A Nursing Intervention to Improve Nutrition for Health Promotion for a Vulnerable Urban Adult Group

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A NURSING INTERVENTION TO IMPROVE NUTRITION FOR HEALTH
PROMOTION FOR A VULNERABLE URBAN ADULT GROUP

Meridell Joy Gracias

A Dissertation Submitted to the Faculty of
GRAND VALLEY STATE UNIVERSITY
In
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Kirkhof College of Nursing

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Dedication

This dissertation is dedicated to my husband, Vicente C. Gracias, M.D., and to all the members of my family. For your encouragement, patience, sacrifice, love, and support that made this educational achievement possible, I am eternally grateful. Your examples to me of selfless concern and caring for others have helped me to develop the philosophy of nursing that has been the foundation of this project, and I am so very thankful to have you in my life!
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Abstract

Title: A Nursing Intervention to Improve Nutrition for Health Promotion for a Vulnerable, Urban, Adult Group

Purpose: Low-income adults often have nutrition-related health issues, such as obesity, diabetes, and hypertension, and others. Factors identified as contributing to these issues are lack of nutrition education and lack of access to quality, healthy food choices. The purpose of this project was to improve nutrition for health promotion in a group of vulnerable adults in an urban setting, and answer questions of (a) Will a program of targeted nutrition education, with advocacy for quality food, be associated with increased knowledge and dietary behavior change? (b) Will such an intervention result in increased self-efficacy for food choices and their impact on health?

Participants: Twenty low-income adult residents of a government-subsidized housing unit participated. These individuals were over age 62, and or had mental and/or physical disabilities. Many were obese, diabetic, and/or hypertensive. All had limited access to healthy food.

Methods and Materials: An 8-session nutrition/health promotion educational program was presented collaboratively with community nutrition educators. It included group discussion, recipes, food tasting, and overcoming barriers to good nutrition. Completed data for 17 participants included: demographic information, pre-test and post-test assessment of nutrition knowledge, behavior, and self-efficacy, and post-session open-ended questions regarding new learning and intended changes after each session. Community advocacy and leadership for access to nutritious food accompanied the intervention.
Analysis: Descriptive statistics, Fisher’s Exact Test and Wilcoxon Signed Rank tests were used and a 0.1 level of significance was chosen due to small sample size.

Results: Data analysis demonstrated a modest positive change from pre-test to post-test in knowledge for four participants. Results also suggest that a significant improvement in mean nutrition self-efficacy and behavior scores was associated with this intervention.

Conclusion: Addressing the needs of vulnerable adult groups with a nursing intervention for health promotion involving nutrition education, advocacy, and leadership activities to improve food access is an effective and appropriate project for a DNP student.
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CHAPTER 1
INTRODUCTION AND PROBLEM FOCUS

Scope of the Problem

The importance of nutrition as a determinant of health is well-known (Wicks, Trevena, & Quine, 2006). Scientific evidence supports the importance of nutrition in maintaining health, self-sufficiency, and quality of life. Major health problems, such as diabetes, cardiovascular disease, and cancer have been shown to be nutrition-related (Estaquio et al., 2008; United States Department of Agriculture [USDA] and the United States Department of Health and Human Services [USDHHS], 2010). The National Health and Nutrition Examination Survey (NHANES) found that in 2000, 64% of adults in the United States were overweight or obese, an increase of 14% since the previous data collection in 1994 (Centers for Disease Control and Prevention, 2001). The survey found an additional 7% increase in overweight and obesity as well as increased incidences of hypertension and diabetes in people who are characterized as “vulnerable,” those with disabilities and those who live at a level of 130% of the poverty level marker.

Vulnerability may be demonstrated by factors that increase risk for poor nutritional status, including limited income, the presence of medical problems, use of multiple medications, lack of transportation, and social isolation (American Dietetic Association, 2000).

The Centers for Disease Control (CDC) in 2001 noted that guidelines from the National Institutes of Health/National Heart, Lung, and Blood Institute Obesity Education Initiative (1998) identified several contributing factors in overweight and obesity. These include behavior, environment, culture, and socioeconomic levels, including being a
member of a minority group and low levels of education, as well as factors of genes and metabolism. This report identified health consequences of overweight and obesity to include those of coronary artery disease, hypertension, and diabetes, among others.

Economic costs of these disorders have a significant impact on the health care system in the United States, with direct and indirect costs of associated mortality and morbidity estimated at $147 billion in 2008. These costs include inpatient and outpatient care and prescription drugs (Finkelstein, Trogdon, Cohen, & Dietz, 2009).

Individuals who are low income and food insufficient are at risk of consuming diets which do not meet the United States Dietary guidelines or federal recommendations for several nutrients (USDA and USDHHS, 2010). The NHANES data set reported several deviations from these recommendations for those living at 130% of the poverty level marker. These include consumption of fruits, vegetables, calcium, and whole grains at 3% to 30%; dietary sodium intake at more than 2400 mg daily; and dietary fat more than 30% of daily caloric intake for 70% of respondents. A low consumption of whole grains, fruits, and vegetables results in low dietary fiber (Bowman, 2007).

Dietary fiber has many health-promoting properties, such as reducing the risk for type 2 diabetes and cardiovascular disease (Salmeron et al., 1977), and lowering body mass index and body fat (Sahyoun, Zhang, & Serdula, 2005). Several reasons were given for low fruit and vegetable intake by low-income adults in the NHANES III study from 1988 to 1994 (Sahyoun et al., 2005), including: lack of money; cost of food; inability to shop, cook, or feed on their own; eating alone; loss of teeth; and self-reported poor health. Because health issues are related to nutrition, they are of particular concern for vulnerable populations, such as those living in poverty, people with literacy challenges, individuals
with substance abuse issues, those who are elderly and/or mentally or physically disabled, and the socially isolated.

Problem Description

The group of people that is the focus of this project has many of these vulnerability risks. It is composed of elderly and/or mentally and/or physically disabled adults, who reside in an urban, section 8 apartment building in a mid-size, mid-western city. The group of people in this environment lives on incomes less than 70% of the poverty marker level. Many are socially isolated due to lack of intact family ties and transient living patterns. General education and literacy levels are low. Most residents receive social security disability, social security, or general welfare as their only source of income. Residents are eligible for the Supplemental Nutrition Assistance Program (SNAP), formerly known as the food stamp program, which averages about $17.00 monthly per person. This urban adult group has demonstrated its vulnerability to the nutrition-related health problems of sub-optimal nutrition through its characteristics of low income, disability, age, low levels of education, social isolation, the number of members of minority groups, and those with past or present substance abuse issues and chronic health conditions. Although some residents are very thin and underweight, many are overweight or obese and have been diagnosed with diabetes and/or hypertension.

Food for this vulnerable group comes from a variety of sources and is of variable quality. An on-site food pantry has been in place since 2000, with food supplies donated through various churches and individuals and through Access of West Michigan, a local faith-based organization that links community resources to address hunger and poverty in this county. Some of the pantry food is purchased through Feeding America West
Michigan (formerly known as Second Harvest Gleaners) food bank. Food bank purchases are made once or twice a month by the Resident Services Specialist or an assistant, and are paid for with cash donations from a few area churches. Food is also donated to the pantry by the federal government program known as “commodities,” which consists of dried and canned food products. Direct observations of the pantry contents on several occasions and conversations with pantry users and staff have made evident that there are very few fresh fruits or vegetables, whole grain products, low-fat dairy products, or lean meats available in the on-site pantry, and that many of the donated and purchased foods are convenience foods high in saturated fat, sugar, and salt. The nearest grocery store is approximately two miles from the apartment building, and few in this vulnerable group have transportation options other than a bus. Therefore, many residents purchase food items at a nearby gas station and/or drug store, which are within a two-block walking distance.

There are two critical problems that contribute to health issues related to poor nutrition in this group. The first is food availability: the vulnerable group of people targeted for this study lives in a “food desert,” defined by Resig and Hobbiss (2000) as an area of relative exclusion, where people experience physical and economic barriers to obtaining healthy food. These are areas where mainstream grocery stores are absent or inaccessible to low-income shoppers. This means that a supermarket or large grocery store is located more than one mile away in an urban area, as described in the definition of food deserts by the USDA Economic Research Service in the food access research atlas (Dutko, Ver Ploeg, & Farrigan, 2012). Unfortunately, this area could also be classified as a “food swamp,” defined by Fielding and Simon (2011) as an area which has an abundance of
high-calorie junk foods. This area qualifies as a food swamp, since much of the food available through the nearby drug store and gas station food sources, apartment building vending machines, and the food pantry donations are highly processed, high fat, high sugar, high salt items. Although some elderly persons receive meals through a home-delivery food service program for seniors, the food received sometimes is high in saturated fat, sugar, and sodium, and low in fresh fruits, vegetables, whole grains, and fiber. Therefore, the first problem, food availability, has two parts: lack of access to healthy food options and quite easy access to unhealthy food.

The second problem that contributes to this issue is lack of knowledge about nutrition and the relationship of food choices to health. Because levels of education and literacy are low, there may be a lack of awareness of what constitutes a healthy diet, what foods to choose and avoid, and the reasons for those decisions as factors that can influence weight, blood pressure, blood sugar, and overall health and longevity. Some of the knowledge needed involves healthy preparation of food, which also incorporates some adjustment in taste, such as less salty or sweet food. An associated area of knowledge need is empowering people to believe they can affect health outcomes through their choices. Many personal conversations with members of this population have uncovered a fatalistic attitude toward life and health.

Populations with the lowest income and educational levels experience disproportionately high rates of diet-related health problems, and they often must choose food in an environment in which adequate personal, social, or community resources for healthful choices are lacking (Devine, Brunson, Jastran, & Bisogni, 2006). Because lack of nutritious food is an important risk factor for poor health in vulnerable populations,
this problem has been approached in urban and rural communities throughout the nation with a variety of programs by federal, state, and local organizations. Social work agencies have also considered this an important issue, as have charitable organizations, which have examined the problem and developed interventions through policies and programs to promote health by improving nutrition for low-income adults through increased food access. Lack of nutritional knowledge as the second part of this problem has been considered by various nutrition and public health education programs (Devine et al., 2006; Devine, Farrell, & Hartman, 2005; Rankins, Sampson, Brown, & Jenkins-Salley, 2005).

For the vulnerable population group that is the focus of this study, no interventions have been introduced to address the issue of nutritional knowledge for health promotion, other than some individual counseling by nurses, who as providers at health screening events, have informally discussed salt intake with some residents of the targeted apartment building. It is unknown if dietary information or nutrition education or counseling as it relates to personal health is included at the appointments of residents who visit other personal health care providers for their primary care. Community nutrition educators from Michigan State University (MSU) presented a nutrition education program at this housing site in 2009. Nutrition-related health problems and special dietary needs are not included in the MSU nutrition education curriculum. Many of the residents who were living in the building at that time are no longer current residents.

Nutrition Interventions Used for Vulnerable Groups

Approaches that have been tried in the past to address the food access issue have addressed hunger and food insecurity. Food insecurity has been conceptualized by
Radimer and Radimer (2002) as having four constructs: quantitative, or having enough food; qualitative, pertaining to the quality and diversity of available foods; psychological, relating to feelings of anxiety and restricted choice about the quantity and quality of available food; and the social construct of food practices, sources, and relationships with others.

One intervention implemented by the United States government to protect people from hunger and food insecurity is subsidized housing. Wehler et al. (2004), however, found that living in subsidized housing was a risk factor for adult hunger, and suggested that one hypothesis for this is that subsidy status may act as an indicator for extreme or chronic poverty or past homelessness. Another intervention has been the development of food pantries as a food source. Research, though, has demonstrated that use of a food pantry also is a risk factor for malnutrition; with one study demonstrating 50% of pantry clients obese and 17% underweight, pantry clients may be at greater risk for malnutrition than the general population (Duffy, Zizza, Jacoby, & Tayie, 2009). A third intervention postulated to be protective for adult hunger has been the Supplemental Nutrition Assistance Program (SNAP) food stamp program. SNAP participation does not ensure nutritional adequacy (Butler & Raymond, 1996), despite funds that have the potential to enhance nutritional status. SNAP participants typically consume fewer servings of all food groups than non-participants (Sasser, Contreras, Taylor, & Gates, 2002).

The literature also describes interventions which have been used to address the nutrition education issue for similar populations. Typically, the programs are a short (one to two hours) presentation, which occur weekly as a series lasting for one to two months. Some programs which are found to be associated with increased participant knowledge,
incorporate information on the topics of hidden salt, reducing saturated fat and cholesterol, and dietary salt and sugar (Klindinst, 2005). Additional program topics include the value of increasing the intake of fresh fruits and vegetables, whole grains, and low-fat dairy products, which are associated with improved blood pressure (Rankins et al., 2005).

Interactive programs, in which the participants have an opportunity to discuss their concerns and questions, have demonstrated effectiveness. Sharing a meal or other activity such as participation in or observation of low-fat, low-salt, and low-sugar cooking and food preparation techniques for culturally-accepted foods has demonstrated effectiveness for increased intake of fruits and vegetables (Devine et al., 2005). This educational method also has demonstrated an association with blood pressure reduction (Rankins et al., 2005). Weight loss, improved nutritional habits, and increased self-efficacy have been associated with nutritional programs that target specific educational needs of community-dwelling adults with developmental disabilities (Bazzano et al., 2009).

The intervention chosen for this project is based upon the evidence presented which has demonstrated the effectiveness of nutrition education programs to impact health and dietary change behaviors in low income populations. The content is based upon the Dietary Approaches to Stop Hypertension (DASH) program (Champagne, 2006; McNeil, 2012; Rankins et al., 2005), which promotes increased intake levels of fresh fruits and vegetables and low-fat dairy foods and decreased intake levels of saturated fats and sodium. Decreasing dietary sugar is also included (Azadbakht et al., 2011). The program was conducted over eight sessions. It featured an educational program followed by a healthy food offering. Each session included a tasting experience in a group setting and
opportunities for group discussion. The selected site for the class was a community room that has a small kitchen. Cooking demonstrations were included with participants assisting with the presentation and preparation of food. The program focused on weekly topics of (a) the components of a healthy diet; (b) how to read food labels; (c) food preparation techniques for better health; (d) making the best choices from available options (such as the on-site pantry and community healthy food resources or farmers’ market locations that accept SNAP); (e) and the impact of dietary choices on overweight and obesity, diabetes, and cardiovascular disease. As Bazzano et al. (2009) have noted, it is important to target the intervention to the intellectual ability of the participants. Therefore, the intervention for this project was targeted to adults with low education and literacy levels and/or who may have developmental or acquired cognitive disabilities, by the use of simple language, demonstrations, and pictures to enhance learning. A focus group discussion of perceived needs, priorities, and preferences of representative participants helped to target the intervention for this group.

A second part of the intervention included improving access to healthy food options for this vulnerable group through advocacy. The advocacy activities incorporated outreach to area churches, food donors, and area stores to increase awareness of the need for healthy food, not just calories, and exploration of further options for healthy food resources. A part of the advocacy activity incorporated education of pantry staff and participation with placement of food pantry orders from Feeding America West Michigan in an effort to stock the pantry with the healthiest available options.
Purpose and Translational Study Question

The rationale for developing this scholarly project is the significance to nursing of the impact of poor nutrition on physical and mental health (American Dietetic Association, 2000; Estaquio et al., 2008; Salmeron et al., 1977). The issue of nutritional quality of food and its effect on health for a vulnerable population is complex. The issue requires leadership to enhance collaboration between disciplines, advanced skills in client needs assessment and education, the capacity to develop of an evidence-based intervention, and a passion for advocacy on behalf of a population which is often unrecognized and unheard. The roles of the Doctor in Nursing Practice, therefore, make this an appropriate issue to address.

The purpose of this scholarly project was to improve nutrition for health promotion in a group of vulnerable adults in an urban setting. The first question was whether a program of nutrition education targeted to the learning and cultural needs of a low-income urban adult population, together with advocacy for improved food choice options, would be associated with increased nutrition knowledge and dietary behavior change? A second question examined if a byproduct of the intervention will lead to an increased level of self-efficacy regarding nutritional choices and their impact on personal health.
CHAPTER 2
LITERATURE REVIEW

The review of literature relevant for this study focuses on studies that address the nutritional challenges of adults and elders in low-income housing, who are ethnically diverse, who are likely to have mental health issues, and who have risk factors for or actual nutrition-related health problems. The review searched the literature for studies that assessed the efficacy of different methods of nutrition education delivery for such persons. The search was done through the electronic data bases of CINAHL, PubMed, PsycINFO, and the Cochrane Library. The search terms “adults,” “elderly,” “poverty,” “low income,” “disabilities,” “nutrition,” “food,” “food access,” “nurses,” “nutrition education,” “urban,” and “health” were used in various combinations. A university librarian assisted with the review process to ensure a thorough search. References were also gleaned from the reference lists of the articles reviewed.

State of Nutrition for Low-Income Individuals

Vulnerability and Related Issues

The state of nutrition for populations with similar vulnerability characteristics to the group that is the target of this study, such as low income, low education/literacy, advanced age, living alone, having mental health problems, and/or minority ethnicity among others, has been shown in the literature to be sub-optimal. Food insecurity, associated with poor health and depression in adults, is considered an outcome of social and economic issues such as lack of adequate education and living wages, lack of access to health care and health information, and unsafe living environments, such as dangerous
neighborhoods and poor housing (Chilton & Rose, 2009; Reutter et al., 2009). Lack of material resources to meet needs and a poor environment may be associated with feelings of low self-esteem and low self-efficacy, feelings that are associated with unhealthy behaviors such as poor diet and lifestyle management (Rose & Hatzenbuehler, 2009). The term “food insecurity,” sometimes also known as “food insufficiency,” has been defined by Eicher-Miller, Mason, Abbott, McCabe, and Boushey (2009) as “limited or uncertain availability to acquire acceptable food in socially acceptable ways” (p. 161) and may be summarized as “inadequate amount of food intake due to lack of money or resources” (Eicher-Miller et al., 2009, p. 161). The USDA includes “the ready availability of nutritionally adequate and safe foods...” in its definition of food security, and “limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways” in its definition of food insecurity (Life Sciences Research Office, 1990, pp. 1575-1576).

As of 2010, 26% of older adults are considered to be “low income,” with lack of resources to meet their nutritional needs adequately. Food insecurity, with its associated lack of nutritional quality and diet quantity, is linked to chronic diseases, such as obesity, diabetes, hypertension, and dyslipidemia. These chronic conditions are present in 87% of older adults, especially those who are low-income (Kamp, Wellman, & Russell, 2010). Mello et al. (2010) in a telephone survey of 1,874 low-income, ethnically diverse individuals found food insecurity linked to dietary behaviors such as higher fat intake. The study explored demographic characteristics, food security status, and dietary behavior measures, including food choice and food preparation. Dammann and Smith (2011) note that food insecurity has been associated with obesity through development of
“disordered eating patterns such as a ‘feast or famine’ situation, associated with monthly food stamp redemption and depletion of other food sources” (p. e2).

Possible explanations for the lack of nutritional quality coupled with chronic diseases for low-income populations may be the consumption of energy-dense, but nutrient poor food, since it is less expensive, more convenient, and more accessible than more healthful foods (Kamp et al., 2010; Love, 2008; Moudon & Drewnowski, 2005). Sisson and Lown (2011) note that “the double burden of suboptimal nutritional intake and obesity exists when available foods lack essential nutrients to promote health but meet or exceed energy needs through calorie-dense foods” (p. 313). This results in chronic health conditions of overweight and obesity, diabetes, and cardiovascular disease.

Factors Affecting Healthy Food Choice

Food Deserts/ Food Swamps

Access to healthy food choices is a significant barrier to optimum nutrition for low-income, urban, diverse adult populations. It is estimated that 11.5 million Americans live in low-income neighborhoods that are located more than one mile from a supermarket, and that 2.3 million of these individuals do not have a vehicle (Wong et al., 2011). Ingredients for making food from scratch may cost more than convenience foods, and in low-income areas, groceries may not be home-delivered, although pizzas are. Unfortunately, stores serving the lowest-income consumers may be more expensive with lower quality, service, and variety than stores provide in more affluent areas (Webber, Sobal, & Dollahite, 2010).

A report based on health and lifestyles survey data, conducted by Lang and Caraher (1998) identified some influences on food choice as the issues of living in food deserts
(which includes food price and limited quality and range of healthy food choices),
difficulties with transportation of purchased food from store to home, inadequate food
storage facilities, and lack of cooking skills. VerPloeg et al. (2009), in an expert
committee report to Congress, further summarized these characteristics of food deserts
and the associated issues of food access in low income communities as transportation
problems, poverty, and food prices. The authors concluded that the relationship between
food access and diet and development of diet-related diseases involves many complex
factors besides individual behaviors, and that individuals are impacted by their physical
and social environments.

In addition to living in these areas called food deserts that lack the physical and
economic access to nutritious foods such as fresh fruits and vegetables (Reisig &
Hobbiss, 2000), persons who live in low-income urban areas often have easy access to all
other foods of poor dietary quality, which results in also naming these areas “food
a cross-sectional multilevel analysis of 2,536 adults in Los Angeles to examine the
association between neighborhood food resource environments and residents’ health
status, with and without chronic conditions such as diabetes and cardiovascular disease.
They found that greater access to and shopping in large supermarkets was associated with
better self-rated health and lower BMI rates. Individuals with chronic conditions were
more adversely affected by living in neighborhoods with a high number of convenience
stores. The accessibility of non-nutritious foods, such as sugar-sweetened beverages, and
foods high in saturated fat, trans-fat or refined sugar may explain the high rates of obesity
and increased risk of diabetes and cardiovascular disease in low-income people. Nutrition
interventions for this vulnerable group should address both increased access to healthy food, such as fruits, vegetables, grains, and low-fat dairy, and behavior change related to dietary choices (Ver Ploeg et al., 2009).

**Mental Health Issues and Healthy Food Access**

People with mental health problems are particularly in need of nutrition education for health promotion, since they have the problem of the deleterious effects of poor nutrition on mental health. These deleterious effects may include either over-requirement or under-requirement of nutritional intake. In addition, persons with mental health issues also have the increased probability of nutritional self-neglect, due to their illness (Bottomley & McKeown, 2008). Depression, which may be associated with aging, loneliness, isolation, and living in poverty, has been identified as a risk factor for malnutrition (Kamp et al., 2010; Nazarko, 2009). Harrington et al. (2009) conducted a cross-sectional design study on four protective life-style behaviors, one of which was the consumption of five or more fruit and vegetable servings daily. They concluded that “better mental health and better self-rated health leads to increased health-seeking behaviors and vice versa” (p. 94).

**Vulnerability and Dietary Guidelines**

Healthful food choices have been shown in the literature to include diets rich in fruit and vegetable consumption. Agudo et al. (2007), in a prospective study of the relationship between fruit and vegetable intake, dietary micronutrients, and total mortality in Spanish adults, found that a high rate of fruit and vegetable intake was associated with lower mortality. A biracial cohort study of fruit and vegetable intake and functional disability found an inverse association between impairment of lower extremity function and activities of daily living and fruit and vegetable intake, particularly in African
American women (Houston, Stevens, Cai, & Haines, 2005). A six year project sought to examine the association between the French Nutritional Guidelines-based score (similar to the United States’ Healthy Eating Index) and anthropometric changes of body mass index (BMI) and waist and hip circumference in a French middle-aged cohort (Kess-Guyot et al., 2009). Despite limitations of compliance and physical activity factors, these authors found a strong association between adherence to the guidelines and a lower BMI, thus predicting lower incidence of overweight and obesity. The average intakes by adults in vulnerable circumstances often fall well below dietary guidelines for fruits, vegetables, whole grains, and low-fat dairy, while being higher than recommended in salt, sugar, saturated fat, and cholesterol (Lesley, 2006; Wang & Chen, 2012).

