hispanic mothers of preschool children (the participants). This group represented a segment of the population in Colorado which has demonstrated a need for improved nutrition related behaviors. Subsequently, their preschool children potentially would benefit from improved knowledge, skills, and behaviors of their care providers. Table 1 describes the participants for the project.

Communicator of Educational Messages

The focus group results indicated that this population desired a person whom they felt was an expert in nutrition to be their communicator of the information. They recognized several community agencies as reputable, but also stated that a barrier to changing nutrition behaviors was in the contradictory and inconsistent information they perceived to receive. They also emphasized the difficulty in accepting information when it went against their own perception of nutritional truths. The focus group participants confirmed that the grandmother (abuela) in the Hispanic population is perceived as the nutrition, parenting, health, and child-raising expert for the family. The abuela is respected and her suggestions are likely to be

followed. Accordingly, the abuela was chosen as the communicator of the message in a peer education format and became known as the Abuela Educator.

Table 1 Demographic Description of La Cocina Saludable Participants

Characteristic	Percentage of Participants
Female	98
Hispanic	98
Age	
Under 20 years	6
20-30 years	40
31-40 years	32
41-50 years	15
51-60 years	0
Over 60	8
Education	
Elementary	26
High School Diploma	35
Some College Credit	29
Bachelor's Degree or above	4
Other	7
Income	
<$10,000/year	60
$10,001 - $20,000/year	22
$20,001 - #30,000/year	14
>#30,000/year	5
Speak Spanish Fluently	46

The focus group results also indicated that if abuelas in the communities were to be used, training was essential. It was evident that the communicator had to be perceived as knowing the information and should be a representative from a reputable agency in the community known for accurate nutrition information. Prior to teaching any classes, the Abuela Educators participated in two eight-hour sessions in which they were trained in the program content and materials. They were given responsibilities of recruitment of participants, organization of class logistics, and actual teaching of the classes.

Materials

Program Content

Five content areas were included in the program. They are as follows:

- *Make It Healthy*: This unit discussed basic nutrition information, including a description and tips on using the USDA Food Guide Pyramid. Food groups, serving sizes, and added fats and sugars were explained. The proper use of the Food Guide Pyramid was demonstrated using a breakfast, lunch, dinner, and snacks scenario.
- *Make It Fun*: This unit provided applicable tips for preparing healthy foods and meals for children and encouraging children to choose these foods over less healthy ones. Fun and creative ideas were proposed for parents related to food preparation including the making of sandwiches in shapes of animals and vehicles using fruits and vegetables, making easy, fast and healthy snacks, and making healthy substitutions for "junk" foods generally chosen by children. The concept of varying the color, size, shape, and texture of foods to increase children's interest was discussed and practiced.
- *Make A Change*: This unit discussed the modification of foods and meals to reduce fat, sugar and salt and increase fiber. Specific techniques for elimination or reduction of fat, sugar, and salt were explained. Ideas for more healthy substitutions were also discussed as well as ways to increase fiber in the diet.
- *Make It Safe*: This unit focused on important food safety issues and guidelines. Keeping hot foods hot, cold foods cold, and eating and preparation areas clean were emphasized. Proper defrosting methods were explained and tips for checking foods while shopping were discussed. Finally, the recipe for a bleach sanitizing solution was explained and demonstrated.
- *Make A Plan:* The final unit explained ways to make food resources last longer so that better quality foods or additional food may be acquired. The messages in this unit emphasized money saving shopping techniques. Participants learned and practiced reading package and shelf labels. They also learned wise uses of coupons.

Material Development

The materials for *La Cocina Saludable* included 1) a 11" X 17" stand-alone flip chart teaching aid; 2) a corresponding *Resource Guide* to be used by the Abuela Educators as a text and script from which to conduct the lessons; 3) a three dimensional Spanish version of the Food Guide Pyramid; and 4) five kitchen

utensils corresponding to each of the five topic units. All materials were developed using the Stages of Change theoretical framework. All pieces were translated into Spanish and highly corresponded to each other.

Flip Chart

The flip chart included 35 pages of color photographs and diagrams that directly corresponded to each page of the *La Cocina Saludable Resource Guide*. The focus group results clearly indicated that this population desired teaching materials that included colorful, realistic photographs of common foods that were fun and attractive to view. They did not particularly like cartoons or unprofessional drawings. Five to thirteen pages were dedicated to teaching the messages for each of the five units. Each separate page was devoted to one message containing from two to six secondary messages described in detail.

The pictures in the Flip chart were photographs designed by a professional food stylist and photographers. Great care was taken to ensure that the photographs were professionally created. For example, the food stylist used several tricks to enhance the photographs such as using glycerin to create shine on the fruit and vegetables, using food coloring to enhance the colors, and using marshmallow cream in place of milk in the cereal bowl. Foods were chosen based on the food choices of the target population. WIC and supplemental foods were used when appropriate. In accordance with copyright laws, brand names were removed or covered up on all containers leaving notations of "light", "low fat", etc. in view for teaching purposes.

