

2006

Efficacy of nutrition education lessons targeting a group of low-income elderly

Gabriela M. Viteri

Louisiana State University and Agricultural and Mechanical College, gviter1@lsu.edu

Follow this and additional works at: https://digitalcommons.lsu.edu/gradschool_theses



Part of the [Human Ecology Commons](#)

Recommended Citation

Viteri, Gabriela M., "Efficacy of nutrition education lessons targeting a group of low-income elderly" (2006). *LSU Master's Theses*. 3461.

https://digitalcommons.lsu.edu/gradschool_theses/3461

This Thesis is brought to you for free and open access by the Graduate School at LSU Digital Commons. It has been accepted for inclusion in LSU Master's Theses by an authorized graduate school editor of LSU Digital Commons. For more information, please contact gradetd@lsu.edu.

EFFICACY OF NUTRITION EDUCATION CLASSES TARGETING A GROUP OF LOW-
INCOME ELDERLY

A thesis
Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Master of Science

in

The School of Human Ecology

By
Gabriela Viteri
B.S, Louisiana State University, 2004
August, 2006

ACKNOWLEDGEMENTS

I would like to thank my committee director, Dr. Carol E. O'Neil for her constant guidance during the course of this study. Without her assistance and support I wouldn't have been able to complete this project. Being her student in several classes has also benefited my academic career. I truly appreciate her help. I would also like to thank my committee members, Dr. Michael J. Keenan, and Dean Pamela A. Monroe for their valuable input to this project. Thank you all very much.

I would like to thank my family for their continuing support and patience throughout my career away from home. Special thanks to Daniel P. Breaux for his help and for being there for me throughout the way. Also I would like to appreciate my gratitude to Maria Sagot for her encouragement and help when I mostly needed it and for being so generous and a good friend to me. This process turned into a much more pleasant experience because I was blessed to count with such great friends. I will miss you.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	ii
LIST OF TABLES.....	v
LIST OF FIGURES.....	vi
ABSTRACT	vii
CHAPTER	
1 INTRODUCTION.....	1
Introduction.....	1
Objectives.....	2
Hypotheses.....	3
Assumptions.....	3
Limitations.....	3
Justification.....	4
2 REVIEW OF LITERATURE.....	5
Nutrition and the Elderly	5
Poor Food Choice Intakes of Low Income Elderly.....	8
Food Insecurity and the Elderly.....	10
Nutrition Education Targeted to the Elderly.....	13
Nutrition Education Tools.....	16
Written Nutrition Education Materials.....	16
Use of Pre-Post Evaluation.....	17
Nutrition Education Topics Included in our Study.....	18
Lesson 1: MyPyramid and DGA.....	18
Lesson 2: Food Labels.....	19
Lesson 3: Nutrition and Aging.....	21
Lesson 4: Food Safety.....	21
Theoretical Model: Social Cognitive Theory.....	23
Telephone Interviewing.....	25
3 SUBJECTS AND METHODS.....	27
Institutional Review Board Approval.....	27
Overall Study Design.....	27
Subjects.....	27
Data Collection.....	28
Nutrition Intervention Program.....	28
Pre-Post Testing Lesson Scores.....	30
Nutrition Education Lesson Using the SCT.....	32
Data Analysis.....	32

4 RESULTS.....	37
5 DISCUSSION.....	47
Discussion.....	47
Summary and Conclusions.....	63
Future Directions.....	64
LITERATURE CITED.....	66
APPENDIX A: IRB PERMIT/INFORMED CONSENT.....	79
APPENDIX B: USDA FOOD SECURITY MODULE (MODIFIED).....	81
APPENDIX C: MYPYRAMID AND THE DGA.....	85
APPENDIX D: FOOD LABELS.....	96
APPENDIX E: NUTRITION AND AGING.....	106
APPENDIX F: FOOD SAFETY.....	115
VITA.....	125

LIST OF TABLES

1: Overall study of “Increasing physical activity and healthy diet behavior among low income seniors” by their contribution to the study.....	27
2: Topics and dates for nutrition classes held at LBC and CPA.....	29
3: Pre-and-post information type on basis of lesson name, number of questions asked, score for each question, and maximum possible test score.....	30
4: Statistical test used, and variables analyzed for data analysis.....	36
5: Study demographics: number of class attendees on basis of age, race, gender, weight, food security status, food stamp participation, and number of classes attended. AA= African American, C= Caucasian, F=female, M=male, kg=kilograms, FS= food secure, FIS=food insecure, and N/A=available.....	38
6: Participants attending 1,2,3 or 4 classes by location.....	39
7: LBC participants’ mean score±SD results for pre-and post-testing for all individual nutrition lessons.....	39
8: CPA participants’ mean score ±SD results for pre-and post-testing for all nutrition lessons.....	40
9: LBC participants’ responses to “Were you able to make any changes we discussed, if so, what were they?.....	44
10: CPA participants’ responses to “Were you able to make any changes, if so, what were they?.....	46

LIST OF FIGURES

1: Social Cognitive Theory constructs including behavior, and personal and environmental factors.....	23
2: Data collection including interviewing tools and process, and the nutrition intervention program.....	31
3: Theoretical framework: SCT for the development of the nutrition intervention program for LBC and CPA participants.....	33
4: SCT constructs used in relation to the lesson (s).....	34
5: Pre-and post-intervention responses for self-perceived eating habits on basis of poor-fair, or good-excellent answers for the entire population.....	40
6: Pre-and post-intervention responses for self-perceived nutritional quality of the diet on basis of poor-fair, or good-excellent answers for the entire population.....	41
7: Pre-and post-intervention responses for self-perceived nutrition knowledge basis of poor-fair, or good-excellent answers for the entire population.....	42

ABSTRACT

Nutrition education has the potential not only to increase nutrition knowledge and, potentially, healthy behaviors, among the elderly, but also to reduce the need for health and social services. The nutrition component described herein is part of an overall wellness program that focuses on increasing physical activity and healthy dietary behaviors among participants. We completed a four month nutrition intervention in a group of 33 low income elderly at the Leo Butler Center (LBC) (n=20) and Catholic Presbyterian Apartments (CPA) (n=13) in the fall of 2005 in Baton Rouge, LA. The Social Cognitive Theory (SCT) was used as the theoretical framework. Topics included in the intervention were MyPyramid and Dietary Guidelines for Americans, Food Labels, Nutrition and Aging, and Food Safety. Pre-post testing was used before and after each class to determine changes in knowledge. Food Security status and self-perceived eating habits, nutritional quality of the diet, and nutrition knowledge (pre-and post intervention) were also assessed.

The majority of study participants were female (88%), African American (70%), and food secure (78%). Mean age was 66.60 ± 10.93 years; mean weight was 86.36 ± 21.9 kilos; and the mean number of classes attended was 1.88 ± 0.86 . For LBC participants, significant increases in knowledge ($p < 0.001$) were shown for all lessons. For CPA participants, significant increases in knowledge were shown for all lessons with the exception of the Food Labels lesson ($p = 0.02$, $p = 0.01$, $p < 0.001$ for MyPyramid and DGA lesson, Nutrition and Aging lesson, and the Food Safety lesson respectively). Significant differences were shown for self-perceived nutritional quality of the diet ($p = 0.01$) and nutrition knowledge ($p = 0.02$) for pre-post intervention results; however, no differences were shown for self-perceived eating habits.

Two months after the intervention was completed, a follow up question to determine if there were any dietary changes was included. Respondents reported dietary changes, especially for increases in fruits and vegetables and use of food labels. Therefore, nutrition education in the elderly, especially on MyPyramid and DGA, and Food labels is recommended.

CHAPTER 1

INTRODUCTION

Introduction

In the United States (US), elderly Americans have increased in number and proportion. The population aged 65 years and older was 12% of the population, and is expected to rise to 20% by 2050 (1).

Good nutrition is one of the main determinants of successful aging. Successful aging can be defined as the ability to maintain a “low risk of disease and disease-related disability, high mental and physical function, and active engagement of life” (2). Diet can influence the incidence and severity of disease (3-4) and poor nutrition can accelerate loss of independence (4). There is also a relationship between nutritional well-being and an older adult’s ability to perform activities of daily living (ADL) (5). The elderly tend to change their diets in response to functional disabilities, which may lead to consumption of a monotonous diet and inadequate nutrient intake (6). Sensory changes including a diminished sense of taste and smell, dysphagia, and poorly fitting dentures can all affect the nutritional quality of the diet (7-8).

Studies with the Expanded Food and Nutrition Education Program (EFNEP) have shown that nutrition education helped low-income individuals improve food shopping, meal planning and preparation, and food safety practices (9-11). Nutrition education has the potential to benefit health and to reduce the need for health and social services (12-13). For the elderly, income affects both the quality and quantity of food purchased, especially because much of this population must allocate a significant part of their budget to medications and health care (4).

A low income individual is defined as one having an income of not more than 130% of the federal poverty level. Low income groups in general, are more likely to consume unhealthy diets and develop chronic diseases at an earlier age, compared to higher-income groups (14-18)

This thesis describes a 4-month nutrition intervention pilot program given to a group of low income elderly at Leo Butler Center (LBC) and Catholic Presbyterian Apartments (CPA) located in Baton Rouge, Louisiana. The nutrition component described herein is part of an overall wellness program that focuses on increasing physical activity and healthy dietary behaviors among participants. Four nutrition lessons were given: MyPyramid and Dietary Guidelines for Americans (DGA), Food Labels, Nutrition and Aging, and Food Safety. The purpose of this study was to determine if this intervention program resulted in increased knowledge of nutrition and increased self-perceived ratings for eating habits, nutritional quality of diet, nutrition knowledge and dietary change by the target population.

Objectives

Objectives of this study were to: 1) determine the food security status of the study participants using a modified version of the United States Department of Agriculture (USDA) short form; 2) implement a 4 month nutrition intervention program that included information on MyPyramid and the DGA, Food Labels, Nutrition and Aging, and Food Safety, 3) assess the participants' change in knowledge by using pre-and post-tests before and after each nutrition lesson; 4) assess the participants' self-reported; eating habits, nutritional quality of diet, and nutrition knowledge before and after the intervention, and 5) assess participants reported dietary changes as a result of the intervention.

Hypotheses

Ho1: Nutrition education classes given to study participants do not increase knowledge of:

- A) MyPyramid and DGA
- B) Food labels
- C) Nutrition and Aging
- D) Food safety

Ho2: For those participants attending at least one class, there is no difference in self-perceived nutritional quality of diet, knowledge of nutrition, and eating habits among participants from LBC and CPA.

Ho3: There are no reported dietary changes during the follow-up for those participants attending at least one class.

Assumptions

Assumptions made in this study were:

- 1) The sample size used in the study was adequate.
- 2) The modified version of the USDA short form was a valid instrument for measuring food security among the participants.
- 3) Participants were honest in their responses.

Limitations

Limitations in this study include:

- 1) A non-probability sample was used.
- 2) Not all participants were able to attend all classes.
- 3) Participants received monetary incentives, regardless of their nutrition classes' attendance, and this may have affected adversely attendance.

- 4) Interviewers were not indigenous to the population sampled and this may have biased the participants' responses.
- 5) Responses for post-testing might have been biased by pre-testing questions and group dynamics.
- 6) Variation in times for follow up telephone interviews might have biased participants' responses.

Justification

Our study was important because it included an intervention that emphasized healthy aging by increasing healthy eating behaviors in a group of low income elderly, a nutritionally vulnerable population. Nutrition is one of the main factors influencing successful aging. Nutrition education lessons were given to a group of low income elderly with the purpose of increasing their nutrition knowledge and ultimately changing behavior. Topics that were covered in each lesson were all relevant to this population. This pilot study will form the basis for planning additional interventions in this population.

CHAPTER 2

REVIEW OF LITERATURE

Nutrition and the Elderly

Nutrition is one of the main determinants of successful aging, defined as the ability to maintain a “low risk of disease and disease-related disability, high mental and physical function, and active engagement of life” (2). Given the physiologic, psychologic, and societal changes associated with aging, older adults face unique nutritional needs and risks (19). For the elderly, unhealthy behaviors can influence the incidence and severity of disease (3-4) and accelerate loss of independence (4). As a primary prevention strategy for chronic disease, good nutrition helps promote health and functionality. As secondary and tertiary prevention, medical nutrition therapy (MNT) is an effective disease management therapy. Good nutrition diminishes chronic disease risk, delays disease progression, and reduces symptoms of disease (2).

The geriatric syndrome, defined as a combination of physical, mental, and functional impairments such as frailty, muscle and bone loss, loss of appetite, depression, and cognitive deficits can lead to deterioration in quality of life (QOL) (20). According to data from the Centers for Disease Control and Prevention (CDC) in 2002, three million elderly could not perform ADL such as bathing, shopping, dressing, and eating (21); as a result, their QOL was adversely affected. In 2000, 34.7% of all individuals aged 65 and older had limited activity caused by a chronic condition; the percentage rose with increased age. More African American (AA) elderly experienced limited ADL and instrumental activities of daily living (IADL) compared to Caucasian, Asian or Hispanic elderly (22). Strategies to improve elderly health and QOL include adopting healthy lifestyles such as exercising and healthy eating (21).

A prevalent problem that can affect nutritional status or intake in the elderly is the presence of chronic diseases (23-25). Approximately 80% of the elderly have at least one chronic disease, and 50% have at least two (21). In a sample of 53 low income urban elderly, most participants had at least one chronic disease such as obesity, diabetes, heart disease, or arthritis and almost one-fourth had some limited mobility (26). Dietary patterns and lifestyle practices are associated with mortality from the majority of the top leading causes of death for those 65 years of age and older: heart disease, cancer (1-2), cerebrovascular disease, diabetes mellitus, and influenza and pneumonia (2). Further, nutrition-related diseases, such as heart disease and cancer, have been the two leading causes of death in the elderly for the past two decades. Chronic health conditions may affect the diet and nutritional requirements of the elderly and are a significant health and financial burden to those affected as well as to their families, and society (1). These diseases may lead to food insecurity or hunger or worsen food insecurity, since they can interfere with the ability of the elderly to shop and prepare food (27, 28).

Poor food intake is common among the elderly and a key risk factor for malnutrition (29). Factors that contribute to poor food intake include physiologic changes such as a slower gastric emptying, altered hormonal responses, and decreased basal metabolic rate (20). Poor food intake in the elderly has been associated with a decreased intake of energy (18, 34), protein (6, 18), carbohydrates (18), calcium (3, 6), vitamins B (6, 7, 18) C (3, 6), D (7), and E (7, 20), magnesium (18), iron, zinc (3, 6, 18); this can lead to nutrient deficiencies. Nutrient deficiencies in turn, may make the elderly more susceptible to infections (30). Dietary deficiencies of niacin, vitamin B12, iron, zinc, and possibly vitamin A can cause sensory losses in the elderly (31), which can exacerbate poor food intake (20). Insufficient food intake may also affect the

functional decline in organ systems and the incidence of chronic illness increasing hospitalizations (32). Malnourished elderly patients, common in those hospitalized with medical illnesses, have greater mortality, delayed functional recovery and higher rates of nursing home use, compared to those well-nourished (5).

Functional disabilities may also alter nutritional status and intake in the elderly. Disability is often measured by limitations in performing ADL such as self-feeding or IADL such as meal preparation (2), and results when illness, chronic disease, or injury limits functioning (1). The elderly often adapt their diets in response to physical disabilities leading to consumption of monotonous foods and an inadequate diet (6). A sample of elderly (n=1,155) with three or more nutrition-related problems e.g. chewing, self-feeding, shopping for basic necessities, carrying a shopping bag, cooking a warm meal, or using fingers to grasp or handle food had inadequate energy and vitamin C intake (6). The latter was associated with a low intake of fruits and vegetables (17, 33), which in turn increases the risk of chronic disease.

Elderly with functional disabilities, even if they have enough food and social support are at a higher risk for food insecurity compared to those without them (16, 28, 34). This is because the elderly may be unable to prepare food because of the disability, or social support may not always be constant or reliable (16). Social support can be informal, for example from family and friends, or more formal, for example at congregate meal sites (16, 34). Even readily available family and friends cannot always help, resulting, at times, in hunger or food insecurity (34). Social support is important in encouraging the elderly to eat; they may not eat if they are tired, lonely, or depressed (16, 35).

Dental problems are common among the elderly and they can have a major impact on QOL (36). Absent or poor dentition may affect adequate chewing (7) especially of solid foods

(37). Dental problems are associated with a poor consumption of common nutrient dense foods like whole grains, fruits, and vegetables (25). In a sample of 110 elderly individuals, 30.3% had tooth or mouth problems that made it difficult to eat (38). In that study (38) 24- hour recalls also showed that 34.3% of respondents consumed no fruit the day before the interview, and 41.2% had consumed no non-starchy vegetables (38). Data collected from 4,820 participants in the Third National Health Nutrition Examination Survey (NHANES) aged 50 years and older, showed that dietary quality and intake of certain foods like fruits and vegetables, was poorer among the group with self-perceived ill-fitting dentures compared to those wearing adequate dentition. The group with self-perceived ill-fitting dentures had significantly lower Healthy Eating Index (HEI) scores. Vitamin C and carotenoid intakes were also lower compared to those with natural teeth (36). Due to dental problems, the elderly may have to change their diets or substitute foods that are easy to chew. For instance, when comparing food choices of older and younger individuals, consumption of easy to chew foods such as soups, were significantly higher in the group of older individuals (6).

A decline in taste and smell is common by age 60, and these senses continue to decline with increasing age. As a result, being able to distinguish between and among varying intensities of certain tastes, such as salty diminishes (8, 31), making food less appealing (7). Disease (31), dental problems (25), nutrient deficiencies (31), and medications for chronic diseases (7, 8, 31) can contribute to impaired taste and smell among the elderly.

Poor Food Choice Intakes of Low Income Elderly

A low income individual is defined as one having an income of below 130% of the federal poverty line. Low income elderly are primarily individuals who are nonwhite, live in the

South (15, 27), are functionally impaired (27), socially isolated (27) or live in rural areas (15, 27).

Income is the single most important non-biological factor that influences health and nutrition in the elderly. It affects food choices, eating habits, and nutritional status. High income provides the ability to purchase adequate food and other basic needs, thus there is a greater ability to make more choices and feel more in control over decisions compared to low income (19). Low-income groups are more likely to consume unhealthy diets (14, 19, 27) in part because of the expense of foods (19). Consuming unhealthy diets leads to developing chronic disease and low income groups develop them at an earlier age compared with higher-income counterparts (14, 15, 27).

Low income elderly have a tendency to include few servings of fruit in their diet, have low energy intake, and low intake of vitamins C and B (15, 39). They are also less likely to eat breakfast (15, 39) more likely to skip lunch or dinner and include fewer snacks compared to high-income counterparts (15). Consumption of fruits and vegetables was lower among all low-income groups when compared to others (15, 28, 40-43). Cost was the number one reported barrier to fruit and vegetable consumption by AA women (including a group of elderly). Other barriers included unavailability of produce, time and effort needed to prepare the foods, and preferences for other kinds of foods (41).

The quality of diets from 2,573 noninstitutionalized elderly examined in the 1999-2000 NHANES was analyzed using the HEI. Results indicated that most elderly Americans have a “poor diet” or one that “needs improvement.” The mean HEI score for people 65-75 years was 67.6 out of 100 (diet needs improvement). Approximately 20% of the elderly had “good diets”,

and 14% had “poor diets”. The HEI was significantly lower for those elderly who were poor compared to those who were not (44).

Data collected by NHANES III 1988-1994 and a state representative sample from the Nutrition Survey of the Elderly in New York State 1994, included a group of 5,035 elderly for nutrient intake analysis, 4,386 for skinfold thickness, and 6,586 for self-reported health status. For participants who were food insufficient, nutrient intake analysis showed that those who were food insufficient had lower mean intakes of 19 nutrients compared to those who were not. However, statistically significant differences were found only for energy, protein, calcium, iron, zinc, vitamins B6 and B12, riboflavin, and niacin. Energy and calcium were of great concern in this population, since food-insufficient elderly were meeting only about two thirds of recommended dietary allowances (RDA) for these dietary elements (18).

Limited income might not be the only reason the elderly have in meeting dietary recommendations. Low-income elderly are less educated and more likely to live alone when compared to other elderly. These are all factors associated with a lower quality of diet (45).

Food Insecurity and the Elderly

Food security for a household is defined as having assured access to enough food for an active, healthy life at all times (15). Food security includes, at least, “the ready availability of nutritionally adequate and safe foods” and “an assured ability to acquire acceptable foods in socially acceptable ways” (26, 46). The term ‘socially acceptable ways’ refers to using conventional food sources (grocery stores, restaurants, and government assistance programs), without resorting to unconventional means like scavenging, stealing, or other coping strategies (46). Food insecurity is defined as “limited or uncertain availability of nutritionally adequate

and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways” (46).

Data collected in 2002 by the US Census Bureau for the USDA, showed that 7.1% of elderly living alone experienced food insecurity in the US (47). Data from the subsequent year showed that 6.0% of households consisting of only elderly experienced food insecurity because of lack of resources; 1.7% of elderly households experienced the most severe form of food insecurity with hunger, with the highest prevalence of those food-insecure elderly with hunger seen in the South (48).

Food insecurity in Hispanic and AA elderly individuals is more prevalent compared to non-Hispanic Caucasian elderly. Prevalence of food insecurity for the elderly are: 18.9% for AA, 15.4% for Hispanics, and 3.7% for non-Hispanic Caucasian individuals (27, 47). When compared with other age groups these numbers suggest that the elderly are less food insecure than other age groups (16). Nationwide data from 2003 showed that 16.7% of those households with children and 31.7% of those households with children and headed by a single woman were food insecure (48).

The principal cause for food insecurity is poverty. However, there are other factors associated with it, especially in the elderly. The elderly may have enough money to buy food, but lack access to food because of transportation or functional limitations (34), or are unable to prepare or eat food because of health problems (26, 34).

In a sample of low income elderly, investigators used the Radimer/Cornell food-insecurity instrument and a series of additional background questions to determine what risk factors were associated with food insecurity. The main risk factor was “taking three or more prescription drugs.” The second risk factor for food insecurity in this population of seniors was

“eating alone” followed by poverty (35). Another significant factor for food insecurity was social isolation related to the loss of a spouse, a close family member or friends. Elderly who live alone have higher levels of food insecurity, food insufficiency, and hunger rates compared to households of elderly couples or to those who live with other non-elderly members (27).

Food insecurity in low income urban seniors has four components: quantitative, qualitative, psychological, and social. The quantitative component relates to the actual amount of food accessed and consumed, while the qualitative component refers solely to diet quality. Having to buy or eat less of a desired food is part of the qualitative component of food insecurity (16). The psychological components that relates to the elderly are knowledge, perception, and feelings about their diet (26). Examples of psychological components include the uncertainty about being able to have enough food or nutritionally adequate food, and the lack of ability to make desired food choices, which can lead to anger, deprivation, and embarrassment (16). Finally, the social component refers to accessing food in socially acceptable ways using socially or culturally less normative patterns of eating (26). Examples would be using food pantries, and in severe cases asking friends or relatives for money or food (16).