A cross-sectional school-based survey conducted by Fahlman, McCaughty, Martin, and Shen (2010) compared consumption of fruits, vegetables, dairy products, and grains as well as levels of nutritional knowledge and self-efficacy between 1,208 black students of low socioeconomic background and 978 white students of higher socioeconomic background in a large metropolitan area in Michigan. This convenience sample was recruited through the Health and Physical Education offices of 40 schools. The study was conducted using a survey instrument which assessed dietary behaviors, nutrition knowledge, and self-efficacy, using an instrument adapted from previous dietary studies. A registered dietitian guided one-on-one interviews for data collection. The researchers found that black students of low socioeconomic background scored significantly lower than the white students of higher socioeconomic background on several of these measures of sound nutrition consumption. They also consumed greater amounts of fried and empty calorie foods. The researchers found a significant group effect for all three of the tested
domains using MANOVA data analysis. They concluded that the health of populations made up of persons of African American ethnicity and low socioeconomic level is negatively impacted by dietary behaviors that are associated with obesity, cardiovascular disease, and diabetes. They recommended that these populations should be targeted for interventions designed to improve dietary choices and self-efficacy to promote future health.

Nutrition Knowledge and Behavior in Vulnerable Groups

Nutrition knowledge is one of the specific influences on the ability to make informed nutritious food choices from available options. Moynihan et al. (2007) conducted a nutrition knowledge survey using a questionnaire methodology among 177 adults living in low-income areas of England. The study examined the knowledge of these respondents in the areas of dietary recommendations, nutrient sources, healthiest meal options, and the association between diet and disease. Results demonstrated that 90% of the respondents were unaware of the benefits of fruit and vegetable consumption and that knowledge of the relationship between diet and disease was poor.

McKay, Houser, Blumberg, and Goldberg (2006) note that low educational and socioeconomic levels may serve as predictors of lower nutrition knowledge, dietary quality and behavior, and of increased disease risk for diabetes, cardiovascular disease, and metabolic syndrome. Higher levels of nutrition information and better diets are associated with higher educational levels. Beydoun and Wang (2008) also note that disadvantaged groups have poorer diet quality, with lower intake of fruits and vegetables, and higher rates of mortality and morbidity, including overweight, obesity, and vascular disease. They hypothesized that low educational levels and knowledge and beliefs about
nutrition and health, which are associated with lower socio-economic levels, contribute to food choice and dietary behavior.

Several additional factors affect food choice. These are cultural, personal preferences and attitudes, pleasure and other psychological influences, and environmental factors. Cultural influences on food choice and dietary behavior include the high levels of fat, salt, and sugar found in some traditional foods, such as “soul food.” Low-income African Americans display relatively lower levels of taste preference for more healthful foods (Lynch, Holmes, Keim, & Koneman, 2012; Peregrin, 2006). Inclusion of personal “healthy food” preferences into the dietary options offered to food-insecure persons, in settings such as food pantries, should be a priority when addressing nutritional vulnerability (McIntyre, Tarasuk, & Li, 2007). Cultural influence on food choice and behavior may be associated with attitudes of “Life is too short to be worried about eating” or “We have always eaten this way” as a lifetime of accumulated dietary habits result in a lowered life expectancy (Shepherd, 2009). The role of pleasure is an important factor, as described by Jacquier, Bonthoux, Baciu, and Ruffieux (2011), who note that psychological influences, emotional associations, and memories, which may be unconscious, impact food choices and behavior and may override rational decision-making. Other influences on food choice include individual factors, such as taste preference, convenience, and consideration of the health effects of foods. Environmental influences on food choice include advertising, food availability, and cost, as demonstrated in two cross-sectional surveys of adults conducted by Beydoun and Wang (2008). All of these influences on food choice lead to further examination of barriers to good nutrition in vulnerable populations.
Barriers to Good Nutrition for Vulnerable Populations

Barriers to good nutrition for vulnerable populations of low income, ethnically diverse adults have been identified in the literature. Literature pertaining to nutrition barriers has frequently been reported based on focus group research. Focus groups have often been used to qualitatively collect data, particularly regarding health issues. This form of research allows attitudes, feelings, and ideas about an issue to be expressed. Focus groups’ data in the areas of needs and preferences for content, program delivery methods, and strategies to enhance participation may be used for planning of programs for nutrition education and/or interventions that will be effective (Patacca, Rosenbloom, Kicklighter, & Ball, 2004).

Pierce, Sheehan, and Ferris (2002) conducted interviews with four focus groups of age 35 and older, low-income women who lived in government-subsidized housing in Connecticut regarding their nutritional concerns. They note that residents of government-subsidized housing tend to be poorer, more likely to be living alone, and have more functional disabilities than older adults living in the general community. The purpose of the study was to “explore what older adults perceive as barriers to good nutrition and the types of support they found helpful in overcoming barriers” (p. 39). The framework used was the concept that the socially constructed reality experienced by a group guides its decisions and behaviors. The most common sources of nutrition-related stress were: (a) accessing adequate and nutritious food, due to food prices, difficulty with transportation, and functional impairments affecting shopping and cooking activities; (b) physical barriers, such as health issues requiring special diets, difficulty with chewing, change in taste, or illness; and (c) mental and emotional barriers, such as lack of motivation to cook
when eating alone or experiencing a generalized depressed mood, which prompted over- or under-eating. Help in overcoming barriers was categorized as instrumental, such as transportation, shopping, and cooking assistance; informational, such as nutrition advice or education; and emotional support, such as encouragement and self-disclosure of similar circumstances. Qualitative data collection allowed understanding of participants’ values and behaviors. The authors concluded that cultural interpretation and understanding of needs and issues from the clients’ perspective is essential to develop goals and objectives that meet their perceived needs. Additionally, programs established from the perspective of clients will be received favorably by clients, with optimum utilization and effectiveness.

Zoellner, Bounds, Connell, Yadrick, and Crook (2010) analyzed 23 adult structured interviews regarding the adoption of nutritional recommendations among low income African Americans in the Mississippi Delta region. Visual aid hand cards obtained from the MyPyramid.gov website of the United States Department of Agriculture Center for Nutrition Policy and Promotion (2005) were used during the interviews to explain food concepts to those with limited understanding of terminology such as “whole grains” and certain types of fats. The authors found that individual factors of food choice, education, willingness to change, and personal health behaviors were stronger determinants of adoption of nutritional recommendations than environmental factors. However, they noted that community and environmental factors are inter-related with individual factors for disadvantaged communities, due to the limiting factors of cost and availability of food choice and the strong influence of culture and social support on nutrition behavior. They also concluded that for this population, health promotion messages associated with
nutrition recommendations receive a more positive response than nutrition information alone.

Another focus group study assessed barriers to adoption of the Dietary Approaches to Stop Hypertension (DASH) eating plan among African Americans of low socioeconomic level (Bertoni et al., 2011). Results demonstrated themes, the first of which was the poor availability and low quality of fruits, vegetables, and lean meats in the neighborhoods. This situation was attributed to few grocery stores (a “food desert,” as described earlier) and an abundance of fast food restaurants (an aforementioned “food swamp”). The second theme was economic, such as food cost, concerns about spoilage, and wasted food. The third theme centered on cultural issues, including unfamiliarity with DASH menu options and preparations, such as fresh fruits and vegetables, lean meats, and low-fat dairy products; unacceptability of this diet program to replace usual dietary preferences and patterns; and disagreements with other members of the household about adopting healthier eating patterns.

A third focus group study was designed to assess both nutrition education needs and barriers to nutritional access among a convenience sample of 90 food pantry users from nine varying demographic and geographic areas in Washington State (Hoisington, Shultz, & Butkus, 2002). Forty percent of the sample reported being disabled. Researchers found that food price, food accessibility (particularly for the disabled participants), and the challenge to store food with limited space were significant nutritional barriers. Study participants identified their top three priorities for nutrition education topics as: (a) stretching food dollars, with information regarding shopping; (b) recipes and skills for cooking and making tasty, low-cost meals; and (c) education regarding healthful foods
and nutrition. The researchers concluded that “empowerment, as a process of gaining mastery over one’s life” (p.332) may be a vital ingredient to overcoming barriers to nutritional adequacy in vulnerable populations. Their conclusions included the recommendation that effective educational programs include skills and coping strategies for increased self-efficacy. They add the important implication of the need for community and policy advocacy for an environment in which food resources are available, from which healthy choices may be made.

Whiting, Vatanparast, Taylor, and Adolphe (2010) conducted 12 focus groups with 73 lower-income adult participants and 11 professional informant interviews to collect data regarding low income groups at risk for poor nutritional intake in Saskatchewan. They used thematic coding of responses to uncover barriers to obtaining adequate nutrition. The five themes that emerged from the focus groups were problems with: (a) knowledge; (b) health, including health priorities other than nutrition; (c) lack of cooking and label reading skills; (d) lack of nutrition resources; (e) food preferences; (f) income; and (g) food accessibility. Key professional informants included registered dietitians, a public health nurse who worked with vulnerable populations, community workers in food programs, and a neighborhood pharmacist. Their perceptions of clients’ barriers to healthy eating centered on: (a) cost of food; (b) preferences for easy to prepare but poor quality food; (c) difficulty with access to grocery stores due to lack of transportation; (d) mental health issues, such as depression and substance abuse which make self-care challenging; (e) lack of knowledge about healthy foods; (f) low literacy and lack of cooking skills; and (g) negative community influences, such as an abundance of fast food sources.
The lists of barriers to good nutrition which have emerged as themes in these various focus group studies reflect similarities. Lack of access to healthy foods due to economic limitations, transportation problems, functional impairments, cultural issues and/or lack of knowledge and skills are significant barriers. These, coupled with easier access to unhealthy foods, and lack of perceived self-efficacy to alter nutrition-related behavior or health outcomes, were barriers common to the various groups studied. Interventions have been developed and are described in the literature to address these barriers.

Nutrition Education Interventions for Improved Nutrition

Nutrition has been recognized for its importance in contributing to the health of populations, particularly for groups at risk for nutrition-related health problems, such as lower socio-economic and ethnically-diverse adults, who may be members of minority groups. A review of the literature found no studies specific to advance practice nurses’ participation in nutrition education and intervention development to promote vulnerable adults’ nutritional well-being. Attention to at-risk groups’ characteristics, awareness of multi-factorial causes of nutritional problems (including functional ability, mental health, oral health, and meal management), and a knowledge of community and financial resources are important features for the advance practice nurse to include when devising an appropriate and effective intervention.

Nurses have a unique role in the prevention of diet-related health problems by using holistic needs assessment and evidence-based protocols to develop nutritional health promotion interventions and supports (Lazarou & Kouta, 2010). Factors that may have contributed to the lack of nutrition-related education and intervention practices in both nursing and medicine include lack of information regarding the impact of nutrition
education on health, lack of awareness of the cost savings realized with health promotion, and lack of reimbursement for addressing nutrition issues (Bonnel, 2003). Other obstacles to health care providers’ development of nutrition education with health promotion programming may include beliefs that adults, particularly older adults, will not make lifestyle changes, so development of behavior change programs is not worth the effort; confusion over nutrition education goals (general aspects of optimal nutrition for health versus specific nutrition deficiency information); and logistical challenges to program delivery (Mitchell, Ash, & McClelland, 2006).

Muchiri, Gericke, and Rheeder (2009) defined nutrition education as “learning experiences designed to facilitate the voluntary adoption of eating and other nutrition-related behaviors conducive to health and well-being, and includes improving an individual’s nutrition knowledge and modifying eating behavior” (p. 2). Changes in dietary behavior are reflected in eating habits and food choices. Nutrition education interventions in resource-poor settings, such as areas with limited facilities and low income groups, require strategies for program effectiveness that are relevant to the characteristics of the targeted population. Group activities, including discussion, goal setting and problem solving, role playing, and meal preparation all actively include the learner in the educational process and have been shown to improve knowledge and change dietary behavior. Theories most frequently used in nutrition education interventions are the Health Belief Model, Social Cognitive Theory of self efficacy, and the Trans-theoretical Model of behavior change (Muchiri et al., 2009). These theories will be discussed in detail in the conceptual framework chapter.
A randomized control trial by Steptoe, Perkins-Porras, Rink, Hilton, and Cappuccio (2004) compared the effectiveness, after 12 months, of two methods of nutrition education provided to 218 adults in an ethnically-diverse, low income neighborhood in South London, using fruit and vegetable intake as the dependent variable. The interventions to which the participants were randomized were two sessions of either nutrition education with an emphasis on beneficial nutritional constituents for health maintenance, or behavioral counseling based on social-cognitive theory and the stages of change model. The behavioral counseling included interventions tailored to individuals, including goal setting, and identification of barriers with suggested ways to overcome them. A two-item frequency validated questionnaire was used for fruit and vegetable consumption data collection. Instruments assessing psychological and social variables used a 5-point scale for items on social support for dietary change, level of encouragement by a close other, motivation for change, self-efficacy, anticipated regret, perceived barriers and perceived benefits, and knowledge of recommended intake. Demographic variables of ethnicity, marital status, educational attainment, income, and smoking status were obtained by questionnaire. Analyses of covariance were used to compare the baseline psychological and social measures of the two groups. The groups were similar on the baseline measures. Both groups demonstrated a significant increase in the amounts of fruits and vegetables consumed, however, greater changes were seen in the group that had the behavioral counseling approach. In the behavioral counseling group, long term (12 month) increased fruit and vegetable consumption was predicted by the short term (8 week) changes in self-efficacy, perceived benefit, and knowledge and encouragement levels.
A systematic review of the literature was conducted by Brunner, Rees, Ward, Burke, and Thorogood (2009) to compare dietary advice to minimal or no advice on the outcome of sustained dietary changes or improved cardiovascular risk profiles. Of the 38 trials reviewed, the authors concluded that dietary advice increased fruit and vegetable consumption and fiber intake and decreased saturated fat and dietary fat intakes. One-to-one contact, group sessions, and the use of printed materials were used to deliver the dietary advice. The authors found greater effectiveness for people who were told that they were at risk for cardiovascular disease or cancer.

A meta-analysis of the long-term effectiveness of tailored nutrition education for adults (Eyeles & Mhurchu, 2009) summarized evidence of 15 randomized control trials. The authors compared tailored nutrition education delivery methods, intended to reach one individual, with generic education, designed to meet the needs of a group or subgroup, and compared both of these to no education in a control group. Outcomes were measured with nutrition-related health behaviors, body weight, body mass index (BMI), or waist measurement. The authors concluded that tailored instruction, such as instruction based on food diary results and unique personal characteristics, is most effective. This suggests that the more personalized the delivery of a nutrition program is designed to be, the more effective it will be.

A review of the literature regarding effectiveness of group nutrition classes for older adults (age 55 and over) was conducted by Higgins and Barkley (2004). They found that only nine studies had been published between 1993 and 2003 on the topic of nutrition education for independent-living older adults in the United States. Of the studies reviewed, these authors found few of the studies based on theory and no standard
interventions among the reported studies. The authors noted weekly class frequency in all nine studies, and three of the studies prioritized cultural awareness, such as ethnicity and preferred language of the participants. The authors concluded that educational and behavioral change strategies used in nutrition education programs for adults should be targeted to the interests and needs of the intended audience.

A focus group evaluation of the use of food workshops to deliver nutrition education for older adults was conducted by Keller, Hedley, Hadley, Wong, and Vanderkooy (2005) in an adult recreation center setting. Participants in the nutrition workshop’s intervention described the effectiveness of the group setting, due to its informal tone, and the demonstrations that included recipes, tasting, and socialization. The Health Belief Model and Social-Cognitive theory formed the conceptual framework for planning the workshops, with the concepts of the interaction of personal, socio-environmental, and behavioral factors to influence and promote participants’ nutrition knowledge and self-efficacy. Food tasting, as part of a nutrition education intervention for older adults and supported in a study by Manilla, Keller, and Hedley (2010), was included as a method for promoting interest in food, recipes, and meal preparation for participants, as well as for translating nutrition educational information into enjoyable eating experiences.

A qualitative study by Duerr (2003) of five focus groups of non-institutionalized adults over age 60 found that although printed materials were used most often, nutrition demonstration and discussion methods were most desired as a delivery method. The topic of basic nutrition was most requested. Study participants also were interested in learning how nutrition could improve their health. The process of screening for nutrition knowledge itself may begin the process of dietary behavior change, with increased risk
awareness. Southgate, Keller, and Reimer (2010) found that nutrition education based on screening results is used most effectively when educational resources are personalized as much as possible, simple educational tools are used, and motivational stage of change is incorporated. These authors conducted a randomized control study of 150 adults from a local seniors’ center in Guelph, Ontario, Canada. In the study, participants were given a 17 item questionnaire called SCREEEN II to assess nutrition knowledge and nutritional behavior in order to assess risk for malnutrition. The participants were then randomized to receive a personalized letter based on the questionnaire results, or a personalized letter plus nutrition education information for older adults. Pre-test and post-test analysis of results demonstrated that personalized messages and nutrition information together promote risk behavior change and knowledge.

A focus group study (Johnson, Hobson, Garcia, & Matthews, 2011) involving 28 community-dwelling participants, with mild to moderate developmental disabilities, and their agency managers and support workers was conducted to gather data regarding needs and preferences for nutrition education programs for this vulnerable group. Themes that emerged from the discussions were addressed in the intervention planning. They included problems of poor eating habits, lack of nutrition knowledge, easy availability of unhealthy foods, cooking safety and equipment issues, low skill levels, lack of resources, lack of social relationships, and funding issues. Participants reported increased self-efficacy related to learning to cook healthy food, with an emphasis on the importance to them of an opportunity to socialize while learning cooking skills. Role playing, modeling of behavior, prompting, corrective feedback, and holding
educational programs in the location where clients live were suggested as additional strategies for nutrition education effectiveness for this group.

Effective nutrition education for adults must provide the information that people want and need, delivered in the form and location desired (MacLellan, Morley, Traviss, & Cividin, 2011). These authors note that since providing nutrition education may include delivery of meaningful information, as well as addressing eating behavior and health status, devising an appropriate, client-centered, evidence-based intervention is a challenge. The intervention design must include awareness of the clients’ varying food experiences, attitudes, and desired outcomes. The inclusion of the concept of establishing a therapeutic relationship with clients as part of the nutrition intervention is also important, since nutritional learning does not take place in relationships in which the client is strictly given information in a hierarchical or critical, corrective manner. In these authors’ survey of 441 dietitians and 680 consumers of nutrition education programs, responses demonstrated that consumers valued programs that used a variety of approaches and delivery methods, especially applied skills, such as cooking. They also found that clients’ multiple issues affecting their eating and nutrition status should be part of an educator’s assessment when developing a client-centered nutrition program.

Other authors note the importance of relationship factors to success of nutrition interventions. Muchiri et al. (2009) note the importance to program success of nutrition educators who have strong personal relationship-building, listening, and communication skills. They also include the importance of intervention contact time of greater than 10 hours for low income groups. Adults may hold misconceptions about nutrition and health or hold a cognitive bias against changing beliefs. A level of engagement beyond
distribution of written material is needed to facilitate conceptual change, not just acquisition of information (Ansburg & Heiss, 2012).

**Nutrition Intervention Planning**

When devising nutrition program content, Jacquier et al. (2011) note that people generally prefer short and simple information, and may prefer positive associations of the benefits of certain foods with health versus the seriousness or negative associations with disease risk. Taste, smell, texture, and appearance of food can be used to enhance memory and stimulate a pleasure response. The concept of pleasure associations with food is important to include in a nutrition intervention, since motivational forces and pleasure-seeking forces are not the same, and a person may have both pleasure and nutritional goals.

Planning interventions for nutrition education may be done using individual or group methods, and may be face to face or computer-generated. Common components exist when planning interventions using any of these methods. These include recognition of three phases of intervention development, as described by Dijkstra and Devries (1999). The first phase is that of preparation, during which the assessment of the problem is made and intervention planned. The second phase is that of tailoring, in which the intervention is adapted to the targeted audience, whether an individual or group, based upon the relevant characteristics which influence intervention effectiveness. The third phase is integration, in which the design of the content delivery on various topics becomes one cohesive intervention. This planning process is usually based on Bandura’s self-efficacy construct of Social-Cognitive theory, the Health Belief Model, and the Trans-theoretical model for change.
Criteria for effective nutritional interventions include attention to information relevant to the persons who comprise the target group, including motivating factors, a personalized self-assessment component, and active participation in the intervention (Brug, Campbell, & van Assema, 1999). Interventions may also be delivered in a group setting using computer programs for individual tailoring and feedback. Literature has described many studies that have effectively used nutrition education intervention via computer, demonstrating the practicality of requiring little or no staff involvement. However, for persons with limited literacy and/or limited computer skills and access, a provider may be essential to facilitate effective use of a software program by individuals of small groups (Vachon et al., 2007).

The principles of nutrition education program content and design include a flexible focus on topics of interest to the participants, current dietary behavior of participants, inclusion of tailored messages based on readiness for change and lifestyle, and goal setting, as described by Block et al. (2000). These authors describe how these principles were incorporated into development by the United States Department of Agriculture of an interactive CD-ROM designed for low-income persons. This program was designed for use in settings where personal nutrition education is not feasible, due to lack of time or financial resources. Dietary intake, stage of change assessments, and questions regarding food sufficiency were included. Unfortunately, while surveys reported that 94% of the users of the 12 minute program learned something new about nutrition, health, or their own eating habits, the extent and maintenance of dietary changes were not examined.
Information Technology for Nutrition Education

Oenema, Brug, and Lechner (2001) conducted a randomized control trial of 198 adults in the Netherlands. The authors’ purpose was to compare the effectiveness of a web-based nutrition education program that was tailored to individuals’ stage of change and included feedback, to a general nutrition information letter that described the risks of high fat diets and the value of increased consumption of fruits and vegetables. Pre- and post-test data collection included a questionnaire for demographic information; fat, fruits, and vegetables food consumption frequencies; and levels of self-efficacy, attitudes, and stage of change. These researchers found the web-based tailored intervention was associated with greater nutritional awareness and intention to change dietary behavior when compared to the control group nutrition letter intervention. They acknowledged that a web-based intervention has barriers (including Internet and computer access requirements), particularly for those who are computer-illiterate, have difficulty processing screen-delivered information, and/or lack the direct social support that some may want and need.

A computer-based program called “Cookin’ Up Health” (Tessaro et al., 2006) was developed to provide education on meal preparation, healthy selections, and portion control in a culturally-attuned format, tailored to individualized needs of women in two rural counties of West Virginia. The program used touch-screen interactive programs with pictures and audio communication by local women, and with cooking demonstrations and recipe sharing. The program was targeted to persons with low literacy levels. The goals of the program were communication of nutrition-related disease risk and strategies for behavior change, which could lead to informed decision-making.
Users could access the program while visiting local primary care health centers where computers were located. Development of the program content was based on results of four focus group interviews. The interview questions were based on the Health Belief Model and Social-Cognitive theory. They included: (a) knowledge about cardiovascular disease, including risk factors and prevention; (b) benefits of healthy eating; (c) the value of low-fat foods, fruits, and vegetables; (d) barriers and motivators for healthy changes; (e) social support; (f) knowledge and skills; and (g) current dietary behavior. Promotion of self-efficacy, behavioral capability, and attention to barriers, motivators, and cues to action for change were concepts that were built into the program content. Quick and easy recipes using healthy versions of familiar and traditional foods were appreciated. The authors concluded that this interactive program could be an effective way to provide nutrition education and initiate behavior change in populations that may have limited resources for nutrition education and limited transportation.