Each of the five units began with an introduction page that provided a brief overview of the messages to come in the unit. Several message pages that specifically outlined the information in application type messages followed the introduction page. The summary page followed the message pages, which summarizes what was presented in the unit.

Creative designing was utilized in the layout of the flip chart. At the bottom of each page was a page number enclosed in a silhouette of the specific kitchen utensil assigned to that unit and used in the learning activities associated with that topic. The page number corresponded to the *Resource Guide* to help the Abuela Educators keep their place as they taught the class. Additionally, the introduction page was surrounded by a thick colorful border unique to each unit. Border designs included wood, granite, sandstone

and two colorful southwestern fabric designs. Each message page of the unit had the same border inverted to a square at the center of the page tying the pages of unit together. The summary page also contained a large photograph of the specific kitchen utensil devoted to that unit with the intention of tying in the learning activity utilizing that incentive to the messages presented in the unit. As much color as possible was used in the flip chart development.

The flip chart text was presented in both English and Spanish. In some cases, there were two Spanish words commonly used reflecting the different Spanish dialects found in the areas. In such cases, both words were used. For example, in one common dialect, the appropriate word for vegetable is *verdura*. In another dialect, the appropriate word is *vegetales*. The flip chart presented the "vegetables" translation as "*verduras vegetales.*" This format was used as necessary throughout the flip chart to ensure appropriateness for a broad range of Spanish dialects. The flip chart text was translated by a bilingual translator from a similar population and then back translated to help ensure accuracy. Additionally, very simple text was used in the flip chart to overcome not only the translation issues, but also the low literacy levels of the targeted population.

La Cocina Saludable Resource Guide

The *Resource Guide* served as both a script for the Abuela Educators and a text from which they could study and review the information they were to teach. It was translated into Spanish for those Abuela Educators teaching Spanish speaking only audiences.

The photographs of the flip chart were designed to be used in conjunction with the *La Cocina Saludable Resource Guide*. They represented examples of foods, provided a visual aid for the Abuela Educators as they presented their messages, and gave the class participants a starting point for discussing questions and concepts presented in the class. On the summary page of each of the five units was a photograph of the kitchen utensil incentive designated for that unit. The kitchen utensil was not only used in the learning activities for that unit, but was also given to each participant to take home as a reminder, or cue, for the messages and skills learned.

Basic Format: The *Resource Guide* included two basic parts: 1) a teaching page and 2) a background page. It was designed to assist the Abuela Educator in easily and effectively teaching the nutrition education

classes and to minimize the training required. Both Spanish and English translations were available to meet as much as possible the language needs of both the Abuela Educators and the participants.

Teaching and Background Page: Each right hand page (the Teaching Page) served as a script for the Abuela Educator. Since prior teaching experience was not a requirement, it was important to make the job of teaching as simple as possible. According to the focus group discussions, consistency in the nutrition education was a key consideration in the program development. With a script in hand, each Abuela Educator could read or follow the information as it was laid out. Each left-hand page of the *Resource Guide* (the Background Page) corresponded to the right hand page script, but gave background information to the items in the script. Not only did the background page serve as a study guide for the Abuela Educator during the training and in preparation for the teaching, it also served as readily available information for items on the teaching page. For example, if an Abuela Educator read "osteoporosis" on the teaching page, but had forgotten exactly what this disease entailed, she could simply look to the adjacent background page on the left and read a brief synopsis of the topic. Located at the top of each page was a header to assist the Abuela Educator in keeping her place as she taught her classes. Included in the header was the title and page number of the corresponding page in the flip chart. Identifying the corresponding flip chart page was important in helping the Abuela Educator to keep on track as she presented the units.

Content: The *Resource Guide* served to explain the information presented in the flip chart. Each of the thirty-five pages of the flip chart contained a main message and several sub-messages designed to reinforce the main message. The messages of each flip chart page were organized into a consistent delivery system. The *Resources Guide* was designed to guide the Abuela Educator through this delivery system in an easy-to-follow manner utilizing consistent headings, subheadings, symbols, and wording which was found throughout the entire guide. The following discussion describes *the Resource Guide* sections.

The "Start The Discussion" Section: Each Teaching Page begins with the *"Start the Discussion"* section. For each flip chart page, the Abuela Educator started the discussion of the topic by asking one or more questions designed to address the various stages of change in which individuals in the class might have been.

The "Introduce The Messages" Section: The next section was the "Introduce The Messages" section in which basic information about the specific topic was presented to set the stage for the importance of the

messages and demonstrate the significance of the behaviors to the class participants. Here, basic concepts, statistical information, facts related to health and disease, and benefits of changed behaviors were presented.