Coping strategies used by food-insecure elderly include eating less varied diets compared to food secure groups, participating in federal food assistance programs, or getting emergency food from community pantries (47). Food programs intended to help meet nutritional needs (15) used by the elderly include Food Stamps, Meals on Wheels, and similar services that deliver already prepared meals to their homes (27). Data from a nationally representative food security survey conducted among the elderly in 2000 showed that 26% of food insecure elderly received food stamps, 11% received meals, either delivered or in community centers, and 15% got food from food banks, pantries, or similar food programs (47).

Participation in the food stamp program (FSP) by the elderly is low when compared to other age groups (49). Only about one third of food stamp eligible elderly in the US receive benefits, which makes them the smallest demographic group to do so. When compared to other groups, nationwide estimates for elderly FSP participation rates were 36% in 1994, 30% in 2000, and 27.5% in 2003 from the total population receiving food stamps (49- 50). Compared to younger individuals, the elderly are less than half as likely to get food stamps (16).

Nutrition Education Targeted to the Elderly

An accepted definition of nutrition education is “any set of learning experiences designed to facilitate the voluntary adoption of eating and other nutrition-related behaviors conducive to health and well-being” (51). Educating the public about nutrition is often difficult because of the complexity of dietary behavior, the misconceptions and misinformation regarding nutrition (52), and the uncertainty of the best nutrition practices (53).

The need for health promotion among the elderly has become more important as a consequence of their population growth rate (54-56), especially since elderly individuals are living longer (1, 57) and medical expenses rise with the onset of major chronic disease (57). Nutrition education has the potential to reduce the need for health and social services (56). Rising numbers of elderly with chronic conditions are seen today, with almost 80% of the elderly population having at least one chronic disease (21). If disease patterns stay the same, the health care system will have to spend an additional \$400 to \$500 billion to cover the costs of treating the elderly (58). It is important for the elderly to adopt dietary and lifestyle practices that help manage chronic conditions (2) or reverse trends of increasing chronic disease, disability, and death (58). Nutrition education emphasizing healthy eating and exercising may help the elderly and societies in general, overcome the burden of chronic disease.

Messages designed to prevent disease and improve diet have been promoted by the DGA (59), MyPyramid (60), and Healthy People 2010 (61). The DGA and Healthy People 2010 have emphasized the role of nutrition education and physical activity in maintaining health in people of all ages (59, 61). One of the Healthy People 2010 objectives on educational and community-based programs is to “increase from 12% to 90% participation of the population ages 65 years and older in at least one organized health promotion activity” (61). However, many Americans do not meet the recommendations set by the DGA. For instance, data from the Behavioral Risk Factor Surveillance System showed that in 1998 only 21% of elderly living in Georgia consumed 5 or more daily servings of fruits and vegetables (55). Further, analysis from NHANES data for the years 1999-2000, using the HEI in 2,573 elderly showed that the lowest component scores were for intakes of milk and fruits (less than 30% met the dietary recommendations) (44).

One way to improve the number of elderly not meeting recommendations may be through effective nutrition education (55-56, 62-64) and physical activity intervention strategies to improve health and functional ability in the elderly (55, 63-64). Both nutrition education and counseling are necessary to help the elderly understand and apply the latest nutrition information (54).

The American Association for Retired Persons (AARP) conducted a Survey on Lifelong Learning in 2000 to discover attitudes toward learning among people aged 50 and older (n=1,019). Ninety percent of the respondents agreed that reflective and hands on-approaches were among the best ways to learn. Ninety one percent of those interviewed were interested in education “for the joy of learning something new.” For all gender and income groups interviewed, education preferences were “learning in loosely structured groups, in workshop settings or by teaching themselves.” Elderly were more interested in learning about topics that

would improve QOL or allow them to take better care of their health. Approximately half of the people surveyed were either interested or extremely interested in nutrition and having a healthy diet (65).

Focus group discussions were conducted in 35 low-income older adults aged 55 years and older to identify needs and preferences for nutrition education. The elderly were aware of the importance of food to their health, and wanted to learn about nutrition. Most wanted to receive nutrition education via group discussions; they liked sharing ideas and opinions and thought it was an effective way to learn new information. The group was also interested in receiving written materials such as brochures and pamphlets. The elderly reported trusting health professionals, such as dietitians, physicians, or nurses, to deliver nutrition education programs (62). However, a different study (56) that used trained congregate nutrition site managers to deliver nutrition classes to a group of 53 elderly participants found that the participants were comfortable with the manager (56).

A review study (57) undertaken to identify nutrition interventions that could provide a foundation for designing effective nutrition education programs for the elderly looked at 25 studies that included older adults. Increased nutrition knowledge was the most common reported successful outcome, which suggested that age did not appear to be a limiting factor for increasing knowledge. Positive outcomes were more probable when nutrition messages were; “limited to one or two, simple, practical, and targeted specific needs”. Other characteristics from the studies that were linked to positive outcomes included the use of behavior theory, use of behavior modification, and customized programs to meet participants’ needs (57).

Nutrition Education Tools

Written Nutrition Education Materials. Health promotion professionals develop and disseminate intervention materials to promote health behavior change (62) and increase knowledge or change attitudes and beliefs (66-67). Individuals may forget information that has been provided verbally (68). Printed information is the most common instructional tool used by health professionals to reinforce verbal education (69-72) and it includes booklets, leaflets, informational handouts, and pamphlets (69).

Printed information targeting the elderly is important, since the elderly carry the greatest burden of chronic disease (e.g., cardiovascular disease, type 2 diabetes, and osteoporosis) (62). Many of the elderly prefer printed materials to complement oral education, and learn new information, or personalize the learning process (70). Advantages of using written information in health intervention programs include message consistency, flexibility of delivery, cost-effectiveness (69-68), portability, and permanence of information (68). Written materials may also answer unasked questions or questions that arise when the individual is at home and not interacting with the health professional (68, 71-72).

Health education materials that are easy to read and follow are best understood by the general public (72-73). Readability of written material can be improved by using shorter sentences and words (68, 74). Content should be presented simply and clearly (69). Not more than one idea should be expressed per sentence to avoid problems in comprehension (68-69, 74). Focus groups conducted with 30 AA women, aged 40 years and older suggested that preferred materials were “short and to the point”, used bright and vibrant colors, and included interesting pictures (73).

However, the effectiveness of providing printed or written materials has been questioned. The problem with providing written information is that it cannot guarantee one's learning if readability level of the written information and the overall design of the materials are not considered (69). Even by improving readability, it does not guarantee that subjects will understand or use the education materials; however, strategies such as simplifying the information provided, increase the likelihood that the materials will be used (74).

Health literacy, as defined by Healthy People 2010, is "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services to make appropriate health decisions (61)." People who are functionally illiterate have less education and more chronic health problems compared to those who read at a high school level (72). Functional literacy refers to the difficulty understanding complex materials or to a lack of reading skills (72, 69). Low literacy affects all groups of people but especially low socioeconomic populations, minorities (71-72, 74, 62), and the elderly in the US (62, 71). Reading levels recommended for printed educational materials are between the 6th and 8th grade level (68, 71).

Use of Pre-Post Evaluation. Evaluation of nutrition education programs needs to be integrated into the entire study to measure efficiency of programs (75). A way of achieving this is by using pre-and post-testing. In nutrition programs, pre-and post-testing has been used to measure changes in knowledge (most common), attitudes and behaviors among groups of children (76), young individuals (77-79), older adults (30, 55, 80-82), food stamp participants (80), diabetics (83), and in combined populations (80, 84-86).

A community based statewide nutrition intervention program in Georgia, used pre-and post-testing on 501 elderly individuals. After the intervention of 12 nutrition education and

physical activity sessions, positive outcomes resulted. The percentage of older adults who knew the importance of eating 5 daily servings of fruits and vegetables almost doubled (34 to 64%) (55).

Nutrition Education Topics Included in our Study. Information on MyPyramid and the DGA, Food Labels, and Food Safety were used to develop the lesson plans used for our study intervention. Information on the section of “Nutrition and the Elderly” presented previously was used to design the lesson plan for the lesson on Nutrition and Aging.

Lesson 1: MyPyramid and DGA

Since 1980, the DGA, issued by the USDA and the Department of Health and Human Services (DHHS) has been a way to provide advice for children over the age of two and adults on good dietary habits to promote health and reduce risk of major chronic diseases (87-89). As required by law (Public Law # 101-445), these guidelines are updated every five years (89); this has enabled inclusion of new scientific information (90). The latest version was issued in 2005 (87). The DGA are the basis for federal nutrition, nutrition education, and information programs. The DGA are used to aid policy makers in the design and implementation of nutrition-related programs and to create educational materials. The DGA encourage Americans to make wise food choices and be physically active (45).

The DGA promote health and reduce risk of chronic diseases, such as heart disease, certain types of cancer, diabetes, stroke, and osteoporosis (45). Qualitative recommendations, such as those in the DGA, typically express nutrition principles in terms of foods and dietary patterns. Since the emphasis is on food choices in relation to lifestyle, the DGA are appropriate for nutrition education and communicating to the public (90).

The 2005 DGA includes key recommendations for specific populations. For example, key recommendations for people over 50 years include the consumption of vitamin B12 in its crystalline form as found in fortified foods or supplements. For older adults, vitamin D- fortified foods or supplementations are also recommended (59).

Presented to the public in 1992, the food guide pyramid was a graphical representation of the government-sponsored dietary plan based on the DGA (89). The latest version, “MyPyramid,” was released in April, 2005. MyPyramid retained the widely known shape of the conventional food guide pyramid (87, 89). Messages like variety, proportion, and moderation in making good nutritional choices are included in MyPyramid (87). However, the new edition emphasizes physical activity, something that was not included in previous editions (89). For the first time, MyPyramid, a nutrition education tool (89), translates the DGA into a diet plan that meets each individual’s daily recommendations based on age, gender, and physical activity. MyPyramid offers web-based interactive and printed materials for consumers and professionals to use (87, 89). Drawbacks of MyPyramid include the lack of use of height and weight for calculating individuals’ needs, and the lack of food pictures on the pyramid itself (91). Making MyPyramid web-based is another disadvantage for those who do not have access to a computer or the Internet (92).

Lesson 2: Food Labels

The 1990 Nutrition Labeling and Education Act (NLEA) established uniform nutrition labels for most foods (93). The Food and Drug Administration (FDA) is responsible for protecting the public’s health by ensuring that foods are safe, sanitary, and honestly labeled. Food labels are a way of providing Americans with accurate information about the nutritional content of food (33, 93). There is a positive association between dietary behavior and label

reading (33). Use of food labels is related to diets higher in overall dietary quality among all income groups (17, 33, 94). Those who read food labels tend to consume diets lower in fat (33, 94) and cholesterol (33), and higher in fruits and vegetables and consequently in vitamin C (17, 33) than those who do not.

One of the NLEA goals is consumer education on how to use the nutrition information on food labels. Offering classes on food labels that meet personal needs may help consumers gain skills needed to use food labels. Labeling education programs that are based on consumer interests are essential for nutrition labeling to achieve its public health function (95).

Few Americans read food labels (95). Women, who are mostly responsible for food purchasing and preparation (95), are more likely than men to read food labels (33). A study including a sample size of 150 women between the ages of 25 and 45 years, assessed label usage behavior. Only 15% of the population surveyed reported always reading food labels, 61% reported reading them sometimes, and the remainder indicated that they rarely or never read them (95). Males with low literacy levels (94), food stamp program participants, low income individuals, and those who live in non-metro areas (17) are less likely to use food labels.

The main reasons for not using food labels included: “takes too much time”, “too hard to understand”, and “print too small to read” (96). A study conducted in the United Kingdom found that approximately one third of the study participants were unable to read labels or make comparisons of food nutrient levels between two labels (97).

Nutrition labeling information can help the public with special needs select foods that are “high” or “low” in specific nutrients (98). People on special diets, especially people with diabetes, are more likely than others to read food labels (94). Food label education was beneficial for understanding and applying the nutrition information found on food labels in

studies including elderly with diabetes (99-100). Focus group discussions conducted in a group of elderly (n=24) found that although participants reported using food labels when grocery shopping, comprehension of terms and product claims on the label was poor (101).

Lesson 3: Nutrition and Aging

Information and the rationale for this lesson were included at the beginning of the review of literature, since the importance of nutrition and aging was the basis of this study.

Lesson 4: Food Safety

The food safety system in the US is the best in the world; however, foodborne illnesses still cause significant morbidity and mortality, as well as substantial economic losses (102). In 2003, the annual cost of foodborne illnesses in the US was \$5 to \$6 billion (103). The FDA, the USDA, and the CDC are the three main federal agencies responsible for the safety of the food supply in the US (102). The CDC estimates that 76 million illnesses, 325,000 hospitalizations, and 5,200 deaths are caused by foodborne illnesses in the US each year (104). However, these numbers are underestimated due to underreporting (102) since sporadic cases or outbreaks involving small numbers of people are rarely reported to a physician or to the CDC (105).

Groups that are more susceptible to foodborne illnesses include the very young, the elderly, the immunocompromised, pregnant women, and the chronically ill (102). For these populations, foodborne illnesses may have life threatening consequences (106). Sporadic cases and small outbreaks of foodborne illnesses often occur in homes in the US (107-108). Since the elderly are a vulnerable population and they eat a high proportion of their meals at home, food safety education is especially important for them (115).

Foodborne illnesses are largely preventable (105) through food safety education (110-111). Consumer messages about food safety have emphasized the role of food safety education

in the reduction of foodborne illnesses in the US (110). Food safety is included in the Healthy People 2010 objectives (61) and in the 2005 DGA with specific recommendations for the elderly (59).

Three major contributors to foodborne illnesses are lack of hand washing, inadequate food temperature control, and cross contamination (102). These should be the focus of consumer food safety education (105-107). In a video-survey of Australian domestic food handling practices, it was noted that almost half of the participants (47%) did not wash their hands after handling raw meat or when they did wash them, they did so without using soap (44%) (108). Other important messages for education should include information on keeping food at safe temperatures and avoiding food from unsafe sources (107).

A study conducted in 106 households in the US and Canada looked at how effectively consumers followed food-handling recommendations at home. Meal preparation, service, post-meal clean-up, and leftover storage were monitored closely. Ninety six percent of the households had at least one critical violation that could potentially lead to a foodborne illness (107).

The California Food Stamp Nutrition Education Program (FSNEP) provides voluntary nutrition education to food stamp recipients. The staff teaches safe food handling and preparation skills to reduce the incidence of foodborne illnesses. Participants showed improvements in food handling practices; for example, they decreased the number of times that food was left out of the refrigerator and increased the number of times food was thawed correctly (112). To reduce foodborne illness among participants in our study, we included education on handwashing, cross contamination, safe; hot and cold holding temperatures, food handling practices, and food storing.

Theoretical Model: Social Cognitive Theory

Theoretical models can be used to plan, implement and evaluate interventions. A theoretical framework is the basic foundation upon which evidence-based interventions are built to achieve successful nutrition interventions for positive outcomes among various populations (113). The social cognitive theory (SCT) targets interpersonal levels of individuals' influences (114). The SCT is a triadic, dynamic, and reciprocal relationship in which behavior, and environmental and individual factors interact (115). It offers a diversity of concepts for explaining behavior and procedures for promoting behavior change (114).

Figure 1 illustrates the SCT constructs. It can be visualized as a triangle with the apices representing a factor: behavior, personal, and environment (116). Personal factors of SCT for understanding behavior include skills, self-efficacy, and outcome expectancies. Self-efficacy is defined as an individual's confidence to perform a specific behavior. It is one of the strongest constructs of the SCT since judging one's efficacy implies a strong influence over human maturity (32, 115). Environmental factors include modeling and availability (114).

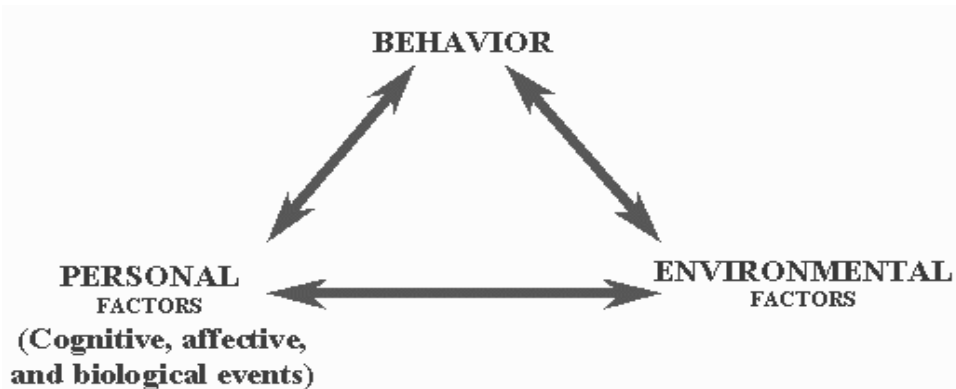


Figure 1. Social Cognitive Theory constructs including behavior, and personal and environmental factors.

The reciprocal nature of the determinants of human functioning in the SCT makes it possible for interventions to be directed at personal, environmental, or behavioral factors (115). SCT has been widely used as a theoretical framework to plan nutrition intervention programs (114) for children (117), young individuals and adults (30-31, 118-122) and the elderly (100, 123).

SCT has been used as a theoretical framework to develop focus group discussion questions among different populations (118, 121, 124). In Fontenot et al (121), the SCT was used to construct focus group questions to elicit personal, behavioral, and environmental factors influencing fruit and vegetable consumption in a sample of 42 low income AA youth (121). Similarly, the construction of focus group questions based on the SCT was used by Croy et al in a group of 26 health club members. Focus groups were completed after the end of a 4-week education program on consumption of whole grains, to examine individual, environmental, and behavioral aspects that influenced whole grain consumption (118). In 34 females, including 3 elderly (124) the SCT and Health Belief Model were used to develop focus group discussion questions to their perceptions about cardiovascular disease prevention and behavior change for cardiovascular health (124).

Few studies using the SCT as a framework for nutrition intervention programs were found in the elderly (100, 123). However, the theory provides one theoretical approach to geriatric education that addresses both the psychosocial dynamics underlying health behaviors and methods to promote behavior change (116). In a sample of 93 elderly individuals, a 10-week group session oriented a food label education program to improve knowledge and skills in diabetes management among elderly participants (100). In that study (100), besides the SCT, researchers also used information processing and learning theory to determine participants'

knowledge, outcome expectations, self efficacy, and decision making skills. In a sample of 3,737 AA adults where 56% of them were aged 52 and older, an intervention to increase fruit and vegetable consumption by at least 0.5 servings a day for reducing the risk of cancer was completed in a period of two years. A higher intake of fruits and vegetables in the intervention group especially among adults over 65 years was noted. Positive outcomes were linked to the use of behavioral theory which included the transtheoretical model, the SCT, and social support model (123).

Telephone Interviewing

Telephone interviewing is a valid method for surveys or interviews for healthcare research (125-126). Telephone interviews are valid and suitable for studies with a specific focus like evaluating patient outcomes, service mapping, follow ups, or reviews where key individuals are targeted (125).

Advantages of telephone interviews include decreased costs (126-127), elimination of travel cost, and time saved when compared to face to face interviews (125). Using telephone interviewing increases response rates (125) and the opportunity to make sure all questions are answered and clarified (128). This creates advantages of telephone interviewing when compared to postal surveys or self-administered questionnaires. Telephone interviewing is also logistically simple (126-127).

Preparation by the interviewer is essential in conducting a telephone interview. The interviewer needs to arrange for privacy in order to avoid any noise, distraction, and also to protect confidentiality (125). Interviewers also need to consider interview length. Conducting an interview over the telephone that lasts over 20 minutes is difficult (127). When conducting a

telephone interview it is important that the interviewer identifies him/herself, explains the reason for the interview, and checks with the interviewee if it is convenient to talk at that time (125).

CHAPTER 3

SUBJECTS AND METHODS

Institutional Review Board Approval

This study was approved by the Institutional Review Board (IRB) of the Louisiana State University (LSU) A&M on October 11, 2004 (IRB # 2407, Appendix A).

Overall Study Design

This thesis is based on a part of a larger multidisciplinary study designed to improve health in the elderly that involved four departments at LSU: Psychology, Social Work, Kinesiology and Human Ecology/Nutrition. Table 1 shows the contribution of each department to the overall study.

Table 1. Overall study of “Increasing physical activity and healthy diet behavior among low income seniors” by their contribution to the study.

Psychology	Social Work	Kinesiology	Human Ecology/Nutrition
- Demographic Assessment - Intellectual Ability - Educational Materials	- Demographic Assessment - Environmental Supports Assessment	- Demographic Assessment - Physical Activity and beliefs assessment - Physical Function Assessment - Physical Activity Education topics - Exercise Intervention	- Demographic Assessment - Pre- post diet beliefs Assessment - Food Security Assessment - Nutrition education Classes, including Pre-post testing

Subjects

Participants for this study were a group of low income elderly from LBC and CPA. Eligibility criteria were: 1) Participating in activities and programs at a local community center (LBC) or residing at a local housing facility for seniors with low or fixed incomes (CPA), and 2)

Signing consent to participate. Participants were recruited through public informational meetings about the study at LBC and CPA, and those interested provided contact information for participating in the study.

Data Collection

Written informed consent (Appendix A) was obtained from all participants prior to participation. Demographics, including weight, age, and race, were obtained at the beginning of the study. Food security status was assessed using the USDA Food Security Module Short Form (Appendix B). The USDA short form is a six-item scale that asks about the food security status over the past 12 months; however, the modified version was used in this study (129). To categorize food security status, items 1 and 2 were scored as affirmative if responses were “often true” or “sometimes true”, and negative if the response was “never true.” Items 3, 4, 5 and 6 were scored as affirmative if the response was “yes” and negative if it was “no.” Individuals answering “yes” to none or one item were classified as food secure (FS). Those answering “yes” to 2, 3, or 4 items were classified as food insecure (FIS); those answering “yes” to 5 or 6 items were classified as food insecure with hunger (FISH) (130).

To assess the participants’ self-reported eating habits, nutritional quality of diet, and nutrition knowledge, we used a set of questions based on a 4-point Likert scale (poor, fair, good, and excellent) (Appendix B). This scale was used before and after the nutrition intervention. Interviews were conducted in the facility at LBC, whereas for CPA interviews were conducted in the participant’s apartments. Each interview lasted approximately 10-15 minutes.

Nutrition Intervention Program

The nutrition intervention program consisted of a 4-month intervention that consisted of 4 nutrition lessons using the SCT as a theoretical framework. Each lesson was offered twice

monthly at each of the centers with the exception of lesson 1 (MyPyramid and DGA) that was offered once at LBC. Each class consisted of a 1-hour session with an interactive discussion. Attendance was taken at the beginning of every class to prevent people from attending the same lesson twice. The Human Nutrition and Food (HNF) graduate student called the participants several days before each class was given, explained what the class was about, and invited them to come. Table 2 shows the nutrition classes' topics and dates of each class based on location.