In a study of the use of web-based learning compared to face-to-face learning for nutrition education for United States Army soldiers, both methods were found to be equally effective. However, inability to ask questions, potential for technical difficulties, and feelings of isolation were major complaints reported by those in the web-education group (Margolis, Grediagin, Koenig, & Sanders, 2009). It would be expected that these complaints might also be experienced by the persons targeted for this present project if a web-based nutrition education intervention were used.

The vulnerable adults who are the target group for this project have the challenges of limited computer access and limited literacy, including computer-literacy. Although a few may have a personal computer, most of those who are computer-literate rely on a
community computer room. The computer room has six computers, limited use time, and prohibitive costs for printing materials generated by a computer, such as nutrition information, recipes, food diaries, and feedback messages. Physical impairments of vision and/or cognition may hinder processing of web-based messages. Many in the target group for this study have mental health issues which could discourage their participation in an intervention without direct, personal social support.

Since nutrition is an important part of chronic disease management and prevention, it is significant to note that web-based material alone retains only 2% of people in chronic management education programs, while education and motivational support from a clinician result in 30%-50% of patients staying with programs (Andrews, 2007). No significant increase in effectiveness of a computer-based approach compared to more traditional face-to-face educational methods was found in a study by Vidourek and King (2008). These authors recommend nutrition education delivery methods that include skill-based approaches and community agency collaboration for demonstrated long-term effectiveness.

Nutrition Education Program Effectiveness

Studies have demonstrated nutrition-based interventions to be associated with positive outcomes, as described in a systematic literature review of 15 randomized control trials of nutrition education and counseling involving community-dwelling older adults (Bandayrel & Wong, 2011). Many of the studies used features of collaboration, group learning, and peer support in their program design. Common features of the studies were theoretical frameworks built on the Health Belief Model, Social Cognitive Theory, or Trans-theoretical Model of behavior change. Outcomes were documented in health and
nutrition quizzes, questionnaires, and self-reported food records. The authors found that interventions that included comprehensive personalized goal-setting, learners’ active participation, and self-efficacy demonstrated the most positive outcomes.

Outcomes of nutrition education programs that have the goal of reducing nutrition-related illnesses among low-income populations by increasing capacity for healthy food choices were evaluated through qualitative analysis of similar programs by Devine et al. (2006). These authors found that short-term outcomes included increased knowledge, self-awareness, and self-efficacy. Medium-term outcomes included skills, communication, and behavior change with an emphasis on the importance of the social aspects of the programs. Long-term outcomes included health effects and local area nutrition policy changes, although these have been difficult to measure. Positive experiences during the programs were associated with later behavior changes. Outcomes were noted to be associated with the stage of change readiness of the participants, their motivation, and their life burden and resource availability. The Muchiri et al. (2009) systematic review of randomized control trials demonstrates the effectiveness of group education for diet and lifestyle topics. The authors suggest that better outcomes were possibly due to group processes which contribute emotional support to participants, sharing of knowledge and skills, and encouragement in behavior and attitude change.
Nutrition Education Interventions Applicable to This Project

Collaborative, Tailored Nutrition Education Models

Klinedinst (2005) demonstrated the effectiveness of collaboration by a graduate nursing student, a community college nursing faculty member, community college nursing students, a public health nurse, building management, and residents in a nutrition education intervention. The population of the study was made up of low-income disabled or older adults living in a designated urban, high-rise apartment building. After recruitment of 25 participants during a blood pressure screening program in the building, a needs assessment survey was conducted by the public health nurse and nursing students. The survey questions included demographic information, questions related to current nutritional behavior and nutrition knowledge related to hypertension, and concepts included were based on concepts from the Health Belief Model. All of the collaborators contributed to the needs assessment, with sharing of ideas to tailor the proposed program to this group’s specific needs. The purpose of the program was to increase knowledge and promote healthy eating among the participating residents.

“Eat and Learn” was a program tailored to the identified needs and developed for this ethnically-diverse group of urban, low-income adults. Based on the Health Belief Model, the program consisted of three programs that were delivered by the graduate nursing student and community college students. The topics covered included hidden salt, reducing the dietary intake of fat and cholesterol, and diabetes and reducing dietary sugar intake. Information was presented in a familiar setting of the apartment community room, which included kitchen space. A simple format and four main take-away points as the focus for each session were used to enhance learning and processing of information.
Group discussion followed each presentation during a healthy lunch that reflected the topic of the day. Meals were chosen to be appropriate to the lifestyles of independent-living, low-income adults, with recipes that were healthy, inexpensive, culturally varied, and easy to cook for one or two people. Printed copies of the menus and recipes were provided to participants. Further social interaction between participants was noted to continue after each program.

Outcomes were measured using identical four question pre-test and post-test knowledge surveys given before and after each presentation. Descriptive statistics were used to analyze the test data. Klinedinst found that average post-test scores increased by one point. A qualitative survey for program process evaluation positively evaluated the format, location, topics, and socialization and cultural sharing opportunities provided by the “Eat and Learn” program. Because the program was short, program modifications, such as a longer program including other topics of interest, were suggested that could influence not just dietary knowledge but address dietary behavior. Limitations of the program were its short time frame and the process of participant recruitment at a blood pressure screening clinic, thereby excluding residents who did not attend the blood pressure screening clinic as possible study participants. A suggestion was given by the author, for future development of nutrition education programs targeting similar populations, to seek ways to stimulate interest and encourage participation for a wider group of people.

The Health Promotion Education Program, originating from Florida International University, was designed as an interdisciplinary program for education and implementation of health promotion programs for adults residing in 11 Miami Housing
and Urban Development (HUD) low-income housing buildings (Cornerly, Elfenbein, & Macias-Moriarty, 2001). The program goals were to increase quality of life and promote health to low income adults, while decreasing health disparities in this population. Students and faculty from nursing and dietetics departments worked together to provide residents with skills to focus on disease prevention and health promotion, with one of the specific objectives to improve dietary intake. Students and faculty from physical and occupational therapy and social work departments addressed other needs. Dietetic students and social work students addressed nutritional advocacy through the local Miami food bank and other community resources. Needs assessments and questionnaires were used to help focus the programming on the needs and preferences at each housing site. Marketing strategies of flyers, food gifts, and door-to-door invitations were used to encourage participation. The project evaluation supported the effectiveness of short, interactive, fun formats, the respect for others’ disciplines and knowledge, and the need for good communication. Satisfaction surveys of the residents and health promotion adherence surveys were not done after the program was completed, so nutrition outcomes are unknown.

“Sisters in Health” (SIH) was a program designed with emphasis on social interaction and food experiences to increase fruit and vegetable consumption among ethnically diverse, urban, low-income adult women (Devine, Farrell, & Hartman, 2005). The program consisted of six 90-minute weekly meetings, facilitated by community nutrition paraprofessionals, under the direction of a nutrition education professional. The program provided experiences of preparing and tasting food in positive social environments, with the opportunity for group discussions and exchange of knowledge and ideas. The purpose
of the program was to improve attitudes and beliefs about fruit and vegetable consumption and to increase consumption to five or more servings per day. Each meeting included a discussion or activity, a food preparation or tasting experience, a group learning experience, a take-home challenge (such as a new recipe) and an opportunity to give feedback. Participation incentives were given. A quasi-experimental design using pre-program and post-program assessments of the program’s effectiveness was used. Two hundred sixty-nine participants from New York State were assigned in a non-randomized fashion to 32 intervention groups and 10 control groups (who received parenting or budgeting classes). Results of the program demonstrated a significant difference in outcome. The intervention group increased consumption over baseline of fruits and vegetables by 1.6 times per day, compared to 0.8 times per day in the control group. The participants in the intervention group were 0.44 times more likely to eat fruits and vegetables five or more times daily, which was a significant difference from their baseline measures, and had a greater mean attitude increase as compared to the control groups. The study emphasized the significance of facilitated group support as a positive influence on food choice, the value of flexibility in program structure, and the importance of taste and positive food experiences for effective program design. The authors concluded that experiential learning may contribute to behavior change, even in the absence of increased knowledge.

Population-Specific Intervention Models

A quasi-experimental study done by Rankins, Samson, Brown, and Jenkins-Smalley (2005) used the Dietary Approaches to Stop Hypertension (DASH) program in weekly small group educational programs for 82 low-income African Americans with poorly
controlled blood pressure in Florida. The program was based on social-cognitive theory, with a purpose of increasing fruit, vegetable, and low-fat dairy consumption, and reducing consumption of fats and sodium. It included small group dinners with a nutritionist, a presentation on a topic of nutrition education, and “table talk” discussions. The program included ethnically and culturally preferred foods. Weight and blood pressure were measured before and after the intervention. Analysis of pre- and post-intervention measures demonstrated that participation in at least 75% of the DASH dinner sessions was associated with reduced systolic and diastolic blood pressure.

The vulnerable group that is the focus of this scholarly project includes persons with developmental disabilities or acquired cognitive deficits, who are at risk for obesity and its associated health issues. Therefore, a quasi-experimental study by Bazzano et al (2009) was included in this literature review for its unique attention to developmentally-disabled, community-dwelling adults. The goal of the study was to increase the knowledge, skills, and self-efficacy in health, nutrition, and fitness in this group. The intervention was designed as a seven month, twice-weekly program with peer-mentors to help lead and motivate, and included cooking techniques and interactive education. The Healthy Lifestyle Change Program (HLCP) had a second unique feature which was its integration of the study population into the decision-making and “ownership” of the intervention. The education and exercise outcome was that two-thirds of the 431 participants reported weight loss and decreased abdominal girth, and improved nutritional habits, self-efficacy, and life satisfaction.
Model Limitations

There were limitations described in the studies reviewed as models for the nutrition intervention to be used in this study. In several of the studies, the sample size was small. The interventions’ long term outcomes were not measured. Instruments and tools for measurements often had to be adapted from other studies. It was not possible to consider the effects on outcomes of variables such as new diagnoses, new medications, or other health changes; change in living arrangements, neighborhood situations, or other environmental factors; and the influence of systems and policy changes on individuals, such as income and benefit changes.

Conclusion

The evidence presented in the literature was reviewed regarding components of nutrition education programs and delivery methods with demonstrated effectiveness for use with similar populations to the one that is the focus of this study. The literature supports interventions that include face-to-face contact, use of an interactive group approach, and extension of the intervention over a period of several sessions. These intervention features facilitate socialization and sharing of food experiences, ideas, and discussion. Programs tailored to the cultural and educational background of participants, and specifically designed to meet the needs and preferences of the targeted audience, were reviewed as models for the program content and design to be used in this study. Effective nutrition messages and communication must incorporate cultural considerations, including values, beliefs, health attitudes, and language that are relevant to the participants (Zoellner et al., 2010). Interdisciplinary collaboration between nurses, dietitians, social workers, community agencies, and others has been demonstrated as
useful in studies addressing the complex nutrition education and access needs of low-income adult populations (Cornerly et al., 2001). The interventions reviewed for relevance to this project were based on the Health Belief Model, Social Cognitive Theory of self-efficacy, and/or the Trans-theoretical Model of behavior change.
CHAPTER 3
CONCEPTUAL FRAMEWORK

The review of the literature reveals that supporting theories used in nutrition education interventions for health promotion are based upon the Health Belief Model, including the Social Cognitive Theory of self-efficacy, and/or the Trans-theoretical Model of Stages of Change. These suggest that social determinants of health have many interpersonal, intrapersonal, environmental, and organizational/community/policy influencing factors that should be considered in the conceptualization of health promotion (Rimer, Glanz, & Rasband, 2001). These social determinants include culture, income, education, and neighborhood factors. The PRECEDE-PROCEED model of health education uses the PRECEDE model for assessment and classification of influencing factors important in planning a health education intervention. The PROCEED phases of the model are useful during implementation and evaluation of the intervention. These above conceptual models will be described for support of the current project.

The Health Belief Model

The Health Belief Model is a frequently used theory for health education and health promotion. It was developed to help understand health behavior and the beliefs, motivations, and factors that influence it. It was originally developed in the 1950s for the analysis of the public’s failure to respond to governmental health programs, such as tuberculosis screening. It is founded upon the concept that personal health behavior is determined by the perceptions and beliefs of an individual regarding a health problem.
and the strategies available to avoid or prevent it. Further, health behavior is influenced by a host of factors.

The Health Belief Model originated with the concepts of perceived susceptibility, perceived severity, perceived benefits and perceived barriers, cues to action, and influence of other variables on health-related behavior as developed by Rosenstock (1966). Champion (1984) describes the “state of concern about health matters resulting in positive activities and willingness to seek and comply with orders that are believed to decrease disease” (p. 78) seen in the Health Belief Model, as determining “health motivation” (p. 78). Strecher and Rosenstock (1997) summarize the Health Belief Model as understanding that

- people will take action about a health condition if they believe themselves to be susceptible to the condition, believe the condition may have potentially serious consequences, believe that a course of action would be beneficial in reducing their susceptibility to and/or the severity of the condition, and believe the anticipated benefits of action outweigh the anticipated barriers. (p. 44)

The Health Belief Model begins with four basic constructs: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. *Perceived susceptibility* is the concept of an individual’s assessment of the risk of developing a health problem or disease, and may range from denial to a feeling of being in real danger. *Perceived severity* is an individual’s judgment of the seriousness of a potential health problem and its possible consequences. This may be based on the emotional impact of the perceived severity of the health problem and on the life issues which may be affected, such as impact on life and physical function, employment, finances, and relationships. *Perceived*
severity and perceived susceptibility combine to create perceived threat. Perceived benefits of taking a particular health action are based on the acceptance of susceptibility to a health problem, followed by an assessment of the positive consequences or effectiveness of various available actions. These actions may include health maintenance, disease prevention or treatment that will ultimately decrease the undesirable consequences of a health problem. Perceived barriers are the individual’s assessment of the influences that may discourage or eliminate possible adoption of the proposed action, including aspects of new behavior which may be inconvenient, expensive, or unpleasant (Champion, 1984; Strecher & Rosenstock, 1997). Janz and Becker (1984), in a critical review of 24 studies of preventive health behavior, found that perceived barriers were the most powerful and perceived severity the weakest of the four constructs of the Health Belief Model. Decisional balance refers to the relative value to the individual of the benefits versus the barriers and costs of taking an action.

Cues to action are events, people, or things that act as trigger mechanisms for behavior change or promotion of awareness (Rosenstock, 1966; Strecher & Rosenstock, 1997), and may be internal, such as a perception of a physical state, or external (Rosenstock, 1966). The intensity required for a cue to be sufficient to trigger action varies with differences in levels of readiness for change (Rosenstock, 1966), with less intensity required for those with greater readiness for change. Cues to action may include things such as education, reminder communication, and personal experiences (Greene et al., 1999). Rosenstock (1966) notes people who are unconcerned about a health problem, such as those in denial, will fail to respond to cues or information given to them, because they lack perception or understanding of the unhealthy behavior as a problem.
Other variables that Rosenstock (1966) describes as possible influences of health behavior include demographic factors, such as age, race, ethnicity and socio-economic level. Socio-psychological and structural factors also may affect perception and therefore influence health behavior. Educational attainment and knowledge are factors that are particularly influential on an individual’s perception of susceptibility, severity, benefits, and barriers (Strecher & Rosenstock, 1997).

Self-Efficacy as a Construct of the Health Belief Model

Self-efficacy, a construct of social cognitive theory introduced by Albert Bandura, was added to the Health Belief Model in 1977 to increase its ability to explain health behavior. The original Health Belief Model focused on health behaviors that were one-time acts, such as a screening or immunization intervention. Self-efficacy involves the confidence required to make long-term lifestyle changes (Strecher & Rosenstock, 1997). Self-efficacy goes beyond the knowledge of the risks and benefits of certain health practices. It includes the belief that one is capable of performing in a certain manner or exercising some control in order to attain certain goals or change health habits. Self-efficacy is not the same concept as that of perceived benefits described in the Health Belief Model, since a person may believe in the benefits in changing a health behavior, yet not feel capable of performing the necessary behavior to accomplish the change (Champion, 2008). Bandura (2004) explains that expectations held by people of outcomes produced by their actions will affect health behavior. These expectations include physically agreeable and disagreeable sensations, material gains and losses, social reactions such as approval or disapproval, and positive or negative self-evaluation of personal health situation and self-satisfaction. Self-efficacy beliefs include (a) perceived
facilitators and perceived barriers to the ability to attain the desired goal, (b) personal factors, such as mood, time, and personal environment, and (c) systemic factors such as food access systems and community policies and resources. Greene et al. (1999) include the concept of capability of resistance to temptation in the self-efficacy construct when applied to dietary behavior.

Bandura (2004) has found that persons with high levels of self-efficacy have correspondingly higher goals, firmer commitments to reach them, and have higher expectations of a successful outcome. Persons with low levels of self-efficacy have the opposite experience, are easily discouraged when faced with difficulties in trying to achieve goals, and are quick to give up trying. These persons may feel that their health outcomes are beyond their personal control. They may benefit from programs which include not just printed materials but interactive support and opportunities for success and exercise of control. In the face of challenging circumstances, programs that produce experiences of mastery lead to enhancement of self-efficacy and less defensive behavior.

Self-efficacy expectations are influenced most strongly from personal mastery experiences, such as participation in activities that promote skill acquisition. Vicarious experiences of accomplishment, such as observing modeled successful behavior change, also may positively influence self-efficacy. However, observation of others’ successes is weaker than experiences of personal mastery in promoting self-efficacy expectations. Another technique, weaker than personal mastery experience but frequently employed to promote self-efficacy, is verbal persuasion, in which people are given the suggestion that they can successfully deal with the situation they are facing. Techniques that diminish emotional arousal and the physiologic states which accompany stress reactions to a
potentially threatening situation also may improve levels of perceived self-efficacy and coping capability. These techniques include relaxation and gradual exposure to formerly threatening topics or situations (Gurung, 2010).

Perceived self-efficacy may affect choice of activities and settings. People may avoid situations that are believed to exceed their coping skills when they perceive low levels of self-efficacy. Furthermore, people will invest more effort in activities for which higher levels of self-efficacy are perceived (Bandura, 1977). It is important to add that motivating people to change behavior by increasing levels of self-efficacy is of limited value if they are not given the resources and supports to make those changes a reality in their lives. In addition to self-efficacy, a sense of community efficacy is required for health promotion. In community efficacy, a societal approach is harnessed using collective citizen action to improve outcomes through political, economic, social, and environmental systems (Bandura, 2004).

Bandura’s self-efficacy theory is applicable to this proposed study of a health promotion intervention for a group of vulnerable adults who may have had past experiences of low levels of self-efficacy. Low levels of economic and educational achievement, job and relationship failures, substance abuse and relapse experiences, legal problems, and poor physical or mental health are experiences common to this group of adults. These experiences may contribute to low levels of expectations for future benefits of health behavior change. Self-efficacy has been shown to be a powerful predictor of nutritional behavior, related to outcomes of more positive attitudes toward nutrition, better food-related behavior and overall improved health (Chen, Acton, & Shao, 2010; Guillaumie, Godin, Manderscheid, Spitz, & Muller, 2012).
The current project incorporates the concepts of the Health Belief Model. For the group of people who are the target of this study, perceived susceptibility for nutrition-related health problems of overweight and obesity, diabetes, and hypertension is the focus. Perceived severity would include their perceptions of the impact of these conditions on life and health. The perceived benefits of a nutrition education intervention may include the positive experiences of education for healthy food choices that incorporate opportunities for socialization and food experiences and the expectation that a result may include improved nutritional status and improved health. The perceived barriers may include the negative perceptions about the extra time required to learn about nutrition and implement healthy food preparation, the social and cultural barriers to healthy food choices, and the financial, geographic, and other environmental, social, and personal factors that may be barriers to healthy food access.

Although this project addressed all four of these perceptions, the focus of the intervention was on perceived barriers to nutrition-related health behavior, since it has been identified as the most powerful of the Health Belief Model constructs. The nursing intervention, based on the Health Belief Model, incorporated the self-efficacy construct, which is also powerful. This included provision of opportunities for participants to experience personal accomplishment and skill attainment, observe modeled food choice and preparation behavior by others in a group setting, and receive verbal persuasion, support, and encouragement in a relaxed, calm atmosphere. These strategies have been described by Brug, Glanz, and Kok (1997) as effective for increasing nutritional self-efficacy. In addition, resource and access barriers to self-efficacy that lie within organizational and societal systems and ways to overcome them were addressed.
The Trans-Theoretical Model of Change allows for the incorporation of the Health Belief Model, including the self-efficacy theory, into a framework of complementary theories which include consciousness raising and helping relationships (Prochaska, Redding, & Evers, 1997; Prochaska & Velicer, 1997). It has been applied to a wide variety of health research areas, including nutritional intake of fruit, vegetables, fat, and fiber (Van Duyn et al., 2001), and to strategies to promote changes in dietary habits and a readiness for healthful eating (Ni Mhurchu, Margetts, & Speller, 1997; Northwehr, Snetselaar, Yang, & Wu, 2006; Salmela, Poskipartta, Kasila, Vahasarja, & Vanhala, 2008). The Trans-Theoretical Model was first developed by Prochaska to use in a study of subjects who were changing their smoking behavior (Prochaska & DiClemente, 1982, 1983). Later it was applied to studies of other behavior changes, including overeating. The main concept of the model is “stages of change.” Change, according to the model, occurs as a process involving stages that occur over time and are dynamic, involving both progression and regression. Prochaska and Velicer (1997) have described this theory of behavior change process as one which includes concepts of decisional balance, self-efficacy, and recognition of temptation.

The theory has been described as having five stages (Prochaska & DiClemente, 1982, 1983; Prochaska & Norcross, 2003). The first stage in the Trans-Theoretical Model is called “pre-contemplation.” In this stage, a person does not intend to take action in the next six months. Typically, persons at this stage have been characterized as “unmotivated.” They may avoid reading about or discussing the problem behavior, may deny that a problem exists, and reject new information. A person may be in the pre-
contemplation stage due to being uninformed about the consequences of a current behavior or may be discouraged from trying further attempts to change based on previous failures. Brug et al. (1997) note that attitudes and levels of self-efficacy vary across the stages of change, with persons in the pre-contemplation stage typically exhibiting the lowest levels of social support and self-efficacy, as the cons of making a change outweigh the pros. Prochaska and Velicer (1997) have concluded that 40% of persons in at-risk behavior populations are in the pre-contemplation stage.

The second stage is known as “contemplation,” in which a person intends to change behavior within the next six months. A sub-concept in this stage is that of decisional balance, defined as the process of identification of the reasons for changing or not changing a behavior, and the influence of the relative weight of the perceived pros and cons of change (Spencer, Wharton, Moyle, & Adams, 2007). Ambivalence about the benefits and costs of behavior change can lead to a person being “stuck” in this stage for a prolonged period of time, as pros and cons may become equivalent. A person may become “un-stuck” as the pros of change (benefits) begin to outweigh the cons (barriers), and barriers are reduced (Greene et al., 1999). At this point, the psychological stage of readiness to change combines with the belief that a change in behavior would be beneficial in reducing a threat (Pratt, Wilson, Leklem, & Kingsley, 1987; Rosenstock, 1966).