The "Use The Flip Chart" Section: This section presented the messages for the flip chart page in a clear, concise, applicable manner. Most messages were specific behavior changes that would achieve the main objective of that page. Bullets explained the details of the desired behavior change or gave examples or specific instructions.

The "Check The Learning" Section: This section provided the Abuela Educator with probing questions to help determine if the participants understood the messages. These questions also provided the class with a self-test and reinforcement of their newly gained knowledge.

The "Review The Messages" Section: The final section summarized the main messages of the flip chart.

Table Top Food Guide Pyramid

The three-dimensional, stand-alone TableTop Food Guide Pyramid was designed as an additional teaching tool to help explain the concept of the USDA Food Guide Pyramid emphasized throughout the units. The Abuela Educators used it in a variety of ways to support their instruction and test the learning of the participants.

Kitchen Utensil Incentives

One of five plastic kitchen utensil was designated as an incentive for each of the five units. The incentive was used in the learning activity, presented in the flip chart, and given to each participant upon completion of the class. The incentives also served as cues to the messages of that specific unit as the participants used the utensil in their homes.

Food Guide Pyramid Magnet

Finally, a Food Guide Pyramid refrigerator magnet was developed and distributed to all participants. This magnet was designed as a reminder of the Food Guide Pyramid and associated concepts and as an additional incentive for class participation.

Learning Activities

The focus group discussions emphasized that both experiential and behavioral learning activities were desired by the targeted population in order for participants to try out new techniques, learn from each other, and have fun. Accordingly, several learning activities were incorporated into the classes reinforcing the messages taught and providing opportunities for participants to taste new recipe or practice new techniques. The "Make It Healthy" unit included the recipe and directions for preparing a low-fat fruit salad and making "Tuna Boats" (low-fat tuna salad in creative alternatives to sandwiches). All materials and supplies were inexpensive, many of which were a part of the WIC supplemental foods. The "Make It Fun" unit included the recipes and directions for "Fruit Transportation" (fun ways to encourage children to eat more fruit), a non-fat fruit dip, and "Animal Sandwiches" (fun ways to encourage children to eat healthful sandwiches). The "Make A Change" unit included the directions and recipe for a variety of healthful peanut butter cookie variations using WIC supplemental foods. The "Make It Safe" unit provided a hand washing activity designed to teach effective hand washing techniques to both parents and children, making a bleach and water sanitizing solution, and demonstrating the differences between wooden and plastic cutting boards. Finally, the "Make A Plan" unit included an activity teaching how to use the Nutrition Facts food package label, an activity teaching how to determine the best buy from store shelf labels, and an activity teaching how to accurately determine the best buys using in store specials and coupons. For each learning activity, a list of supplies and detailed instructions were provided for the Abuela Educator.

Training of the Abuela Educator

The Abuela Educator participated in two eight-hour training sessions in which they went through the five units, practiced the learning activities, and completed the evaluation surveys. Additionally, they were instructed in the administrative procedures of the program and their responsibilities of recruitment of participants, organizing of logistics for their classes, and acquisition of supplies and materials for each class meeting. Finally, they were trained in cultural sensitivity to increase the understanding and empathy for the participants.

Evaluation Design

There were three areas of evaluation involved in this project: 1) an evaluation of the effect of the Abuela Educator training program, 2) an evaluation of the nutrition education program delivered to the class participants, and 3) an evaluation of the class participants' movement through the stages of change. The evaluation of the Abuela Educator training program was conducted separately. [9] The evaluation results of the participants change in knowledge, skills, and behavior and movement through the stages of change are also discussed elsewhere. [8]

Discussion

The evaluation results suggested that this program was effective in increasing selected nutrition knowledge and skills of the participants when measured immediately after the conclusion of the program. Retention of knowledge and skills was demonstrated by the participants when measured in a six-month follow-up survey. Additionally, the six-month follow-up survey suggested that self-reported nutrition related behavior also improved. The surveys of the Abuela Educators suggested that the format used in the program was capable of allowing minimally trained peer educators to convey accurate and consistent information to this population. Several areas for improvement as well as strengths of the program emerged. The success of this program also suggests the importance of asking the target population first what would be well-received and what is needed.

Length of Units: Unit 1- Make It Healthy, which discussed basic nutrition concepts using the Food Guide Pyramid, was by far the longest of the five units. In addition, the Entry Survey used as the pre-test was also administered during this class meeting. It may be of benefit to increase the time suggested for teaching this unit or break the unit into two class meetings for best participant retention and maintenance of interest. The information presented here established a foundation for the remainder of the program and was important to convey in an accurate manner. An alternative to expanding the time scheduled for this unit was suggested by several Abuela Educators. They suggested moving Unit 4 – Make It Safe to the first class meeting. This unit was much shorter and presented food safety information important in the remaining units. Several Abuela

Educators actually tried this unit order and reported that it worked well. Since the *Resource Guide* corresponded to the page numbers on the flip chart, rearranging of units was an easy task.