Table 2. Topics and dates of nutrition classes held at LBC and CPA.

Class Name	Dates	Location
1) MyPyramid and DGA	July 18 July 25 and 27	LBC CPA
2) Food Labels	August 16, 18 August 23 and 25.	LBC CPA
3) Nutrition and Aging	September 28, 29 October 5 and 6.	LBC CPA
4) Food Safety	November 8, 9, November 14 and 15.	LBC CPA

All the sessions were taught by the HNF graduate student. Participants were welcome to ask questions about the material any time. Classes were informal talks, where attendees could feel free to ask questions. Each class began with a salutation and introduction. Then, objectives from each lesson were read, followed by pre-testing. To avoid issues with people with low literacy, pre-test questions were read aloud. Lesson plans, including pre-and post-test questions are found in Appendices C (Lesson 1: MyPyramid and DGA), D (Lesson 2: Food labels), E (Lesson 3: Nutrition and Aging), and F (Lesson 4: Food Safety). Instructional materials including handouts and brochures used for each lesson are also included in the respective appendices.

Pre-and post-testing consisted of a set of 5 to 8 questions related to the topic covered in the nutrition class that day. After the lesson was completed, there was time for questions. Each

class ended with post-testing which consisted of the same set of questions used for pre-testing. These were also read aloud by the graduate student. Then, the student thanked the participants for attending. At LBC, classes were held in the board room, conference room or the fitness room inside the facility. At CPA, all classes were held at their auditorium.

Post-assessment was completed 2 months after the nutrition intervention program was finished. We used the same set of questions related to self-reported; eating habits, nutritional quality of diet, and nutrition knowledge during a phone interview. Variation in time for those attending the first classes compared to those attending only the last classes might have biased participants' responses. For this interview, the question "Were you able to make any changes we discussed, if so, what were they" was also included to see if any dietary modifications were made after the intervention. Each phone interview lasted approximately 5 minutes. Figure 2 summarizes the data collection process for this study.

Pre-Post Testing Lesson Scores

For analysis, each pre-and post-test was given a score based on 100 points. Table 3 shows the lesson name, number of questions used for each lesson, and the possible score for each question from the pre-and post-tests.

Table 3. Pre-and post-test information type on basis of lesson name, number of questions asked, score for each question, and maximum possible test score.

Lesson Name	# Questions	Score for each question	Maximum possible test score
MyPyramid and DGA	5	20	100
Food labels	8	12.5	100
Nutrition and Aging	5	20	100
Food Safety	6	16.67	100

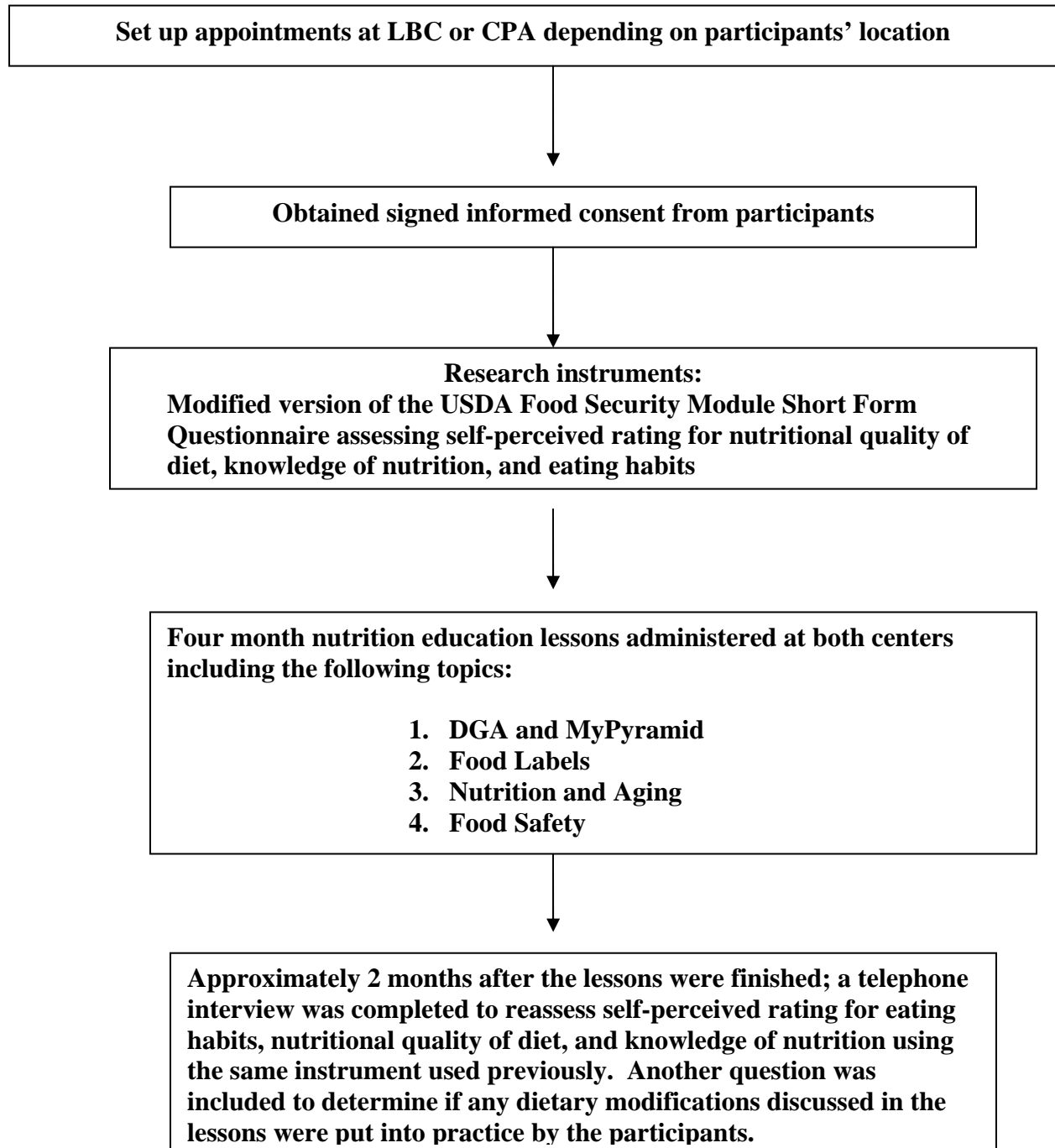


Figure 2. Data Collection including interviewing tools and process, and the nutrition intervention program.

Nutrition Education Lessons Using the SCT

The SCT guided the development of this nutrition intervention program. The SCT was used for the lesson plan design and question construction for pre-post-testing used in each lesson. Figure 3 shows the SCT constructs (environment, personal factors, and behaviors) used in developing the intervention. The three factors are constantly influencing each other. Behavior is not only the result of the environment and the person, and the environment is not only the result of the person and the behavior (131).

Constructs applicable to a specific lesson or all lessons are outlined in Figure 4. The figure includes the SCT construct used associated to the lesson(s) where it was used. SCT constructs used were: behavioral capability, observational learning, building self-control, participation incentives, and reinforcements. They are all related to personal factors with the exception of observational learning that is related to environmental influences. Behavioral capability refers to the knowledge and skill to perform a given behavior and promote mastery learning through skills training. Observational learning refers to the behavioral acquisition that occurs by watching the actions and outcomes of others' behaviors; it includes credible role models of the targeted behaviors. Building self-control refers to the personal regulation of goal-directed behavior or performance. Participation incentives refer to the present outcomes of change that have functional meaning. Reinforcements refer to responses to person's behavior that increase or decrease the likelihood of reoccurrence (131).

Data Analysis

Data were analyzed using SPSS (version 9.0), and Microsoft Office Excel 2003. Summary statistics were calculated for the population as a whole and for both facilities separately

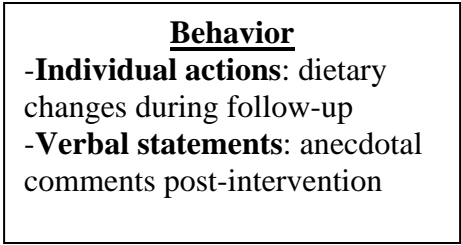
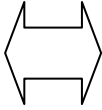
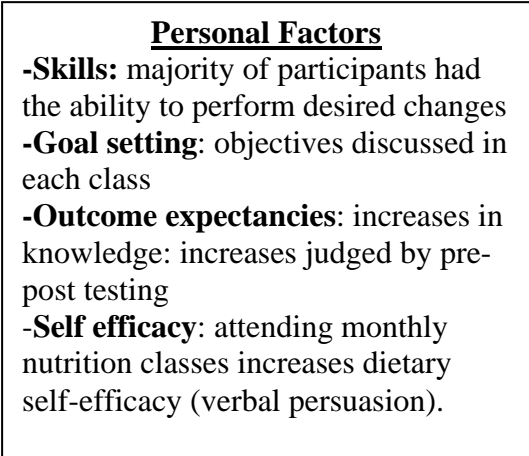
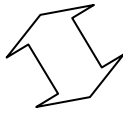
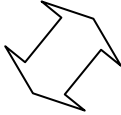
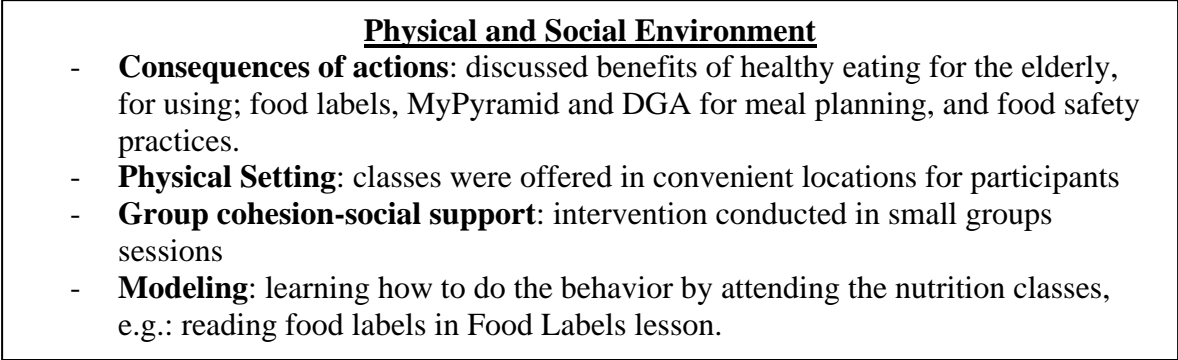


Figure 3. Theoretical framework: SCT for the development of the nutrition intervention program for LBC and CPA participants.

Construct: Behavioral capability to healthy eating
<p>-Based on lesson: MyPyramid and DGA lesson: Follow recommended servings and serving sizes from food groups. Food labels lesson: using food labels to select and purchase foods to meet recommendations. Nutrition and aging lesson: making food substitutions for those who have complications such as problems chewing or lack of appetite Food safety lesson: Proper handling of foods -Applicable to all lessons: Review all instructional materials offered in class to provide knowledge and skills for healthy eating behaviors.</p>
Construct: Observational Learning
<p>- Based on lesson: Food labels lesson: providing actual foods in class to become familiar with food labels from different food groups (e.g. lemon pie, vegetable patties, and cheese)</p>
Construct: Building self-control
<p>- Based on lesson: Nutrition and aging lesson: offering substitutions or problem-solving to common problems that occur when we age. - Applicable to all lessons: setting of objectives for each class</p>
Construct: Participation Incentives
<p>- Applicable to all lessons: participants were offered a monetary incentive at the beginning of the study - Applicable to all lessons: providing handouts, booklets, and recipes</p>
Construct: Reinforcement
<p>- Applicable to all lessons: providing ongoing support and behavioral change through group discussion</p>

Figure 4. Social Cognitive Theory constructs used in relation to the lesson(s).

Comparisons of mean age, and weight of LBC and CPA participants were made using a two sample t- tests (two-tailed); descriptive statistics (mean \pm standard deviation (SD)) are presented. Comparisons of populations' racial breakdown, gender, and food security status were made using Fisher's Exact Test (132). Paired t-tests (two tailed) were used to compare mean scores from pre-and post-test results for all lessons.

Because of a small sample size, answers for the self-perceived ratings for eating habits, nutritional quality of the diet, and nutrition knowledge were combined into 2 groups: poor-fair and good-excellent. Chi-square was used to compare self-perceived eating habits and self-perceived nutritional quality of diet pre-and post-intervention. Chi-square could not be used for the question on self-perceived nutrition knowledge because of the small number in some categories (132). Therefore, Fisher's Exact Test (132) was used for comparing self-perceived nutrition knowledge pre-and post-intervention.

Fisher's Exact Test was also used to compare differences between those who changed for the positive and those who didn't for the questions on self-perceived; eating habits, nutritional quality of diet, and nutrition knowledge, based on the number of classes they attended. Because of the small sample size, participants were grouped into those attending 1-2 classes and those attending 3-4 classes.

Due to a small number in some categories, answers ("yes" or "no") for the question "Were you able to make any changes we discussed?" were analyzed using Fisher's Exact Test. Answers for the question "if so, what were they"? referring to dietary changes, were linked to the lessons attended to determine if the change stated matched the lesson attended. This information was also analyzed using Fisher's Exact test. A p value less than or equal to 0.05 was considered

to be significant for all tests. Table 4 summarizes the statistical test used and the variables that were analyzed using each test.

Table 4. Statistical test used, and variables analyzed for data analysis.

STATISTICAL TEST USED	VARIABLES ANALYZED
1) Two sample t-test	- Age, weight and number of classes attended
2) Paired sample t-test	- Pre-and-post test mean scores
3) Chi-square	- Self-perceived ratings for nutritional quality of the diet, and eating habits
4) Fisher’s Exact	- Race, gender, and food security - Self-perceived ratings for nutrition knowledge - Answers for the “Were you able to make any dietary changes, if so what were they?” - differences for those who responded positively and those who didn’t for the self-perceived questions based on number of lessons attended.

CHAPTER 4

RESULTS

A total of 33 low income elderly attended one or more nutrition classes at either LBC (n=20) or CPA (n=13). Table 5 shows the study demographics including the number of attendees, age, race, gender, weight, food security status, and number of classes attended. At LBC, 95% of attendees were AA; 90% were female; mean age was 66.05 ± 10.51 years; mean weight was 85.25 ± 20.90 kg; 85% were Food Secure (FS); and the mean number of classes attended was 1.9 ± 0.9 . At CPA, 31% of attendees were AA; 85% were female; mean age was 67.46 ± 11.94 years; mean weight was 88.07 ± 23.52 kg; 69% were FS; and the mean number of classes attended was 1.84 ± 0.98 . No significant differences were found between LBC and CPA participants' age, weight, gender, number of classes attended, or food security status. However, the racial breakdown for the two sites was significantly different (<0.001) with a higher percentage of AA at LBC. Information on food stamp participation was not included in the table due to a low participation rate seen in this population. Only one participant (CPA) received food stamps.

Table 6 shows the number and percentage of people who attended the nutrition lessons by location. Overall, 46% of them attended one class, 30% attended two classes, 18% attended three classes, and 6% attended all four classes. At LBC, 40% (n=8) attended one class, 35% (n=7) attended two classes, 20% (n=4) attended 3 classes, and 5% (n=1) attended all four classes. At CPA, 54% (n=7) attended one class, 23% (n=3) attended 2 classes, 15% (n=2) attended 3 classes, and 8% (n=1) attended all 4 classes.

Table 5. Study demographics: number of class attendees on basis of age, race, gender, weight, food security status, food stamp participation, and number of classes attended. AA= African American, C= Caucasian, F=female, M=male, kg=kilograms, FS= food secure, FIS=food insecure, and N/A=available.

Name of Place	#	Age	Race	Gender	Weight (kg)	Food Security Status	# Classes Attended
LBC	1	75	AA	F	76	FS	3
	2	79	AA	F	68	FS	3
	3	69	AA	F	98	FS	2
	4	64	AA	F	75	FS	1
	5	64	AA	F	109	FS	1
	6	66	AA	F	82	FIS	1
	7	68	C	F	96	N/A	2
	8	61	AA	F	100	FS	3
	9	66	AA	F	62	FS	1
	10	54	AA	F	134	FS	4
	11	73	AA	F	55	FS	2
	12	87	AA	F	48	FS	1
	13	65	AA	M	96	FS	2
	14	69	AA	F	112	FS	2
	15	52	AA	F	66	FIS	1
	16	45	AA	F	92	FS	1
	17	71	AA	F	73	FIS	3
	18	81	AA	F	85	FS	2
	19	62	AA	M	82	FS	2
	20	50	AA	F	96	FS	1
Mean±SD %	n=20	66.05±10.51	95 AA	90 F	85.25±20.90	85 FS	1.9±0.9
CPA	1	79	AA	F	69	FIS	2
	2	57	C	F	117	FIS	3
	3	63	C	F	98	FS	4
	4	55	AA	F	106	FS	1
	5	62	AA	M	97	FS	3
	6	93	C	F	43	FS	1
	7	51	C	F	67	FIS	2
	8	77	C	F	95	FS	2
	9	58	C	F	133	FS	2
	10	77	AA	F	77	FS	1
	11	65	C	M	84	FS	1
	12	75	C	F	72	FS	1
	13	65	C	F	87	FIS	1
Mean±SD %	n=13	67.46±11.94	69 AA	85 F	88.07±23.52	69 FS	1.84±0.98

Table 6. Participants attending 1,2,3 or 4 classes by location

LBC	Number (%)	CPA	Number (%)
1 class	8 (40%)	1 class	7 (54%)
2 classes	7 (35%)	2 classes	3 (23%)
3 classes	4 (20 %)	3 classes	2 (15%)
4 classes	1 (5%)	4 classes	1 (8%)

Table 7 shows LBC participants' pre-and post-testing results for all the nutrition lessons.

For all 4 lessons, significant differences were seen for pre-and post-test mean score results ($p<0.001$).

Table 7. LBC participants' mean score \pm SD results for pre-and post-testing for all individual nutrition lessons.

Lesson	Test	Mean	Number	Significance
MyPyramid and DGA	PRE	53.84 \pm 22.18	13	<0.001
	POST	89.23 \pm 23.96	13	
Food labels	PRE	57.95 \pm 15.07	11	<0.001
	POST	92.04 \pm 6.30	11	
Nutrition and Aging	PRE	54.28 \pm 22.25	7	<0.001
	POST	91.42 \pm 10.69	7	
Food Safety	PRE	67 \pm 16.02	10	<0.001
	POST	93.6 \pm 8.26	10	

Table 8 shows CPA participants' results for all nutrition lessons. Significant differences were seen for pre-and post-test mean score results for MyPyramid and DGA lesson ($p<0.05$), Nutrition and Aging lesson ($p<0.05$), and Food Safety lesson ($p<0.05$). No significant differences were seen for pre-and post-test mean scores for the Food Labels lesson.

Figure 5 shows the pre-and post-self-perceived ratings for eating habits for all participants. There was not a significant difference between self-perceived eating habits comparing pre-and post- intervention results.

Table 8. CPA participants’ mean score \pm SD results for pre-and post-testing for all nutrition lessons.

Lesson	Test	Mean	Number	Significance
MyPyramid and DGA	PRE	45 \pm 10.00	4	0.02
	POST	90 \pm 20.00	4	
Food labels	PRE	75 \pm 14.43	4	NS
	POST	87.5 \pm 10.20	4	
Nutrition and Aging	PRE	68.57 \pm 19.51	7	0.01
	POST	94.28 \pm 9.76	7	
Food Safety	PRE	50.1 \pm 17.71	10	<0.001
	POST	90.1 \pm 17.84	10	

As shown in Figure 5, 10 participants ranked themselves as “poor-fair” pre-intervention, while 7 of them ranked themselves the same way after the intervention. Nineteen participants ranked themselves as “good-excellent” pre-intervention, while 22 of them ranked themselves the same way after the intervention. For participants who changed positively, no significant differences were seen between those participants who attended 1-2 classes and those who attended 3-4 classes.

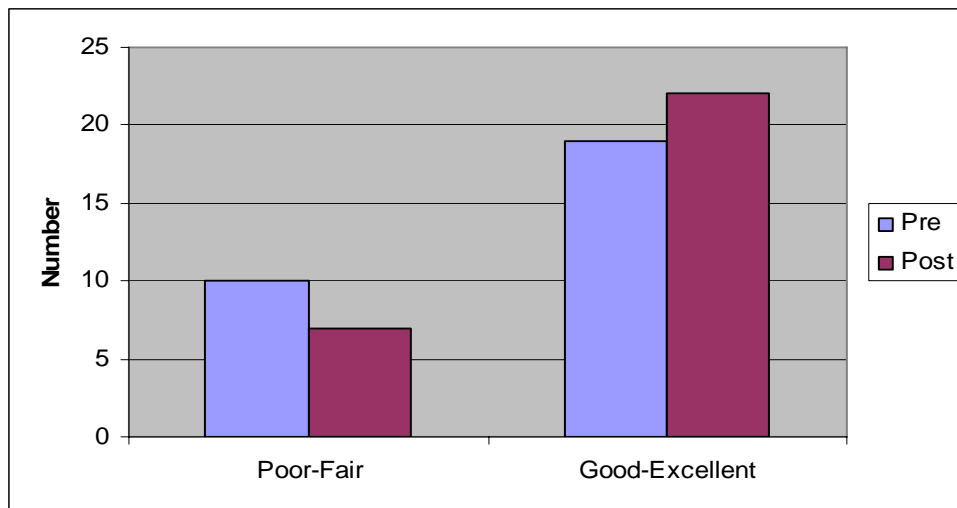


Figure 5. Pre-and post-intervention responses for self-perceived eating habits on basis of poor-fair, or good-excellent answers for the entire population.

Figure 6 shows the pre-and post-self-perceived ratings for nutritional quality of diet for all participants. Significance differences ($p < 0.01$) were seen for self-perceived nutritional quality of diet when pre-and post-intervention results were compared. As shown in Figure 6, participants ranked themselves as “poor-fair” pre-intervention, while 5 of them ranked themselves the same way after the intervention. Thirteen participants ranked themselves as “good-excellent” pre-intervention, while 22 of them ranked themselves the same way after the intervention. Seventy seven percent ($n=10$) of those participants who changed for the positive ($n=13$) reported making dietary changes during the follow up interview. For participants who changed positively, no significant differences were seen between those participants who attended 1-2 classes and those who attended 3-4 classes.