The third stage of change described in the Trans-Theoretical Model is known as “preparation,” in which people are intending to take action in the immediate future, usually within the next month. The stage is characterized by a plan of action, such as desire to join a nutrition class, lose weight, or get better control of blood pressure or
blood sugar. Small behavioral changes may begin to occur. Setting personal goals for healthy eating, participating in discussions, exchanging ideas, and learning new information and skills related to healthy nutrition, and completing a nutrition education program are examples of the behavior changes that could be expected during this stage (Greene et al., 1999). Nutrition education for people in the contemplation and preparation stages is most beneficial if it is aimed at increasing nutritional self-efficacy, such as food preparation skills, techniques for accessing healthy foods, such as fruits and vegetables, and coping with situations such as eating alone (Brug et al., 1997).

The fourth stage of the Trans-theoretical Model is that of “action,” defined as a person making overt behavioral changes within the past one day to six months. Significant levels of time and energy may be invested by persons in this stage as they modify their behavior (Prochaska & Norcross, 2003). New information may still be accepted. Skills are needed to handle emotional, cognitive, behavioral, and environmental challenges. Nutrition education applicable to persons in this stage includes relapse-prevention strategies and handling situations of temptation, social pressure, and cravings for non-nutritious foods (Greene et al., 1999).

The Trans-Theoretical Model categorizes its fifth stage as “maintenance.” This stage is one in which persons are trying to maintain the changes they have made and avoid relapse. Prochaska and Norcross (2003) note that while this stage has often been viewed as a static state, that the maintenance stage is actually not an absence of change, but a continuation of the changes made, for a period lasting longer than six months. This stage is characterized by stabilized behavior and an absence of relapse. Peer support, including
sharing strategies to maintain new health habits and avoid temptation to relapse, is helpful in this stage.

Because relapse often occurs when changing problematic health behavior, the Trans-Theoretical Model is not linear. As a spiral model of change, the theory conceptualizes the way in which a person who has relapsed in health behavior change may regress to an earlier stage, and may remain for various periods of time. It is encouraging to note that although it is possible to regress all the way back to the pre-contemplation stage, generally those who relapse do not go all the way back to their starting point (Prochaska & Norcross, 2003).

Another major construct of the Trans-Theoretical Model is the existence of various processes of change which facilitate movement through each stage. These can be divided into cognitive processes and behavioral processes. Awareness of the processes of change is important, as this knowledge can be useful for structuring into an intervention the processes appropriate at each stage of change that will help individuals progress to the next stage (Prochaska & Norcross, 2003; Wright, Velicer, & Prochaska, 2009).

Change processes are used infrequently by those in the pre-contemplation stage, as those in this stage spend little time or attention on the problem behavior, and have few emotional responses to its negative aspects. Change processes that may help pre-contemplators move to the contemplation stage include cognitive processes of consciousness raising (increasing awareness through knowledge, confrontation, and sharing of observations) and dramatic relief (experiencing and discussing feelings related to the problem). Those in the contemplation stage will continue to benefit from consciousness raising, and their increased awareness leads to self re-evaluation of
personal values and problems and environmental re-evaluation of the effect their behavior has on others and knowledge of situations which contribute to problem behavior. Persons who are in the preparation stage of change use the cognitive process of self-liberation, in which they believe that they have the ability, or self-efficacy, as Bandura (1977) described the concept, to change their behavior and be successful, even when faced with difficult circumstances. Part of self-liberation also involves identifying sources of support for behavioral change, known as the process of involvement in helping relationships. Behavioral processes which are particularly important in the action stage include counter-conditioning (in this case, substituting a healthy alternative for an unhealthy one), stimulus control, and use of contingency or reinforcement management techniques such as acknowledging positive behavior through self-praise, recognition from others, or a tangible reward. Persons in the maintenance stage of change continue to use the processes which they have used before to reinforce to themselves the personal value of their successful changes, with open awareness of possible pitfalls (Prochaska & Norcoross, 2003; Vinci, 2003).

The Trans-Theoretical Model of Change was useful for the conceptual framework for the project, since it recognizes the concept that behavioral change involves stages which may vary in length of time and involve progression or regression, and the movement to another stage may be enhanced by inclusion of the appropriate cognitive or behavioral process for persons at each particular stage. Because the model incorporates more than one theory (hence the name “Trans-theoretical”), it includes the concepts of the Health Belief Model, particularly in the decisional balance of benefits versus barriers found in the contemplation stage, and the self-efficacy concept, demonstrated particularly in the
contemplation and preparation stages. The model provides the opportunity to apply individualized interventions, using processes of change to facilitate progress through stages (Spencer, Wharton, Moyle, & Adams, 2007). By including in the nutrition intervention stage-sensitive strategies and processes for food behavior change, the interventions had a greater likelihood to be effective (Greene et al., 1999; Horwath, 1999; Merrill, Friedrichs, & Larsen, 2002). For the purposes of this project, because participants may vary in their stage of behavioral change, the intervention included strategies appropriate for support of the change process at all of the five stages. However, this project focused the nutrition education intervention content on the Health Belief Model constructs most applicable to the contemplation and preparation stages of change, for reduction or elimination of healthy eating barriers and improvement of healthy nutrition self-efficacy.

The PRECEDE-PROCEED Model for Health Education

A conceptual model for planning this health education intervention was based on the PRECEDE constructs described by Green, Kreuter, Deeds, and Partridge (1980) and Green and Kreuter (1992). PRECEDE is an acronym for Predisposing, Reinforcing and Enabling Constructs in Educational Diagnosis and Evaluation (Green et al., p.11). PRECEDE-PROCEED is a structural guide and conceptual model for the application of relevant theories and models for health promotion programs targeted to specific groups of people. PRECEDE is a vital first step for making the diagnoses upon which analysis can be based; without analysis of the target population’s needs, program resources may be used inappropriately and ineffectively (Gielen & McDonald, 1997). PRECEDE stresses the importance of assessment of the predisposing, enabling, and reinforcing factors that
are relevant to health-related behavior prior to planning an effective education intervention.

For planning nutrition education programs for health promotion, predisposing factors include antecedents to behavior that may influence motivation, such as nutrition knowledge, beliefs about links between diet and disease, attitudes toward food, and values about health. One of the goals of nutrition education is to reduce barriers to good nutrition (Greene et al., 1999), therefore, assessment of perceived barriers is essential. Demographic factors, such as age and ethnicity, socioeconomic level and educational attainment, may be included in the classification of predisposing factors that must be considered for effective tailoring of education programs for a target population. Enabling factors are those that enable a behavior to be accomplished, and include the ability to perform certain food-related behaviors, such as having access to food, the resources for food purchase, and the skills for food preparation. Reinforcing factors are rewards, feedback, or incentives that may positively or negatively contribute to or support behavior change. Reinforcing factors include the attitudes and reactions of significant others, such as peers, and health professionals (Chavez-Martinez et al., 2010; Green & Kreuter, 1991; Neumark-Sztainer & Story, 1996).

The assessments of predisposing, reinforcing, and enabling factors obtained contribute to five phases of diagnosis in the PRECEDE model. The first is a social diagnosis of people’s perceptions of their needs and how they affect and are affected by their quality of life. The next phase is the epidemiological diagnosis in which the needs and quality of life issues are correlated with the existing health problems. The third phase is the behavioral and environmental diagnosis of the risk factors for the health problems
identified, such as lifestyle and external social and physical factors, including an evaluation of their changeability. The next phase is the educational and organizational diagnosis of the predisposing, enabling, and reinforcing factors that influence behavior and identification of the needs for new resources, skills, or policies which are related to the identified risk factors. The final phase of PRECEDE is that of administrative and policy diagnosis, in which the policies, resources, and structure of associated organizations that could affect program implementation positively or negatively are identified. The PRECEDE model stresses the importance of active participation by members of the target population at each phase of diagnosis in identification of their own needs and priorities as fundamental to success in achieving behavioral change (Gielen & McDonald, 1997; Green & Kreuter, 1991; Horacek et al., 2000).

For the purposes of this project, the PRECEDE phase began with focus group discussions for collection of the data necessary to make the social, epidemiological, environmental, behavioral, and educational diagnoses described in the first four phases. This included assessment of needs and quality of life issues, demographic factors, and the predisposing, enabling, and reinforcing factors that contribute to this group’s dietary behavior and influence nutrition behavior change. It also included assessment of the Health Belief Model elements of perceived barriers and levels of self-efficacy through surveys, questionnaires, and discussions with project participants, as described in Chapter 4. Phases Four and Five included assessment of the housing commission, which oversees the residence of this project population, and the community for data necessary to make the organizational, administrative, and policy diagnoses.
The PROCEED part of the model began with the use of an appropriate intervention that was tailored on the identified predisposing, enabling, and reinforcing factors already identified as behavioral influences, and environmental, educational, organizational, administrative, and policy factors. PROCEED is an acronym for Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development, and includes the intervention and subsequent evaluation of the process, its impact on individuals, communities, and systems, and the outcome. Integrating the Health Belief Model and self-efficacy constructs into the intervention included discussions of barriers and possible strategies for dealing with them, including contributions and suggestions from study participants. It is expected that sharing coping successes in addition to skill acquisition will increase levels of self-efficacy. Materials and information were provided as appropriate for each stage of nutrition behavior change, since participants could transition from one stage to another. See Figure 1 for a depiction of the model constructs.

Assessment of the outcome of the intervention using the PRECEDE-PROCEED model included an evaluation of the changes in predisposing, enabling and reinforcing factors, such as knowledge, attitudes, skills, and resources, and evaluation of impact on systems, organization and policies. The Health Belief Model is the conceptual foundation that underlies assessment of an outcome of increased understanding of the relationship between nutrition and disease and health, and the ways to overcome barriers, such as the environmental factors, to improve dietary behavior. Self-efficacy is also included in outcome assessment, specifically regarding participants’ perceptions of capability to implement nutrition behavior changes and influence their own health.
In summary, the conceptual framework for the project was based upon an integration of theories. The Health Belief Model, with its component of self-efficacy as a construct of Social Cognitive Theory, integrated with Trans-Theoretical Model of Change provides a sound theoretical foundation upon which to base a nutrition intervention. The use of the PRECEDE-PROCEED model is useful for structuring inclusion of specific areas of assessment, intervention, and outcome evaluation which include both individual and organizational factors within these theoretical models.
CHAPTER 4
Methods and Measurements

The purpose of this scholarly project was to improve nutrition for health promotion in a group of vulnerable adults in an urban setting. The first question to answer was whether a program of nutrition education targeted to the learning and cultural needs of a low-income urban adult population, together with advocacy for improved food choice options, would be associated with increased nutrition knowledge and dietary behavior change. A second question was whether a by-product of the intervention led to an increased level of self-efficacy regarding nutritional choices and the impact of those choices on personal health.

This chapter will describe the procedures used to explore this purpose and these questions. The intervention was planned in collaboration with a community partner, the Michigan State University-Extension (MSU-E) nutrition program. Some decisions for the procedures were made based on the experience of this partner, including sample size (a 10:1 ratio of participants to educators) and the tool used to measure nutrition behavior.

Project Site

The site for this project was a low-income housing apartment building in a midwestern urban area. This building of 181 one-bedroom and five two-bedroom apartments, hereafter referred to as the “apartments,” was built in 1966. It is designated as government-subsidized housing for low-income adults who are elderly (age 62 and older) and/or mentally and/or physically disabled. Eligibility requirements for residents include meeting federal income levels of less than or equal to $35,000 annually for a household of one person and $40,000 for a two-person household. Tenants receive a
federal rent subsidy and rent is not more than 30% of the household’s adjusted monthly income. The city’s Housing Commission describes the apartment building in its United States department of Housing and Urban Development (HUD) documents as the largest population of frail elderly, mentally disabled, and physically disabled residents in public housing in this community.

Three staff members are employed to assist the residents based on the level of poverty and disability among the occupants. A full-time resident services specialist with a Master’s degree in social work (MSW) coordinates services. A substance recovery coach assists residents who are current or former substance abusers. Another resident services specialist with an MSW assists residents with mental health problems. A building manager and maintenance staff are also present on site. There are security cameras, but no security staff on site, other than a community police officer who patrols regularly. Crime in and around the building, including drug transactions, prostitution, theft and violence is frequently mentioned as a source of resident stress.

The majority of the apartments have one bedroom and one bathroom. They are equipped with a stove, refrigerator with freezer, and sink. Several residents have microwave ovens that they have obtained on their own. One of the 188 apartments on the second floor has been designated as an on-site food pantry, and is equipped with perimeter shelves, a few tables, a refrigerator, and a freezer. A community room with a kitchen is located on the main floor of the building. The surrounding community is made up of small, older homes rented or owned by an ethnically and racially diverse population, some small businesses (such as gas station, drug store, car wash, hardware store, party store,
etc.), and several churches. Although the near-by party store, drug store, and gas station do carry some grocery items, there are no major grocery stores within 1.9 miles from the site.

Project Population

The current resident population at the apartments includes 105 (61%) males and 66 (39%) females. Of these 171 persons, 161 (94%) are considered to be disabled, and about half of these disabilities are of a mental health nature. Most residents with mental health disabilities have case managers through local mental health agencies. The resident population includes 143 (84%) individuals less than 62 years of age (average age 48) and 28 persons (16%) who are age 62 or older and considered elderly (average age 69 years). The population is racially and ethnically diverse, with 79 (46%) residents who are white, of which 9 (5%) identify themselves as Hispanic or Latino, 91 (53%) who are African American, and 3 (2%) who are all or part Native American. All speak English. The majority of the residents are unemployed. Most do not own any form of transportation, other than perhaps a motorized scooter/wheelchair. Most members of the resident population have a low level of education (less than high school) and low literacy level, as revealed in personal conversations and at community events.

Residents are not required to disclose health information, therefore exact percentages are unavailable. By observation, several health issues are apparent. A large number of the resident population is overweight, obese, or morbidly obese. Community blood pressure screening events have documented that many in the resident population have hypertension or elevated blood pressure. Informal conversations with residents at community events have revealed that a large number of residents have diabetes. Many have no teeth or dentures, and of those who have teeth, most have poor dentition with
missing or broken teeth. About half of the disabled residents have a known mental health disability, such as depression, bipolar disorder, schizophrenia, and/or post-traumatic stress disorder. A small number of residents have acquired cognitive deficits due to brain injury, stroke, or tumor. A few have developmental cognitive delays present since birth. About a quarter of the resident population uses an ambulation assistive device, such as a cane, walker, wheelchair, or scooter. A very large number of residents have substance abuse disorders, including tobacco, alcohol, marijuana, and cocaine.

Income for most residents is supplied by Social Security, Social Security Disability, and in some cases, case management assistance for rent. The data from the Housing Commission include an average annual income of $8,346 per person. This is less than 70% of the poverty marker, and less than the income classified by HUD as “extremely low.” Most residents are eligible to receive financial benefits for food purchases, usually averaging $16.00 monthly through the Supplemental Nutrition Assistance Program (SNAP), formerly known as the food stamp program. Some of the residents do not use their SNAP funds for food, but sell them to others to obtain money to use for other purchases, thereby decreasing their food purchasing power.

**Project Sample**

The project sample of 20 participants was drawn from the total population of the apartment building residents. The sample size was limited to twenty due to the constraints of space, the desire for an interactive activity that included group discussion, food tasting and sharing, and the recommendation from the nutrition educator who considers a ratio of one educator to ten participants to be the maximum for effective learning of the curriculum content. The sample met the following study eligibility criteria: (a) be a legal resident of the apartments, and by definition, low-income and elderly and/or mentally
and/or physically disabled; (b) be English speaking; (c) not be the recipient of meals prepared by another source on a regular basis, such as chore worker meal preparation, Meals on Wheels, or other home delivered meals program; (d) be physically able to participate in food selection, preparation, and consumption; and (e) agree to participate in all 8 sessions, the related data collection, and sign an informed consent.

The initial sample was a self-selected, convenience sample of 20 persons. The sample consisted of fourteen females and six males. Nine identified themselves as white, nine as African American, one as multi-racial (white and Native American), and one as Hispanic. The age of the sample ranged from 37 to 69 years, with a mean age of 53.3 years. Seventeen individuals participated in enough sessions to be included in the final analysis, and of these, sixteen participated in all eight sessions. The three who did not complete more than the first session included one white male who was hospitalized and two African American females, one of whom had a family emergency out-of-state and the other who was not seen in the building for several weeks without explanation. Table 1 contains data describing and comparing the beginning (n = 20) and final (n = 17) participants. The final group of 17 had essentially the same characteristics as the original group of 20. The sample is representative of the project population for ethnicity and age. A higher percentage of women participated in the program.
Table 1

*Participant Demographics before and after Attrition*

<table>
<thead>
<tr>
<th>Category</th>
<th>Original Sample, N=20</th>
<th>Post-attribution Sample, N=17</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>%</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>9</td>
<td>45%</td>
</tr>
<tr>
<td>African American</td>
<td>9</td>
<td>45%</td>
</tr>
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<td>Female</td>
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<td>70%</td>
</tr>
<tr>
<td>Age</td>
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<tr>
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<td>10%</td>
</tr>
<tr>
<td>45-54</td>
<td>8</td>
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<td>55-64</td>
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<tr>
<td>65+</td>
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<td>5%</td>
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<tr>
<td>Marital Status</td>
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<tr>
<td>Single</td>
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</tr>
<tr>
<td>Married</td>
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</tr>
<tr>
<td>Separated</td>
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<td>25%</td>
</tr>
<tr>
<td>Divorced</td>
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<td>15%</td>
</tr>
<tr>
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<td>5%</td>
</tr>
<tr>
<td>Education</td>
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<tr>
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<td>5%</td>
</tr>
<tr>
<td>Some HS or HS Grad/GED</td>
<td>10</td>
<td>50%</td>
</tr>
<tr>
<td>Some College or College Degree</td>
<td>9</td>
<td>45%</td>
</tr>
</tbody>
</table>

**Recruitment of Project Sample**

After obtaining approval from the Grand Valley State University Human Research Review Committee (Appendix A), time and date selection for an educational intervention was determined through informal discussion with 10 residents, the building manager, resident services specialist, and maintenance staff. Time and dates were selected to be most conducive to participant attendance and to avoid conflicts with other activities scheduled in the same space. Flyers (Appendix B) were posted on bulletin boards in and near elevators on each floor, the community room, near mail boxes, and in the computer.
room to invite participation in the project activity. Additionally, the resident services specialist discussed the project with several residents to encourage participation. The participants were recruited by the DNP student during the monthly pantry visit time, community room open time, and during computer room hours over three days. Those interested in participation were also told that the project and participation requirements could be discussed at an individually arranged time or location if necessary, that participation was limited to the first 20 participants, and that a waiting list for others would be kept by the resident services specialist in case of cancellations or no-shows.

Potential participants were informed of the risks of participation, which could include an unforeseen cooking accident, food consumption injury, or allergy. Confidentiality and privacy of their information was included in the discussion of risks. They were informed of the benefits of participation, including increased nutrition knowledge, opportunities to learn new skills, opportunities to taste and try new recipes, and opportunities to have an enjoyable social activity that included a healthy food experience. Incentives included a food-related or cooking-related reward (such as utensils, salt replacement, etc.) at each individual session, and a $30.00 gift card at the end of the educational intervention for those participants who attended all eight sessions, including participation in data collection. The amount of $30.00 as a reward incentive for complete participation was chosen as a reasonably significant amount for low-income persons without being construed as a bribe. It is a standard amount of reward for complete participation in other SNAP education (SNAP-Ed) programs.
After recruitment of the first 20 interested participants, two found they were unable to attend due to scheduling conflicts, and two from the wait list were substituted. A personal screening interview was conducted to obtain informed consent (Appendix C) and obtain demographic and baseline information (Appendix D). One participant disclosed that he was unable to read or write, so the consent and all subsequent data collection information were delivered and obtained from that participant verbally, at his request, by the DNP student.

**Project Design**

Higgins and Barkley (2003) note that it is important to assess the desires and needs of the targeted audience before planning nutrition education programs. The same authors, in a 2004 study of nutrition education for older adults, noted many health educators do not completely understand their targeted audience’s nutrition concerns. This lack of understanding may result in development of inappropriate educational programs. A focus group qualitative method was used initially to validate perceived nutritional needs at this housing site and preferences for the educational activity. Five selected individuals who agreed to participate in the intervention were also invited and agreed to participate in the focus group. The selected participants were representative of the 20 who registered for the intervention: three African American, two white; four female, one male; two independently ambulatory, three used assistive devices. The group met for a 30-45 minute discussion, one month prior to the start of the educational intervention in the apartment community room. Notes were taken during the group meeting and analyzed qualitatively (Appendix E). The topics for focus group discussion
included nutrition knowledge needs of the adults in this population, nutrition-related health concerns, barriers to healthy eating, and cultural food preferences and aversions. Program logistics preferences, such as time/date structure, were also included for confirmation by focus group members. Informed consent was obtained from the focus group participants (Appendix F).

For the 20 participants in the study, a one group pre-test, post-test design was selected for this project. This design was selected due to the use of data collection before and after the intervention, and for its ability to measure change or differences after an intervention within a group (Polit & Beck, 2008). The dependent variables in this project were the scores on nutrition knowledge, nutrition-related self-efficacy, and nutrition behavior tests. The intervention in this study was attendance at the nutrition education sessions offered in the “Healthy Food for Healthy Living” program intervention.

Instruments and Measures

Demographic and Sample Descriptions

Demographic and baseline information were collected in an intake interview using a questionnaire survey that included individual predisposing and enabling factors pertinent to the study. Questionnaires used in this project were written at an approximate fifth grade reading level and were administered in a setting that allowed questions to be asked and terms clarified if needed, as suggested by Howard-Pitney, Winkleby, Albright, Bruce, and Fortmann (1997). Data were collected regarding age, gender, race/ethnicity, income, educational level, health problems (such as presence of overweight/obesity, elevated blood pressure, and/or diabetes), and other health issues that may affect ability
to obtain, choose, prepare, and consume healthy food. To operationalize stage of change readiness, one question was adapted from Tessaro, Rye, Parker, Mangone, and McCrone’s 2007 survey of effectiveness of a nutrition intervention program with rural low-income women. Possible responses included “Not interested” which corresponded to the pre-contemplation stage; “Thinking about or considering making changes” which corresponded to the contemplation stage; “Planning for change soon” which corresponded to the planning stage; and “Already changing” which corresponded to the action stage.

Perceived barriers were addressed with one open-ended question. Participants were asked to self-rate their health with one question designed to numerically rate their level of perceived personal health on a scale from poor to excellent, scored correspondingly from 1 to 4, with 1 being the lowest and 4 being the highest score. As Polit and Beck (2008) note, combining both open-ended and closed-ended questions in one instrument may be recommended to balance the advantages and disadvantages of each. Therefore, open-ended questions were used to collect data regarding “other health issues” and perceived “barriers to good nutrition,” as this format allowed participants to answer in their own words, without being compelled to choose a response that did not accurately reflect their situation.