Additional learning activities: Based upon the feedback from both Abuela Educators and class participants, it may be useful to add more learning activities to each of the five units to better illustrate, demonstrate, and practice the messages in the program. Additionally, it may also be helpful to structure the timing of the activities to ensure that the Abuela Educators conduct the activities accurately and that all of the activities are included in their classes. Finally, since each group may be different in terms of size, characteristics, and group dynamics, a variety of options for activities could be valuable. To facilitate the activities, detailed instructions including exact amounts, instructions, etc. should be developed and the Abuela Educators should be trained specifically in this area. The Abuela Educators often wanted to provide full meals for their class participants, which can be very expensive. Detailed instructions including amounts per person may help in alleviating this situation.

Recipe cards: Abuela Educators, and several of the class participants requested recipe cards to help them with preparing dishes and meals in a more healthy way. Though the initial focus group discussions suggested that flyers with nutrition information would not be well received, recipe cards may be a beneficial addition, especially if designed with reminders of the messages in the program. The foods used in the recipes should reflect inexpensive, nutritional foods, especially food used in the WIC program or other supplemental food programs.

Language Use: There are several dialects of Spanish in Colorado. In order to avoid using words in one dialect that are inappropriate in another dialect, two or more different words were used when where appropriate throughout the materials. For example, in one dialect of Spanish, the word *vegetales* is appropriate for "vegetables." In another dialect, the word *verduras* is the best choice and *vegetales* means "houseplants" rather than vegetables. Participants speaking different dialects recognize that other dialects use different words. The use of two or more words increased the target population for which the materials could be used and ensured the accurate messages were conveyed. There did not seem to be any confusion or complaints about this strategy. Many participants and educators expressed their appreciation in the recognition of the differences in languages of Hispanics from different backgrounds.

Use of Script for the Abuela Educators: The use of the script format for the Abuela Educators proved useful in conveying accurate and consistent information. The Abuela Educators expressed the usefulness and stated that they often referred to the background pages for diseases. A beneficial addition to the script format for the Abuela Educator may the addition of codes for use of the various materials, reminders of specific uses of the behavior change theory, and suggestions for conduction of the learning activities.

Training of the Abuela Educator: The training of the Abuela Educator in use of the materials and teaching of the nutrition messages was limited to 16 hours. Training is generally a source of great expense and often time consuming. The positive results of the program evaluation in terms of improvement in knowledge, skills, and behavior suggest that this format for message delivery may lend itself to limited training. The training that does occur should include empathy training for the target population, information on specific resources available in the community, specifics of the behavior change theory, teaching techniques, group dynamic techniques, and discussion of issues relating to problems occurring with including information not stated in the materials. Abuela Educators sometimes wanted to convey their own nutrition information which had varying degrees of accuracy.

In summary, the *La Cocina Saludable* nutrition education program featured several theory based and well-received strategies designed to improve the knowledge, skills, and behaviors of low-income Hispanic mothers of preschool children in southern Colorado. The program provided content which addressed the target population's stated desires for educational materials and nutrition education needs. Additionally, it proved simple for minimally trained peer educators to use, provided flexibility useful in adaptation of materials to a variety of educators and class characteristics, and increased the consistency of information conveyed by the educators.

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Knowledge, Skills, and Behavior Improvements After A Stage of Change Based Nutrition Education Program

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INTRODUCTION

A national prevention strategy for improving the health of the American population is presented in *Healthy People 2000: National Health Promotion and Disease Prevention* Objectives.[1] The goals *of Healthy People 2000* are separated into three areas: 1) increasing the span of healthy life, 2) reducing health disparities, and 3) achieving access to preventative services for all Americans. The objectives designed to meet these goals are divided into 22 priority areas, some of which directly address nutrition behaviors. Priority Area 8 (Educational and Community-Based Programs) recognizes the importance of community-based programs in changing health behaviors. Priority Area 2 (Nutrition) acknowledges the dietary factors which substantially contribute to preventable illness and premature death for Americans. What people eat may be the most significant controllable risk factor affecting long-term health for Americans.[2] According to *Healthy People 2000*, there are five major causes of death associated with dietary factors: coronary heart disease, some types of cancer, stroke, non-insulin-dependent diabetes mellitus, and coronary artery disease.[1] Nutrition behaviors including reducing fat intake; increasing fruit, vegetable, and grain intake; increasing calcium-rich food intake; decreasing the prevalence of overweight; and increasing the number of people practicing sound weight loss practices are emphasized in the nutrition goals.