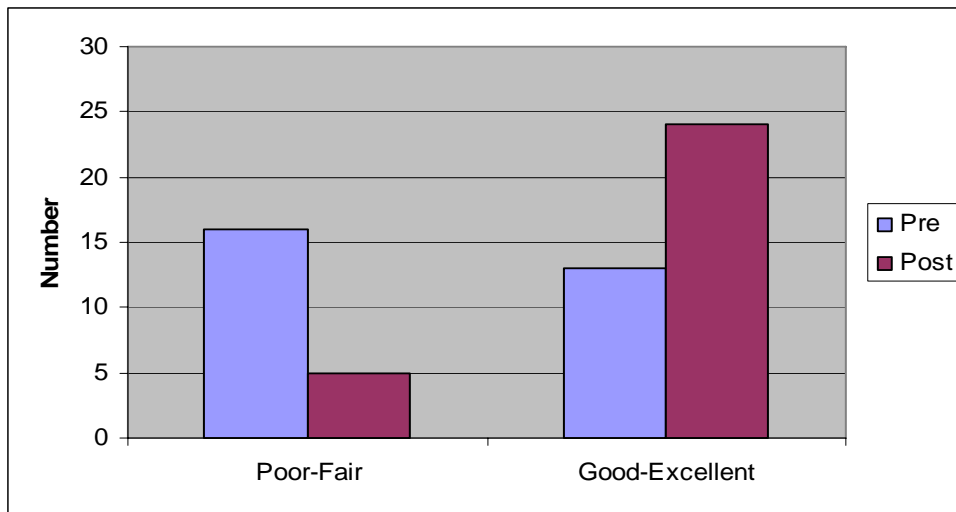


Figure 6. Pre-and post-intervention responses for self-perceived nutritional quality of the diet on basis of poor-fair, or good-excellent answers for the entire population.

Figure 7 shows the pre-and post-self-perceived rating results on nutrition knowledge for all participants. Significance differences were seen for self-perceived nutrition knowledge comparing pre-and post-intervention results ($p=0.02$). As shown in Figure 7, 13 participants ranked themselves as “poor-fair” pre-intervention, while 4 of them ranked themselves the same

way after the intervention. Sixteen participants ranked themselves as “good-excellent” pre-intervention, while 25 of them ranked themselves the same way after the intervention. Seventy eight percent (n=7) of those participants who changed for the positive (n=9) reported making dietary changes during the follow up. For participants who changed positively, no significant differences were seen between those participants who attended 1-2 classes and those who attended 3-4 classes.

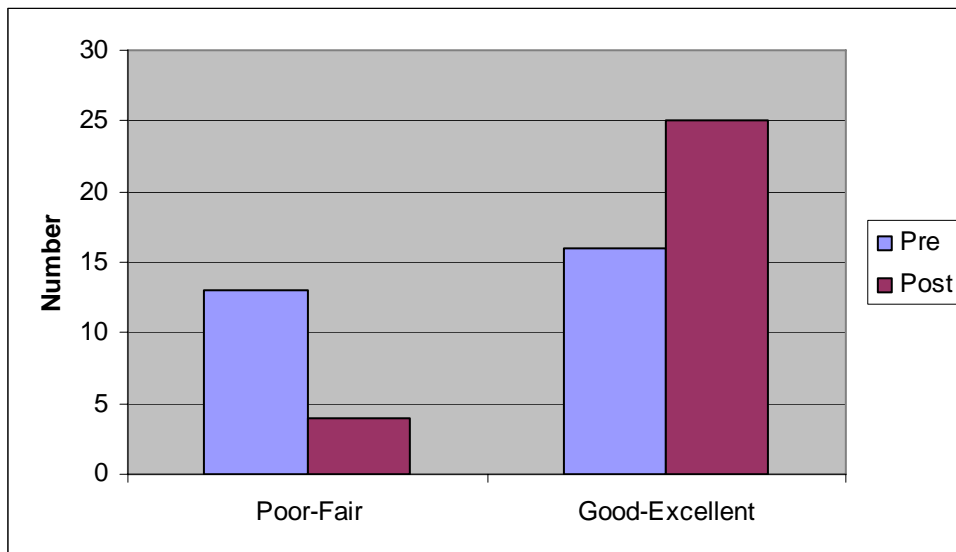


Figure 7. Pre-and post-intervention responses for self-perceived nutrition knowledge basis of poor-fair, or good-excellent answers for the entire population.

Table 9 shows responses to the question “Were you able to make any changes we discussed, if so what were they?” for LBC. Ninety five percent (n=18) of participants responded positively to dietary changes. One person could not be contacted at follow up.

Table 10 shows responses to the question “Were you able to make any changes we discussed, if so what were they?” for CPA. Sixty four percent (n=7) of participants responded positively to dietary changes, while 36% (n=4) responded negatively. Two people could not be contacted at follow up.

Significant differences ($p=0.047$) between positive and negative responses for the question “Were you able to make any changes we discussed?” were found between LBC and CPA, with LBC participants having a greater positive response rate. Answers for the question “if so, what were they?” regarding dietary changes, were linked to the specific lesson(s) participants attended. No significant differences were seen between LBC and CPA.

Table 9. LBC participants’ responses to “Were you able to make any changes we discussed, if so, what were they?”

# Classes	Lesson Name	Answers
1	MyPyramid and DGA	Yes, more fruit and vegetables, watching portion sizes
1	MyPyramid and DGA	Less junk foods, cutting back on calories, more fruit and vegetables
1	MyPyramid and DGA	Watching portions sizes, eating lots of salads
1	MyPyramid and DGA	Unable to contact
1	MyPyramid and DGA	Not really, have always tried to eat healthy
1	Food Labels	Switched to whole grains
1	Food Labels	Try to cut back on soft drinks, drinking juice instead, trying to incorporate 2-3 vegetables a day
1	Nutrition and Aging	Cutting back on calories, walking and going to fitness class at LBC
2	Nutrition and Aging, Food Safety	No alcohol, staying away from fattening foods
2	Food labels, Food Safety	Trying to keep a diet moderated in salt
2	Food labels, Food Safety	More fruit and vegetables
2	MyPyramid and DGA, Food Safety	More fruit and vegetables, trying to stay away from too many starches
2	MyPyramid and DGA, Food Safety	Eating more vegetables, not a lot of fat
2	MyPyramid and DGA, Food Labels	Cutting back on fat, sweets and fried foods, trying to eat more fruit and vegetables
2	MyPyramid and DGA, Food Labels	Eating less fried foods, more vegetables, and watching starches
3	MyPyramid and DGA, Nutrition and Aging, Food Safety	Yes, counting calories, working out, reading food labels
3	MyPyramid and DGA, Food Labels, Food Safety	Yes, reading food labels, checking for fat content

(Table continued)

3	MyPyramid and DGA, Food Labels, Food Safety	Trying to eat more fiber, does not use much sugar, trying to increase milk consumption
3	Food labels, Nutrition and Aging, Food Safety	Yes, reading food labels
4	All lessons	More aware of food labels (reading them), eating more fruit and vegetables and less sweets

Table 10. CPA participants’ responses to “Were you able to make any changes, if so, what were they?”

# classes	Lesson	Answers
1	MyPyramid and DGA	Unable to contact
1	Food Labels	No changes, eating the same way
1	Food Labels	Did not make any changes, didn’t remember coming to class
1	Nutrition and Aging	Eating more fruits and vegetables, whole grains
1	Food Safety	Less red meat, more white meat
1	Food Safety	Not really. Neighbors bring in her food, dependent on social support
1	Food Safety	Haven’t been able to, doesn’t cook (hand problem), eats fast food or microwave foods
2	Nutrition and Aging, Food Safety	More fruit, started drinking orange juice
2	Nutrition and Aging, Food Safety	Eating more vegetables, more fresh fruit, getting away from too many carbohydrates
2	MyPyramid and DGA, Food Labels	Eating more fresh fruit and vegetables, trying to keep a balanced diet
3	MyPyramid and DGA, Food Labels, Food Safety	Yes, eating more vegetables, better use of meat (following recommended amounts)
3	Food labels, Nutrition and Aging, Food Safety	Unable to contact
4	All lessons	Yes, watching carbohydrates, eating more vegetables and fruit, trying to keep her blood sugar under control

CHAPTER 5

DISCUSSION

Discussion

Our study population consisted of 20 participants from LBC and 13 participants from CPA. The majority of study participants who attended the nutrition lessons were AA (70%) and food secure (78%). No significant differences were seen between age, gender, weight, number of nutrition classes attended or food security status of participants from LBC or CPA. However, there was a difference between the prevalence of the AA and Caucasian participants at LBC and CPA. Significant differences were seen between pre-and post-test mean score results for all lessons at LBC and CPA, with the exception of the Food Labels lesson at CPA participants. When comparing differences in pre-post test results, no significant differences were seen between the two facilities. Significant differences were seen between pre-and post-intervention for the questions on self-perceived nutritional quality of the diet and nutrition knowledge. However, no significant difference was seen between pre-and post-intervention for the question on self-perceived eating habits.

Food security status in study participants was determined using a modified version of the 18-item scale USDA form. Findings from the Current Population Survey Food Security Supplement in 1998, 1999 and 2000 consistently indicated that the 18-item food security form fairly represented the food security status of the elderly compared to non-elderly (133). The 6-item form (short) is a robust and reliable instrument; when compared to the 18-item scale it correctly identified the level of food security for 97.7% of all households tested (134). Even though numerous studies (134-136) have used the

short form in different populations, no studies were found which the short form was used with the elderly. However, the short form has been used successfully in the past by LSU researchers to measure food insecurity among a group of female food stamp recipients (129) so we feel confident that it accurately determined food security status in our population.

In our study there was a high prevalence (22%) of food insecurity, with no significant differences between the population at LBC and CPA. Our findings were higher than those of Nord (47-48) who showed a low prevalence (6-7%) of food insecure elderly. This was not surprising since our study population was limited to low-income, and Nord looked at (47-48) nationally representative data collected for the Current Population Survey Food Security Surveys. However, Nord did show demographic and geographic variability. Twenty two percent of AA households and 12.4% of those living in the South were food insecure, which are factors that need to be taken into account when interpreting our data, since our participants were mainly low-income, AA elderly all living in the South. In a sample of 1,662 households from Arkansas, Louisiana, and Mississippi there was a high prevalence of food insecurity. This study conducted by the Lower Mississippi Delta Nutrition Intervention Research Initiative (NIRI) Consortium, found that 21% of those interviewed were food insecure. Groups with the highest rates of food insecurity were those with incomes below \$15,000, AA households, and households with children (137).

Food insecurity is a problem in the South, and among AA individuals. Thus, future efforts to determine household and community determinants of food insecurity are suggested (137) in order to understand underlying causes of food insecurity by our

population. It is important to understand the prevalence and causes of food insecurity especially in the elderly, since there are factors associated with food insecurity that are not related to poverty (6). Since measurement of food insecurity is an important part of understanding and assessing nutritional problems, using measurements to determine what components (quantitative, qualitative, psychological, and social) are more prevalent among our population could help understand the underlying causes of food insecurity (7), and could help assess needs of the low-income elderly thoroughly for program and policy decisions.

Food insecurity affects health and QOL (18) since limited economic resources increase the risk for poor nutrition among the elderly (15). Having a poor diet may lead to nutrient deficiencies, anemia and other diseases or it could lead to diseases related to excessive nutrient consumption, such as, coronary heart disease (48). Nutrient deficiencies may also lead to exhaustion and weakness that contribute to reducing physical activity and performance, and increasing frailty and disability (16). The elderly use more health, medical, and other services compared to the general population and food insecurity can bring further burdens to those affected, as well as, to their families. Our population needs more attention because food insecurity is not only an undesirable phenomenon because of its negative impact on health, but also because it is ethically unacceptable (18).

The FSP was designed to reduce the risk of food insecurity and assist low-income individuals in obtaining a more nutritious diet; however, the FSP failed to reach our study population. The low participation rate in the FSP seen in our study (n=1), especially with the high prevalence of food insecurity, was of concern. More than half of a sample of

110 elderly from the South (40% AA) on a waiting list for home-delivered meals stated they did not always have enough money (or food stamps) to buy food (38). In that study (142) 18 respondents (16.4%) received food stamps but 15 reported they only received a mean of \$44.47 monthly. A little more than a quarter of those in poverty received food stamps suggesting that a large pool of potentially eligible elderly were not enrolled in the program (142). Also, the number of elderly FSP participants, has dropped slightly from 1994 (36%) to 2000 (30%) (49), which suggests that few eligible elderly are enrolling nationwide per year.

Although our study did not assess barriers for participation in the FSP, it is clearly an important future direction. In general, barriers for participation by the elderly not only include “low expected benefits” (38) but also lack of information, a perceived lack of need, the “time and hassle” involved in applying, and the stigma of receiving public benefits (138). These barriers should be assessed in order to find ways to improve participation. Since food insecure individuals may decrease food intake by eating less food or fewer meals compared to those food secure, which may compromise their diet quality (35), it is of importance that those who are food insecure be identified and offered information about their options regarding food assistance programs. To encourage participation among vulnerable food insecure populations, dietitians and other health professionals should actively offer information about the FSP (27). In our study, in the brochure given to attendees in the lesson on Nutrition and Aging we provided participants with information regarding options on what to do when they were “short on money.” We also suggested they contact the local food stamp office to get further assistance.

To raise participation in the food stamp program by the elderly, the USDA implemented the Elderly Nutrition Demonstration in six states (Arizona, Connecticut, Florida, Maine, Michigan, and North Carolina). Some of the strategies that worked well in this population include simplifying the eligibility requirements for the elderly, assisting them directly with the application process, and offering the option of receiving packages of commodities each month instead of getting benefits through an electronic benefits transfer card (139). Implementing a program like the Elderly Nutrition Demonstration in Louisiana may be an effective way to increase food stamp participation for low income elderly. Strategies for increasing FSP participation for this group include targeting community centers or retirement facilities available for low income elderly such as LBC and CPA, where food insecurity rates were high and food stamp participation was low.

In our study, the nutrition intervention itself consisted of four lessons offered to LBC and CPA participants. Topics covered in each lesson were independent of one another. Therefore, if someone was not able to attend a lesson, she/he would still be able to understand and benefit from other lessons. Although classes were planned and scheduled to accommodate as many participants as possible, participation rates were low. This may be attributed to scheduling conflicts, lack of interest in a particular topic, or a lack of incentive to participate. However, a monetary incentive was provided to participants who volunteered to participate at the beginning of the study regardless of their attendance. More participants from LBC than from CPA attended the classes. This was probably the result of the larger potential participation pool available from LBC. A more enthusiastic staff from LBC could have also influenced participation. From the graduate student's perspective, it seemed that LBC participants were more active and

more interested in learning about nutrition and health. For future considerations, offering incentives or refreshments like healthy snacks or even free meals may increase participation for this population.

Our first hypothesis was that nutrition education classes given to study participants would not increase knowledge of a) MyPyramid and DGA, b) Food Labels, c) Nutrition and Aging, d) Food Safety. At LBC, results from the study rejected this hypothesis as judged by pre-and post-test results. These encouraging results suggest that LBC is a good population for other nutrition interventions. LBC participants also appeared to benefit from the knowledge gain as judged by positive reported behavior modifications. LBC participants were enthusiastic about coming to the classes; the majority participated in class discussions and shared anecdotes frequently. At CPA, results from our study rejected the hypothesis that there was no increase in knowledge for: a) MyPyramid and DGA, c) Nutrition and Aging, and d) Food Safety. This suggested that the aforementioned classes' content and delivery were effective in increasing knowledge among participants. However, results from our study supported the hypothesis that there were no increases in knowledge for the lesson on Food Labels. There were two principal reasons why we did not see a significant difference, one was the small sample size ($n=4$). However, an equally likely explanation was the high level of baseline knowledge (75 ± 14.43) about food labels that this population displayed. It was possible that the participants could have received past education on food labels or were interested enough on the topic to learn this information on their own.

The positive outcomes shown by our population suggested that use of the SCT to design and deliver the classes was an effective way to increase knowledge among

participants. Strategies used in our study that were related to the SCT were social support, discussing benefits of healthy eating, convenient location for participants, and increasing self-efficacy by attending the monthly classes. Even though the SCT has been widely used, limited information about this model and how it can be used with intervention programs for the elderly could be found (100, 123).

Bandura (140) hypothesized that a change in personal factors or the environment influenced behavior. Even though increases in knowledge (personal factors) were assessed in our study, it is recommended that dietary self-efficacy be used as a measurement variable before and after the intervention to determine any changes as a result of the program. Because skills are difficult to measure, a focus on self-efficacy could be an appropriate approach to measure behavior change (114). Dietary self-efficacy is the capability to choose more healthful food, and it is associated with improved nutrition behavior. Self-efficacy questionnaires were used before and after the completion of a nutrition intervention program in children and adolescents (120). In that study (120) monthly nutrition classes were effective in increasing dietary self-efficacy in the group of children. It would be of interest to see if any changes in dietary self-efficacy occurred as a result of a nutrition intervention program to grasp a better understanding of efficacy beliefs in a group of elderly individuals.

Other strategies could be used to increase participation and mastery of nutrition education, and consequently increase self-efficacy. In elderly groups, strategies that have been used by other researchers include having an intensive program with a limited number of messages (100); incorporating the individual, social network and community levels with a culturally sensitive approach (123); and incorporating topics related to

chronic disease and nutrition (30). These are all good strategies that have resulted in positive outcomes related to dietary modifications, and could be considered for future interventions. In our study, we included the individual and community levels and incorporating limited number of nutrition messages for assuring positive outcomes.

Our second hypothesis was that for those participants attending at least one class, there was no difference in self-perceived nutritional quality of the diet, knowledge of nutrition, and eating habits among participants from LBC and CPA. This hypothesis was rejected only for differences in self-perceived nutritional quality of the diet and knowledge of nutrition. The part of the hypothesis related to self-perceived eating habits was supported. Encouragingly, the majority of participants, who reported positive changes, also reported dietary changes at the follow up. For the question on self-perceived dietary quality of the diet, 77% of those reporting positive change also reported making dietary changes. This suggested a positive association between self-perceived quality of diet and reported dietary changes. However, the number of classes attended did not seem to influence if whether participants reported positive changes in the self-perceived eating habits question. This suggested that it was not a strong influencing factor for positive changes in self-perceived eating habits. Since sample size was small, especially for those attending 3-4 classes, the statistical power of the analysis was questionable.

For the question on self-perceived nutrition knowledge, 78% of those reporting a positive change also reported making dietary changes. This suggested a positive association between self-perceived increase in knowledge and reported dietary modifications. However, the number of classes attended did not seem to influence

whether participants reported positive changes in the self-perceived nutrition knowledge question. This suggested, paradoxically, that the number of classes attended was not a strong influencing factor for positive changes in self-perceived nutrition knowledge. This information could not be compared directly with the literature, since we were unable to find any published reports that looked at self-perceived eating habits, nutritional quality of diet, or knowledge of nutrition. However, self-perceived health has been widely assessed in different populations (18, 141-142) with consistent findings reporting that self-perceived health status accurately reflected health in different populations, suggesting that our approach for assessing self-perceived nutrition related issues was a valid one.

Our results did not support the hypothesis regarding differences in self-perceived nutritional quality of diet. Significant differences between pre-and post-intervention ratings for self-perceived nutritional quality of diet suggested that participants may have believed they were eating better, or were making healthier food choices after the intervention. However, the number of classes attended did not seem to influence if whether participants reported positive changes in this question. This suggested that it was not a strong influencing factor for positive changes in self-perceived nutritional quality of the diet. For those participants who attended the classes and went from a “good or excellent” to a “poor or fair” answer, an increased in nutrition knowledge may have influenced their perception of the nutritional quality of their diets. Learning about healthy eating may have helped one realized “how bad” their diet actually was.

Our results did not support the hypothesis for differences in self-perceived knowledge of nutrition. Significant differences between pre-and-post intervention ratings

for self-perceived knowledge of nutrition suggested that after attending the classes, participants believed that their knowledge of nutrition was increased. It was not unexpected that after demonstrating more knowledge by pre-and post-test change, and receiving printed nutrition education materials along with the classes, participants would have ranked themselves differently. Several participants, who ranked themselves the same before-and after the classes, attended only one or two classes, suggesting that attending only one or two classes are not enough to change perceptions. However, when the two groups, those attending 1-2 lessons and attending 3-4 lessons were compared, no significant differences were found. This suggested that the number of classes attended did not seem to influence if whether participants reported positive changes in the self-perceived nutrition knowledge question.

Our results supported the hypothesis for differences in self-perceived eating habits. No significant differences between pre-and post intervention ratings for self-perceived eating habits were seen. Eating habits for the elderly are determined not only by lifetime preferences and physiological changes, but also by factors such as living arrangements, finances, transportation, and disability (33). For this population, it is not only a matter of being willing to modify behaviors, but also being able to modify them; this could have influenced the individuals' lack of self-perceived change about their eating habits. A short-term intervention like ours may not be sufficient to change long-term behaviors like eating habits in the elderly. Further research is needed to understand more fully the role of nutrition education programs on sustaining long-term changes in healthy behaviors, including eating habits.

Finally our study results did not support our third hypothesis that there would be no dietary changes for those participants attending at least one class, as reflected by positive answers to the question “Were you able to make any changes we discussed, if so, what were they”? At one time, it was believed that nutrition education was sufficient to elicit behavior change (143). However, we now know that knowledge is essential but not sufficient to change behavior (144). The Knowledge, Attitude, Behavior (KAB) model suggested that to influence behavior all that was needed was to provide someone with the knowledge about how their behavior influenced their health; this would, in turn, influence their attitude toward the behavior and eventually lead to the desired behavior (144). By applying measurement tools to assess the theory constructs mentioned above it is clear that changes in knowledge are poorly related to and not predictive of behavior change (114, 143). So, increasing nutrition knowledge by itself may not be useful in promoting changes in eating behaviors (145). Therefore, the KAB model seems to be inadequate in promoting dietary or physical activity-related behavior changes (114). However, in our study, increases in knowledge were related to an increase in reported dietary modifications, suggesting that although changes are not completely dependent on knowledge, increased knowledge is an important step in behavior modification.

Another model that has been widely used as a conceptual framework in nutrition to explain behavior change is the Transtheoretical Model (TTM) introduced by James Prochaska and Carlo DiClemente in 1983 (146-147). The TTM includes five stages of change offering guidance for people at all stages of readiness to change. It attempts to explain behavior change as a series of levels of readiness to modify one’s behavior. The five stages of change are pre-contemplation, contemplation, preparation, action and

maintenance and it is assumed that the individual moves along the continuum of the different stages of change. The TTM is based on the theory that people are at different stages of motivational readiness to change behavior (146). The use of this model has been effective in eliciting behavior change if educational means are stage specific and address the individual needs of participants (148). Successful use of this model requires that the researchers know the participants stage and use appropriate strategies to target nutrition education to the right stage (55). The TTM is useful in understanding behavior change; however we did not use it because our population was too small. For future directions, if a larger sample size is facilitated, the TTM could be used in order to individualize behavior modification according to specific participants needs. This allows researchers to enhance motivation in those who are not ready to change, and change or maintain a behavior for those who are already motivated (146).

In our study, significant differences were seen in the number of individuals who made changes between LBC and CPA; participants from Leo Butler were more likely than those at CPA to make dietary modifications. The only LBC participant who responded negatively to these questions stated she had not made any changes because she “has always tried to eat healthy.” Results from our study suggested that LBC participants not only increased their knowledge in all lessons judged by pre-and post-test results, but also attempted to change behavior. Thus, it can be argued that LBC participants are a good target population for nutrition education classes that would elicit behavior change. Conversely, CPA participants may have benefit from a more intensive program including more lessons to help them foster behavior change.