**Nutrition Knowledge, Self-Efficacy, and Behavior Tool Models**

Nutrition knowledge, behavior, and self efficacy were measured using questions that were adapted for this group from previously validated instruments used with other low-income and low-literacy groups. Adaptations were required since this project group did not include families with children or a large number of Hispanic members. The
following instruments used to measure nutrition knowledge, behavior, and/or self-efficacy in similar populations were reviewed as models for development of the test items included in the tools used in this project. While specific tools from these studies were not used, types of questions and response categories were adapted as the project tools were developed.

The Stanford Nutrition Action Program questionnaire (Howard-Pitney et al., 1997) was used for a multi-ethnic population of 351 low-income adults with low literacy skills, who were determined to be at risk for cardiovascular disease. The questions included items to assess nutrition knowledge, nutrition attitudes, and self-efficacy. The tool used 14 true/false statements to test nutrition knowledge based on the SNAP nutrition education curriculum content used in that intervention. Total tool reliability was reported using Cronbach’s alpha at .42 for nutrition knowledge. In the Stanford Nutrition Action program study, nutrition attitudes were measured by 18 items on a five-point Likert-like scale ranging from “1 = strongly disagree” to “5 = strongly agree.” Items in the scale reflected attitudes toward cost, taste, low-fat food, elements of preparation, effort, food appropriateness for children, family acceptance, and diet and health concerns. This nutrition attitudes subscale had a Cronbach’s alpha of .64. The Stanford Nutrition Action Program study questionnaire also used 10 items to test self-efficacy, measuring the certainty with which participants felt they could perform specific nutrition-related behaviors. Self-efficacy was measured using a five-point Likert-like scale ranging from “1 = not at all certain” to “5 = very certain.” The Cronbach’s alpha for this subscale was .76, demonstrating good reliability.
Fahlman, Dake, McCaughtry, and Martin (2008) conducted a pilot study to determine the impact of the Michigan Model Nutrition Curriculum on nutrition knowledge, self-efficacy, and behavior in 783 metropolitan-area middle-school students. It used three subscales to evaluate nutrition knowledge, eating habits, and efficacy regarding healthy eating. The study was based on a dietary curriculum designed to address dietary patterns that may begin in adolescence and be carried into adulthood. It specifically targeted patterns associated with risk factors for overweight/obesity, cardiovascular disease, and type 2 diabetes. The curriculum content included increasing fruit, vegetable, and dairy consumption, making healthy choices in fast food restaurants, and understanding food groups, advertising, and labels. The tool, composed of three subscales, was validated by factor analysis with varimax rotation of items. Overall reliability for the tool was reported using Cronbach’s alpha as .71. Eating behavior was assessed with pictures of 33 single serving food items accompanied with a possible response from “none” to “three or more times” for the number of times the pictured food was eaten the previous day. The reliability measure for this subscale was .71. Nutrition knowledge was tested using a subscale of 18 items coded for dichotomous correct/incorrect answers, with a Cronbach’s alpha of .80. Self-efficacy was tested in this study with four expectation questions with responses measured using a seven-point Likert-like scale ranging from “1= not at all confident” to “7 = very confident.” This subscale had a Cronbach’s alpha of .72.

Blackburn et al. (2006) developed a tool, called the Food Behavior Checklist (FBC), to evaluate the impact of nutrition education on fruit and vegetable consumption in ethnically-diverse female SNAP-education recipients. The tool was validated by the authors using correlation of responses with biomarkers and three 24 hour dietary recalls
given before and after the Food Stamp Nutrition Education Program (FSNP) and Expanded Food and Nutrition Education Program (EFNEP) intervention. It includes seven questions related to fruit and vegetable consumption, with a Cronbach’s alpha of .80. The tool questions have either dichotomous yes/no possible response or a four- or five-point Likert-like scale response, ranging from “never” to “usually or always.”

Southgate et al. (2010) developed the Diet Knowledge Questionnaire (DKQ) as a tool to assess demographic information, nutrition knowledge, and nutrition-related behavior in older adults in response to educational interventions. It had been validated by the research team. The nutrition knowledge subscale consisted of 12 items. The knowledge response items used a five-point Likert-like scale, ranging from “1 = definitely true” to “5 = definitely false.” The Cronbach’s alpha of the knowledge subscale was .42. Nutrition behavior responses were measured as part of a risk screening tool, known as SCREEN II. This is a 16 item questionnaire with responses scored from “0 (minimum)” to “4 (maximum),” with a maximum possible total score of 64. In this behavior tool, a higher total score is correlated with a lower risk for malnutrition. The authors state the SCREEN II is both valid and reliable for measuring behavior, although a Cronbach’s alpha was not reported.

Parmeter and Wardle (1999) used a 50-item questionnaire to measure nutrition knowledge and behavior in the United Kingdom. Item validity was determined by a panel of psychologists and dieticians with test/re-test results reviewed for item adaptation. Reliability of subscale items was determined to range from .70 to .97, using Cronbach’s alpha. Content areas included understanding of terms, knowledge of nutritional recommendations, knowledge of food sources of specific nutrients, informed food
choices, and knowledge of nutrition-illness associations. Questions required from one to four possible responses, several included “not sure” as a possible answer. Some open-ended questions were included.

Turconi et al. (2003) developed a dietary questionnaire on food habits, eating behavior, and nutrition knowledge. It was initially developed for adolescents in Italy, based on the concern that nutritional habits of adolescence may persist into adulthood and have effects on future health. This questionnaire was found to be reliably modifiable for use with other populations. The 99-item questionnaire reported a Cronbach’s alpha ranging from .55 to .75 for its subscales. It includes seven questions on personal data. The next two sections contain 28 questions regarding frequency of consumption of specific foods and 14 questions about food habits and behaviors. These were scored on Likert-like scale from “1 = never” (least healthy response) to “4 = always” (most healthy response), with a maximum total score of 56. Subsequent questionnaire sections included six questions regarding physical activity and five questions regarding beliefs about healthy/unhealthy food. These were scored with the same Likert-like scale, with possible scores of 24 for activity and 20 for food beliefs. An eight item section was devoted to self-efficacy regarding improving personal health through nutrition behaviors. Possible responses were “1 = no,” “2 = don’t know,” “3 = yes.” A possible self-efficacy total score was 24. Evaluation of barriers to change included nine questions regarding presence of specific difficulties in improving eating habits. A response of “yes = 1,” “no = 2” was used for each item, with a possible barrier maximum score of 18. The nutrition knowledge section contained eleven questions, with responses coded “correct = 1,” and “incorrect = 0.” This section had a possible maximum score of 11. A similar scoring was
done for a 10 item section on food safety knowledge, with a possible maximum score of 10. A section regarding food safety behavior had eight questions, with responses ranging from “never = 1” (least healthy response) to “always = 4” (most healthy response) possible. The possible maximum score in this section is 32.

All of these instruments included items and subscales that assessed knowledge, behaviors, and self-efficacy of the respondents. Items used ordinal and Likert-like scale responses to assess eating behaviors and self-efficacy. Nutrition knowledge was most frequently assessed using true and false dichotomous choices. These were incorporated into the tools used for this project.

**Nutrition Knowledge, Self Efficacy, and Behavior Tools**

**Validity of Items**

The tool used to measure nutrition knowledge and self-efficacy was created for this project as “Survey: Nutrition Knowledge and Self-Efficacy” (Appendix G). The items selected for these measures were determined to be appropriate for the group for which they were used. This determination was based on experience with this population and the informed professional judgment of the DNP student. Items used in the tools were reviewed by other experts to corroborate the determination of content validity of the items.

**Nutrition Knowledge Tool**

The assessment of nutrition knowledge was measured with a ten-item true/false subscale of the survey tool. The items were scored as “1 = correct,” and “0 = incorrect.” It had a possible total score range of 0 to 10, scored before and after the education intervention. The items contained in this knowledge tool were adapted from the models
described in the previous section that had been used for nutrition education programs for SNAP recipients. Specific items were included that covered concepts contained in the curriculum planned for this intervention. A Kuder-Richardson test for reliability in the nutrition knowledge instrument was the default test for reliability calculation since the items in the test have only two categories of response. The Kuder- Richardson could not be calculated because several items lacked variability in responses. Item validity was evaluated by consultation with nutrition and health professionals.

**Nutrition-Related Self-Efficacy Tool**

The nutrition self-efficacy scale used for pre-intervention and post-intervention data collection contains ten items with five-point Likert-like response choices. The response choices for each item were scored on a scale from “not at all certain = 1” to “very certain = 5.” The possible score range is from 1-50. Because of the educational and literacy levels of the study participants, items were worded in an affirmative way to avoid confusion that could result from reversed positive and negative polarities of items (Polit & Beck, 2008). The ten item self-efficacy sub-scale of the tool had a Cronbach’s alpha of .66 (pre-test) and .77 (post-test). The items for this sub-scale were adapted for this project from the questionnaires described earlier that have been used in similar populations.

**Nutrition Behavior Tool**

The Expanded Food and Nutrition Education Program (EFNEP) and SNAP-Ed behavior checklist has been used to evaluate these programs. The reliability of this checklist has been reported using Cronbach’s alpha as .77-0.80 when tested with SNAP-Ed adult study participants in Wyoming (Wardlaw & Baker, 2012). Hoerr et al.
(2011) describe factor analysis of the items for determination of constructs to include in the EFNEP behavior checklist. These constructs and item choices were then used in Michigan by MSU-E to develop a tool for assessment of behavior change for participants in their EFNEP programs.

It was agreed, as part of the collaboration plan for the intervention, that the MSU-E educators would give a pre- and post-intervention nutrition adult behavior checklist known as the “MSU-E Modified Behavior Checklist” (MBC). This measure is required by MSU-E and the USDA for each participant in EFNEP programs for SNAP recipients (Appendix H). It was also agreed that MSU-E and this DNP student would share the results of data collected by MSU-E to avoid duplication of effort by the participants (Appendix I). At the time the intervention was initiated, during baseline data collection, the community nutrition educators substituted another nutrition behavior checklist for the Modified Behavioral Checklist. The MSU-E nutrition educators considered the substitute “Nutrition Education Senior Adult Checklist” (Appendix J) to be more appropriate to the adults participating in this project. This checklist is also known as the “Senior Adult Checklist” and “Senior MBC.” For this project, to avoid confusion since there were few senior participants, this tool is identified as the Nutrition Adult Behavior Checklist (NABC). The NABC was developed in 2012 as the “MSU-E Nutrition Education Senior Adult Checklist” by the Nutrition and Physical Activity Workgroup of the Health and Nutrition Institute, MSU-E. It was based on questions from the EFNEP database to evaluate nutrition behaviors of adults who are SNAP recipients, but do not have dietary responsibility for children. Due to this unforeseen substitution, retroactively, a change in protocol request was made to Grand Valley State University’s
Human Research Review Committee to substitute this behavior checklist for the one originally approved. Permission to use the new tool was given (Appendix K).

The NABC consists of fourteen items rated on a Likert-like scale. Possible responses range from “not applicable = 0,” included as the first item of the scale, “never = 1,” “seldom = 2,” “sometimes = 3,” “most times = 4,” to “always = 5.” The possible range of scores is 14 to 70. In this project, the calculated Cronbach’s alpha for the NABC was .71 (pre-test) and .70 (post-test).

Qualitative Data

Each participant at each session received a 3x5 card with the following open-ended statements to complete before leaving: (1) “One thing I learned today that I did not know before is…” and (2) “One thing I am going to change or start doing now is…” (Appendix L). The purpose of the open-ended statement cards after each session was to obtain immediate feedback regarding what, if any, new learning had occurred, whether any erroneous conclusions had been drawn, and to give participants an opportunity to set a written personal decision for change after each session.

Education Intervention

Nutrition Education Plan

An intervention planning meeting was held by the DNP student and the MSU-E educators three weeks prior to the start of the intervention to discuss specific lesson content, organization of time, and appropriate incentives to reflect each lesson’s content. The focus group results were shared. Recipes and food samples for each session were discussed. The educators were given a facility tour of the community room, kitchen, and pantry.
The intervention program content was based upon the “Eating Right is Basic” curriculum, developed by the United States Department of Agriculture (USDA) for SNAP recipients. This program has been used and updated for over 30 years to offer nutrition education to low income families. The program, which began as the Expanded Food and Nutrition Education Program (EFNEP), and is now known as “SNAP-ED,” has been shown to be successful in increasing nutrition knowledge and changing dietary behaviors (Arnold & Sobal, 2000). This curriculum was chosen for use in this DNP project because, as described by Townsend, Johns, Shilts, and Farfan-Ramirez (2006), its focus is primary prevention and health promotion for low income families. Its main objective is “to assist adults and youth in acquiring knowledge, skills, and behaviors necessary for nutritionally sound diets, contribute to their personal development and the improvement of the total family diet and nutritional well-being” (Townsend et al., 2006, p.30). The final project intervention combined the MSU-E curriculum content, the focus group identified content, and the DNP student specific focus on the health promotion aspects of a healthy diet, including overcoming barriers to good nutrition. The title of the intervention became “Healthy Food for Healthy Living” to reflect the emphasis of this project. The curriculum and lessons plans were organized for eight sessions of about 60 to 90 minutes (Appendix M).

**Delivery of the Intervention**

The education sessions were conducted in the apartment building’s community room and adjoining kitchen, which was closed for other activities during each session. Tables and chairs were already set up for congregate activities, with about four to six seats at each table. It had been determined by previous discussion that most participants preferred a schedule of mid-morning to noon, twice weekly for four weeks. The
intervention was conducted collaboratively by the DNP student (with a Master’s degree in Education and a Master’s degree in Nursing) and two MSU-E employed community paraprofessional nutrition educators who have a high school diploma or greater and are trained in community nutrition education.

The initial session included pre-test data collection of 30 to 40 minutes, and an overview of the course. Participants were asked by the nutrition educators to recall their food intake for the past 24 hours to understand usual dietary patterns. This is part of the content and data collection required by their program. The DNP student then discussed diet-related health issues that would be included in the next sessions of the educational program. These issues, such as diabetes, hypertension, and overweight/obesity were frequently cited by the participant group members on intake surveys and in informal conversations as significant. Based on the intake survey responses, the discussion also included the stages of dietary behavior change present among participants, and some identified barriers to healthy eating.

In the next seven sessions, each of the following topics was the main focus: (a) My Plate (updated) vs. My Pyramid, concepts of food quality, and food groups; (b) the vegetable and fruit food groups; (c) protein and milk food groups; (d) whole grains food group; (e) understanding food labels; (f) planning and making the most of food dollars, and (f) beverage and breakfast choices and overall program content summary. The last session included collection of post-test data.

The nutrition educators from MSU-E started each session with their information. This included a take-away “refrigerator card” reminder of goals and objectives for each session. After the community nutrition educators presented their information, the DNP
student discussed information to link health promotion to each nutritional topic discussed. The time was divided evenly between the nutrition educators and the DNP student. The main health promotion topics linked to each nutritional topic included weight control, the impact of nutritional choices on cardiovascular disease, especially hypertension, and blood sugar control. This health promotion information was based upon the Dietary Approaches to Stop Hypertension (DASH) nutrition principles. These principles include an emphasis on increased consumption of fruits and vegetables, whole grains, low fat dairy products, lean protein, potassium, and calcium, and decreased consumption of sodium and refined sugars (Champagne, 2006).

Part of the health promotion discussion addressed the topic of barriers to good nutrition specific to each topic, and ways to overcome them. For example, a barrier to eating fruits and vegetables was difficulty chewing hard or crunchy foods due to poor or missing teeth. Suggestions for ways to overcome this barrier included choosing softer fruits and vegetables and cooking/steaming before eating. Barriers to address low income and transportation issues were discussed, including currently available and developing community resources and pantry options.

The health promotion discussion also included attitudes relevant to the various stages of dietary behavior change. This included recognition of various motives for participation, contributions of peer support, encouragement, and recognition for changes being contemplated, planned, or already happening. Strategies addressed setting goals, handling dietary behavior change and potential relapse, and dealing with temptation.

At each session a recipe was prepared in advance by the community nutrition educators or the DNP student, or was assembled by the participants on-site when
appropriate. A copy of the recipe was given to each participant. These recipes were relevant to the topic of each session and chosen to be culturally acceptable, tasty, and easy to chew and swallow. They were made with inexpensive, easily available, and healthy ingredients. The features and components of each dish were explained during the last 20 minutes of each session. The food was shared communally, with tasting, comments, questions, and informal discussion. Contributions of favorite cooking tips, recipes, and alternative ingredients from participants were part of the discussion.

Food Access Advocacy

The second part of the intervention was comprised of on-going advocacy, collaboration, and systems leadership activities to improve access to healthy foods for the residents of this apartment building, including both the project participants as well as the general resident population. The project participants joined this process as often as possible. These activities were organic and evolved as opportunities and contacts were uncovered; therefore, there was no planned formal evaluation of participants’ response to these activities. Participants were informed during the educational intervention, as well as at other times, of the various activities that were being developed to improve access and reduce barriers to obtaining healthy food. Three of the project participants, two of whom were also key pantry volunteers, participated in discussions with this DNP student, resident services specialist, and local church representatives to identify needs and resources. An advocacy group was formed consisting of this DNP student, the resident services specialist, the building manager, Housing Commission manager, and deputy director of the Housing Commission. The goal of this group was to plan monthly meetings for exploration of further options to improve access to healthy food in this
setting, including identification of policy and legal issues, opportunities, resources and barriers.

**Advocacy for Direct Food Access**

The first area of advocacy focus was to directly increase healthy food access. The coordinator for the YMCA “Veggie Van,” a mobile farmers’ market that focuses on low-income areas with low access to fresh fruits and vegetables, was contacted by this DNP student. An associated area of advocacy activity was directed to initiate the schedule of these on-site visits at the apartment building. These were planned so they would coincide closely with dates of receipt of electronic SNAP benefits for most residents. This DNP student also posted “Double-Up Food Bucks” fliers, provided by the YMCA coordinator, in the apartment building to make residents aware of this service that allows SNAP recipients to get double value for their dollars at this venue. A second set of activities led by this DNP student focused on increasing access to healthy foods in the apartment building’s pantry. With collaboration with representatives of three neighborhood churches, a monthly donation cycle was developed so that low-fat dairy, eggs, fresh fruits, and vegetables would be available to residents. This DNP student had accompanied the resident services specialist to select and purchase pantry food from the food bank. The outdated dairy products and poor condition of most fresh fruits and vegetables available at the food bank made development of the church resource a viable option to increase healthy food access. Another activity to increase pantry food access and quality was direct contact by this DNP with three other area pantries. This included personal visits to evaluate other methods of obtaining healthy food resources, controlling inventory, and distribution practices that might be applicable
to this project site. It also allowed for an arrangement to share some of the abundance of excess produce and other foods. This advocacy activity was done through collaboration with the resident services specialist and other pantry leaders to share resources and plan for transportation of these foods.

**Advocacy for Access through Nutrition Knowledge**

Contact was made by this DNP student with the new MSU-E nutrition education coordinator to initiate an on-site “Cooking Matters” healthy cooking class designed for SNAP participants, specifically the project participants who requested that education. Due to MSU-E funding constraints, that option was not available as an immediate follow up to the DNP project intervention. The DNP student then contacted alternative sources of “Cooking Matters” classes offered through the major health provider organization and the YMCA, both of which may have alternative funding sources.

A second effort was developed to continue learning that could be applicable to all residents and increase nutrition access through knowledge. This DNP student developed an educational feature for the monthly resident newsletter: an item for a “Healthy Nutrition Corner.” This consists of a nutrition “fun fact” and an associated simple, low cost recipe using available ingredients, such as items from the food pantry.

**Advocacy for Retail Food Access**

Several activities focused on improving access to retail food stores. This DNP student contacted a local church regarding the possibility of using their church van and volunteer driver twice monthly to transport residents to grocery stores. This is still being evaluated for feasibility by the church board. Discussion was initiated by this DNP student with a representative from a local group that has the goal of assisting Medicaid-
eligible adults to “age in place” by provision of housekeeping, cooking, and non-medical (such as grocery shopping) transportation services. A personal presentation by this organization’s representative to the residents to explain options is planned through collaboration with the resident services specialist.

A third activity for overcoming access barriers involving transportation originated from many of the residents themselves. As a group, several residents of the housing site, many of whom had been participants in the DNP educational intervention, initiated contact with the local Disability Advocates organization and the city bus service regarding their barriers to use of public transportation. This DNP student attended the residents’ meeting, which was held on a city bus at the housing site, with city commissioners and representatives of the bus service. At the meeting, the DNP student discussed with some of the community representatives present the food advocacy element of this DNP project, including the need of transportation to obtain retail food purchases.

Another advocacy activity regarding retail food access was discussion and collaboration by this DNP student and a local organization that was seeking to enhance neighborhood businesses in low-income urban areas. Together, this DNP student and the executive director from the “Neighborhood Ventures” organization approached the neighborhood drugstore and gas station to discuss, with the management representatives, the options for offering a healthier food inventory, including more fresh foods. This DNP student participated in advocacy for this increased healthy food access with a simple description to the retailers of the access problems, the nutritional needs, and nutrition-related health issues of the near-by housing site residents.
Advocacy for Food Access through Food Growth

Plans to plant individual and group gardening plots were discussed collaboratively with a local church representative/local gardening advocate to plan individual and group plots with gardening coaching and assistance. This includes collaboration with “Our Kitchen Table,” a grassroots gardening and food advocacy organization that seeks to promote social justice and improve health and environments, particularly in low-income neighborhoods. The DNP student, resident services specialist, and community gardener together met with residents at their monthly meeting to discuss preferences, needs, ideas, goals, and sustainability challenges to gardens.

Advocacy for Food Access through Community Organizations

This DNP student participated in other local food access advocacy activities related to policies, systems, and budgets. This included participation in the county’s Essential Needs Task Force Food & Nutrition Coalition, acting as a representative of both the housing site food pantry and the university. In this forum, the DNP student was also able to contact and collaborate with other community resources, such as other pantry representatives, the YMCA, Access of West Michigan (a faith-based organization that addresses issues of poverty, hunger, and provides pantry support), the major health care provider organization, and others. As a member of the poverty and hunger focus group of the “Micah Center,” a local advocacy and justice organization, the DNP student also collaborates regularly with community and religious leaders for quality food access as an important health issue for low income populations. Through a formal food advocacy
organization, Bread for the World, in addition to individual contacts, the DNP student communicates personally or in writing with local, state, and government officials regarding the critical connection between low access to quality food and chronic illnesses as an important policy issue affecting low income populations. An important advocacy concept in this area of access focus is the need to protect SNAP benefits during budget cuts. This involves the education of legislators and other leaders about the high societal cost of the health consequences of poor nutrition.
CHAPTER 5

RESULTS

There were two questions to be answered in this project. The first was whether a program of nutrition education, targeted to the learning and cultural needs of a low-income urban adult population, together with advocacy for improved food choice options would be associated with increased nutrition knowledge and dietary behavior change? The second question was whether a by-product of the intervention would be an increased level of self-efficacy regarding nutritional choices and their impact on personal health.