Colorado has a large Hispanic population representing about 14% of the state's total population. Additionally, there are approximately 21,000 migrant farm laborers who work in agricultural activities throughout the state.[3,4] These individuals are among the poorest in the state, especially when the migrant farm worker families are considered, and pose many obstacles to effective nutrition education programs.[4] These obstacles involve mainly limited financial resources on both the part of the agencies providing the education and on the part of the individuals being served. This population has demonstrated that the challenges of transportation, child care, and free time needed for educational endeavors as well as low education levels, low literacy rates, and limited opportunities to

learn English, if English is the second language, severely restrict the participation in and success of nutrition education endeavors. Translation issues, reading level considerations, and complexity of program content become critical considerations for educators. Community agencies have found these obstacles to be major challenges in providing effective nutrition education programs for this population.

Hispanics, in general, have been shown to have a genetic predisposition to diabetes, gallbladder disease, pterygium, and obesity, which are complicated by poor living and working conditions, food choices and preparation methods, and food safety practices.[5 6 7 8 9] Food choices, particularly for children, have been shown to be less in line with the recommendations of the Food Guide Pyramid than is desirable for healthy lifestyles and prevention of nutrition related diseases and disorders.[10 11 12] The impact on health by these factors may be partially responsible for health problem trends associated with the Hispanic population, particularly in children.[13 14 15 16 17 18]

It has been suggested that nutrition education programs may be more effective if they were guided by sound theory specifically addressing nutrition behavior change.[19] A model for behavior change that shows potential for use in nutrition education programs is the Stage of Change Model.[20] This model attempts to explain not only how people intentionally change their behavior, but also when does change take place, what tools specifically do changers use, and what indicators can be used to predict change success. The model suggests that individuals move through a series of five sequential stages beginning with not being aware of a problem behavior or having no intention of changing the problem to complete and lasting behavior change. These stages include precontemplation, contemplation, preparation, action, and maintenance. The model further suggested that individuals within each stage emphasize specific processes, or psychological tools, which assist them in changing their behavior.[21]

The United States Department of Agriculture/Extension Service (USDA/ES) asked for help in addressing the nutrition needs of individuals who are eligible for the Special Supplemental Food Program for Women, Infants, and Children (WIC). The goal of this nutrition education initiative was to develop, deliver, and evaluate community-based intensive nutrition education projects in order to improve nutrition related behaviors that would lead to healthier lifestyles for the targeted populations.

This project represents a portion of the resulting nutrition education program in response to this initiative.

The primary purpose of this project was to develop a nutrition education program based on the Stage of Change Model. The targeted population was that of low-income Hispanic mothers of preschool children, including migrant farmworker families, in three separate areas of Colorado. The program's objectives and corresponding indicators were established by the USDA/ES initiative. They included improving specified nutrition related knowledge, skills, and behaviors that would lead to nutritionally sound diets and healthy lifestyles.

METHODS

Program Design and Development. A needs assessment utilizing ten separate qualitative focus group discussions was initially conducted in the target areas with groups of both the Hispanic mothers themselves as well as professionals and paraprofessionals who work with the mothers in nutrition and health related areas. The results of the focus group results suggested elements of material development and program implementation which were important to the population. These results are discussed in detail elsewhere.[22] The nutrition education program, *La Cocina Saludable – The Healthy Kitchen* was developed and implemented accordingly. Hispanic grandmothers (abuelas) were used as peer educators to deliver a five section nutrition education program to teach fundamental nutrition messages with the goal of improving knowledge, skills, and behaviors which lead to healthy lifestyles for mothers and their preschool children.

Program Materials. All materials, the content, and the implementation plan were then developed based on the focus group results and on the Stage of Change Model. Materials included 1) a free standing, color photograph, bilingual flip chart; 2) a corresponding bilingual *La Cocina Saludable Resource Guide;* 3) a 3-dimensional free standing bilingual Food Guide Pyramid; and, 4) coordinating plastic kitchen utensils used as incentives. The *Resource Guide* was written in both English and Spanish and included scripted teaching pages corresponding to text background pages. This guide was designed to provide the abuela educators, who were minimally trained in nutrition and teaching, with a resource for the nutrition information as well as a script to follow while they taught the classes, thus improving the consistency and accuracy of information presented to participants. The materials focused on five

units. "Make It Healthy" discussed basic nutrition knowledge including use of the Food Guide Pyramid. "Make It Fun" provided tips on making food fun to encourage preschool children to eat healthful foods. "Make A Change" explained techniques for lowering fat, lowering salt, lowering sugar, and increasing fiber in diets. "Make It Safe" discussed food safety techniques, including cleanliness, the safe cooking of foods, and food storage. "Make A Plan" provided tips on making food resources last longer and choosing healthful foods. Each of the five units included an experiential and behavioral learning activity designed to reinforce the messages presented in the unit and to use the specific kitchen utensil designated for that unit. The kitchen utensil was then given to the participants as a type of reward for participation and incentive to return to the next class meeting in an attempt to increase class retention. A detailed description of the program materials can be found elsewhere.[23]

Program Format. The classes were taught by abuela (Hispanic grandmother) educators. Each abuela educator was empowered to determine (within guidelines) the length of the classes, the time and location of the classes, and the solution to any logistical obstacle such as childcare, transportation, facility, etc. The abuela educators were trained in a 16-hour training program covering the nutrition messages, use of the materials, and program administration policies and procedures.