In our study, researchers made an effort to emphasize healthy nutrition behaviors such as the importance of including fruits and vegetables in the diet. In MyPyramid and DGA, the recommended number of daily servings and what a serving size was, were addressed. In the lesson on Nutrition and Aging, substitutions for “hard to eat” fruits and vegetables were offered for those who had chewing problems. Eating fruits and vegetables was also emphasized in the handout on “How to Improve Diets of the Elderly” given to study participants. Easy to make recipes that included fruits and vegetables were also given to participants. Therefore, if a participant stated an increased fruit and vegetable consumption and attended MyPyramid and DGA, Nutrition and Aging, or both lessons, it was assumed that the increased in knowledge influenced reported behavior change. Knowing the number of daily servings and the importance of eating fruits and vegetables and benefits from eating fruits and vegetables could have also influenced reported increases in their consumption. An assumption in this study was that participants were honest in their responses; however, over-reporting may have occurred. Also, vague terms used by respondents like “watching” or “being more aware of” were hard to assess.

Only three participants mentioned trying to increase their intake of whole grains even though the importance of including whole grains in the diet was stressed in the lessons on MyPyramid and DGA, and Nutrition and Aging. A specific lesson on whole grains, including information on identification and ways to incorporate them in a daily diet is suggested. Including recipes and tasting have elicited behavior changes in another study (80), suggesting it may be beneficial for future interventions.

Another common answer given by participants during the follow up was “I’m reading food labels” which was related to the Food Labels lesson and to the Nutrition and Aging lesson. Understanding and using food labels were stressed in both lessons. Answers that reflected food label use were encouraging, since use of food labels may result in decrease prevalence in chronic, diet-related diseases, such as coronary heart disease and some cancers (17). Other studies have emphasized the need for education to help the elderly with diabetes understand and apply the nutrition information on food labels (99-101). These studies (29, 99-101, 149-150) demonstrated positive results after a food label education program for diabetics in increasing knowledge and skills to improve diabetes management based on food label reading. Increased food label reading is a positive behavior change, especially in our population where the prevalence of diabetes (48.5%, data not shown) and heart disease (33%, data not shown) were high. So, sustained education on food labels especially in a population like ours is recommended for future interventions.

Other common answers to the question on dietary changes included limiting fats and sweets and controlling portion sizes. These reported behaviors are related to the MyPyramid and DGA lesson, which again suggested that information from this particular lesson was useful for participants in behavior modification.

It should be noted that the above comments reflected reported behavior changes only; we do not know if they actually modified their behaviors. Collecting 24-hour recalls or food diaries before-and after the intervention could have been included in the study to determine if any dietary modifications were made. However, the small sample size in our study was a limitation, since population samples can largely affect the degree

of validity of 24 hour recalls (151-152). Another limitation of 24-hour recalls, especially among women and older individuals, is underreporting (151-152). Other limitations of using 24-hour recalls and food diaries which are especially important for the elderly, is that they rely on memory. Problems involving memory include difficulties in reporting accurate portion sizes, and biases of the respondents (151).

Some answers obtained at the follow-up were not related to the class(es) which the participant actually attended. Answers such as “I’m trying to increase fruit and vegetable consumption” or “trying to eat less red meat” were comments made by people who attended the Food Safety Lesson only. This suggested that the participant responded that way to please the interviewer with any nutrition-related behavior change, when in fact, no dietary modifications attributed to increases in knowledge from attending a specific class were made.

Another answer not related to the classes was “I’m staying away from too many carbohydrates or starches.” This was true even though low-carbohydrate diets were neither encouraged nor discussed in any of the lessons. Low carbohydrate diets have been popularized without comprehensive evidence of their efficacy or safety (153-154). Media exposure is influencing this population; by implying reduced-carbohydrates diets are healthy. Low-carbohydrate diet books are common and low-carbohydrate products are easily available (155), but tend to mislead the general public about diet and nutrition (156). A major concern with a low carbohydrate diet is not only a restriction of carbohydrate or concomitant increase in protein which leads to ketosis, but also their high and unrestricted saturated fat content (156-157). Low carbohydrate diets are also low in water soluble vitamins and fiber (157) which can be of concern to the elderly. Lastly, a

diet low in carbohydrates is dehydrating. This is a problem in the elderly population who are at risk for dehydration (154).

In our study, all of those who responded negatively to dietary changes only attended one class, suggesting that a single nutrition lesson was not enough to foster behavior change. Many nutrition education programs (30, 55, 80, 100, 151) included from 4-12 lessons on the same topic. However, we could not program our lessons to be interrelated or to build sequentially because of attendance problems. Moreover, it was believed that a general overview of nutrition was more important in this population.

Physical disability, a common problem in the elderly, may have influenced participants with no reported behavior change. Physical disabilities or impairments may lead to adaptations in the affected individual's diet in response to the particular problem which may lead to a monotonous diet (9). For example, a woman at CPA who did not report dietary changes had a hand impairment that limited her capability to cook; she stated that she "eats fast foods and microwave foods all the time."

Paradoxically, social support also limited behavior change in one of our study participants. Social support may come from informal social networks such as family and friends, or more formal programs such as congregate feeding sites (6). Help from others for purchasing, preparing, and cooking food may help the elderly maintain a varied and balanced diet (40). Social support was clearly a factor for some participants, for example one woman at CPA who did not report making dietary changes, was wheelchair bound and dependent on others for food.

Surprisingly, no answers related to food safety were seen for the question on dietary changes. This suggested that even though this topic was relevant to this

vulnerable population (104, 115), the lesson may not have been as helpful as the other lessons. A less likely explanation may be that since participants seemed familiar with safe food handling practices, no changes were reported because they were already performing them previously. This population appeared fairly knowledgeable about food safety issues, as was reflected by LBC participant's knowledge based on anecdotal comments shared during the class. Further participants commented on the importance of handwashing, and they were able to describe specific times when handwashing was essential. Anecdotal comments such as "I never leave food out for more than 2 hours", or "I use different cutting boards for different types of foods", or "I used to thaw foods in the counter until I was told I was not supposed to do so" reflected their previous knowledge of food safety.

Summary and Conclusions

A high prevalence of food insecure elderly and a low participation rate for food stamps in our study suggested that measures need to be taken to increase elderly participation in federal and state programs. Assessment of barriers to participation in our population is suggested, which would result in higher levels of participation in federal or state programs. Providing information and ways to contact local and state programs may also increase participation in these programs.

Our findings suggested education based on MyPyramid and DGA, and food labels are relevant for this population, and should be considered for future nutrition education programs targeting the elderly. Using the DGA and MyPyramid can help the elderly assure they are getting adequate nutrition from all food groups. Since studies have shown that a low percentage of elderly meet recommendations for fruits and vegetables (30, 44)

and milk (44), education on recommendations may help the elderly increase consumption.

When participants attended lessons 3 and 4 they made anecdotal comments about the Food Label class. Comments like “I am now reading food labels, something I never did before attending the food labels class” or “I am paying more attention to food labels when I shop now” suggested that education not only increased knowledge, but also resulted in behavior changes.

To improve behavior modification outcomes, more than one lesson on a given topic may have helped. For example, having a lesson on MyPyramid and DGA, followed by a more specific lesson on ways to increase fruit and vegetable consumption or whole grain consumption may have helped participants take action towards increasing healthy behaviors. The elderly population is expected to double by 2030; therefore, it is important that programs keep targeting this population and focusing on ways to increase healthy behaviors such as physical activity and adequate nutrition.

Future Directions

Due to a low participation rate from food assistant programs in the elderly, it is suggested that intervention strategies focus on reducing the barriers associated with health and community support services. To understand the problem, personal attitudes and limitations that prevent the elderly from accessing services when available must be assessed.

To increase the statistical power of the study, future studies should include larger samples of low income elderly. If a larger sample size was used, the TTM could be applied to target specific behavior modifications based on stages of change (148). A

larger sample size would have also allowed the use of aggregate diet recall information like 24-hour recalls for determining behavior change more precisely.

Another suggestion for the design of lessons for the elderly includes the use of lessons targeting prevention or treatment of chronic disease along with dietary recommendations in order to increase healthy behaviors. For example, classes on cardiovascular disease and fat intake would be a way to link specific nutrients to certain chronic diseases or diabetes management education would help the elderly deal with health-related complications. Other suggestions would be to increase the duration of the program, in order to increase the likelihood of participants engaging in healthy behavior modification.

LITERATURE CITED

1. Rogers C. America's Older Population. *Food Review*. 2002;25:2-7.
2. Position Paper of the American Dietetic Association: Nutrition Across the Spectrum of Aging. *Journal of the American Dietetic Association*. 2005;105:616-633.
3. Weimer JP. Factors Affecting Nutrient Intake of the Elderly. *Family Economics and Nutrition Review*. 1999;12:101-103.
4. Sharpe D, Huston S, Finke M. Factor Affecting Nutritional Adequacy Among Single Elderly Women. *Family Economics and Nutrition Review*. 2003;15:74-82.
5. Bonnel W. Nutritional Health Promotion for Older Adults, Where is the Context? *Journal of the American Academy of Nurse Practitioners*. 2003;15:224-228.
6. Bartali B, Salvini S, Turrini A, Lauretani F, Russo C, Corsi A, Bandinelli S, Amicis A, Palli D, Guralnik J, Ferrucci L. Age and Disability Affect Dietary Intake. *J. Nutr.* 2003;133:2868-2873.
7. Mason A, Hanley E, Chezem C, Wallmann H. Nutrition and Aging. *Consumer and Family Sciences: Department of Foods and Nutrition*. Purdue Extension. 2004.
8. Greely A. Nutrition and The Elderly. *FDA Consumer*. 1990;24:24-25.
9. Cason K, Cox R, Wenrich T, Poole K, Burney J. Food Stamp and Non-Food Stamp Program Participants show similarly positive change with nutrition education. *Top Clin Nutr.* 2004;19:136-147.
10. Brink MS, Sobal J. Retention of knowledge and practices among adult EFNEP participants. *J Nutr Educ.* 1994;26:74-78.
11. Hartman TJ, McCarthy PR, Park RJ, Schuster E, Kushi L. Results of a community-based low literacy nutrition education program. *J Community Health*. 1997;22:325-341.
12. Posner BM, Jette AM, Smith KW, Miller DR. Nutrition and health risks in the elderly: the Nutrition Screening Initiative. *AM J Public Health*. 1993;83:972-978.
13. Lee CJ, Godwin SL, Tsui J. Association between dietary knowledge and quality of diets in southern rural elderly. *J Nutr Elderly*. 1997;17:5-17.
14. Dibsball LA, Lambert N, Bobbin RF, Frewer LJ. Low income consumers attitudes and behaviours towards access, availability and motivation to eat fruit and vegetables. *The Nutrition Society*. 2003.

15. Guthrie J, Lin B. Overview of the Diets of Lower-and Higher-Income Elderly and their Food Assistance Options. *J Nutr Educ Behav.* 2002;34:S31-S41.
16. Frongillo E, Horan C. Hunger and Aging. *Food and Nutrition for Healthier Aging.* 2004;28:28-33
17. Perez-Escamilla R, Haldeman L. Food Label Use Modifies Association of Income with Dietary Quality. *Nutritional Epidemiology.* 2002;132:768-772.
18. Sun Lee J, Frongillo E. Nutritional and Health Consequences Are Associated with Food Insecurity among US Elderly Persons. *J. Nutr.* 2001;131:1503-1509.
19. Visser L. Overcoming the Barriers to Healthy Eating for Older Adults Living in the Community. Available at:
http://www.ocsa.on.ca/PDF/healthy_eating_report.pdf#search='Overcoming%20the%20Barriers%20to%20Healthy%20Eating%20for%20Older%20Adults%20Living%20in%20the%20Community' Accessed on 10.10.05.
20. Drewnowski A, Shultz JM. Impact on Eating Behaviors, Food Choices, Nutrition, and Health Status. *The Journal of Nutrition, Health and Aging.* 2001;5(2).
21. Centers for Disease Control and Prevention. Healthy Aging: preventing disease and improving quality of life among older Americans. Available at:
<http://www.aoa.gov/aoa/stats/profile/2002/2002profile.pdf>. Accessed 02.05.06.
22. National Center for Health Statistics. Chartbook on Trends in the Health of Americans, 2002. <http://www.cdc.gov/nchs/htm>. Accessed 02.10.06.
23. Drewnowski A, Warren-Mears. Does Aging Change Nutrition Requirements?. *The Journal of Nutrition, Health and Aging.* 2001;5(2).
24. Kazuo K, Widjaja L, Gayle S. Lifecycle nutrition and cardiovascular health: the aged. *Asia Pacific Clin Nutr.* 2001;10(2):118-121
25. Topp R, Fahlman M, Boardley D. Healthy aging: health promotion and disease prevention. *Nursing clinics of North America.* 2004;39:411-422
26. Wolfe W, Frongillo E, Valois P. Understanding the Experience of Food Security by Elders Suggests Ways to Improve Measurement. *J. Nutr.* 2003;133:2762-2769.
27. Hall B, Brown L. Food Security Among Older Adults in the United States. *Top Clin Nutr.* 2005;4:329-338.
28. Lang Susan. Food Insecurity in the Elderly. *Nutritional Sciences, Brief Reports.* 2002;30:24.

29. Alibhai S, Greenwood L, Payette H. An Approach to the management of unintentional weight loss in elderly people. *CMAJ*. 2005;172:6
30. Broihier K. Taste and Smell: Tactics to Triumph over declining senses as you age. *Environmental Nutrition*. 2000;23:1-2
31. Nutrition, Exercise, and Wellness. 2000. Available at: <http://ag.arizona.edu/nsc/new/news/news2-00.htm>. Accessed on 12.04.05.
32. Rolls B, Dimeo K, Shide D. Age-related impairments in the regulation of food intake. *Am J Clin Nutr*. 1995;62:923-31.
33. Misra R. Influence of Food Labels on Adolescent Diet. *The Clearing House*. 1998;75:306-9.
34. Frongillo E, Valois P, Wolfe W. Using a Concurrent Events Approach to Understand Social Support and Food Insecurity Among Elders. *Family Economics and Nutrition Review*. 2003;15:2532.
35. Messer E, Ross E. Talking to Patients About Food Insecurity. *Nutrition in Clinical Care*. 2002;5:168-81.
36. Sahyoun N, Krall E. Low dietary quality among older adults with self-perceived ill-fitting dentures. *J Am Diet Assoc*. 2003;103:1494-1499.
37. Shapiro J, Downey L. The Evaluation and Management of Swallowing Disorders in the Elderly. *Geriatrics Times*. Available at: <http://www.geriatrictimes.com/g031217.html>. Accessed Sept 18.04
38. Salmon MA, Gooden J. Food Insecurity and Hunger among Homebound Older Adults in the Rural South: A Study of People on the Waiting List for Home-Delivered Meals. Available at: http://srdc.msstate.edu/focusareas/health/fa/salmon01_final.pdf#search='Food%20insecurity%20and%20hunger%20among%20homebound%20older%20adults%20in%20the%20rural%20south'. Accessed on 02,02,06.
39. Sharkey J, Branch L, Zohoori N, Giuliani C, Busby J, Haines P. Inadequate nutrient intakes among homebound elderly and their correlation with individual characteristics and health-related factors. *Am J Clin Nutr*. 2002;76:1435-45.
40. Benzeval M, Judge K, Shouls S. Understanding the Relationship between Income and Health: How much can be gleaned from cross-sectional data? *Blackwell Publishers*. 2001;35:376-396.
41. Shankar S, Klassen A. Influences on Fruit and Vegetable Procurement and Consumption Among Urban African-American Public Housing Residents, and Potential

Strategies for Intervention. Family Economics and Nutrition Review. Available at: www.highbeam.com/library/doc0.asp?docid=1G1%3A86059680&refid=ink_d8. Accessed Sept 18.04

42. Steptoe A, Perkins-Porras L, McKay C, Rink E, Hilton S, Cappuccio F. Behavioural counseling to increase consumption of fruit and vegetables in low income adults: randomized trial. *BMJ*. 2003;326:855.

43. Turrell G, Hewitt C, Patterson B, Oldenburg B, Gould T. Socioeconomic differences in food purchasing behaviour and suggested implications for diet-related health promotion. *J Hum Nutr Dietet*. 2002;15:355-364

44. Juan WY, Lino M, Basiotis PP. Quality of diets of older adults. Nutrition insight 29, Alexandria, VA: Center for Nutrition Policy and Promotion; 2004. Available at: <http://www.usda.gov/cnpp/Insights/insight29.pdf>. Accessed on 02.02.06.

45. Guthrie J, Lin B. Older Americans Need to Make Every Calorie Count. *FoodReview*. 2002;25:8-12.

46. Anderson SA. Core Indicators of Nutritional State for Difficult to Sample Populations. *The Journal of Nutrition*. 1990;120:1557S-1600S.

47. Nord M. Food Security Rates are High for Elderly Households. *Food Review*. 2002;25:19-24.

48. Nord M, Andrews M, Carlson S. Household Food Security in the United States, 2003. Washington, DC: US Dept of Agriculture:2004. Available at: <http://www.ers.usda.gov/publications/fanrr42/>. Accessed 09.08.05.

49. Wilde P, Dagata E. Food Stamp Participation by Eligible Older Americans Remains Low. *Food Review*. 2002;25:25-29.

50. Cunyngnam, K. Food Stamp Program Participation Rates: 2003. July 2005. Available at: <http://www.fns.usda.gov/oane/MENU/Published/FSP/FILES/Participation/FSPPart2003.pdf#search='Elderly%20participation%20in%20Food%20Stamp%20Program'> Accessed on 03.13.06.

51. Contento IR, Randell JS, Basck CE. Review and analysis of evaluation measures used in nutrition education intervention research. *J Nutr Educ Behav*. 2002;34:2-25.

52. Abusabha R, Peacock J, Achterberg C. How to make nutrition education more meaningful through facilitated group discussions. *J Am Diet Assoc*. 1999;99:72-76.

53. Willett W. Diet and Cancer. *Oncologist*. 2000;5:393-404.

54. Sayhoun N. Food Insufficiency and the Nutritional status of the Elderly Population. Nutrition insight 18, Washington DC: 2000. Available at: <http://www.usda.gov.cnpp/Insights/insight18.pdf>. Accessed on 08.02.05.
55. Mc Carney MA, Hawthorne NA, Reddy S, Lombardo M, Cress ME, Johnson MA. A Statewide Educational Intervention to Improve Older Americans' Nutrition and Physical Activity. *Family Economics and Nutrition Review*. 2003;15.
56. McCleeland J, Irving L, Mitchell R, Bearon L, Webber K. Extending the reach of nutrition education for older adults: of a train-the-trainer approach in congregate nutrition sites. *Journal of Nutrition Education and Behavior*. 2002;34;S49-S52
57. Sayhoun N, Pratt C, Anderson A. Evaluation of Nutrition Education Interventions for Older Adults: A Proposed Framework. *J Am Diet Assoc*. 2004;104:58-69.
58. Chronic disease notes and reports. National Center for Chronic Disease Prevention and Health Promotion. 1999;12. Available at: <http://www.cdc.gov/nccdphp/publications/cdnr/pdf/cdfall99.pdf> Accessed 02.05.06.
59. Dietary Guidelines for Americans, 2005. Available at: <http://www.health.gov/dietaryguidelines/dga2005/document/pdf/dga2005.pdf>. Accessed on 06.03.95.
60. MyPyramid. Steps to a Healthier You. United States Department of Agriculture. Available at <http://www.mypyramid.gov>. Accessed on 06.03.05.
61. Healthy People 2010. Available at: <http://www.healthypeople.gov/Document/pdf/uih/uih.pdf>. Accessed on 06.03.05.
62. Stewart, P, Brochetti D, Cox RH. Low-income Older Adults' Needs and Preferences for Nutrition Education. *J Nutr Elderly*. 1998;18:1-20.
63. Parrett CB, Greenhill ED, Martin JC, Wade-Koch ML. Evaluation of Nutrition Education and Exercise in a health promotion and wellness programs for older adults. College of Nursing, the University of Tennessee Health Science Center, Memphis, TN.
64. Charlton K. Eating well: aging gracefully! *Asian Pacific J Clin Nutr*. 2002;11:S607-S617.
65. AARP Survey on Lifelong Learning. 2000. Available at: <http://assets.aarp.org/rgcenter/general/lifelong.pdf>. Accessed 10.02.05.
66. Holt CL, Kreuter MW, Clark EM, Sharff D. Understanding the effects of printed health education materials: Which features lead to which outcomes? *Journal of Health Communications*. 2001;6:265-279.

67. Sellers D, Thompson-Robinson M, Parra-Medina D, Wilcox S, Thompson N, Will J. Readability of Educational Materials Targeting CVD Risk Factors in African Americans and Women. *American Journal of Health Studies* 2003;18(4):188-94.
68. Hoffman T, Worrall L. Designing effective written health education materials: Considerations for health professionals. *Disability and Rehabilitation*. 2004;26:1166-1173.
69. Griffin J, McKenna K, Tooth L. Written health education materials: Making them more effective. *Australian Occupational Therapy Journal* 2003;50:170-77.
70. Hoisington A. Community Nutritional Update: Older Adults. OSU Extension, Multnomah Co. 2002.
71. Billek-Sawhney B, Reicherter EA. Literacy and the Older Adult. *Topics in Geriatric-Rehabilitation*. 2005;21:275-281.
72. Horner S, Surratt D, Juliusson S. Improving Readability of Patient Education Materials. *Journal of Community Health Nursing*. 2000;17(1):15-23.
73. Parra-Medina D, Wilcox S, Thompson-Robinson M, Sargent R, Will J. A Replicable Process for Redesigning Ethnically Relevant Educational Materials. *Journal of Women's Health*. 2004;13:579-587.
74. Alridge M. Writing and Designing Readable Patient Education Materials. *Methodology Nursing Journal*. 2004 July-August;31:373:77.
75. Oshaug A. Evaluation of nutrition education programmes: Implications for programme planners and evaluators. Available at: http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/W3733E/w3733e06.htm Accessed on 01.15.06.
76. Winter M, Stanton L, Boushey C. The Effectiveness of a Food Preparation and Nutrition Education Program for Children. *Top Clin Nutr*. 1999;14(2):48-59.
77. Afifi-Soweid R, El Kak F, Major S, Karam D, Rouhana A. Changes in Health-Related Attitude and Self-Reported Behaviour of Undergraduate Students at the American University of Beirut Following a Health Awareness Course. *Education of Health*. 2003;16:265-78.
78. Marais IV, de Muynk R, Shedden A. Computer-Aided Learning in Disadvantaged Communities in the Southern Cape and Karoo-A Nutrition Education Initiative. *SAJCN*. 2001;14:106-111.