Qualitative Data Analysis

Focus Group Discussion Findings

Results of the focus group discussion began with participants’ discussion of the needs, priorities, and preferences for nutrition education to help tailor the planned intervention for persons living at this housing site (Appendix E). The first comment, “We all just need food!” was echoed by the other group members and some time was spent discussing specific types of food needs. Specific foods mentioned as needed were fresh fruits and vegetables, eggs, bread, 2% “Not skim!” milk, and cooking oils. “Nutrition education needs” were identified as diabetes, foods that contain lower levels of sodium and higher levels of potassium, healthy vs. unhealthy fats, cooking for one person, healthy and fast meal ideas, and good substitutes for salt. “Diet-related health issues” identified by the group as important for residents at this site included diabetes, hypertension, heart disease, cancer, being physically unable to shop and cook, lack of good food safety and hygiene practices, and gluten or other food intolerances.
The group discussed some of the “barriers to healthy eating” as first, “no grocery store available,” to which all agreed. Other barriers mentioned were influences of others to eat fast/junk food, lack of fresh food, limited pantry availability of one time monthly, teeth problems, lack of cooking skills, “not caring.” Another barrier discussed was the lack of financial resource for food purchases experienced by many residents who sell or trade food stamps for non-food items.

The final topic discussed, “cultural preferences,” was used for tailoring the information and the food selection for tasting and recipes used in the intervention. It included suggestions for including traditional southern foods, such as sweet potatoes, “greens,” Cajun, and “soul food.” The discussion of cultural preferences included some discussion of need to avoid racial and gender stereotypes, such as assumptions that African Americans will eat meat but not fish and will only eat deep-fried foods, or assumptions that women have cooking ability, but men do not. Focus group participants all agreed that recipes that included tofu would not be well received, but that recipes for Chinese dishes that included low use of salt would be acceptable.

Application of Focus Group Results

Results of the focus group discussion helped the DNP student to tailor the intervention for this group. Based upon the results of this discussion, topics of food access, nutrition-related health concerns, and a discussion of strategies for overcoming identified barriers to healthy eating were planned for inclusion in the intervention content. The cultural preferences discussed were included in the collaborative DNP-nutrition educator plans for recipes to offer and foods to taste that would be well received by participants.
Quantitative Data Analysis

Microsoft Excel, The Statistical Package for the Social Sciences (SPSS 17), and STATA were used for data entry and analysis. Participants’ intake forms, demographic data, and pre-test and post-test data were initially coded by birth date (8 digits for month, day, year), then coded with a case identification number, from 01-20. Descriptive statistics were used, including a change over time from pre-test to post-test analysis with graphic display. Due to the small sample size, the Self-Efficacy Scale and Nutrition Adult Behavior Checklist (NABC) were analyzed for change over time using the non-parametric Wilcoxon Signed Ranks Test. A Fisher’s Exact Test was used to compare the knowledge test sub-scale correct responses. For knowledge items in which all of the participants’ answers were correct, a Fisher’s exact could not be computed. Due to the small sample size and exploratory nature of the project, a significance level of $p < 0.1$ was determined to be appropriate (Williams, 1986).

Health Status of Participants

The data reveal that most of the participants had one or more chronic health problems of overweight or obesity, elevated blood pressure or diagnosed hypertension, elevated blood sugar or diagnosed diabetes, chewing problems with missing or broken teeth, and/or ambulation problems (Figure 2). It is important to note that, of the 20 original participants, only one reported having none of these chronic health problems. Two participants reported having one; two participants reported two problems, twelve (60%) reported three or four problems, and three reported having all five of these chronic health problems. Ten (50%) of the 20 original participants reported being overweight or obese. Sixteen (80%) self-report having elevated blood pressure or hypertension. Twelve (60%)
report that they have elevated blood sugar or know they have diabetes. Thirteen (65%) reported having problems with teeth and mobility.

![Bar graph representing chronic health problems reported by participants.](image)

**Figure 2:** Bar graph represents chronic health problems reported by participants.

The presence of other health concerns that were identified in this group also were detailed (Figure 3) with an open-ended question. Leg discomfort, high cholesterol, heart problems, celiac disease, and epilepsy were identified as additional health issues. One participant disclosed that he had a history of having a kidney transplant, although that was not posing a current health issue. Five (25%) of the original 20 participants reported having a food allergy or intolerance.
Figure 3: Bar graph represents other health conditions present in this group.

Despite the fact that all participants receive Social Security Disability and have one or more of these chronic health problems and other health issues, most (80%) self-rate their own health as “good” (Figure 4).

Figure 4: Participants’ self-rating of their health
When asked in the intake survey “Where do you think you are with making changes in your eating?” the options were listed to correspond to the Trans-theoretical Stages of Change model described in Chapter Three. Most of the participants (80%) identified themselves as being in the planning or action stage of change regarding eating habits (Figure 5).

![Bar chart showing stage of change](image)

**Figure 5:** Participants identified a baseline stage of change.

In response to the open-ended question “What do you think are the greatest barriers, if any, to healthy eating for you?” there were several responses given (Figure 6). The most frequently cited barrier was the issue of low income, a problem identified by four of the 20 original participants. The two next most frequently identified barriers, each cited by two participants, were a habit of eating at night and a dislike of the taste of healthy food. Half of the participants responded to this question with only one barrier identified, three identified two barriers, and seven did not identify any. Although lack of access to a grocery store was not cited as a barrier by any participant, there was strong agreement during group discussion that lack of a close grocery store or adequate transportation to get to a major grocery store was a significant barrier for most.
Participants identified personal barriers to healthy eating.

Nutrition Knowledge

As seen in Table 2, participants (N = 17) displayed high levels of nutrition knowledge on both the pre-test and post-tests on the nutrition subscale of the Survey: Nutrition Knowledge and Self-Efficacy (Appendix G). The items that reflected an increase in the number of correct responses from pre-test to post-test were #3 “Beans and rice are a good source of protein”; #4 “Broccoli contains calcium”; and #6 “Nuts are a good source of protein.” For items (#1, # 6, #10) in which all 17 participants had a correct answer on the pre-test or post-test, a Fisher’s exact was not applicable, since a dichotomous variable was not produced in those cases. The number of correct responses on the nutrition knowledge test at pre-test ranged from 4 to 10, with a mean of 8.85. At post-test, the correct responses ranged from 7 to 10, with a mean of 8.76. While the range of correct
responses narrowed, the mean decreased at the post-test. Several aspects of the administration of the tests and the experiences of the participants may explain this.

The high number of correct answers in both pre-test and post-tests may be affected by the group environment in which the test was given which was conducive to conversation between participants during the test. Several participants had prior exposure to nutrition education through diabetes classes, general education, and public media such as television and magazines. They shared their knowledge readily with others during the test. In addition, with true and false questions, there is a 50% chance of correct answers even if guessing.

Another issue that may have affected knowledge responses and resulted in fewer correct answers at post-test compared to pre-test may have been wording. For example, a test item that demonstrated a decrease in the total number of correct answers from pre-test to post-test was “Fruits and vegetables should make up at least ¼ of the space on my plate.” Since much of our class discussion included the fact that fruits and vegetables should ideally take up half the space on one’s plate, the DNP student concluded that perhaps some participants did not fully understand the phrase “at least” in this question, and erroneously considered the statement to be “false” if it was not interpreted to indicate the known correct amount of “half.” The other knowledge test items did not have an increase or decrease in total number of correct responses from the pre-test to post-test.

Some participants left some questions on the pre-test and/or post-test unanswered. The reason for this is unknown. Possible explanations are mistakenly overlooking these questions or uncertainty about the correct answers. A “Do Not Know” response choice was not offered.
### Nutrition Knowledge Sub-scale of Survey: Nutrition Knowledge and Self-Efficacy

<table>
<thead>
<tr>
<th>Knowledge Item</th>
<th>Pre-Test Correct</th>
<th>Post-Test Correct</th>
<th>Change</th>
<th>Direction of change</th>
<th>Fisher Exact p=</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fruits and vegetables are good sources of vitamins and fiber</td>
<td>17</td>
<td>17</td>
<td>0</td>
<td>-</td>
<td>NA*</td>
</tr>
<tr>
<td>2. Milk, yogurt, and cheese are good sources of calcium and protein</td>
<td>16</td>
<td>16</td>
<td>0</td>
<td>-</td>
<td>0.059</td>
</tr>
<tr>
<td>3. Beans and rice are a good source of protein</td>
<td>14</td>
<td>15</td>
<td>1</td>
<td>↑</td>
<td>0.331</td>
</tr>
<tr>
<td>4. Broccoli contains calcium</td>
<td>10</td>
<td>12</td>
<td>2</td>
<td>↑</td>
<td>0.593</td>
</tr>
<tr>
<td>5. Fruits and vegetables should make up at least ¼ of the space on my plate</td>
<td>14</td>
<td>11</td>
<td>-3</td>
<td>↓</td>
<td>0.728</td>
</tr>
<tr>
<td>6. Nuts are a good source of protein</td>
<td>16</td>
<td>17</td>
<td>1</td>
<td>↑</td>
<td>NA*</td>
</tr>
<tr>
<td>7. Whole grain foods are not as nutritious as white flour foods</td>
<td>15</td>
<td>15</td>
<td>0</td>
<td>-</td>
<td>0.228</td>
</tr>
<tr>
<td>8. All fats are bad for your health</td>
<td>16</td>
<td>16</td>
<td>0</td>
<td>-</td>
<td>0.941</td>
</tr>
<tr>
<td>9. 3000 mg of sodium per day is recommended for adults</td>
<td>13</td>
<td>13</td>
<td>0</td>
<td>-</td>
<td>0.219</td>
</tr>
<tr>
<td>10. A recommended portion size of meat is the size of a deck of card</td>
<td>17</td>
<td>17</td>
<td>0</td>
<td>-</td>
<td>NA*</td>
</tr>
</tbody>
</table>

About half (47.1%) of the final 17 participants showed no change in the total number of knowledge questions answered correctly on the knowledge test from pre-test to post-test, as seen in Table 3. Almost 30% had a decrease in their test scores from pre-test to post-test by one correct response point. Almost one quarter (23.5%) of participants
showed an increase in the number of correct responses from pre-test to post-test. Of these, three participants increased by one correct response and one participant increased by three (from four to seven) correct responses.

Table 3

*Nutrition Knowledge Subscale Correct Response Change, Pre-test to Post-test*

<table>
<thead>
<tr>
<th></th>
<th>Decreased</th>
<th></th>
<th>Stable</th>
<th></th>
<th>Increased</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td></td>
<td>n</td>
<td></td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>Total Knowledge Change</td>
<td>5</td>
<td>29.4%</td>
<td>8</td>
<td>47.1%</td>
<td>4</td>
<td>23.5%</td>
</tr>
</tbody>
</table>

Nutrition-Related Behavior

The NABC (Appendix J) scores demonstrated some changes from pre-test to post-test. As seen in the first four columns of Table 4, five items had a median score increase at post-test. The first of these items was #4 “Do you eat more than one kind of fruit daily?” The amount of change for this item was a one point increase in median score from “seldom” to “sometimes.” The increase was important, since access to any fruit is limited by the factors discussed earlier for this group. A second item that had a median score increase was #6 “How often do you add salt to your food?” (a response of adding salt less often, as a healthier behavior, corresponding to a higher score). The amount of change on this item was a one point increase in median score, in the healthier direction of going from “sometimes” to “seldom.” This increase was an important factor for the educational intervention evaluation, since the DASH dietary principle of a low sodium diet was emphasized during the intervention. A third item that had an increase in median score
Table 4

*The NABC Median Scores Analyzed Using the Wilcoxon Signed Ranks Test*

<table>
<thead>
<tr>
<th>Nutrition Adult Behavioral Checklist Item</th>
<th>Pre-test Item Median</th>
<th>Post-test Item Median</th>
<th>Amount of Change</th>
<th>Direction of Change</th>
<th>Wilcoxon z score</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Eat 2 or more servings of fruit daily</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>-</td>
<td>-0.27</td>
<td>0.788</td>
</tr>
<tr>
<td>2. Eat 3 or more servings of vegetables daily</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>-</td>
<td>-1.33</td>
<td>0.183</td>
</tr>
<tr>
<td>3. Eat more than one kind of vegetable daily</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>-</td>
<td>-0.28</td>
<td>0.780</td>
</tr>
<tr>
<td>4. Eat more than one kind of fruit daily</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>↑</td>
<td>-1.77</td>
<td>0.076</td>
</tr>
<tr>
<td>5. New ways to prepare fruits and vegetables</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>-</td>
<td>-2.2</td>
<td>0.031</td>
</tr>
<tr>
<td>6. How often add salt to food</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>↑</td>
<td>-2.03</td>
<td>0.042</td>
</tr>
<tr>
<td>7. How often whole wheat as bread choice</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>↑</td>
<td>-1.09</td>
<td>0.277</td>
</tr>
<tr>
<td>8. Drink 6 cups of water daily</td>
<td>4</td>
<td>3</td>
<td>-1</td>
<td>↓</td>
<td>0.05</td>
<td>0.961</td>
</tr>
<tr>
<td>9. Wash hands with soap before cooking</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>-</td>
<td>0.36</td>
<td>0.721</td>
</tr>
<tr>
<td>10. Physically active 30 min a day, 4 days a week</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>↑</td>
<td>-0.46</td>
<td>0.649</td>
</tr>
<tr>
<td>11. Eat low fat vs. high fat foods</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>-</td>
<td>-1.78</td>
<td>0.077</td>
</tr>
<tr>
<td>12. Able to tell if fresh vegetable is good quality</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>↑</td>
<td>-2.73</td>
<td>0.006</td>
</tr>
<tr>
<td>13. Refrigerate/freeze foods within 2 hours of serving</td>
<td>4</td>
<td>3</td>
<td>-1</td>
<td>↓</td>
<td>0.43</td>
<td>0.668</td>
</tr>
<tr>
<td>14. Worry about running out of food</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>-</td>
<td>-0.11</td>
<td>0.915</td>
</tr>
<tr>
<td><strong>Total Scale Median Score</strong></td>
<td><strong>45.4</strong></td>
<td><strong>46.9</strong></td>
<td><strong>1.5</strong></td>
<td>↑</td>
<td><strong>-1.73</strong></td>
<td><strong>0.084</strong></td>
</tr>
</tbody>
</table>

From pre-test to post-test by one point from “most times” to “always” was #7, “When you eat bread, do you eat whole wheat bread?” This increase also was important since several
residents had expressed a dislike for whole wheat products when the intervention began. This response was correlated with anecdotal reports of several participants requesting whole wheat products in the pantry instead of rejecting them during the course of the intervention and after it concluded. A fourth item that had an increase in median score of one point from “sometimes” to “most times” was #10, “Are you currently physically active for at least 30 minutes per day, on 4 or more days per week?” This was important, since group discussion had included various ways to incorporate exercise into daily life as an important element of health promotion. These suggestions included walking through the building hallways or in the neighborhood, using stairs if possible, etc. A fifth item that demonstrated an increase in median score was #12 “Do you know how to tell if a fresh vegetable is of good quality?” The amount of change on this item was a one point change in median score from “sometimes” to “most times.” This increase was important since the participants had limited access to fresh vegetables of any quality. Using the Wilcoxon z score, change was significant for three items (#4, #6, and #12) using the p < 0.1 as the acceptable level. The small increase in the total median score from pre-test to post-test suggest that the intervention was associated with some nutrition-related positive behaviors (Wilcoxon z = -.173, p = 0.084).

Median scores remained stable for seven behavior items. Of these, six (#1, #2, #3, #5, #11, and #14) had a median response of “sometimes” at both pre-test and post-test. The Wilcoxon z score for two items (#5 and #11) met the p < 0.1 significance level. This suggests that among the participants there were changes in the ranking of these items, despite their stability for the overall sample.
Median scores decreased from pre-test to post-test for two items. These were #8 “How often do you drink at least 6 cups of water daily?” and #13 “How often do you refrigerate or freeze foods within 2 hours of serving?” The importance of water as a beverage was discussed during the educational intervention. However, some participants with health issues involving fluid restrictions, such as kidney disease and heart failure, may have been advised by their health care provider not to “drink at least six cups of water daily.” It is also possible that participants did not realize what was meant by the question, such as confusion about water vs. all liquids. Many participants did not own measuring cups and spoons until they received them as incentives in the educational intervention. Therefore, some may have over-estimated or under-estimated the volume of a cup, and thus may have provided inaccurate responses at pre-test. Food safety and preparation and handling, such as refrigeration and thawing, were discussed during the educational intervention as well. The reasons for a decrease in healthy behavior median score for this item from pre-test to post-test are difficult to explain.

Nutrition-Related Self-Efficacy

Table 5 shows the results of the self-efficacy test (Appendix G). The first four columns demonstrate an increase in median self-efficacy scores from pre-test to post-test. Three of these items, #3 “I can pick out healthy food choices,” #7 “I am able to gain or lose weight if I need to,” and #8 “I am able to put nutrition information to use to improve my health” increased by one point in median scores. One item, #10 “I have what it takes to make the changes I want to make in my diet” had a median score increase of two points, from 3 to 5. A Wilcoxon z score demonstrated significance for items #3, #8, and #10 at p < 0.1. This was very important, since these items specifically relate to the health
promotion purpose of the intervention. Although the score for item #7 increased, the Wilcoxon z score was not significant. The data demonstrated that the intervention was associated with a significant increase in total median self-efficacy scores (from 36 to 42, $z = -2.88$, $p = 0.004$).

Median scores did not increase or decrease for the other items on the self-efficacy subscale. These unchanged items (#1, #2, #4, #5, #6, and #9) had a high pre-test self-efficacy score (a rating of 4 or 5) that remained unchanged at post-test. Importantly, none of these items demonstrated a decrease in median self-efficacy scores from pre-test to post-test.
Table 5

*Self-Efficacy Median Scores, Analyzed Using the Wilcoxon Signed Ranks Test*

<table>
<thead>
<tr>
<th>Self-efficacy Item</th>
<th>Pre-test Item Median</th>
<th>Post-test Item Median</th>
<th>Amount of Change</th>
<th>Direction of Change</th>
<th>Wilcoxon z score</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I know where I can get fruits or vegetables when I want them</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>1.000</td>
</tr>
<tr>
<td>2. I know how to prepare foods in a healthy way to make a tasty meal</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>-</td>
<td>-1.34</td>
<td>0.181</td>
</tr>
<tr>
<td>3. I can pick out healthy food choices</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>↑</td>
<td>-2.30</td>
<td>0.023</td>
</tr>
<tr>
<td>4. By changing/improving my diet, I would change/improve my health</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>-</td>
<td>1.03</td>
<td>0.303</td>
</tr>
<tr>
<td>5. I can make a list of the foods I need to plan for 2 meals</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>-</td>
<td>-1.51</td>
<td>0.132</td>
</tr>
<tr>
<td>6. I can plan my budget to cover my healthy food needs</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>-</td>
<td>-1.35</td>
<td>0.177</td>
</tr>
<tr>
<td>7. I am able to gain or lose weight if I need to</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>↑</td>
<td>-1.53</td>
<td>0.127</td>
</tr>
<tr>
<td>8. I am able to put nutrition information to use to improve my health</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>↑</td>
<td>-2.90</td>
<td>0.004</td>
</tr>
<tr>
<td>9. I can plan strategies for situations that could cause me to eat unhealthy foods</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>-</td>
<td>-0.73</td>
<td>0.466</td>
</tr>
<tr>
<td>10. I have what it takes to make the changes I want to make in my diet</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>↑</td>
<td>-2.93</td>
<td>0.003</td>
</tr>
<tr>
<td>Total Scale Median Score</td>
<td>36</td>
<td>42</td>
<td>6</td>
<td>↑</td>
<td>-2.88</td>
<td>0.004</td>
</tr>
</tbody>
</table>

**Summary of Quantitative Data Results**

The nutrition knowledge began at a high level at pre-test and increased for four participants at post-test. The intervention was associated with significant nutrition-related
behavior median score increase from pre-test to post-test. The intervention also was associated with a significant increase in the median score of self-efficacy for this group.

**Qualitative Data Analysis**

Each nutrition education session concluded with each participant being given a 3x5 card to complete two open-ended sentences: The first was “One thing I learned today that I did not know before is….,” The second open-ended sentence given was “One thing I am going to change or start doing now is…..”

**Additional Findings of Nutrition Knowledge**

Table 6 shows the number of participants whose responses to the first question regarding new nutrition information learned came from the topics discussed during the intervention. The number of responses to the “new learning” statement demonstrated that, while the pre-test level of nutrition knowledge was quite high, there were 113 statements of “something new” that was learned during the educational sessions (without including the erroneous conclusions or random comments). Of the 11 random comments, four were from the same participant who stated “nothing new” was learned….but added “I know it, but I don’t do it.” An example of an erroneous conclusion was a statement such as “Beans have a lot of salt.”
Table 6

*Responses to Open-ended Questions about New Nutrition Learning*

<table>
<thead>
<tr>
<th>Coded Theme From Open-ended Responses</th>
<th>Number of Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Safety and Preparation</td>
<td>9</td>
</tr>
<tr>
<td>Menu Planning/Selection/Budgeting</td>
<td>11</td>
</tr>
<tr>
<td>Food Ingredients/Quality/Labels</td>
<td>13</td>
</tr>
<tr>
<td>Absorption of Nutrients</td>
<td>6</td>
</tr>
<tr>
<td>Fruits and Vegetables</td>
<td>14</td>
</tr>
<tr>
<td>Calcium and Protein</td>
<td>10</td>
</tr>
<tr>
<td>Whole Grains</td>
<td>11</td>
</tr>
<tr>
<td>Food Groups and Portion Size</td>
<td>24</td>
</tr>
<tr>
<td>Fats</td>
<td>7</td>
</tr>
<tr>
<td>Health, Diabetes, Hypertension</td>
<td>8</td>
</tr>
<tr>
<td>Erroneous Conclusion</td>
<td>6 (4 from 1 participant)</td>
</tr>
<tr>
<td>Random Comments</td>
<td>11</td>
</tr>
<tr>
<td>“Nothing New”</td>
<td>6 (4 from 1 participant)</td>
</tr>
</tbody>
</table>

Additional Findings of Decisions for Behavior Change

Table 7 shows the total number of responses to the statement regarding a behavior change decision was 126 for the group. In this case, random comments included several things related to general health, such as “Eat more healthy,” “Change the way I eat, to be more healthy,” and “My eating habits.” Many of the comments involved more attention to food quality, ingredients, and labels as well as increasing fruit and vegetable consumption.
Table 7

Responses to Open-ended Questions about a New Nutrition Behavior

<table>
<thead>
<tr>
<th>Coded Theme from Open-ended Responses</th>
<th>Number of Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Safety and Preparation</td>
<td>11</td>
</tr>
<tr>
<td>Menu Planning/Selection/Budgeting</td>
<td>14</td>
</tr>
<tr>
<td>Food Ingredients/Quality/Labels</td>
<td>31</td>
</tr>
<tr>
<td>Absorption of Nutrients</td>
<td>2</td>
</tr>
<tr>
<td>Fruits and Vegetables</td>
<td>23</td>
</tr>
<tr>
<td>Calcium and Protein</td>
<td>10</td>
</tr>
<tr>
<td>Whole Grains</td>
<td>3</td>
</tr>
<tr>
<td>Food Groups and Portion Size</td>
<td>13</td>
</tr>
<tr>
<td>Fats</td>
<td>3</td>
</tr>
<tr>
<td>Health, Diabetes, Hypertension</td>
<td>1</td>
</tr>
<tr>
<td>Erroneous Conclusion</td>
<td>1</td>
</tr>
<tr>
<td>Random Comments</td>
<td>15</td>
</tr>
</tbody>
</table>

Summary of Qualitative Data Results

Qualitative data results demonstrate that some new learning occurred during each session for almost all participants, despite the high knowledge pre-test scores. The learning reflected the content taught and discussed. Some erroneous conclusions were made by three participants. One decision for behavior change was based on an erroneous statement. Several decisions for behavior change reflected the content taught and discussed, with many general decisions for overall “healthy eating.”
Advocacy

Results of the advocacy interventions as part of this project included interventions to directly improve food access for both the project participants as well as all of the residents of the housing site. The results of these interventions include increased food access through scheduled visits of the YMCA Veggie Van (including a “Double up Food Bucks” benefit for SNAP recipients) to the site since March 1, 2013. Visits have increased from monthly to weekly due to resident response. Quality of pantry food has increased through an organized cycle of church donations of specific food items since February, 2013. Pantry users comment regularly on their appreciation of having access to items such as low fat milk, yogurt, eggs, fresh fruits and vegetables. A plan with another pantry that has abundance of produce for sharing and regular monthly pick-up began in February, 2013. This pantry sharing has resulted in large cases of fresh vegetables, as well as other foods such as whole-grain bread, being added to the food pantry inventory.