Evaluation Design and Instruments. The change in knowledge/skills and self reported behavior of the participants was evaluated using a repeated measures design with two groups and three time periods. Because the groups were of different sample sizes, a sequence of t-tests for the repeated measure analysis was used. In order to determine if the change in knowledge/skills and self reported behavior of the participants was different that of the control group at the completion of the nutrition education classes, t-tests were used. In order to determine if the change in knowledge/skills and behavior of the participants was different over the three time periods (before and after the classes, and at six months following the class completion), a sequence of t-tests was used. For the knowledge/skills portion, the survey was scored using the percent of total questions answered correctly. The response variables for the paired t-tests included the total knowledge/skills score, and the subcategories related to the objectives of the program as established by the USDA. These subcategories were 1) knowledge of nutrition and dietary needs of preschool children, 2) ability to plan nutritionally balanced meals/menus, 3) ability to interpret food labels, select, buy, and/or prepare appropriate foods to meet the nutritional

needs of their families, and 4) ability to handle food safely to prevent foodborne illness, and 5) ability to manage food budgets and related resources from food assistance programs. The behavior portion was scored by assigning one to five points to the Likert scale rating system with one being the most negative statement and five being the most positive statement. The score was determined using the percent achieved by the participants of the best score possible. Response variables for the behavior portion included the total nutrition behavior score and the subcategories of 1) food selection and preparation for children, 2) safe food handling, 3) food selection and purchasing, and 4) stretching the food budget. The knowledge/skills and behavior questions were combined into one survey. The survey was administered in person to the participants at the beginning of the classes (ENTRY), and immediately after the classes were completed (EXIT). It was then sent to the participants via mail with instructions for completion six months after the end of the classes (FOLLOW-UP). The participants were asked to complete the survey and return it in the mail. Participants returning the completed survey were sent five dollars. It is important to note that the participants completed the FOLLOW-UP survey without the assistance. Potentially, someone other than the participant could have completed the survey or the participant could have found the information from another source. The survey instrument was tested for reliability using a test-retest design. The correlation coefficient of 0.83 was found and accepted as reliable.

RESULTS

Demographic characteristics are outlined in Table 1. The FOLLOW UP Surveys had a 24 % return rate (n=81). Many individuals had moved and their survey was returned in the mail. Others did not respond. This return rate was expected when the high mobility of the population and the extreme dislike for taking tests was taken into consideration. The results are shown in Table 2 and Table 3. Table 4 shows the change in total test scores for the six-month FOLLOW-UP compared with the ENTRY and EXIT survey scores. Table 4 and Table 5 illustrate these results for the Knowledge/Skills Scores and Behavior scores, respectively. The FOLLOW UP scores were not compared to a control group.

Table 1 Demographic Characteristics of Participants

Characteristic	Percentage of Participants
Female	98
Hispanic	98
Age	
Under 20 years	6
20-30 years	40
31-40 years	32
41-50 years	15
51-60 years	0
Over 60	8
Education	
Elementary	26
High School Diploma	35
Some College Credit	29
Bachelor's Degree or above	4
Other	7
Income	
<$10,000/year	60
$10,001 - $20,000/year	22
$20,001 - #30,000/year	14
>#30,000/year	5
Speak Spanish Fluently	46

Table 2 Comparison of ENTRY and EXIT Mean Knowledge and Skills Scores of the Program Participants and the Control Group (% Score ± SD)

	ENTRY SCORES	EXIT SCORES	CHANGE
Total Knowledge/Skills Scores			
Control ± SD (N=52)	25.71 ^{aA} ± 14.97	26.98 ^{aA} ± 22.94	*
Program ± SD (n=337)	32.98 ^{aB} ± 28.53	80.78 ^{bB} ± 25.44	
Food Safety Indicator			
Control ± SD (N=52)	56.90 ^{aA} ±13.97	58.69 ^{aA} ±18.35	p=0.242
Program ± SD (n=337)	56.20 ^{aA} ±15.26	61.19 ^{bB} ±12.31	
Resource Management Indicator			
Control ± SD (N=52)	66.19 ^{aA} ±30.48	71.90 ^{aA} ±21.09	p=0.055
Program ± SD (n=337)	66.27 ^{aA} ±20.81	77.98 ^{bB}±17.39	
Nutrition Knowledge Indicator			
Control ± SD (N=52)	58.17 ^{aA} ± 16.56	54.44 ^{aA} ± 17.34	*
Program ± SD (n=337)	53.12 ^{aA} ± 17.82	65.92 ^{bB} ± 18.83	
Balanced Meals Indicator			
Control ± SD (N=52)	10.31 ^{aA} ± 14.70	14.20 ^{aA} ± 28.24	*
Program ± SD (n=337)	24.68 ^{aA} ±33.88	86.20 ^{bB} ± 23.37	
Food Labels & Shopping Indicator			
Control ± SD (N=52)	56.73 ^{aA} ± 17.60	43.71 ^{bA} ± 5.15	*
Program ± SD (n=337)	57.64 ^{aA} ± 17.76	72.17 ^{bB} ± 17.07	