79. Lacey J. Improving familiarity with legumes in an introductory tertiary nutrition course in Pennsylvania, USA. *Nutr diet*. 2004;61:159-61.
80. Johnson MA. Whole Grains Education Programs For Older Adults. Available at: <http://www.fsci.umn.edu/img/assets/6714/05WholeGrainOlderAdultsMAJohnsonFINALMay18SHORT.ppt> Accessed on 02.20.06.
81. Horowitz B, Chang PF. Efficacy of Lifestyle Redesign Within Medical Model Adult Day Program. Available at: <http://www.utmb.edu/pmch/SeminarSchedules/PMCH%20Seminars%202002-03/Slides%202002-03/PMCH%20presentation%201002.pdf#search='Efficacy%20of%20lifestyle%20redesign%20within%20medical%20model%20adult%20day%20program'> Accessed on 02.10.06.
82. Gleberzon B. Developing a community-based educational program for older persons. *J Can Chiropr Assoc*. 2001;45(1):18-25.
83. Kunkel M. From the Pyramid to the Plate: A Curriculum for Individuals and Groups with Type 2 Diabetes. *J Nutr Educ Behav*. 2004;36:157-8.
84. Briley M, Padgett A, Gillham MB, Wilson K, Roberts-Gary C. Nutrition Education for Organizations Supported by Food Banks. *Top Clin Nutr*. 2001;16(4):21-7.
85. Blair S, Collingwood T, Reynolds R. Health Promotion for Educators: Impact on Health Behaviors, Satisfaction, and General Well-Being. *AJPH*. 1984;74:147-9.
86. Wade J. A Fruit and Vegetable Nutrition Education Intervention in Northeast Georgia Older Americans Act Nutrition Programs Improves Intake, Knowledge, and Barriers Related to Consumption.
87. Nappo-Dattoma. 2005 USDA Nutrition Guidelines. *Access*. 2005:29-35
88. Loughrey K, Basiotis P, Zizza C, Dinkins J. Profiles of Selected Target Audiences: Promoting the Dietary Guidelines for Americans. *Research Articles*. 2001;13:3-14.
89. Ottoboni A, Ottoboni F. The Food Guide Pyramid: Will the Defects Be Corrected? *Journal of American Physician and Surgeons*. 2004;9:109-113.
90. Schneeman B. Evolution of dietary guidelines. *J Am Diet Assoc*. 2003;103:S5-9.
91. Godfrey J. Toward Optimal Health: Walter Willett, M.D., Dr, P.H. Discusses Dietary Guidelines. *Journal of Women's Health*. 2005;14:679-83

92. Krisberg K. USDA debuts new interactive food pyramid, Web Site. *Nation's Health*. 2005;35:2-5
93. Jordan CT, Lee JY. Dietary Fat Intake and Search for Fat Information on Food Labels: New Evidence. *Consumer Interests Annual*. 2003;49.
94. Kim SY, Nayga R, Capps O. Food Label Use, Self-Selectivity, and Diet Quality. *The Journal of Consumer Affairs*. 2001;35:346-62.
95. Alfieri L. Assessing the Performance of Women On Nutrition Labeling Tasks. *American Journal of Health Studies*. 2000. Available at http://www.findarticles.com/p/articles/mi_mOCT/is_3_16/ai_72731724/print Accessed on January 30.05.
96. Kristal A, Lewy L, Patterson R, Li Sue, White E. Trends in Food Label Use Associated With New Nutrition Labeling Regulations. *American Journal of Public Health*. 1998;88:1212-15.
97. Rayner M, Boaz A, Higginson C. Consumer Use of Health-Related Endorsements on Food Labels in the United Kingdom and Australia. *JNE*. 2001;33:24-30.
98. LeGault L, Brandt MB, McCabe N, Adler C, Brown A, Brecher S. 2000-2001 Food Label Package Survey Update on Prevalence of Nutrition Labeling and Claims on Processed, Packaged Foods. *J Am Diet Assoc*. 2004;104:952-8.
99. Macon JF, Oakland MJ, Jensen HH, Kissack PA. Food label use by older Americans: data on the Continuing Survey of Food Intakes by Individuals and the Diet and Health Knowledge Survey 1994-1996. *J Nutr Elder*. 2004;24(1):35-52.
100. Miller CK, Edwards L, Kissling G, Sanville L. Evaluation of a theory-based nutrition intervention for older adults with diabetes mellitus. *J Am Diet Assoc*. 2002 Aug;102(8):1069-81.
101. Miller C, Brown J. Knowledge and use of the food label among senior women in the management of type 2 diabetes mellitus. *J Nutr Health Aging*. 1999;3(3):152-7.
102. English J. Food Safety. Available at: <http://www.nalboh.org/envh/primer/FoodSafety.pdf#search='food%20safety%20old%20dominion%20university'>. Accessed on 02.15.06.
103. Foodborne Diseases. US Department of Health and Human Services. 2005. Available at: www.niaid.nih.gov/factsheets/foodbornedis.htm. Accessed on 02.03.06.
104. Foodborne Illness. US Department of Health and Human Services: CDC. 2005. Available at: http://www.cdc.gov/ncidod/dbmd/diseaseinfo/foodborneinfections_t.htm Accessed on 02.05.06.

105. Medeiros L, Hillers V, Kendall P, Mason A. Evaluation of Food Safety Education for Consumers. *JNE*. 2001;33:S27-34.
106. Mead PS, Slutsker V, Dietz LF, McCaig JS, Bresee JS, Shapiro C, Griffin PM, Tauxe. Food-Related Illness and Death in the United States. *Emerging Infectious Diseases*. Volume 5, No5. Available at: <http://www.cdc.gov/ncidod/eid/vol5no5/mead.htm>. Accessed on 01.20.06.
107. Medeiros L, Hillers V, Kendall P, Mason A. Food Safety Education: What Should We Be Teaching to Consumers? *JNE*. 2001;33:108-113.
108. Surujlal M, Badrie N. Household consumer food safety study in Trinidad, west Indies. *Internet Journal of Food Safety*. Available at <http://www.foodhaccp.com/internetjournal/ijfsv3-3.pdf#search='household%20consumer%20food%20safety%20study%20in%20trinidad,%20west%20indies'> Accessed on 02.17.06.
109. Johnson AE, Donkin AJ, Morgan K, Lilley JM, Neale RJ, Page RM, Silburn R. Food safety knowledge and practice among elderly people living at home. *J Epidemiol. Community Health*. 1998;52:745-48.
110. Woteki C, Facinoli S, Schor D. Keep Food Safe to Eat: Healthful Food Must Be Safe as Well as Nutritious. *American Society of Nutritional Sciences*. 2001;131:502S-509S.
111. Fraser A. Calculating the Economic Value of Food Safety Education. Available at: <http://www.ces.ncsu.edu/depts/fcs/food/safety.fscal.html>.
112. Block A. Diet, shopping and food-safety skills of food stamp clients improve with nutrition education. *California Agriculture*. 2004;58:206-8.
113. Brug J, Oenema A, Ferreira I. Theory, evidence and Intervention Mapping to improve behavior nutrition and physical activity interventions. *International Journal of Behavioral Nutrition and Physical Activity*. 2005;2.
114. Baranowski T, Cullen K, Nicklas T, Thompson D, Baranowski J. Are Current Health Behavioral Change Models Helpful in Guiding Prevention of Weight Gain Efforts? *Obesity Research*. 2003;11:23S-43S.
115. Pajares F. Overview of Social Cognitive Theory and of Self-Efficacy. Available at <http://www.des.emory.edu/mfp/eff/html>. Accessed on 03.25.06
116. Billek-Sawhney B, Reicherter A. Social Cognitive Theory. Use by Physical Therapists in the Education of the Older Adult Client. *Topics in Geriatric Rehabilitation*. 2004;4:319-23.

117. Lefebvre C, Olander C, Levine E. The Impact of Multiple Channel Delivery of Nutrition Messages on Student Knowledge, Motivation and Behavior: Results From The Team Nutrition Pilot Study. *Social Marketing Quarterly*. 1999;5:90-8.
118. Croy M, Marquart L. Factors Influencing Whole-grain Intake by Health Club Members. *Top Clin Nutr*. 2005;20(2):166-176.
119. Resnicow K, Davis-Hearn M, Smith M, et al. Social cognitive predictors of fruit and vegetable intake in children. *Health Psychol*. 1997;16:272-6.
120. Rinderknecht K, Smith C. Social Cognitive Theory in an After-School Nutrition Intervention for Urban Native American Youth. *J Nutr Educ Behav*. 2004;36:298-304.
121. Fontenot E, Connell C, Stuff J, Yadrick K, Bogle M. Influences on Fruit and Vegetable Consumption by Low-Income Black American Adolescents. *J Nutr Educ Behav*. 2005;37:246-251.
122. Wilson D, Friend R, Teasley N, Lee Irvine, Sica D. Motivational Versus Social Cognitive Interventions for Promoting Fruit and Vegetable Intake and Physical Activity in African American Adolescents. *Ann Behav Med*. 2002;24(4):310-19.
123. Campbell MK, Demark-Wahnefreid W, Symons M, Kalsbeek MD, Dodds J, Cowan A, Jackson B, Motsinger B, Lashley J, McClelland JW. Fruit and vegetable consumption and prevention of cancer: the Black Churches United for Better Health project. *Am J Public Health*. 1999;89:1390-6.
124. Krummel D, Humphries D, Tessaro I. Focus Groups on Cardiovascular Health in Rural Women: Implications for Practice. *JNEB*. 2002;34:38-46.
125. Smith E. Telephone interviewing in healthcare research: a summary of the evidence. *Nurse Researcher*. 2005;12:41.
126. Rhode P, Lewinsohn P, Seeley J. Comparability of Telephone and Face-to-Face Interviews in Assessing Axis I and II Disorders. *Am J Psychiatry*. 1997;154:1593-1598.
127. Thomas R, Purdon S. Telephone methods for social surveys. Available at <http://www.soc.surrey.ac.uk/sru/SRU8.html> Accessed on 02.14.06.
128. German T. Telephone surveys. Available at: <http://www.musc.edu/btm738/spring2000/German/German.html#Telesurvey>. Accessed on 03.02.06.
129. Burke C. Food Security Status, Nutrient Intake At The Beginning and End of The Monthly Resource Cycle, and Body Mass Index in Female Food Stamp Participants. Master's Thesis submitted in May 2005, Louisiana State University.

130. Household Survey Tools. Available at: <http://www.ers.usda.gov/briefing/foodsecurity/surveytools/>. Accessed on 03.01.06.
131. Social Cognitive Theory. Available at: http://www.tcw.utwente.nl/theorieenoverzicht/Theory%20clusters/Health%20Communication/Social_cognitive_theory.doc/ Accessed on 03.20.06.
132. Freund W, Wilson W. Statistical Methods, second edition. 2003.
133. Nord M. Measuring the Food Security of Elderly Persons. *Family Economics and Nutrition Review*.2003;15:33-46
134. Blumberg SJ, Bialostosky K, Hamilton WL, Briefel RR. The effectiveness of a short form of the household food security scale. *Am J Public Health*. 1999;89:1231-1232.
135. Tingay RS, Tan CJ, Tang S, Teoh PF, Wong R, Gulliford MC. Food insecurity and low income in an English inner city. *J Public Health Med*. 2003;25:156-9.
136. Gulliford M, Mahabir D, Roche B. Food insecurity, food choices, and body mass index in adults: nutrition transition in Trinidad and Tobago. *International Journal of Epidemiology*. 2003;32:508-516.
137. Stuff JE, Horton JA, Bogle ML, Connel C, Ryan D, Zaghloul S, Thornton A, Simpson P, Gossett J, Szeto K; Lower Mississippi Delta Nutrition Intervention Research Consortium. High Prevalence of food insecurity and hunger in households in the rural Lower Mississippi Delta. *J Rural Health*. 2004;20(2):173-80.
138. Schwarzer R, Renner B. Social-cognitive predictors of health behavior: action self-efficacy and coping self-efficacy. *Health Psychol*. 2000;19:487-95.
139. Cody S. Food Stamp Program-Elderly Nutrition Demonstrations: Interim Report on Elderly Participation Patterns. Available at: <http://www.ers.usda.gov/publications/efan04009/>
140. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev*. 1977;84:191-215.
141. Bierman A, Bubolz T, Fisher E, Wasson J. How Well Does a Single Question about Health Predict the Financial Health of Medicare Managed Care Plans? Effective Clinical Practice. 1999. Available at: <http://www.acponline.org/journals/ecp/marapr99/single.htm> Accessed on 02.05.06.
142. Eriksson I, Unden AL, Elofsson S. Self-rated health. Comparisons between three different measures. Results from a population study. *International Journal of Epidemiology*. 2001;30:326-33.

143. Leslie L. Nutrition Education, Behavioral Theories, and the Scientific Method: Another Viewpoint. *J Nutr Educ Behav*. 2005;37:90-3.
144. Chapman-Novakofski K. Behavior Theory and Impact Analysis in Nutrition Education. 2003. Available at: <http://aging.als.uiuc.edu/Discovery%202005/Dr.%20Chapman-Novakofski.pdf#search='Behavior%20Theory%20and%20Impact%20Analysis%20in%20Nutrition%20Education'>. Accessed on 03.25.06.
145. Pirouznia M. The correlation between nutrition knowledge and eating behavior in an American school: the role of ethnicity. *Nutr Health*. 2000;14:89-107.
146. Ruggiero L. Helping People With Diabetes Change Behavior: From Theory to Behavior. *Diabetes Spectrum*. 2000;13. Available at: <http://journal.diabetes.org/diabetesspectrum/00v13n3/pg125.htm>. Accessed on 02.10.06.
147. Tassell N. Stages of Change for Fruit and Vegetable Intake and Dietary Fat Modification in Maori Women: Some relationships with body attitudes and eating behaviours. *New Zealand Journal of Psychology*. 2005;34:28-34.
148. Fontenot E. Stages of Change in Clinical Nutrition Practice. *Nutrition in Clinical Care*. 2002;5:251-257.
149. Miller CK, Jensen GL, Achterberg CL. Evaluation of food label nutrition intervention for women with type 2 diabetes mellitus. *J Am Diet Assoc*. 1999 Mar;99(3):323-8.
150. Kessler H. Relationship Between Use of Food Labels and Nutrition Knowledge of People with Diabetes. *The Diabetes Educator*. 1999;24:549-559.
151. Howat PM, Mohan R, Champagne C, Monlezun C, Wozniak P, Bray GA. Validity and reliability of reported dietary data. *JADA*. 1994;94(2):169-73.
152. Johnson RK, Soutanakis RP, Matthews DE. Literacy and body fatness are associated with underreporting of energy intake in US low-income women using the multiple-pass 24-hour recall: A doubly labeled water study. *JADA*. 1998;98(10):1136-40.
153. Bravata DM, Sanders L, Huang J et al. Efficacy and safety of low-carbohydrate diets: a systematic review. *JAMA* 2003;289:1837-50.
154. Volek J, Westman E. Very low-carbohydrate weight-loss diets revised. *Cleveland Clinic Journal of Medicine*. 2002;69:849-61.
155. Bilsborough S, Crowe S. Low Carbohydrate diets: what are the potential short-and long term health implications? *Asia Pacific J Clin Nutr* 2003;12 (4):396-404.

156. Noakes M, Kritharides L, Miller M. Position Statement on Very Low Carbohydrate Diets. National Heart Foundation of Australia, April 2004. Available at: http://www.heartfoundation.com.au/downloads/Very_low_carb_dietsPP_04.pdf Accessed on feb.12.05.

157. Keller U, Rastalsky N. Low-carbohydrate diets for obesity. *Ther Umsch.* 2005 Sept;62(9):647-50.

APPENDIX A:
IRB PERMIT
INFORMED CONSENT



Institutional Review Board
203 B-1 David Boyd Hall
Louisiana State University and A&M College
Baton Rouge LA 70803
irb@lsu.edu

(225) 578-8692

FAX: 578-6792

LSU IRB
ACTION ON PROTOCOL APPROVAL REQUEST

TO: Robert Wood
Department of Kinesiology

Rebecca Ellis Gardner
Department of Kinesiology

FROM: Robert C. Mathews, Chairman
Institutional Review Board for Research with Human Subjects

DATE: October 11, 2004

RE: IRB# 2407

TITLE: "Increasing Physical Activity and Healthy Diet Behavior among Culturally Diverse Seniors"

New Protocol/Modification: M

Review type: Full _____ Expedited X **Review date:** 10/11/2004

Approved X **Disapproved** _____

Approval Date: 10/11/2004 **Approval Expiration Date:** 10/11/2005

Re-review frequency: (annual unless otherwise stated) _____

Number of subjects approved: ~~140~~ 180

By: Robert C. Mathews 

PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING -- Continuing approval is CONDITIONAL on:

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. SPECIAL NOTE:

**All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at <http://www.osr.lsu.edu/osr/comply.html>*

Informed Consent

TITLE OF RESEARCH PROJECT Health Promotion in Low Income Elders

The purpose of this study conducted by the Louisiana State University (LSU) investigators is to study the relationship between diet, weight, income, and health. To do this, you will be asked questions about your weight and history of weight, your perceptions of weight and diet, income, nutrition education, and perceptions of diet and health.

This information will be used to understand more fully the relationships among income, diet, and weight. You will benefit directly from this study by learning valuable information about your health; further, society as a whole may benefit through improved understanding of weight, diet, and health in a population of low-income women. There are no physical risks associated with answering these questions.

Only LSU researchers involved in this study will have access to these recalls. Results of this study, including any publications, will not identify individuals by name. Data will be presented either in summary form or stripped of individual identifiers. You may choose not to participate in this aspect of the study. You may withdraw from this study at any time without prejudice.

The study has been discussed with me and all questions have been answered to my satisfaction. I may direct additional questions regarding this study to Dr. Carol O’Neil, School of Human Ecology, at 225-578-1631. If I have questions about subjects’ rights or other concerns, I can contact Dr. David Morrison at 225-578-8236.

With full knowledge of the above information, I voluntarily consent to take part in this study.

Name of participant (please print): _____

Signature of participant: _____ Date: _____

Mailing address: _____
(Street) (City) (Zip)

Phone: _____

—

Witness (please print): _____

Signature of witness: _____

Date: _____

APPENDIX B

USDA FOOD SECURITY MODULE (MODIFIED)

[Administer these items in a fairly standard manner. Upon completion of these items, go on to the height, weight, and waist circumference measures, then the 24-hour food recall]

The next questions are about the food eaten in your household in the last 30 days and whether you were able to afford the food you need.

1. “The food that I bought just didn’t last, and I didn’t have money to get more.” Was that often, sometimes, or never true for you in the last 30 days?
2. “We couldn’t afford to eat balanced meals.” Was that often, sometimes, or never true for you in the last 30 days?

(1) Often true (2) Sometimes true (3) Never true

Probe: What does “balanced meal” mean to you?

3. In the last 30 days, did you ever cut the size of your meals or skip meals because there wasn’t enough money for food?

(1) Yes _____ (2) No _____

4. In the last 30 days, did you ever eat less than you felt you should because there wasn’t enough money to buy food?

(1) Yes _____ (2) No _____

5. In the last 30 days, were you ever hungry but didn’t eat because you couldn’t afford enough food?

(1) Yes _____ (2) No _____

6. In the last 30 days, have you not eaten in order to have enough food for your children?

(1) Yes _____ (2) No _____

7. Which of these statements best described the food eaten in your household in the last 30 days? (Check only one)

(1) We always have enough to eat and the kinds of food we want

- (2) We have enough food to eat but NOT always the KINDS of food we want
- (3) SOMETIMES we don't have ENOUGH to eat
- (4) OFTEN we don't have ENOUGH to eat

8. Who does the majority of the grocery shopping in your household? (circle one)

- a) Self
- b) Spouse/significant other
- c) Parent(s)
- d) Child(ren)
- e) Friends/roommate
- f) Other (describe): _____

9. Who does the majority of cooking for your household? (circle one)

- a) Self
- b) Spouse/significant other
- c) Parent(s)
- d) Child(ren)
- e) Friends/roommate
- f) Other (describe): _____

10. Where do you do the majority of your food shopping?

11. Where else do you shop for food?

12. What amount of food stamps do you receive each month? _____

13. How much money do you spend for food above the amount of food stamps that you receive each month? _____

14. If you need to, how do you stretch your food stamps to reach the end of the month?

15. On the average, how much does your household spend per week on food?

- | | | | | | |
|--------|---------|-----------|-----------|-----------|-----------|
| \$0-25 | \$26-75 | \$ 76-125 | \$126-200 | \$201-300 | \$301-500 |
| (1) | (2) | (3) | (4) | (5) | (6) |

16. How many persons does this feed per week? (fill in a number in each of the spaces below; fill in zero if applicable)

- a. _____ number of adults
- b. _____ number of teenagers
- c. _____ number of children
- d. _____ number of infants

17. Do you receive WIC? ____ Yes ____ No

18. How would you rate your eating habits? (circle one)

Poor	Fair	Good	Excellent
(1)	(2)	(3)	(4)

19. How would you rate the nutritional quality of your diet? (circle one)

Poor	Fair	Good	Excellent
(1)	(2)	(3)	(4)

20. About how many calories do you think you eat a day? (circle one)

Much Too Low	Somewhat Low	Just About Right	Somewhat High	Much Too High
(1)	(2)	(3)	(4)	(5)

21. How would you rate your knowledge of nutrition? (circle one)

Poor	Fair	Good	Excellent
(1)	(2)	(3)	(4)

22. On average, how often do you eat in fast-food restaurants? (circle one)

Rarely Or Never	Several Times Per Month	Several Times Per Week	Once a Day	Most Meals
(1)	(2)	(3)	(4)	(5)

23. Which fast-food restaurants do you eat in most often?

24. What do you typically order in these fast-food restaurants?

25. On average, how often do you eat in other types of restaurants?

Rarely	Several Times	Several Times	Once a	Most
--------	---------------	---------------	--------	------

	Or Never (1)	Per Month (2)	Per Week (3)	Day (4)	Meals (5)
26.	What do you typically order in these fast-food restaurants?				

APPENDIX C

MYPYRAMID AND THE DGA

Lesson Plan 1

Program objectives:

- At the end of the lesson, all participants will learn about the new dietary guidelines released in 2005.
- At the end of the lesson they will know serving size recommendations from each food group based on their age and sex.

Target audience: Participants from Leo Butler Center and Catholic Presbyterian Apartments.

Pre-testing: 10 minutes

Introduction

Dietary Guidelines for Americans are the official policy of the United States Government. They are revised every five years,

This year, revisions were sweeping:

- Included the demolition of the Food Guide Pyramid
- Changed recommendations to household measures-like cups instead of the most confusing “servings”
- Made specific recommendations for different populations
- Provided specific daily recommendations for all food groups and for vegetables for the week.

What is a "Healthy Diet"?

The Dietary Guidelines describe a **healthy diet** as one that:

- Emphasizes fruits, vegetables, whole grains, and fat-free or low-fat milk and milk products;
- Includes lean meats, poultry, fish, beans, eggs, and nuts; and
- Is low in saturated fats, cholesterol, salt (sodium), and added sugars.

Taking a closer look at your own personal guidelines!