Advocacy interventions to address access to retail grocery establishments began with collaborative approaches to neighborhood drug store and gas station retailers to increase quality food inventory. Despite an offer from a local business developer for grant funding for increased refrigerator space and shelf reorganization to present healthy food items, national corporate structures did not permit the managers of these businesses to change their inventory. Other advocacy activities to increase transportation options to grocery stores such as collaborative arrangements with churches and a home care agency, as well as communication of the needs of disabled persons for public transportation to the local bus provider are still in progress but have no reportable results at this time.
Advocacy directed toward increasing access through growing food has resulted in the formation of a “Garden Group.” The group includes several residents who are interested in gardening, the building manager, custodian, resident services specialist, and a neighborhood community gardening advocate, as well as this DNP student. Results have included brainstorming for funding ideas and forming community contacts for soil testing and donations of equipment and mentoring. A local high school is planning to assist with soil preparation. Proposals are being explored for additional individual planting boxes at elevated heights for easier use by disabled persons.

Results of advocacy for continued nutrition education have resulted in a plan with the YMCA to provide a “Cooking Matters” healthy cooking class for residents who were not participants in this project, to begin June, 2013. MSU-E will offer the same class to the residents who were project participants only after October 1, 2013, due to funding regulations. A monthly contribution to the resident newsletter by this DNP student began in February, 2013, with a nutrition “fun fact” and an associated simple, healthy recipe using easily available ingredients.

Community advocacy for improved nutrition for health promotion has resulted in increased awareness of the needs of this vulnerable group for those working in health, education, business, and political arenas. After learning of the needs of this group, the responses have included “Wow! I had no idea that this problem existed so close to us,” “I had thought the government was taking care of all these problems” or “How do I help?”
CHAPTER 6
DISCUSSION

The method of translation of research into practice for this study was the use of an evidence-based nutrition-education program. The program was delivered using a collaborative team approach, and group processes to enhance nutrition knowledge, self-efficacy, and behavior change for health promotion in a vulnerable adult group. The method included the use of focus group input to include the adult participants’ priorities, identified needs, and preferences. The strategies incorporated in each session were built on theoretical concepts of the Health Belief Model to address barriers, the Self-efficacy construct to include skills and mastery of content, and the Trans-theoretical Stages of Change to address behavioral change. A simultaneous set of advocacy activities to increase access to healthy food options for the project participants, as well as for the general resident population, was a second part of the intervention.

Intervention Evaluation

The intervention was an evidence-based approach to answer two practice questions. The first question asked if a program of nutrition education targeted to the learning and cultural needs of a low-income urban adult population, together with advocacy for improved food choice options, would be associated with increased nutrition knowledge and dietary behavior change. A second question asked if a by-product of the intervention would be an increase in self-efficacy regarding nutritional choices and their impact on personal health.
Nutrition Knowledge

Evaluation of the knowledge test results suggest that the intervention was associated with marginally increased nutrition knowledge. Several conclusions emerged after evaluating the nutrition knowledge test results. First, interventions that contain purely educational content alone may not address the issues that underlie nutrition behavior and self-efficacy, since the pre-test scores for the group were much higher than expected. A second conclusion was that an accurate assessment of baseline knowledge requires evaluation of prior exposure to the curriculum content. A third conclusion is that the valuable camaraderie, conversation, and communication patterns present in an informal group setting may encourage shared information (and sometimes shared erroneous information) among participants, and thus may result in individual knowledge test scores that do not accurately reflect individual participant’s true level of nutrition knowledge. In the future, a private environment for individual testing that does not permit communication with others and a pre-pre-test of prior nutrition knowledge and exposure to nutrition information would be recommended for knowledge assessment.

Nutrition Behavior

Evaluation of the nutrition adult behavior checklist results suggest that the intervention was associated with a statistically significant increase in healthy nutrition behaviors. A behavior checklist item median score that did not change was the “worry about running out of food” score. This was surprising in light of the group discussions that we had about ways to overcome the problem of food access as a barrier to good nutrition. These discussions included sharing with the participants the plans and progress for the food access interventions being developed for this housing site, to help reduce that
barrier. Therefore, it was expected that the “worry” score would improve, despite the fact that the tool does not specify if “food” refers to any type of food or implies healthy, quality food. One possible explanation for the lack of change is that the planned new food access interventions had not yet been implemented. Several participants expressed “I’ll believe it when I see it” skepticism regarding planned food access improvements they had not yet experienced.

Self-Efficacy

Evaluation of the self-efficacy test results suggests that the intervention was associated with an increase in the level of self-efficacy in these participants. Items in the tool that were associated with significant (p < 0.1) and positive change were “I can pick out healthy food choices,” “I am able to put nutrition information to use to improve my health,” and “I have what it takes to make the changes I want to make in my diet.” These items, in particular, reflect the concept of self-efficacy as it relates to the impact of nutritional choices on personal health.

PRECEDE Model: Before the Intervention

The PRECEDE-PROCEED Model of health promotion education planning and evaluation (Green & Kreuter, 1991) was very helpful in the decision-making involved with this intervention. The project included input from all stakeholders, including the project participants, in all phases. In this model, health is considered a “quality of life” issue that affects individuals as well as communities. The structured information obtained through the various diagnostic questions in the PRECEDE model were essential for planning an effective intervention.
Social, Epidemiological, and Behavioral/Environmental Diagnosis

A “social diagnosis” of nutrition-related health needs and how they affect and are affected by quality of life was the first phase of diagnosis. The diagnostic purpose was to improve nutrition for health promotion for a group of vulnerable adults in an urban setting. This was followed by the second phase of making an “epidemiological diagnosis” of the needs and risk factors correlated with existing health problems and the “behavioral and environmental diagnosis” of lifestyle and external social and physical risk factors. These were all assessed through the focus group discussion, intake survey, and discussions with participants during the educational intervention sessions.

Educational and Organizational Diagnosis

In the third phase of diagnosis, demographic data supplied the information that was useful for assessing the predisposing factors that may influence health behavior for this group, including educational level, income, and perceptions of personal health. Reinforcing factors that influenced dietary behavior positively and negatively and enabling factors affecting ability to access and prepare healthy food were evaluated.

Administrative and Policy Diagnosis

The fourth phase of diagnosis includes evaluation of the administrative policies, resources, and structures of the organization that affected the intervention. The administrative and policy diagnosis was aided by a detailed organizational assessment. Interviews with organization stakeholders aided in this phase of diagnosis.
**PROCEED Model: During and After the Intervention**

Using the PROCEED portion of the model, the diagnostic information was used to create and evaluate the intervention. The DNP student was guided by the literature reviewed and the data obtained. This information was used to create an effective intervention for this population.

**Intervention Delivery Evaluation**

The fifth phase, project intervention, was delivered to address identified nutrition-related health needs. The educational part of the intervention lasted for four weeks (with eight sessions). The advocacy part of the intervention lasted for 16 weeks, and remains on-going.

**Process Evaluation**

What was planned to be done as part of the intervention was accomplished, as evaluated during the sixth phase of the PRECEDE-PROCEED model. The intervention finished with 16 out of the original 20 participants completing all eight education sessions. Advocacy activities to improve access to quality food occurred simultaneously with the educational intervention, and have continued after the educational intervention concluded.

**Impact Evaluation**

The seventh phase of assessment, the impact of the intervention on individuals has been measured quantitatively and qualitatively. The findings correlate with the literature review of effective interventions. The findings also are consistent with the conceptual framework relative to the influence of health beliefs, particularly regarding perceived barriers, self-efficacy, and the Trans-theoretical Stages of Change.
Informal impact was demonstrated in the request of several project participants to follow this intervention with a healthy cooking class to increase skills and knowledge in healthy food preparation. There have been many positive comments about the intervention and the changes that have been made as a result. The evaluation of the project’s impact on the larger community of housing site residents has been informally assessed. Many residents have commented appreciatively on the increased healthy food choices available in the pantry, and are using the Veggie Van. A systemic change regarding access to healthy food through improved local store inventory and increased transportation options to major grocery stores has yet to be realized. However, the issue has been raised with representatives of both of these systems, and awareness of the problem exists. Legislators are continuing to receive written and verbal communication from this DNP student regarding the societal costs of nutrition-related health problems for vulnerable populations, the need to preserve nutrition benefits in the state and national budgets, and the moral imperative to address poverty issues. It remains to be seen what the impact of this legislative advocacy may be.

**Outcome Evaluation**

The PROCEED evaluation model concludes with a final phase of an evaluation of the outcome of the intervention in terms of its original purpose. The purpose of this project was to improve nutrition for health promotion for a vulnerable, urban adult group. Although some of the outcome measures were seen immediately after the educational intervention, some may be lifestyle changes that occur in subsequent weeks, months, or years. The associated health benefits of increased nutritional knowledge, behavior change, and self-efficacy may be long-term effects. It would be helpful to evaluate the
outcome of the intervention with another post-test at least three and six months after the intervention. Informal evaluation of the effect of the intervention through discussions with residents and staff has shown that it has had an overall positive effect on the quality of life of the residents of this housing site.

Sustainability of the project with continuation of support for nutrition education and improved access to healthy food for the residents of this housing site has begun, with the plan in place for healthy cooking classes for residents through different community agencies in the coming months. Nutrition education through MSU-E and the “Eating Right is Basic” curriculum will also be available to residents who have not yet participated. However, the absence of a DNP or DNP student involved to provide the health promotion aspect of the nutrition education means this important element of the project would be missing. Sustainability of the educational intervention, as it was presented in this project, would require a funded volunteer, or student DNP position for provision of health promotion education. Sustainability may be enhanced by private or corporate donations of food and incentives, since these were important features of the education intervention. Funding for educational, health promotion, and/or social interaction programs for residents of this and other HUD-funded sites may be available through government grants.

The improved access activities that have been implemented are sustainable through maintenance of relationships between the collaborative and partnering individuals and organizations in the community and the staff of this housing site that have been developed during this project. Continuing face-to-face meetings of the “Access to Healthy Food Group” that was established by the staff stakeholders at this project site
will help to sustain the commitment of the group to ensuring that access to healthy food remains a priority issue for promoting individual and community health and well-being. Sustaining access to healthy food after the completion of the project also will necessitate staff stakeholders’ persistence in seeking new resources and creative options for increasing healthy food availability, and raising awareness of this need in the community.

DNP Roles

The “essential competencies” of a DNP as identified by the American Association of Colleges of Nursing (AACN, 2006) were integrated throughout the roles required for this scholarly project. As the role implementation is described the correlating essential competency is noted. The DNP roles of clinician, leader, educator, advocate, scholar, and innovator, as described by Chism (2013) were all related to the project’s many facets of implementation and evaluation.

The clinician role was demonstrated in several activities. When addressing health issues of overweight/obesity, diabetes, and cardiovascular disease, evidence-based practices for health promotion were incorporated. The essentials of scientific underpinnings for practice were often used in this role. The clinician role in this DNP project also included collaboration, credibility, compassion, and care coordination, which Chism (2013) describes as significant components of the clinician role. In this project the clinical aspect of collaboration with other health professionals was accomplished with the community nutrition educators. Credibility was accomplished through discussions that demonstrated health and nutrition knowledge throughout the intervention. Compassion was demonstrated through expressions of empathy and understanding to all project
participants. Care coordination was demonstrated in the coordination of all aspects of the intervention, including educational content, and appropriate food, recipes, and incentives.

In this DNP project, the role of leader and the essential competency of organizational and systems leadership was incorporated throughout the other roles. Specifically, leadership was demonstrated in the planning, organizing, and implementing of the project’s intervention; initiating the formation of the “Access to Healthy Food Group” of GRHC staff members; and development of food access connections and relationships to enhance food access for this group in the community, such as initiating the “Veggie Van” visits to the site.

The role of advocate and competency of health policy for advocacy in health care was demonstrated in this DNP project by raising awareness of the nutrition education and healthy food needs of this vulnerable group with local organizations, churches, and other community resources. The role of advocate included participation in advocacy groups, such as the Micah Center, Access of West Michigan, the Grand Valley State University Food Summit, and the Kent County Essential Needs Task Force Food & Nutrition Coalition. Finally, the DNP student advocated at a policy level. This was done through communication of the nutrition-related health issues of vulnerable populations to legislators and community leaders pertaining to access, budget, and policy issues as further demonstrations of the advocate role.

The role of scholar was demonstrated through this dissertation project which supports the essentials of clinical scholarship and use of analytical methods for evidence-based practice and use of information technology. This was demonstrated in the literature review process, development of the conceptual framework, and data analysis of project
results. Development of a poster summary for scholarly presentation and dissemination of the project to others was also an important aspect of the scholar role.

The roles of innovator and educator were demonstrated together with the competencies for inter-professional collaboration during the educational intervention. Although nutrition education classes had been offered by the MSU-E community nutrition educators for SNAP recipients in the past, this intervention was the first instance of a collaborative program with nutrition education by community nutrition educators that integrated health promotion education by a DNP. Thus, the educational intervention was innovative.

Special challenges that required the essential of collaboration competency included the negotiation for use of the MSU-E collaborator’s curriculum and assessment tool and coordination with their schedule. Collaboration competency was also required when a different behavior tool than originally planned was used by the collaborators, requiring DNP project adaptations. Collaboration was involved in the negotiation with the GRHC for use of their facilities and coordination with the housing site activity schedules. An additional demonstration of the innovator and educator roles was the development of a “Healthy Nutrition Corner” in the monthly resident newsletter, containing a nutrition “fun fact” and related recipe submitted by this DNP student.

The essential competency for clinical prevention and population health was demonstrated in the culturally-sensitive health promotion intervention that addressed concepts of health related to the community. The competency for advanced practice nursing was evident throughout this project. This included assessment of complex situations and included design, implementation, and evaluation of an evidence-based
intervention. The development and maintenance of therapeutic relationships and sensitivity to cultural considerations integrated into the intervention were also demonstrations of the advanced nursing practice competency.

**Project Strengths and Limitations**

This DNP project had strengths. First, the participant sample reflected the age and ethnicity of the residents of the housing site. Second, the intervention was well-received by the residents and staff. Third, the advocacy efforts for access to healthy food have been sustained, with new ideas and connections for access continuing to develop among residents, staff, and community partners.

This DNP project had some limitations. The first limitation was the small number of participants ($n = 20$), further reduced by attrition, to 17 for pre-test and post-test data collection. Because the participants were a self-selected group, and not a random sample, they may have had a higher pre-intervention level of interest and knowledge in nutrition and health than the residents who did not choose to participate. Thus, it is difficult to generalize results to a larger population. The project also was limited in validity of data collected, since pre-test and post-test data were collected in a group setting, with sharing of opinions and information between participants. Another limitation was the collection of post-test data only once, immediately after the education intervention, so no long-term results are known. Qualitative data obtained from open-ended questions in the intake survey and in the two open statement responses given after each class were very brief, usually one to three words. These may have been limited by time and space for responses, and by participants’ literacy abilities for spelling and writing. The outcome measures for nutrition knowledge and self-efficacy used were created for this project and
may need continued refinement. The true/false questions had a 50% chance of being correct by guessing. The survey responses were not reviewed with participants to clarify the correct answers, although the information upon which they were based was included in the curriculum.

Recommendations

The first recommendation that resulted from this DNP project is to continue to offer the program of tailored, collaborative nutrition education that includes health promotion, at this site for other residents who have requested it, and at other GRHC sites for similar groups. It also could be implemented for vulnerable, adult groups in other urban settings, such as community centers and churches. Because of the interactive, group structure of the intervention, it is recommended that the class size be limited to 20 participants, with one DNP or DNP student, and two community nutrition educators. It would be recommended to review the survey responses with participants to explain correct and incorrect answers. It is recommended that in future collaborative projects, all of the tools that will be used be reviewed and approved in advance. It is also recommended that a follow-up nutrition education program that can build on what was learned in this intervention, such as the “Cooking Matters” class, be offered to all interested residents, without delay if possible. Unfortunately, this delay often occurs due to the mandate that SNAP-Ed recipients only participate in one educational activity per fiscal year. It is recommended that this educational need be brought to the attention of the funding sources and policy makers for the USDA-affiliated SNAP education programs as well as the community agencies that support this education to alter this mandate.
For future projects, it is recommended that a pre-intervention intake survey include a history of any prior nutrition education, and if so, when and what type. It is also recommended that a private, individual setting instead of the group setting be provided for pre-test and post-test data collection from each participant, if possible. A further recommendation is a project time frame that allows for immediate post-test data, collection, followed by repeat post-test data collection at three and six months to evaluate long-term results. A final recommendation would be for the Grand Valley State University Kirkhof College of Nursing to continue to use the housing sites of the GRHC for clinical placement of DNP students for doctoral projects, which would be a mutually beneficial experience.

Summary

This scholarly project has combined a tailored, collaborative nutrition education and health promotion intervention with advocacy for improved access to quality food for a vulnerable, urban adult group. The PRECEDE-PROCEED model of implementation provided an excellent framework for this project. The result has demonstrated improved nutrition knowledge, improved nutrition-related behavior, and increased nutrition-related self-efficacy. Plans are in place to promote sustainability of resources established for improved food access for all residents. The roles of the DNP and the eight “essentials” of DNP competency have been demonstrated. Although the project is completed, it is expected that this DNP will continue a relationship of support and involvement in areas of health promotion and advocacy for quality food access for residents at this housing site after graduation. Although the focus of this scholarly project was limited to a specific vulnerable group, the essential competencies gained during this DNP project, with the
enactment of the DNP roles, will provide competency for future advanced nursing practice in other settings and with other groups.
APPENDICES
APPENDIX A

HRRC Approval Letter
HRRC Approval Letter

DATE: November 15, 2012
TO: Meridell Gracias
FROM: Grand Valley State University Human Research Review Committee
STUDY TITLE: [389928-2] A Nursing Intervention to Improve Nutrition for Health Promotion for a Vulnerable, Urban, Adult Group
REFERENCE #: 13-070-H
SUBMISSION TYPE: Revision
ACTION: APPROVED
APPROVAL DATE: November 15, 2012
EXPIRATION DATE: November 15, 2013
REVIEW TYPE: Expedited Review

Thank you for your submission of materials for this research study. The Human Research Review Committee has approved your research plan application as compliant with all applicable sections of the federal regulations, Michigan law, GVSU policies and HRRC procedures. All research must be conducted in accordance with this approved submission. This approval is based on no greater than minimal risk to research participants. This study has received expedited review, category 2-7, based on the Office of Human Research Protections 1998 Guidance on Expedited Review Categories.

The study revisions have been approved pending minor revisions as noted below. Please upload the revised consent form as a new package to the protocol file. Revisions will be acknowledged.

1. The inclusion criteria of being able to give ethically valid consent - i.e. not having a legal guardian, not having hallucinations, etc. should be stated as such on the informed consent document.
2. The ICD has a lot of type in red which should be changed to black - this is minor but may affect readability and the professional look of the document.

Please insert the following sentence into your information/consent documents as appropriate. All project materials produced for participants or the public must contain this information.

This research protocol has been approved by the Human Research Review Committee at Grand Valley State University. File No. 13-070-H Expiration: November 15, 2013.

Please remember that informed consent is a process beginning with a description of the study and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the study via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document. Please note the following in order to comply with federal regulations and HRRC policy:

1. Any revision to previously approved materials must be approved by this office prior to initiation. Please use the Change in Protocol forms for this procedure. This includes, but is not limited to, changes in key personnel, study location, participant selection process, etc.
2. All UNEXPECTED PROBLEMS and SERIOUS ADVERSE EVENTS to participants or other parties affected by the research must be reported to this office within two days of the event occurrence. Please use the UP/SAE Report form.
All instances of non-compliance or complaints regarding this study must be reported to this office in a timely manner. There are no specific forms for this report type.

3. All required research records must be securely retained in either paper or electronic format for a minimum of three years following the closure of the approved study. This includes signed consent documents from all participants.

4. This project requires continuing review by our office on an annual basis. Please use the appropriate Continuing Review forms when applying for approval extension.

- Protocols that are active and open for enrollment require both the Primary Investigator and Authorizing Official to electronically sign the Continuing Review submission in IRBNet.
- Protocols that are open for data analysis ONLY, require the Primary Investigator's signature.

If you have any questions, please contact the HRRC Office, Monday through Thursday, at (616) 331-3197 or hrrc@gvsu.edu. The office observes all university holidays, and does not process applications during exam week or between academic terms. Please include your study title and reference number in all correspondence with this office.

cc:
APPENDIX B

Recruitment Flyer
“HEALTHY FOOD FOR HEALTHY LIVING”

WOULD YOU LIKE TO LEARN ABOUT BETTER EATING FOR BETTER HEALTH?

JOIN US FOR FUN, FOOD, INFORMATION SHARING!

Sessions will include information about different foods, how your food choices affect your health, ways to get the foods you need, and more!

A take-home gift will be given at the end of each class! A $30.00 gift card will be given to everyone who attends all 8 sessions and completes survey information!

Interested? See Meridell! (May contact in Stacy’s office).

Thanks
APPENDIX C

Informed Consent Form
Informed Consent for the “Healthy Eating for Healthy Living” Program

1. TITLE: A Nursing Intervention to Improve Nutrition for Health Promotion for a Vulnerable, Urban, Adult Group.

2. RESEARCHER: Meridell J. Gracias, Doctor of Nursing Practice Student, Dr. Andrea Bostrom, Faculty Advisor, Grand Valley State University, Kirkhof College of Nursing.

3. PURPOSE: This program is focusing on health, what makes food “good” or “not good” for you, and how to get the good food you need for good health.

4. REASON FOR THE INVITATION: You are invited to be part of this study because we would like to see how adults might benefit from a “Healthy Eating” learning program.

5. HOW PARTICIPANTS WILL BE SELECTED: The first 20 residents who volunteer to be part of the study and have no reason not to be a part of the study will be chosen. People who are able to volunteer to be a part of the study must: a) live at Adams Park Apartments; b) speak and understand English; c) not receive meals cooked by someone else on a regular basis (chore worker or meal service); d) be able to choose, prepare, and consume food; and e) agree to be part of the 8 session program with some surveys and questionnaires. You will not be able to participate if you have a) a guardian, b) have not been able to legally sign your lease, or c) you are displaying delusions, hallucinations, or confusion.

6. PROCEDURES: There will be an eight session program, each lasting about 90 minutes, located in the Adams Park community room. It will include discussion of nutrition, recipes, and some cooking, and eating activities. We will get some survey and questionnaire information at the beginning and end of the program, and ask 2 simple questions (with no right or wrong answers) after each session. There will be no costs for the program for those who volunteer to be a part of the study.