Same lower case letter represents no significant difference in mean ENTRY and EXIT scores within each row.
Same upper case letter represents no significant difference in mean ENTRY and EXIT scores within each column.
* = change from ENTRY and EXIT scores of participants is significantly different than change in ENTRY and EXIT scores of control ($p<.05$)

Table 3 Comparison of the ENTRY and EXIT Mean Behavior Scores of the Program Participants and the Control Group (% Score ± SD)

	ENTRY	EXIT	CHANGE
Total Behavior Score			
Control ± SD (N=52)	63.33 ^{aA} ± 8.82	66.19 ^{aA} ± 13.91	p=0.606
Program ± SD (n=337)	53.09 ^{aB} ± 21.60	57.19 ^{bB} ± 20.98	
Food Selection & Preparation Indicator			
Control ± SD (N=52)	70.10 ^{aA} ± 12.19	70.57 ^{aA} ± 16.64	*
Program ± SD (n=337)	63.86 ^{aB} ± 15.41	70.39 ^{bA} ± 13.15	
Food Safety Indicator			
Control ± SD (N=52)	55.24 ^{aA} ± 14.59	60.79 ^{aA} ± 22.24	*
Program ± SD (n=337)	50.41 ^{aA} ± 16.03	50.43 ^{aB}± 14.24	
Food Resources Indicator			
Control ± SD (N=52)	55.24 ^{aA} ± 26.80	54.76 ^{aA} ± 31.56	p=0.766
Program ± SD (n=337)	45.40 ^{aB}± 25.55	43.86 ^{aA} ± 23.46	
Stretching Food Budget Indicator			
Control ± SD (N=52)	72.54 ^{aA} ± 17.18	71.90 ^{aA} ± 20.27	P=0.070
Program ± SD (n=337)	64.37 ^{aB} ± 17.23	68.11 ^{aA} ± 15.22	

Same lower case letter represents no significant difference in mean ENTRY and EXIT scores within each row.
Same upper case letter represents no significant difference in mean ENTRY and EXIT scores within each column.
* = change in ENTRY and EXIT mean scores of participants is significantly different than change in ENTRY and EXIT scores of control ($p<.05$)

Table 4 Change in Knowledge and Skills Mean ENTRY, EXIT, & FOLLOW-UP Scores for Program Participants (% Score ± SD)

	ENTRY	EXIT	P1	FOLLOW-UP	P2	P3
Total Knowledge/ Skill Score (n=80)	39.72 ± 25.92	86.74±20.51	<0.001	82.36±22.20	<0.083	<0.001
Nutrition Knowledge Indicator (n=80)	53.00 ± 17.04	66.50 ± 18.76	<0.001	67.35 ± 15.82	0.712	<0.001
Balanced Meals Indicator (n=80)	27.71 ± 33.67	89.06 ± 24.79	<0.001	83.96 ± 30.55	0.111	<0.001
Food Labels & Shopping Indicator (n=80)	57.61 ± 18.44	72.68 ± 17.79	<0.001	73.46 ± 14.66	0.713	<0.001
Food Safety Indicator (n=80)	55.31 ± 15.98	59.75 ± 11.25	0.005	86.63 ± 14.79	<0.001	<0.001
Resource Management Indicator (n=80)	67.81 ± 19.96	77.88 ± 17.19	<0.001	79.38 ± 16.04	0.511	<0.001

P1 = significance of difference between ENTRY and EXIT; P2 = significance between EXIT and FOLLOW UP; P3 = significance of difference between ENTRY and FOLLOW UP; significances were tested with paired t-tests.