Handouts of "My Pyramid" given to attendees consisted of a 1,600 calorie pattern for women and a 2,000 calorie pattern for men. Profiles were based on sex and physical activity. Amount of moderate or vigorous activity (such as brisk walking, jogging, biking, aerobics, or yard work) used was 30 minutes or less every day, considering that the participants were involved in exercise classes for a few days per week.

Finding out which foods are included under each food group

What foods are in the grain group?

Any food made from wheat, rice, oats, cornmeal, barley or another cereal grain is a grain product. Bread, pasta, oatmeal, breakfast cereals, tortillas, and grits are examples of grain products.

Grains are divided into 2 subgroups, **whole grains** and **refined grains**.

Whole grains contain the entire grain kernel -- the bran, germ, and endosperm

Whole grains examples include:

- whole-wheat flour
- bulgur (cracked wheat)
- oatmeal
- whole cornmeal
- brown rice

Refined grains have been milled, a process that removes the bran and germ. This is done to give grains a finer texture and improve their shelf life, but it also removes dietary fiber, iron, and many B vitamins. Some examples of refined grain products are:

- white flour
- degermed cornmeal
- white bread
- white rice

What foods are in the vegetable group?

Any vegetable or 100% vegetable juice counts as a member of the vegetable group.

Vegetables may be raw or cooked; fresh, frozen, canned, or dried/dehydrated; and may be whole, cut-up, or mashed.

What foods are in the fruit group?

Any fruit or 100% fruit juice counts as part of the fruit group. Fruits may be fresh, canned, frozen, or dried, and may be whole, cut-up, or pureed.

What foods are included in the milk, yogurt, and cheese (milk) group?

All fluid milk products and many foods made from milk are considered part of this food group. Foods made from milk that retain their calcium content are part of the group, while foods made from milk that have little to no calcium, such as cream cheese, cream, and butter, are not. Most milk group choices should be fat-free or low-fat.

What foods are included in the meat, poultry, fish, dry beans, eggs, and nuts (meat & beans) group?

All foods made from meat, poultry, fish, dry beans or peas, eggs, nuts, and seeds are considered part of this group. Dry beans and peas are part of this group as well as the vegetable group.

Most meat and poultry choices should be lean or low-fat. Fish, nuts, and seeds contain healthy oils, so choose these foods frequently instead of meat or poultry.

What are “oils”?

Oils are fats that are liquid at room temperature, like the vegetable oils used in cooking.

Oils come from many different plants and from fish. Most oils are high in monounsaturated or polyunsaturated fats, and low in saturated fats. Oils from plant sources (vegetable and nut oils) do not contain any cholesterol. In fact, no foods from plants sources contain cholesterol.

A few plant oils, however, including coconut oil and palm kernel oil, are high in saturated fats and for nutritional purposes should be considered to be solid fats.

Solid fats are fats that are solid at room temperature, like butter and shortening.

Try to stay away from solid fats, since they are high in saturated fats, and choose more oils from vegetable oils such as olive, canola, cottonseed, safflower, soybean, sunflower oils.

What about the things called discretionary calories?

Each person has an allowance for some discretionary calories. But, many people have used up this allowance before lunch-time! Most discretionary calorie allowances are very small, between 100 and 300 calories, especially for those who are not physically active. For many people, the discretionary calorie allowance is totally used by the foods they choose in each food group, such as higher fat meats, cheeses, whole milk, or sweetened bakery products.

You can use your discretionary calorie allowance to:

- Eat more foods from any food group than the food guide recommends.
- Eat higher calorie forms of foods—those that contain solid fats or added sugars. Examples are whole milk, cheese, sausage, biscuits, sweetened cereal, and sweetened yogurt.
- Add fats or sweeteners to foods. Examples are sauces, salad dressings, sugar, syrup, and butter.
- Eat or drink items that are mostly fats, caloric sweeteners, and/or alcohol, such as candy, soda, wine, and beer.

Instructional Materials:

1. Description of Objectives
2. Handout distributed to participants: My Pyramid: Steps to a healthier you

3. Handout used in class: Examples of whole grains and refined grains-examples of vegetables you can pick a week.

Learning activities: pre-and post-testing

PRE-TEST

Circle the best answer

According to the 2005 Dietary Guidelines for Americans, people your age:

1. Should consume a wide variety of nutrients each day

TRUE

FALSE

2. Should eat how many cups of vegetables each day?

a) $\frac{1}{2}$

b) 1

c) $1\frac{1}{2}$

d) 2

e) $2\frac{1}{2}$

3. Should eat how many cups of dark green vegetables each week?

a) 2

b) $2\frac{1}{2}$

c) 3

d) $3\frac{1}{2}$

e) 4

4. Should drink how many cups of milk each day?

a) 1

b) $1\frac{1}{2}$

c) 2

d) $2\frac{1}{2}$

e) 3

5. Should take a vitamin supplement or eat fortified foods to meet requirements for hard to get nutrients

TRUE

FALSE

POST-TEST

Circle the best answer

According to the 2005 Dietary Guidelines for Americans, people your age:

1. Should consume a wide variety of nutrients each day

TRUE

FALSE

2. Should eat how many cups of vegetables each day?

f) $\frac{1}{2}$

g) 1

h) $1\frac{1}{2}$

i) 2

j) $2\frac{1}{2}$

3. Should eat how many cups of dark green vegetables each week?

f) 2

g) $2\frac{1}{2}$

h) 3

i) $3\frac{1}{2}$

j) 4

4. Should drink how many cups of milk each day?

f) 1

g) $1\frac{1}{2}$

h) 2

i) $2\frac{1}{2}$

j) 3

5. Should take a vitamin supplement or eat fortified foods to meet requirements for hard to get nutrients

TRUE

FALSE

Handout # 1: MyPyramid: Steps to a Healthier You distributed to male participants



Based on the information you provided, this is your daily recommended amount from each food group.

GRAINS 6 ounces	VEGETABLES 2 1/2 cups	FRUITS 2 cups	MILK 3 cups	MEAT & BEANS 5 1/2 ounces
<p>Make half your grains whole</p> <p>Aim for at least 3 ounces of whole grains a day</p>	<p>Vary your veggies Aim for these amounts each week:</p> <p>Dark green veggies = 3 cups</p> <p>Orange veggies = 2 cups</p> <p>Dry beans & peas = 3 cups</p> <p>Starchy veggies = 3 cups</p> <p>Other veggies = 6 1/2 cups</p>	<p>Focus on fruits</p> <p>Eat a variety of fruit</p> <p>Go easy on fruit juices</p>	<p>Get your calcium-rich foods</p> <p>Go low-fat or fat-free when you choose milk, yogurt, or cheese</p>	<p>Go lean with protein</p> <p>Choose low-fat or lean meats and poultry</p> <p>Vary your protein routine—choose more fish, beans, peas, nuts, and seeds</p>
<p>Find your balance between food and physical activity</p> <p>Be physically active for at least 30 minutes most days of the week.</p>		<p>Know your limits on fats, sugars, and sodium</p> <p>Your allowance for oils is 6 teaspoons a day.</p> <p>Limit extras—solid fats and sugars—to 265 calories a day.</p>		

Your results are based on a 2000 calorie pattern.

Name: _____

This calorie level is only an estimate of your needs. Monitor your body weight to see if you need to adjust your calorie intake.

Handout # 1: MyPyramid: Steps to a Healthier You distributed to female participants



Based on the information you provided, this is your daily recommended amount from each food group.

GRAINS 5 ounces	VEGETABLES 2 cups	FRUITS 1 1/2 cups	MILK 3 cups	MEAT & BEANS 5 ounces
<p>Make half your grains whole</p> <p>Aim for at least 3 ounces of whole grains a day</p>	<p>Vary your veggies Aim for these amounts each week:</p> <p>Dark green veggies = 2 cups</p> <p>Orange veggies = 1 1/2 cups</p> <p>Dry beans & peas = 2 1/2 cups</p> <p>Starchy veggies = 2 1/2 cups</p> <p>Other veggies = 5 1/2 cups</p>	<p>Focus on fruits</p> <p>Eat a variety of fruit</p> <p>Go easy on fruit juices</p>	<p>Get your calcium-rich foods</p> <p>Go low-fat or fat-free when you choose milk, yogurt, or cheese</p>	<p>Go lean with protein</p> <p>Choose low-fat or lean meats and poultry</p> <p>Vary your protein routine—choose more fish, beans, peas, nuts, and seeds</p>
<p>Find your balance between food and physical activity</p> <p>Be physically active for at least 30 minutes most days of the week.</p>		<p>Know your limits on fats, sugars, and sodium</p> <p>Your allowance for oils is 5 teaspoons a day.</p> <p>Limit extras—solid fats and sugars—to 130 calories a day.</p>		

Your results are based on a 1600 calorie pattern.

This calorie level is only an estimate of your needs. Monitor your body weight to see if you need to adjust your calorie intake.

Name: _____

Handout used in class

EXAMPLES OF WHOLE GRAINS AND REFINED GRAINS.

Whole grains:

Brown rice
buckwheat
bulgur (cracked wheat)
Oatmeal
Popcorn

Ready-to-eat breakfast cereals:

Whole wheat cereal flakes
muesli

whole grain barley
whole grain cornmeal
whole rye
whole wheat bread
whole wheat crackers
whole wheat pasta
whole wheat sandwich buns and rolls
whole wheat tortillas
wild rice

Less common whole grains:

amaranth
millet
quinoa
sorghum
triticale

Refined grains:

cornbread
corn tortillas
couscous
crackers
flour tortillas
grits
noodles

Pasta

spaghetti
macaroni

pitats
pretzels

Ready-to-eat breakfast cereals

Corn flakes

white bread
white sandwich buns and rolls
white rice

EXAMPLES OF VEGETABLES YOU CAN PICK A WEEK:

Dark green vegetables

broccoli
collard greens
dark green leafy lettuce
kale
mustard greens
romaine lettuce
spinach
turnip greens
watercress

Orange vegetables

acorn squash
butternut squash
carrots
squash
pumpkin
sweet potatoes

Dry beans and peas

Black beans
black-eyed peas
garbanzo beans (chickpeas)
kidney beans
lentils
lima beans (mature)
navy beans
pinto beans
soy beans
split peas
tofu (bean curd made from soybeans)
white beans

Starchy vegetables

corn
green peas
lima beans (green)
potatoes

Other vegetables

artichokes
asparagus
bean sprouts
beets
Brussels sprouts
cabbage
cauliflower
celery
cucumbers
eggplant
green beans
green or red peppers
iceberg (head) lettuce
mushrooms
okra
onions
parsnips
tomatoes
tomato juice
vegetable juice
turnips
wax beans
zucchini

APPENDIX D

FOOD LABELS

Lesson Plan 2

Program objectives:

-At the end of the lesson, all participants will learn how to read and use food labels. They will be able to differentiate between two different foods, and tell which the healthier option is.

-At the end of the lesson, participants will be able to understand the label language, which consists of all the nutrient claims that are included in common foods. Participants will be able to state what common nutrient claims such as “light in sodium” means.

Target audience: Participants from Leo Butler Center and Catholic Presbyterian Apartments.

Pre-testing: 10 minutes

Introduction: Keeping it healthy

There are different tools that will help you understand the relation between diet and health and build up skills to make the right food decisions. First, the dietary guidelines based on what foods we should eat to maintain our health. Second, “MyPyramid” puts these guidelines into a visual guide we can follow. This tool guides us in selecting what food to eat and how much to eat each day to be healthy. We need to eat a variety of food from each of the food groups. The Nutrition Facts label is the third tool for healthier eating. Learning to use it will help you make healthier food choices.

The Nutrition Facts food label gives you information about which nutrients are in the food. Your body needs the right combination of nutrients, such as vitamins and minerals,

to work properly. The Nutrition Facts food label is printed somewhere on the outside of packaged food, and you usually don't have to look hard to find it. Fresh food that doesn't come prepackaged sometimes has nutrition facts, too.

What's on the Label?

You can find the ingredient list on your food package. Reading the list of ingredients will tell you a lot about a food. Labels can help you make the best food choices, choices that benefit you now and in the future, too. Ingredient lists are required on labels of all foods with more than one ingredient. The ingredients are listed in order by weight, from most to least. If you have food allergies, the ingredient list can help you identify foods that might be a problem for you.

Nutrition Facts Label

Let's take a look at a Nutrition Facts label. We'll start at the top and work our way down. Refer to generic food label poster to indicate where exactly everything can be located.

Serving Size

It is the first thing you will see on the top of the label. Calorie and nutrient content are given per serving. Serving sizes have been standardized for most foods. They reflect the amounts people actually eat. They are not based on "MyPyramid" serving sizes, but are just based on what it is believed most Americans would consume. Servings are given in common household measures as well as metric measure. For example, the serving size here is a cup (generic food poster).

Remember that a serving and a helping are not the same thing. If you eat more or less than the serving size on the label, you'll need to adjust the amounts of nutrients accordingly. Pretend that you will be serving yourself twice of what the serving size is,

explain that you'll have to do the math and multiply by 2 every item to get accurate numbers.

Servings per Container or Package

This tells you how many servings you can expect to get. In this package there are four one-cup servings. The next part of the label tells you how many calories and nutrients are in each serving of the food.

Calories and Calories from Fat

In this food there are 110 calories in each one-cup serving. The calories in a food can come from fat, protein, or carbohydrate. People pay attention to calories because if you eat more calories than your body uses, you might gain weight. Remember, if you eat two servings, you have to double the calories and all the nutrients. Of those 110 calories, 5 calories are from fat. People check this because it's good to limit fat intake.

The most important thing to remember is this:

- 1 gr. fat = 9 calories
- 1 gr. protein = 4 calories
- 1 gr. carbohydrate = 4 calories
- 1 gr. alcohol = 7 calories

Nutrients listed on the label are those most important to the health of today's consumers. Some nutrients we should try to eat less of are fat, saturated fat, cholesterol and sodium. Some nutrients we need more are fiber, vitamin A, vitamin C, calcium and iron. The label tells you how much of each of these nutrients is in a serving of the food.

Percent Daily Values

You'll find percentages on food labels that are based on recommended daily allowances - meaning the amount of something a person should get each day. For instance, there's a recommended daily allowance for fat, so the food label might say that one serving of this food meets 10% of the daily value. The daily values are based on an **adult's needs**.

Some percent daily values are based on the amount of calories and energy a person needs. These include carbohydrates, proteins, and fat. Other percent daily values - like those for cholesterol, sodium, vitamin A, vitamin C, calcium and iron- stay the same no matter how many calories a person eats.

A neat trick you can use is to remember the *5 and 20 rule*. If a food has 5% or less of a nutrient, it is considered low in that nutrient. If it has 20% or more, it's considered high.

Total Fat

The total fat is the number of fat grams contained in one serving of the food. Fat is an important nutrient that your body uses for growth and development, but you don't want to eat too much. The different kinds of fat, such as saturated, unsaturated, and trans fat, may be listed separately on the label.

Cholesterol and Sodium

These numbers tell you how much cholesterol and sodium (salt) are in a single serving of the food. They are included on the label because some people need to limit cholesterol or salt in their diets. Cholesterol and sodium are usually measured in milligrams.

Total Carbohydrate

This number tells you how many carbohydrate grams are in one serving of food.

Carbohydrates are your body's primary source of energy. This total is broken down into grams of sugar and grams of dietary fiber.

Protein

This number tells you how much protein you get from a single serving of the food. Your body needs protein to build and repair essential parts of the body, such as muscles, blood, and organs. Protein is often measured in grams.

Vitamin A and Vitamin C

These list the amounts of vitamin A and vitamin C, two especially important vitamins, in a serving of the food. Each amount is given as a percent daily value. If a food provides 20% of the RDA for vitamin A, that one serving of food gives an adult one fifth of the vitamin A needed for the day.

Calcium and Iron

These list the percentages of calcium and iron, two especially important minerals, that are in a serving of the food. Again, each amount is given as a percent daily value. If a food has 4% of iron, you're getting 4% of the iron you need for the whole day from that serving.

Calories per Gram

These numbers show how many calories are in one gram of fat, carbohydrate, and

protein. This information is the same for every food and is printed on the food label for reference.

Important points:

-If a food says that it has no cholesterol, it doesn't mean that it is a healthy food.

Example: Zaaps chips

-Some products like lifesavers candies do not include a food label enclosed to the package, it does however include a number that you can call and find out nutritional information about the product. Call and find out, sometimes you can speak directly to a dietitian and can help you out with any doubts or questions you may have.

Label Language

Just like the Nutrition Facts, nutrient content claims are defined for one serving. For example, that means that low- fat cheese has no more than three grams of fat per serving.

Instructional Materials:

1. Description of objectives
2. Handout1: Nutrient content claims.
3. Handout2: What's on the label?
4. Food labels from common foods and generic food label poster

Learning activities: pre-and post-testing

NAME _____

PRE-TEST

Food Labels Lesson

1. **For most foods, the ingredient listed first is:**

- A) ingredient present in the largest amount
- B) Ingredient present in the smallest amount
- C) Alphabetized

2. **If you are looking for a healthier options, which of the following milk options will you choose?**

A) Reduced fat milk

Serving size 1 cup

Calories per serving 120

Saturated fat 3 grams

B) Chocolate nonfat milk

Serving size 1 cup

Calories per serving 80

Saturated fat 0 grams

3. **A food labeled 5 grams of fat per serving has _____ calories from fat**

- A) 5
- B) 20
- C) 45
- D) 75

4. **If a food says that it has no cholesterol, it means it is a healthy food**

TRUE

FALSE

5. **Calorie content and % Daily values are based on a single serving**

TRUE

FALSE

6. **A label that reads “iron-6%” means that 6% of your daily value for iron is supplied in a single serving**

TRUE

FALSE

7. **The % Daily Value on the Nutrition Facts label shows you how a food fits into your overall diet. If a food has 5% or less of a nutrient, it is considered low in that nutrient. If it has 20% or more, it is considered high.**

TRUE

FALSE

8. **Food products making claims such as "fat free," "light," "reduced sodium “or” high fiber" must meet strict guidelines set by the Food and Drug Administration.**

TRUE

FALSE

NAME _____

POST-TEST

Food Labels Lesson

1. For most foods, the ingredient listed first is:

- A) ingredient present in the largest amount
- B) Ingredient present in the smallest amount
- C) Alphabetized

2. If you are looking for a healthier options, which of the following milk options will you choose?

A) **Reduced fat milk**
Serving size 1 cup
Calories per serving 120
Saturated fat 3 grams

B) **Chocolate nonfat milk**
Serving size 1 cup
Calories per serving 80
Saturated fat 0 grams

3. A food labeled 5 grams of fat per serving has _____ calories from fat

- A) 5
- B) 20
- C) 45
- D) 75

4. If a food says that it has no cholesterol, it means it is a healthy food

TRUE

FALSE

5. Calorie content and % Daily values are based on a single serving

TRUE

FALSE

6. A label that reads "iron-6%" means that 6% of your daily value for iron is supplied in a single serving

TRUE

FALSE

7. The % Daily Value on the Nutrition Facts label shows you how a food fits into your overall diet. If a food has 5% or less of a nutrient, it is considered low in that nutrient. If it has 20% or more, it is considered high.

TRUE

FALSE

8. Food products making claims such as "fat free," "light," "reduced sodium "or" high fiber" must meet strict guidelines set by the Food and Drug Administration.

TRUE

FALSE

Handout 1: Nutrient claims

NUTRIENT CLAIM DEFINITION PER SERVING

CALORIES

Calorie Free:	less than five calories
Low Calorie:	40 calories or less
Reduced or fewer calories:	at least 25% fewer calories compared with the standard food
Light:	1/3 fewer calories compared with the standard food

SUGAR

Sugar Free:	less than 0.5 gram sugar
Reduced sugar:	at least 25% less sugar compared with the standard food
No added sugar:	no sugars added during processing or packaging, including ingredients that contain sugar like fruit juices, applesauce or dried fruit.

FAT

Fat Free:	less than 0.5 gram of fat
Low fat:	3 grams or less of fat
Reduced or less fat:	at least 25% less fat
Light:	0% less fat

SATURATED FAT

Saturated fat free:	less than 0.5 gram saturated fat
Low saturated fat: from saturated fat	1 gram or less saturated fat per serving and not more than 15% of calories
Reduced or Less saturated fat:	at least 25% less saturated fat compared with the standard food

CHOLESTEROL

Cholesterol free:	less than 2 milligrams cholesterol and 2 grams or less of saturated fat
Low cholesterol:	20 milligrams or less cholesterol and 2 grams or less of saturated fat
Reduced or less cholesterol:	at least 25% less cholesterol and 2 grams or less saturated fat

SODIUM

Sodium free:	less than 5 milligrams sodium
Very low sodium:	35 milligrams or less sodium
Low sodium:	140 milligrams or less sodium
Reduced or less sodium:	at least 25% less sodium
Light in sodium:	50% or less sodium

FIBER

High fiber:	5 grams or more
Good source of fiber:	2.5 grams to 4.9 grams
More or added fiber:	at least 2.5 grams or more fiber

OTHER CLAIMS:

High, rich in, excellent source of:	20% or more of Daily Value
Good Source:	provides 10% to 19% of Daily Value
More, enriched, fortified:	added 10% or more of Daily Value
Lean:	less than 10 grams of total fat, 4.5 grams saturated fat and 95 milligrams cholesterol
Extra lean:	less than 5 grams of total fat, 2 grams of saturated fat and 95 milligrams cholesterol.

Handout 2: What's on the Label?

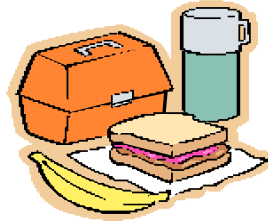
WHAT'S ON THE LABEL?

SERVING SIZE: Calorie and nutrient content are given per serving. These serving sizes are standardized for most foods, they reflect what people actually eat.

SERVINGS PER CONTAINER OR PACKAGE: Tells you how many serving sizes you can expect to get in the whole package.

CALORIES AND CALORIES FROM FAT: Total calories in a serving size. This calories can come from fat, protein or carbohydrates.

1 gram of fat=	9 calories
1 gram of protein=	4 calories
1 gram of carbohydrate=	4 calories
1 gram alcohol=	7 calories



PERCENT DAILY VALUES: Based on recommended daily allowances; meaning the amount of something a person should get each day. For instance, there's a recommended daily allowance for fat, so the food label might say that one serving of this food meets 10% of the daily value. The daily values are based on adult's needs.

5-20 RULE: If a food has 5% or less of a nutrient, it is considered low in that nutrient. If it has 20% or more, it's considered high.

Some percent daily values are based on the amount of calories and energy a person needs. These include carbohydrates, proteins, and fat. Other percent daily values - like those for cholesterol, sodium, vitamin A, vitamin C, calcium and iron- stay the same no matter how many calories a person eats.

TOTAL FAT: Number of grams present in 1 serving of the food, different kinds of fat may be listed separately.

TOTAL CARBOHYDRATES: Tells you how many carbohydrate grams are in one serving.

PROTEIN: Tells you how many protein grams are in one serving.

CHOLESTEROL AND SODIUM: This tells you how much sodium and cholesterol are in a single serving size. Usually measured in milligrams.