Table 5 Change in Behavior Subcategory Mean ENTRY, EXIT & FOLLOW-UP Scores for Program Participants (% Score ± SD)

	ENTRY	EXIT	P1	FOLLOW	P2	P3
Total Behavior Scores (n=80)	56.57 ± 11.38	59.68±10.57	0.002	76.63±11.41	<0.001	<0.001
Food Selection & Preparation Indicator (n=80)	63.15 ± 13.68	73.85 ± 11.70	<0.001	73.85 ± 11.70	<0.001	<0.001
Food Safety Indicator (n=80)	49.17 ± 16.10	50.43 ± 14.24	0.983	83.83 ± 18.12	<0.001	<0.001
Food Resources Indicator (n=80)	46.00 ± 25.14	42.81 ± 22.41	0.200	72.75 ± 26.48	<0.001	<0.001
Stretching Food Budget Indicator (n=80)	63.33 ± 14.58	69.79 ± 10.45	<0.001	80.08 ± 13.81	<0.001	<0.001

P1 = significance of difference between ENTRY and EXIT; P2 = significance between EXIT and FOLLOW UP; P3 = significance of difference between ENTRY and FOLLOW UP; significances were tested with paired t-tests.

DISCUSSION

The results suggest that the five class units led to significant gains in knowledge and skills and retention of this knowledge at six months. When ENTRY scores were compared to the EXIT scores for both the total survey and the knowledge/skills indicators, the program participants improved their survey scores after attending the program compared to the control. This trend occurred in all subcategories with the exception of food safety. A different trend occurred when comparing the ENTRY and EXIT survey scores for self-reported behavior and the behavior subcategories. There was little significant change immediately after the program for either the program participants or the control group. This small improvement in behavior scores may reflect the difficulty in demonstrating nutrition-related changes in a short time frame (two to five weeks) of a nutrition education program. Time is required to assimilate the information, put the information into practice, and succeed enough to report positively on a survey. This time requirement is consistent with the Stage of Change Model suggesting that individuals may be moving through the stages of change toward action or maintenance.

Self-reported behavior change also improved at six months following the classes. The FOLLOW-UP scores were significantly higher than both the ENTRY and the EXIT scores suggesting that given the six months time period, behavior did change. It is recognized that the self-reported behavior improvements reflected the improvement in knowledge and skills as much as, if not more than, improvement in behavior itself. Since actual measurement of nutrition behavior was not made at

six months, the results included only what the participants reported. An increase in knowledge and skills means that the participants knew what they were supposed to say in response to the behavior questions. There is much evidence for the "yes-saying" tendencies in many ethnic groups, including Hispanics. [24] [25] It has been suggested that this tendency comes from a desire to show respect to people perceived as being in positions of authority. Included in this concept is the desire to show that the participant is behaving in the way they know the perceived authority wants them to behave. Solutions to this obstacle may be in constructing an evaluation instrument that disguises the intent of the question or actually observing of behavior. Both solutions have inherent disadvantages. It may be, however, that the increase in knowledge and skills, as reflected by improved total scores, can still be considered program success. According to the Stage of Change model, knowledge and skill acquisition is important in movement to higher stages of change.

The results of this study cannot necessarily be generalized because the class participants were not randomly chosen and may not have been representative of the Hispanics in the community or Hispanic populations in other areas. However, the participants represent those likely to volunteer for a nutrition education program sponsored in the community and reflect the problems presented to agencies striving to meet nutrition education needs in similar communities. It has been suggested that individuals who volunteer often have at least some of the desired attitudes and behaviors being encouraged in the program and potentially a desire to improve nutrition behaviors. [26] [27] According to the Stage of Change Model, these individuals fall into higher stages of change and are aware of nutrition behavior problems and ready for change. By using Abuela Educators as the recruiters for the nutrition classes, this study attempted to recruit individuals who were in the lower stages of change in addition to the higher staged individuals. Many of these individuals reported that they enrolled in the classes only because their friend, the abuela educator, asked them to join the group. These participants may not have been aware of nutrition behavior problems or not ready for change, yet they were exposed to processes of change in the classes that may have moved them toward change readiness. The latter proactive recruitment strategy may be desirable for nutrition education programs. If programs only direct their recruitment toward those individuals ready for change, a large part of the population is missed.

Evaluation is a necessary, but apparently unpopular part of many educational programs. This discontent with evaluation instruments has been found to be a problem elsewhere [26,28,29] and may potentially result in inaccurate evaluation or participant attrition. One way to partially overcome this problem may be to revise the evaluation process itself. Suggestions from participants in this study included "discussing" what they had learned rather than taking a test on it, playing games to demonstrate what they had learned, or taking a "practical" cooking or meal preparation test. Many participants stated that they loved the classes, but hated the tests at the beginning and end. Their past educational experiences created a negative connotation for anything resembling a test. This problem also has limited the follow-up response significantly.

CONCLUSIONS

The results of this study suggest that use of a nutrition education program based on the Stage of change Model and using abuelas as peer educators is effective in improving selected nutrition related knowledge, skills, and self reported behaviors. Consideration for this population include evaluating the program in a non-threatening way, recognizing the "yes-saying" tendencies observed in some groups, and ensuring that evaluators are not only non-threatening to the target population, but are trained to effectively gain accurate information.

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