VITAMIN A AND C: Amounts are given as a percent daily value. If a food provides 20% of the RDA for vitamin A, that one serving of food gives an adult one fifth of the vitamin A needed for the day.

CALDIUM AND IRON: Each amount is given as a percent daily value. If a food has 4% of iron, you are getting 4% of the iron you need for the whole day from that serving.

APPENDIX E

NUTRITION AND AGING

Lesson Plan 3

Program objectives:

-At the end of the lesson, all participants will be familiar with common changes that affect the elderly and ways to manage them to prevent nutritional problems.

-At the end of the lesson, participants will be able to understand why good nutrition is important, especially during aging years.

Target audience: Study participants from Leo Butler Center and Catholic Presbyterian Apartments.

Pre-testing: 10 minutes

Question to audience:

Why do you think good nutrition is important in helping the elderly?

Good nutrition is important in helping the elderly remain independent, maintain their quality of life and avoid premature nursing home placement. It is never too late or too early to begin planning well for a long life. Aging depends on personal health and well-being. Nutritional status can reduce the length of hospital stays, and influence the progress of many diseases or even delay them. Being well-nourished is important to improve your health in general, to decrease your dependency, shorten diseases, delay diseases, and improve or maintain quality of life.

5 Reasons why good nutrition is essential in the elderly

- Health is improved.
- Dependence is decreased.

- Illnesses are shorter.
- Disease progression is delayed.
- Quality of life is improved or maintained.

Changes that may occur:

Body and physical changes take place and can result in changes in nutrient needs. These changes can contribute to decreased food intake, unintentional weight loss, and malnutrition. Not everyone experience these changes.

Information on the brochure covered here.

Information on handout covered here.

Instructional Materials:

1. Handout: 15 ways to improve your diet
2. Booklet: Eating Well as We Age
3. Recipe time

Learning activities: pre-and post-testing

15 ways to improve your diet!

1. Follow the USDA Food Guide Pyramid.
2. Eat more whole-grain bread and cereals.
3. Eat more fruit.
4. Eat dark green vegetables.
5. Eat more lean meat, legumes and other meat alternates.
6. Drink more skim and low-fat milk, and eat more skim and low-fat dairy products.
- ▶ 7. Decrease intakes of foods that are high in fats and sugars but provide few other nutrients.
8. Drink more water.
9. Include nutritious foods you enjoy and can chew.
10. Follow any special diets prescribed by the doctor.
11. Eat meals at regular times. Eating smaller meals on a regular basis may be better tolerated than eating three large ones.
12. Make snacks count!
13. Follow instructions when taking medicine. Some medicines must be taken after eating or with milk. If medicine is not taken as prescribed, you may become nauseated and ill.
14. Eat a snack before getting out of bed in the morning if your blood pressure tends to drop when you get up. Also, to help stabilize your blood pressure, sit on the side of the bed for a few minutes before getting up.
15. Exercise!

The following information was included in a booklet, taken from the FDA's website It available at: <http://www.fda.gov/opacom/lowlit/eatagepf.pdf>

Eating Well as We Age

The Food and Drug Administration, or FDA, is a United States government agency that makes sure foods are safe, wholesome and honestly labeled.

Eating Well

Many older people have trouble eating well. This booklet tells why. Then it gives ideas on what you can do about it. Using the food label is one way to eat well. There are others.

Problem: Can't chew

Do you have trouble chewing? If so, you may have trouble eating foods like meat and fresh fruits and vegetables.

What to do: Try other foods.

Instead of:	Try:
fresh fruit	fruit juices and soft canned fruits, like applesauce, peaches and pears
raw vegetables	vegetable juices and creamed and mashed cooked vegetables
meat	ground meat, eggs, milk, cheese, yogurt, and foods made with milk, like pudding and cream soups
sliced bread	cooked cereals, rice, bread pudding, and soft cookies

Problem: Upset stomach

Stomach problems, like too much gas, may make you stay away from foods you think cause the problem. This means you could be missing out on important nutrients, like vitamins, calcium, fiber and protein.

What to do: Try other foods.

Instead of:	Try:
milk	milk foods that may not bother you, like cream soups, pudding, yogurt and cheese
vegetables like cabbage and broccoli	vegetable juices and other vegetables, like green beans, carrots and potatoes

fresh fruit

fruit juices and soft canned fruits

Problem: Can't shop

You may have problems shopping for food. Maybe you can't drive anymore. You may have trouble walking or standing for a long time.

What to do:

- Ask the local food store to bring groceries to your home. Some stores deliver free. Sometimes there is a charge.
- Ask your church or synagogue for volunteer help. Or sign up for help with a local volunteer center.
- Ask a family member or neighbor to shop for you. Or pay someone to do it. Some companies let you hire home health workers for a few hours a week. These workers may shop for you, among other things. Look for these companies in the Yellow Pages of the phone book under "Home Health Services."

Problem: Can't cook

You may have problems with cooking. It may be hard for you to hold cooking utensils, and pots and pans. Or you may have trouble standing for a long time.

What to do:

- Use a microwave oven to cook TV dinners, other frozen foods, and foods made up ahead of time by the store.
- Take part in group meal programs offered through senior citizen programs. Or, have meals brought to your home.
- Move to a place where someone else will cook, like a family member's home or a home for senior citizens.

To find out about senior citizen group meals and home-delivered meals, call (1-800) 677-1116. These meals cost little or no money.

Problem: No appetite

Older people who live alone sometimes feel lonely at mealtimes. Loneliness can make you lose your appetite. Or you may not feel like making meals for just yourself.

Maybe your food has no flavor or tastes bad. This could be caused by medicines you are taking.

What to do:

- Eat with family and friends.
- Take part in group meal programs, offered through senior citizen programs.

- Ask your doctor if your medicines could be causing appetite or taste problems. If so, ask about changing medicines.
- Increase the flavor of food by adding spices and herbs.

Problem: Short on money

Not having enough money to buy enough food can keep you from eating well.

What to do:

- Buy low-cost foods, like dried beans and peas, rice and pasta. Or buy foods that contain these items, like split pea soup and canned beans and rice.
- Use coupons for money off on foods you like.
- Buy foods on sale. Also buy store-brand foods. They often cost less.
- Find out if your local church or synagogue offers free or low-cost meals.
- Take part in group meal programs offered through local senior citizen programs. Or, have meals brought to your home.
- Get food stamps. Call the food stamp office listed under your county government in the blue pages of the telephone book.

Read the Label

Look for words that **say something healthy about the food.**

Examples are:

- Low Fat
- Cholesterol Free
- Good Source of Fiber

Look for words that **tell about the food's relation to a disease.**

A low-fat food may say:

While many factors affect heart disease, diets low in saturated fat and cholesterol may reduce the risk of this disease.

The words may be on the front or side of the food package.

FDA makes sure these words are true.

Use label claims like these to choose foods that help make a good diet.

Look for "Nutrition Facts"

Most food labels tell what kinds and amounts of vitamins, minerals, protein, fat, and other nutrients are in a food.

This information is called "Nutrition Facts." You can find it on the side or back of most food labels.

Use "Nutrition Facts"

1. Look at the serving size.
2. Find the % Daily Value. The numbers underneath tell how much of each nutrient listed is in one serving.
3. About 100% of each nutrient each day is usually healthful. If you're on a special diet, like a low-sodium or low-fat diet, use the % numbers to pick low-sodium and low-fat foods.

The 3g (grams) of total fat in one serving of this food provides 5% of fat for the day, leaving 95% more fat allowed that day in a normal diet. The 300mg (milligrams) of sodium provide 13% for the day, leaving 87% more sodium allowed that day in a normal diet. The "mg" number is much larger than the "g" number because it takes many, many milligrams to equal 1 gram.

Do You Have More Questions About Eating Well As You Age?

Ask your doctor or other health-care worker.

And ask FDA. There may be an FDA office near you. Look for the number in the blue pages of the phone book.

You can also contact FDA through its toll-free number, 1-888-INFO-FDA (1-888-463-6332).

Or on the World Wide Web at www.fda.gov.

Recipe Time: The following recipes were distributed among participants.

APPLE-CHEESE BAKE

INGREDIENTS

MAKES 6-8 SERVINGS

6 cups apples, peeled and sliced
1 Tablespoon lemon juice
½ cup flour
½ cup sugar
¼ teaspoon cinnamon
¼ cup margarine
2/3 cup cheese, grated

PROCEDURE

1. PREHEAT OVEN TO 350 F
2. PLACE APPLE SLICES IN A PAN 8" X 8"
3. SPRINKLE APPLES WITH LEMON JUICE AND HALF THE SUGAR
4. IN A SMALL BOWL, MIX THE REMAINING SUGAR, FLOUR AND CINAMMON
5. ADD THE MARGARINE AND MIX WELL
6. ADD THE CHEESE AND MIX WELL
7. SPRINKLE THE FLOUR MIXTURE EVENLY OVER THE APPLES
8. BAKE FOR 45 MINUTES OR UNTIL APPLES ARE SOFT.
REFRIGERATE LEFTOVERS WITHIN 2 HOURS.

THIS RECIPE GIVES US:

CALCIUM: BUILDS BONES AND TEETH

FIBER: PREVENTS CONTIPATION

TACO SALAD

INGREDIENTS

MAKES 6 SERVINGS

- ½ lb ground meat or hamburger
- 1 cup cooked kidney or chili beans
- ½ package taco seasoning or season to taste. You can make your own: 1 teaspoon each of salt and chili powder; ½ teaspoon each cornstarch, crushed dried red pepper, cumin, and garlic powder; and ¼ teaspoon dried oregano leaves.
- ½ cup water
- 1 bunch dark, green lettuce
- 2 medium tomatoes
- 1 small bunch scallions
- 1 package (16 oz) tortilla chips, preferable: low fat, unsalted
- ½ cup grated cheese

PROCEDURE

1. Brown hamburger in frying pan. Drain off fat.
2. Add beans, seasoning and water. Stir. Cover and simmer for 10 minutes.
3. Tear lettuce into tiny pieces. Chop tomatoes and scallions.
4. Mix vegetables and put into large bowl.
5. Spoon hamburger and bean mixture over vegetables
6. Sprinkle with cheese and tortilla chips
7. Toss lightly and serve at once
8. Refrigerate leftovers within 2 hours.

TACO SALAD IS GOOD FOR:

PROTEIN: Build and repairs skin, muscle and blood

B VITAMINS: Turn food into energy

IRON: makes red blood

FIBER: prevents constipation

VITAMIN C: keep gums and blood vessels healthy

CALCIUM: builds strong bones and teeth

APPENDIX F
FOOD SAFETY

Lesson Plan 4

Lesson goals:

1. Educate seniors on the importance of knowledge of safe food handling to help them stay healthy.
2. Educate seniors on the importance of hand washing for preventing the spread of infection.

Lesson objectives:

1. Increase awareness of the relationship between safe food handling and prevention of disease.
2. Increase knowledge of ways to increase home food safety so that at the end of the lesson they will be familiar with home safe handling techniques and proper temperatures to keep food safe.
3. Participants will be able to state safe food temperatures for both cold and hot foods.

Target audience: Participants from Leo Butler Center and Catholic Presbyterian Apartments.

Pre-test time: 10 minutes

Why is Food Safety important in the elderly?

Seniors become more vulnerable to illness, and once ill, can take them longer to recover. Knowledge of safe food handling procedures is essential to stay healthy. Some of the changes seniors undergo lessen the body's ability to fight bacteria. For example, there is

a decrease in stomach acid secretion, which is a natural defense against ingested bacteria. Over time, the immune system may become less skilled in ridding the body of bacteria. The sense of smell and taste sometimes affected by medications or illness may not always sound an alert when meat is spoiled or milk is sour. By knowing how the body changes, and using safe food handling techniques, seniors can easily protect themselves and reduce the risk of foodborne illness.

Guidelines for safe food handling (information included in a handout)

Importance of Hand washing

According to the U.S. Centers for Disease Control and Prevention, handwashing is the single most important means of preventing the spread of infection. Poor handwashing contributes to millions of cases of food poisoning every year.

Handwashing handout covered here.

Instructional materials:

1. Handout 1: Guidelines for safe food handling
2. Brochure: Keep your food safe: link:
<http://www.fda.gov/opacom/lowlit/foodsfevf.pdf>
3. Handout 2: Internal food temperatures
4. Handout 3: handwashing
5. Pre-Post Test

Post-Test: 10 minutes

Name: _____

PRE-TEST

FOOD SAFETY QUIZ

Please take a moment to answer the following questions:

1. How long should you wash your hands to get rid of bacteria?

- a) 5 seconds
- b) 10 seconds
- c) 15 seconds
- d) 20 seconds

2. Refrigerator prevents bacterial growth.

TRUE

FALSE

3. What is the best way to make sure meat and poultry are cooked thoroughly?

- a) Feel it with your fingers
- b) Judge it by its color
- c) Use a food thermometer
- d) Taste it

4. After you are done checking the temperature of a food, what should you do with the food thermometer before using it again?

- a) Wipe it off with a paper towel
- b) Place it in another food item and check its temperature
- c) Wash the food thermometer in hot, soapy water

5. At what temperature should you keep your cold foods?

- a) At or under 50
- b) At or under 60
- c) At or under 40
- d) At or under 70

Name: _____

POST-TEST

FOOD SAFETY QUIZ

Please take a moment to answer the following questions:

1. How long should you wash your hands to get rid of bacteria?

- e) 5 seconds
- f) 10 seconds
- g) 15 seconds
- h) 20 seconds

2. Refrigerator prevents bacterial growth.

TRUE

FALSE

3. What is the best way to make sure meat and poultry are cooked thoroughly?

- a) Feel it with your fingers
- b) Judge it by its color
- c) Use a food thermometer
- d) Taste it

4. After you are done checking the temperature of a food, what should you do with the food thermometer before using it again?

- d) Wipe it off with a paper towel
- e) Place it in another food item and check its temperature
- f) Wash the food thermometer in hot, soapy water

5. At what temperature should you keep your cold foods?

- a) At or under 50
- b) At or under 60
- c) At or under 40
- d) At or under 70

Handout:

Guidelines for safe food handling

1. Refrigerate or freeze all perishable foods. Refrigerator temperature should be 40 °F or less; freezer temperature should be 0 °F or less. Buy a refrigerator/freezer thermometer to check the temperatures, if you already own one, use it.
2. Never thaw food at room temperature. Always thaw food in the refrigerator, in cold running water or in a microwave. When thawing in the microwave, you must cook the food immediately.
3. Wash hands for 20 seconds with warm, soapy water before preparing food and after contact with raw meat and poultry.
4. Wash cutting boards and other work surfaces after contact with raw meat and poultry. Sanitize surfaces with a solution of 1 teaspoon chlorine bleach per quart of water before using them for other foods.
5. Never leave perishable food out of refrigeration over **two hours**. If room temperature is 90 °F or above, food should not be left out over an hour. This would include take-out foods, leftovers from a restaurant meal and Meals-on-Wheels deliveries. Total time, including time of transport from where ever you are, will be 2 hours.
6. Thoroughly cook raw meat, poultry and fish. Refrigerate or freeze all perishable foods. Refrigerator temperature should be 40 °F or less; freezer temperature should be 0 °F or less.
7. Keep cold food cold: eat or refrigerate the food immediately. Cold food should be held at 40 °F or colder.
8. When storing food in the refrigerator to eat later, you should place it in shallow containers, divide larger quantities into smaller portions, cover it loosely and refrigerate immediately or reheat it thoroughly when ready to eat.
9. Reheat thoroughly to temperature of 165 °F or until hot and steaming. In the microwave oven, cover food and rotate it so it heats evenly.
10. Store canned goods and pantry items in a cool, dry place. Store foods off the floor and away from cleaning supplies.
11. Label leftovers with date of cooking and store where you can see them. Use within three days. Store food in airtight containers; do not use ceramic or metal dishes or cans to store food. If in doubt, throw it out.
12. To prevent contamination of foods you need to wash the thermometer with hot water and soap after each use.

Booklet information: Taken from FDA's website.

Keep Your Food Safe

The Food and Drug Administration, or FDA, is a United States government agency. FDA helps protect the health of consumers by teaching them about food safety.

Keep Your Food Safe

Food that goes bad can make you sick. This is called food poisoning, or foodborne illness.

Sometimes when people think they have the "flu" or a "stomach bug," they really have a foodborne illness. You can keep food safe. This booklet tells you how to:

- buy safe food *and*
- keep it safe at home.

What makes foods go bad? Germs. They get on foods and grow. You cannot see germs on food. You cannot always smell or taste them, either.

These are some of the foods germs like best:

- Milk and other dairy products
- Eggs
- Meat
- Poultry
- Seafood
- Fruits and vegetables

Foods that are likely to have germs that can make you sick include:

- Unpasteurized or untreated juices, such as apple cider
- Sprouts
- Raw eggs and foods that contain raw eggs, such as cookie dough and Caesar salad dressing

Safe Food At the Store

Buy cans and jars that look perfect.

Do the cans have dents? Are the jars cracked? Do they have lids that are not closed tight? The food may have germs that can make you sick.

Check eggs, too. Open the carton and see if any eggs are broken or cracked. Only buy eggs that are refrigerated in the store.

Raw meat, poultry, and seafood sometimes drip. The juices that drip may have germs.

Keep these juices away from other foods. Put raw meat, poultry, and seafood into plastic bags before they go into your cart.

Pick up milk and other cold foods last. This will give them less time to warm up before you get home.

Save hot chicken and other hot foods for last, too. This will give them less time to cool off before you get home.

Safe Food At Home

After shopping, get home as soon as you can. Then put food into the refrigerator or freezer right away. Eggs always go in the refrigerator, but NOT in the door of the refrigerator.

Make sure that you and your kitchen are clean.

Always wash your hands for at least 20 seconds before and after you touch food. Use warm water and soap.

Wash everything else before and after it touches food.

Wash your cutting board with hot soapy water before you go on to the next food.

For extra protection, you can clean the board with a kitchen sanitizer, such as a solution of one teaspoon chlorine bleach to one quart water. When the cutting board becomes worn or hard to clean, throw it out and get a new one.

Fresh fruits and vegetables also need to be clean. Rinse them under warm running water to wash dirt away. Use a produce brush when appropriate.

Raw meat, raw poultry, raw seafood and raw eggs can spread germs in your kitchen. Keep these foods and their juices away from other foods. If you use cutting boards, it's best to set one aside that is used only for raw meat, poultry, fish and eggs.

Did you wipe up the juices with a dish towel? Wash it before you use it again.

Or, use paper towels and throw them away.

Meat, poultry and seafood need to stay cold while they thaw.

Thaw them:

- In the refrigerator. Do it one or two days before you will cook the food or

- In the microwave. Use the "defrost" setting. Then cook the food right away.

Raw meat, raw poultry, raw seafood, and raw eggs can make you sick. Cook them until they are done.

- Use a meat thermometer for poultry and meat, if possible.
- Use a meat thermometer if possible when cooking hamburger. Cook hamburger to a temperature of 160 degrees F. If you don't have a meat thermometer, don't eat hamburger if the meat is still pink.
- Dig a fork into cooked fish. The fish should flake.
- Cooked egg whites and yolks are firm, not runny.

If the food is left out for two or more hours, germs can grow.

So, put leftovers in the refrigerator or freezer as soon as you finish eating. Put them in shallow dishes so they cool faster.

Did you put leftovers in the refrigerator? Eat them in the next few days, before they go bad.

Keep Your Food Safe

It is hard to tell if a food is safe.

Foods that go bad may look, smell, and taste like safe foods.

So be safe.

- Buy safe food.
- Keep food safe at home.

If you think a food might be bad, **do not taste it.**

Remember this: When in doubt, throw it out!

Do you have questions about food safety? The FDA (Food and Drug Administration) may have an office near you. Look for their number in the blue pages of the phone book or call 1-888-SAFEFOOD (1-888-723-3366).

You can also contact FDA through its toll-free number, 1-888-INFO-FDA (1-888-463-6332). Or, on the World Wide Web at www.fda.gov.

Handout # 2:



Internal Cooking Temperatures °F

Eggs & Egg Dishes

Eggs.....Cook until yolk & white are firm.
Egg casseroles.....160
Egg sauces, custards.....160

Fresh Beef, Veal, Lamb

Medium Rare.....145
Medium.....160
Well Done.....170

Ham

Fresh (raw).....160

Fully cooked (to reheat).....140

Poultry

Chicken, Turkey-whole.....180
Chicken, Turkey-dark meat.....180
Poultry breast.....170
Duck & Goose.....180

Sauces, Soups, Gravies, Marinades

Used with raw meat,
poultry, fish.....Bring to a boil.

Seafood

Fin Fish.....Cook until opaque
and flakes easily with a fork.
Shrimp, lobster, crab.....Should turn red;
flesh should become pearly opaque.
Scallops.....Should turn milky white
or opaque and firm.

Clams, mussels, oysters.....Cook until
shells open.

Leftovers..... 165

Ground Meat and Meat Mixtures

Turkey, Chicken165
Beef, Veal, Lamb, Pork.....160

Fresh Pork

Medium.....160
Well Done.....170

Roast Beef

Cooked commercially, vacuum
sealed and ready to eat.....140

Stuffing

Cooked alone or in bird.....165

Handout # 3:

Importance of Hand washing

According to the U.S. Centers for Disease Control and Prevention, handwashing is the single most important means of preventing the spread of infection. Poor handwashing contributes to millions of cases of food poisoning every year.

When Should You Wash Your Hands?

1. After being outside. For example: after gardening, shopping, visiting someone.
2. After you sneeze or cough.
3. Before you eat.
4. After bathroom trips.
5. After handling pets.
6. If you are taking care of an ill children or adult = wash hands as often as possible
7. Before and after cooking
8. After handling diapers

The High Five

To be sure your hands don't carry disease-causing germs, follow the five basic steps to handwashing:

Step 1 - Wet hands with hot water. Add soap.

Step 2 - Use friction to work up lather; wash hands for at least 20 seconds.

Step 3 - Rinse well under a stream of water.

Step 4 - Dry hands thoroughly, with a single-use paper towel whenever possible.

Step 5 - Turn off faucet with paper towel, if possible.

VITA

Gabriela Viteri was born to Ramiro and Mariuxi Viteri on June, 8, 1980, in Guayaquil, Ecuador. She graduated from Jefferson High School in January 1999. She received her Bachelor of Science in dietetics in May 2004 from Louisiana State University in Baton Rouge, Louisiana. As an undergraduate student, Gabriela received scholarships from both the Human Ecology department and the College of Agriculture; she also received the Non-Resident Tuition Waiver. Gabriela was an active member of several organizations such as Golden Key International Honour Society and Gamma Sigma Delta. In August 2004, she enrolled for graduate studies in the Human Ecology Department at Louisiana State University. She received the Graduate Tuition Waiver award in August 2004. Gabriela was awarded a teaching assistantship and had the opportunity to work with Mrs. Teresa Jones and Mrs. Brandi Milioto at the Human Ecology Department. She intends to graduate in August 2006 and pursue her career goals in her home country: Ecuador.