7. RISKS: Risks of being involved in the study include a possible cooking accident, eating injury, or food allergy. To avoid these, we will use strict food storage, cooking, and safety rules. We will ask you about food allergies, tell you all of the ingredients being used in the foods offered, and choose dishes for the program.
based on the allergy information we are given from those who are part of the study. Other risks include sharing of personal information that you may discuss with the group. Overall, there is a low risk for harm to you if you decide to be a part of this study.

8 COMPENSATION FOR HARM: If you are harmed from being a part of this study, emergency first aid will be provided to you and you will be sent to a medical care center. The costs for any medical care needed will be the responsibility of you and your insurance company.

9 POTENTIAL BENEFITS TO YOU: Being a part of this study will give you the benefits of more nutrition knowledge, learning new skills, getting some healthy recipes, sharing some good food, and having some fun together.

10 POTENTIAL BENEFITS TO SOCIETY: The information you provide will help create programs like this for groups like this one.

11 VOLUNTARY PARTICIPATION: Your decision to be a part of this study is completely voluntary. You do not have to be a part of this study, and you may quit at any time without any penalty to you.

12 PRIVACY AND CONFIDENTIALITY: Your name will not be given to anyone other than the research team. It will be eliminated from the surveys that ask for it and information will be coded by using your birth date to protect your privacy. This date will be listed with your name in a separate form to allow us to keep all information together. At the end of the study, any document with your name on it will be destroyed. All information collected from you or about you will be kept confidential to the fullest extent allowed by law. In very rare circumstances, specially authorized university or government officials may be given access to our research records for purposes of protecting your rights and welfare.

13 RESEARCH STUDY RESULTS: If you wish to learn about the results of this study you may request that information from Meridell Gracias in the Adams Park office.

14 PAYMENT: A $30 gift card will be given to all participants who complete the entire program and the surveys and questionnaires given, as recognition of your time and effort. Also, there will be a gift given to each person who attends each session.
15 AGREEMENT TO PARTICIPATE: By signing the consent form below you are stating:

- The details of this study have been explained to me, including what I am being asked to do and the expected risks and benefits.
- I have had the chance to have my questions answered.
- I am volunteering to be a part of this study as this form describes it.
- I may ask more questions or stop being a part of the study at any time without penalty.

__________ (Initial here) I have been given a copy of this form for my records.

Print name___________________________________________

Sign name in ink_____________________________________

Date signed__________________________________________

16 If you have any questions about this study, you may contact the lead researcher as follows:
NAME: Meridell J. Gracias
Email: graciasm@gvsu.edu
PHONE: 616-235-2933, ext 17.

If you have any questions about your rights as a person who is a part of this study, please contact the Research Protections Office at Grand Valley State University, Grand Rapids, MI. Phone: 616-331-3197. E mail: HRRC@GVSU.EDU
APPENDIX D

Intake Survey
CODE # ____________

INTAKE SURVEY

A. Birthdate: ____________________ Current age ____________________

B. Gender: Male ________________ Female ____________________

C. Race/Ethnic background: Please check all that apply: White ___________ African American ___________ Native American _______ Other ____________________
Hispanic/Latino ________________

D. Highest level of education: Grade school _____ High school _______
College ___________ None ___________ Other ________________

E. Marital status: Single _____ Married _______ Separated _______ Divorced ______
Widowed ___________

F. Living Arrangements: Live alone ___________ With spouse or significant other _________ Other ________________

G. What is your monthly income? ________________

H. What is your monthly SNAP food benefit amount? ________________

I. Do you currently have problems with any of the following? (check all that apply):
Weight problems (overweight or obesity) ________________
Elevated blood pressure or hypertension ________________
Elevated blood sugar or diabetes__________________________

Missing or broken teeth and chewing problems_________________

Problems with walking, strength, balance_______________________

J. Other health concerns?__________________________________________
________________________________________________________________
________________________________________________________________

K. Do you have any non-medication allergies, such as food allergies or food intolences?______ If so, what are they?____________________________
___________________________________________________________________
___________________________________________________________________

L. How would you rate your health? (check one)

    I have excellent health_______

    I have good/ok health_______

    I usually do not feel healthy__________

    I have poor health________________________

M. Where do you think you are with making changes in your eating?

    a. Not interested______

    b. Thinking about/considering making changes______________

    c. Planning for change soon__________
d. Already changing

N. What do you feel are the greatest barriers, if any, to healthy eating for you?
APPENDIX E

Notes from Focus Group
DNP student: We are here to discuss the nutrition education program that you agreed to join. I would like to discuss, in this group, what you think would be important to include.

“We just need food, period! Classes are fine, but we need food!” After one mentioned, all agreed that food (fruit, vegetables, eggs, 2% milk) was the top priority nutritional issue.

DNP student: Aside from needing food, what do you think are the greatest education needs about food and nutrition for the people here?

“We also have a lot of sick, fat people here with diabetes and a lot of problems because of that.” “Class should include things especially for people with medical problems, especially diabetes.” “Just about everybody here is a diabetic, so eating right for that. People think they can eat whatever they want.” “People need to learn how to eat healthy with very little money.” “Cooking for one person.” “Salt substitutes.” “Fast meals.”

DNP student: What do you think are the most serious health problems of the residents?

“Look around, everybody is too fat. A few are too skinny because they don’t eat enough.” “Diabetes and heart problems, high blood pressure.” “People end up in the emergency room a lot because of these problems.” Everyone agreed with these responses. “Cancer, gluten problems, allergies.” “Being unable to shop and cook.”

DNP student: What do you think are the greatest barriers to eating a healthy diet?

“Money. Healthy food costs a lot.” “People here often run out of money for food because they sell their SNAP money for drugs and booze.” “People just don’t care.” “Healthy food is just not as good as some salty, not-healthy food.” “Some people just do not know
how to make healthy food and are too lazy.” “Bad teeth. A lot of people can’t chew very well so they just eat junk that is soft.” “There are no grocery stores around here and it’s hard to get to one on a bus, especially for people with walkers and wheelchairs.”

Everyone agreed that lack of a close grocery store and transportation to stores were very significant barriers. “Lack of fresh food.” “Influence of others to eat junk.” “Bad habits.”

DNP Student: What kind of cultural things should we include in this program? Any particular food likes or dislikes that you think would be common to the group?

“Just about everybody here, black or white, likes southern food… so greens, sweet potatoes, chicken, things like that would be good.” “Just because people are black does not mean they only eat fried foods and won’t eat fish. We can’t lump people together by race.” “But we could make soul food a little healthier maybe… not so much salt.”

“People like some spicy food, but not Indian. Cajun and Mexican are good.” “But please, no tofu or anything like that. Everyone would hate that.” Everyone agreed to that. “And the same for sex as for race: don’t think men can’t cook, but women can. Not true!”
APPENDIX F

Focus Group Consent Form
Informed Consent for "Healthy Eating for Healthy Living" Focus Group Participants

It is important for planning a nutrition education program for adults, to get input from some participants which will likely represent the views of the whole group. Your participation in this small group, known as a focus group is very valuable, because we can talk informally about things and topics that you see as important to include.

We will spend about 15-30 minutes in a “coffee-break” type of group in the community room and talk about what you see as areas of nutrition education need at Adams Park, diet-related health concerns for you and others, what you find to be barriers to healthy eating, and any ethnic or cultural food likes or dislikes that should be kept in mind. I or an assistant will take some notes during the discussion to be sure nothing said is forgotten.

Risks of participation in the focus group could be giving personal information to the group during discussion. Your personal identity will not be included in any written notes or discussion summary report, only your birth date, and that will be coded to another number.

Benefits of participation in the focus group will be the opportunity to contribute your concerns, ideas, suggestions, and needs as you see them to the program that is planned, and to represent the rest of the group in this way as well.

You may be given the results of the focus group discussion if you desire.

By signing here, I agree to participate in the focus group discussion. I understand that my participation is voluntary and may be stopped or
suspended at any time for any reason without penalty.

Name________________________________________

Date______________________

Date________________________
APPENDIX G

Survey: Nutrition Knowledge and Self-Efficacy
Please answer the following questions as true or false. Place an X on the line next to the answer you believe to be correct.

1. Fruits and vegetables are good sources of vitamins and fiber
   True_________________ False________________

2. Milk, yogurt, and cheese are good sources of calcium and protein
   True_________________ False________________

3. Beans and rice are a good source of protein
   True_________________ False________________

4. Broccoli contains calcium
   True_________________ False________________

5. Fruits and vegetables should make up at least ¼ of the space on my plate
   True_________________ False________________

6. Nuts are a good source of protein
   True_________________ False________________

7. Whole grain foods are not as nutritious as white flour foods
   True_________________ False________________

8. All fats are bad for your health.
   True_________________ False________________

9. 3000 mg of sodium per day is recommended for adults.
   True_________________ False________________

10. A recommended portion size of meat is the size of a deck of cards.
    True_________________ False________________
Please answer the following questions with X next to the answer that most closely matches you. There are no right or wrong answers.

11. I know where I can get fruits or vegetables when I want them

Not at all certain        Very Certain
1____ 2____ 3_____ 4____ 5_____

12. I know how to prepare foods in a healthy way to make a tasty meal

Not at all certain        Very Certain
1____ 2____ 3_____ 4____ 5_____

13. I can pick out healthy food choices when I look at food in the pantry or a convenience store (such as a drug store, gas station, or party store).

Not at all certain        Very Certain
1____ 2____ 3_____ 4____ 5_____


Not at all certain        Very Certain
1____ 2____ 3_____ 4____ 5_____

15. I can make a list of the foods I need to plan for 2 meals.

Not at all certain        Very Certain
1____ 2____ 3_____ 4____ 5_____

16. I can plan my budget to cover my healthy food needs.

Not at all certain        Very Certain
1____ 2____ 3_____ 4____ 5_____

17. I am able to lose or gain weight if I need to.

Not at all certain        Very Certain
1____ 2____ 3_____ 4____ 5_____

18. I am able to put nutrition information to use to improve my health.

Not at all certain        Very Certain
1____ 2____ 3_____ 4____ 5_____
19. I can plan strategies for situations that could cause me to eat unhealthy foods.

   Not at all certain                      Very Certain
   1____ 2_____ 3______ 4_____5 _____

20. I have what it takes to make the changes I want to make in my diet.

   Not at all certain                      Very Certain
   1____ 2_____ 3______ 4_____5 _____
APPENDIX H

MSU-E Modified Behavior Checklist
Evaluation of MSUE Nutrition Education Program

Modified Behavior Checklist

Michigan State University Extension

Evaluation of MSUE Nutrition Education Program
Modified Behavior Checklist

Your Name: ____________________________

Today’s Date: ________________________

Thank you for your participation!

To be completed by program staff (extension agents or program coordinators):

1. I plan meals for a few days ahead of time before going grocery shopping.
2. I compare prices when I shop to find the best buy.
3. I run out of food before the end of the month.
4. I eat a healthy lunch when I shop for food.
5. I load such as milk or meat all at once more than 2 times.
6. I keep liquid meat by letting it sit on the counter or another space outside the refrigerator.
7. I stock about healthy food choices.
8. I prepare meals without adding salt.
9. I use the information on food labels to compare the fat or other nutrients in foods.
10. My children eat within 2 hours of waking up.

Modified Behavior Checklist – Page 2

Your Name: ____________________________

Today’s Date: ________________________

Thank you for your participation!

To be completed by program staff (extension agents or program coordinators):

11. I eat at least 1 cup of vegetables each day.
12. I eat at least one cup of fruit each day.
13. I eat at least three servings of whole grain foods each day. (Brown rice, whole-grain bread, whole-wheat tortillas, barley, regular rice, whole wheat products, etc.)
14. I drink at least three cups of tea or fluid daily each day. (Six ounces white wine, 1.5 ounces cheese, 1 cup equivalent).
15. How often do you work, take the stairs, run with your kids, and take other opportunities to be physically active?
16. Are you currently physically active for at least 30 minutes per day, on 4 or more days per week?
17. How often do you tell your children choices how much to eat?
18. Do you prepare at least 2 cups of your family meals from scratch per week?
19. I budget enough money for food and other food-related purchases.
20. I wash my hands with soap and warm running water before preparing food.
21. How often do you use a meat thermometer to measure the doneness of meat?

*This modified version includes SWAP-R Mini Project. For more information about this resource, contact your local Michigan State University Extension agent.
APPENDIX I

MSU-E Agreement Letter
April 25, 2013

Meridell J. Gracias, RN, DNP Candidate, M.Ed, MSN
3979 Reeds Lake Blvd.
Grand Rapids, MI. 49506

Via e-mail (graciasm@mail.gvsu.edu)

Dear Mrs. Meridell:

We received your request via e-mail (April 19, 2013) for a written permission to use the following documents and data for your doctoral project:

1. the “MSU-E Nutrition Adult Behavior Checklist” – referred to as Modified Behavioral Checklist;
2. the “Nutrition Education Senior Adult Checklist - Revised 09 07 12”;
   referred to as Senior Behavioral Checklist
3. the associated data collected by the MSU-E nutrition educators.

After consulting with our Human Research Protection Program, Michigan State University Internal Review Board, this is our response to your request:

1. The "MSU-E Nutrition Adult Behavior Checklist", called as the Modified Behavioral Checklist (MBC), was developed and tested by a multi-state research group of the Expanded Food and Nutrition Education Program (EFNEP). You can find more information about EFNEP at the United States Department of Agriculture (USDA) webpage (http://www.nifa.usda.gov/nea/food/efnep/about.html).

The Michigan State University Extension (MSUE) MBC form, is not copyrighted. It includes 10 requested questions for EFNEP programs, and other 11 question from the EFNEP Master Question Database. You can obtain more information about the development of this set of questions at:
http://www.csrees.usda.gov/nea/food/efnep/neers5/neers5.html; and at

2. The “Nutrition Education Senior Adult Checklist – Revised OS 09 07 12” called Senior Behavioral Checklist form was developed on September 2012, by the Nutrition and Physical Activity Workgroup of the Health and Nutrition Institute, MSUE. The questions were taken from the EFNEP Master Question Database. This evaluation tool is not copyrighted.
3. **Associated data collected by the MSU-E nutrition educators**

   Based on the information that you provided (via e-mails on April 19 and April 22, 2013) about your research protocol "Healthy Food for Healthy Living", describing the consent process and the consent form; and based on communication with the MSUE instructors, we understand that the participants were aware and consented to be part of the research project. Based on that information, participants voluntarily completed the surveys, at the beginning and at the end of the program, and were aware that those documents were part of the research study. After the participants completed the MBC and the Senior MBC, MSUE staff shared with you these documents, after removing any identified data. MSUE did not release any identified data.

   Based on this information, we do not have any objection of your use of participants' answers to the MBC and the Senior MBC, collected by MSUE staff, for your doctoral project.

   Cordially,

   Olga J. Santiago Rivera, PhD, MHSA  
   Extension Specialist  
   Nutrition and Physical Activity Workgroup  
   Health and Nutrition Institute of MSUE  
   Michigan State University Extension  
   2100C Anthony Hall  
   474S Shaw Ln  
   East Lansing MI 48824  
   Phone: 517-432-8204  
   Fax: 517-353-6343

   Director  
   Improving Health and Nutrition Institute  
   Michigan State University Extension  
   160 Agriculture Hall  
   East Lansing, MI 48824  
   Phone: 517-353-3886
APPENDIX J

MSU-E Nutrition Education Senior Adult Checklist (NABC)
### Nutrition Education Senior Adult Checklist

**Check the box that best describes you.**

<table>
<thead>
<tr>
<th>Not Applicable</th>
<th>Never</th>
<th>Seldom</th>
<th>Some Times</th>
<th>Most Times</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you currently eat 2 or more servings of fruit every day? This includes fresh, frozen, canned, and 100% fruit juice.</td>
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<tr>
<td>Do you currently eat 3 or more servings of vegetables every day, including fresh, frozen, canned, and 100% juice?</td>
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<tr>
<td>Do you eat more than one kind of vegetable each day?</td>
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<tr>
<td>Do you eat more than one kind of fruit each day?</td>
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<tr>
<td>Do you try new ways of preparing vegetables and fruits?</td>
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<td>How often do you add salt to your food?</td>
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<tr>
<td>When you eat bread, do you eat whole wheat bread?</td>
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<tr>
<td>How often do you drink at least 6 cups of water a day?</td>
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<td>How often do you wash your hands in warm soapy water before preparing food?</td>
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<tr>
<td>Are you currently physically active for at least 30 minutes per day, on 4 or more days per week?</td>
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<tr>
<td>Do you eat low-fat foods instead of high fat foods?</td>
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<tr>
<td>Do you know how to tell if a fresh vegetable is of good quality?</td>
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<tr>
<td>How often do you refrigerate or freeze foods within 2 hours after serving?</td>
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<tr>
<td>Do you worry about whether your food will run out before you can buy more?</td>
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</tr>
</tbody>
</table>

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*This material was funded by USDA's SNAP-Ed Program. The SNAP Program provides nutrition assistance to people with low income. It can help you buy nutritious foods for a better diet. To find out more, call 1-800-461-4489. MSU is an affirmative-action, equal-opportunity employer.*

Revised OS 9 7 12
APPENDIX K

HRRC Approval Letter for Behavior Tool Change
DATE: February 15, 2013
TO: Meridell Gracias
FROM: Grand Valley State University Human Research Review Committee
STUDY TITLE: [389928-3] A Nursing Intervention to Improve Nutrition for Health Promotion for a Vulnerable, Urban, Adult Group
REFERENCE #: 13-070-H
SUBMISSION TYPE: Amendment/Modification
ACTION: APPROVED
EFFECTIVE DATE: February 15, 2013
REVIEW TYPE: CHANGE IN PROTOCOL
Thank you for your submission of materials for this research study. Your request has been approved to change one tool (nutrition checklist) in the study. Your project retains its original expiration date of November 15, 2013. If you have any questions, please contact the HRRC Office, Monday through Thursday, at (616) 331-3197 or hrrc@gvsu.edu. The office observes all university holidays, and does not process applications during exam week or between academic terms. Please include your study title and reference number in all correspondence with this office.
APPENDIX L

Open-ended Question Cards After Each Session
1. One thing I learned today that I did not know before is:

2. One thing I am going to change or start doing now is:
APPENDIX M

Curriculum Content and Lesson Plans
“Eating Right is Basic” MSU-E curriculum with health promotion additions, including disease applications, barriers to good nutrition, and stages of change.

Note: The sequence of the sessions 2-7 may change, depending on educator.

Session 1. Introduction, discussion of topics to be covered, completing surveys.

DNP student will discuss common nutrition-related health problems, including overweight/obesity, diabetes, and cardiovascular disease. Will discuss susceptibility and severity of these health problems, benefits of good nutrition to health, and barriers identified in focus group and literature. Will discuss some ways to overcome identified barriers. Will discuss attitudes toward dietary change. Will share prepared “loaded baked potato bar” with plain yogurt, black bean and corn salsa, low fat shredded cheese toppings, chopped broccoli, herbal seasoning on russet potatoes with recipe and food label. Incentive: Measuring cups and spoons.

Session 2. MY PLATE updates

Community educator will present portions, food groups, foods to limit, foods to increase.

DNP student will discuss details of sodium and sugar in diet, including hidden sodium and sugar, effects of sodium and sugar on health, optimum sodium intake, will discuss making healthy choices from best available options. Objectives will include: identify a balanced plate, compare sodium in foods, identify a recommended portion size. Will make and share a “sweet carrot and apple bake,” with recipe and food label. Incentive: Mrs. Dash salt substitute.

Session 3. Vegetable and Fruit group

Community educator will present facts on fruits, vegetables, fiber, potassium, vitamin C, vitamin A, principles of cleaning, storing, and preparing fruits and vegetables,
recommended intake amounts. DNP student will discuss relationship of fruits and vegetables to health (part of DASH diet principles for lowering blood pressure, etc.), barriers to getting the recommended number of fruits and vegetables and ways to overcome them. Will address stages of change readiness for increase of fruit and vegetable consumption. Objectives will include: know how to prepare and store for optimal quality, identify daily recommended intake, identify two health benefits of vegetables and fruit. Will make and share “turnip and mustard greens” with recipe and food label. Incentive: Vegetable peeler and brush.

Session 4: Finding whole grains: Reading labels & Using the Whole Grain Stamp

Community educator will present what foods are considered whole grain, why they are important (B vitamins, fiber, often fortified with iron, etc), storage safety, label identification, nutritional recommendations. DNP student will discuss value of whole grains to health (from DASH dietary principles for lowering blood pressure, etc.), barriers to achieving optimum intake, and address stages of change readiness to change from white flour products to whole grains. Objectives will include: be able to identify whole grain foods, name one nutrient found in whole grain foods, and state how to store grain products properly. Will share MSU prepared “whole grain macaroni and cheese,” with recipe and label. Incentive: food storage containers.

Session 5: Protein and Milk Group

Community educator will present milk, meat, and beans foods, food safety and preparation, calcium and iron information, daily recommended intakes, fish, and fats. DNP student will discuss value of lean protein and low-fat dairy in diet for health promotion (and as part of DASH dietary principles for control of hypertension), good fats
versus bad fats in the diet. Will discuss barriers to getting the lean protein needed, and
how to overcome them, and address stages of change when choosing low fat options.
Objectives will include: identify foods in the meat and beans group that are good sources
of protein, identify two other foods (beans, nuts, eggs, etc.) that are also protein sources,
state the value of choosing low fat dairy products. Will make and share “yogurt, fruit and
whole grain cereal parfaits”, with recipe and label. Incentive: kitchen utensils.

Session 6: Understanding the Food Label
Community educator will present nutrition facts on labels, how to read a label, allergenic
foods, sodium, transfats, etc. DNP student will discuss effects of sodium and transfats on
health, how to make the best available choices by reading labels. Will discuss barriers to
reading and understanding labels, and ways to overcome them. Will address stages of
change readiness for attention to food labels. Objectives will include: identify where
portion size is found on label, identify where sodium content and transfat content are
found, state where ingredient list is located. Will serve and share MSU prepared
“microwave candied yams” with recipe and label. Incentive: Low-sodium canned soups.

Session 7: Planning and Making the Most of Your Food Dollar
Community educator will present menu planning, shopping, food safety, saving money
on groceries. DNP student will discuss ways to use SNAP benefits (farmer’s markets’
Double Up Food Bucks), community resources for food, shopping for bulk quantities
with and for others, will discuss planning menus for health, variety, and appeal, and how
to choose healthier options at fast food restaurants and convenience store shopping. Will
include discussion on barriers to accessing healthy foods and how to overcome them.
Will address stages of change readiness for meal planning, food budgeting, and avoiding
temptation. Objectives: Describe benefits of meal planning, state one way a list can save money, identify one neighborhood source of healthy food options. Will make and share “10 minute chicken and noodles” with recipe and label. Incentive: Recipe cards.

Session 8: Review and Graduation, Completion of survey assessments.

Community educator will present summary of MSU “Eating Right is Basic” information, DNP student will discuss summary of health promotion/disease prevention aspects of good nutrition, overcoming barriers, and behavior changes. Will give both the MSU nutrition education behavior checklist and DNP project nutrition knowledge and self-efficacy survey that was given at beginning of program for data collection. We will share a meal of prepared “vegetable lasagna” with recipe and label. Graduation and completion gift: $30.00 gift cards. Incentive for those who did not complete all 8 sessions: Pot holders.
LIST OF REFERENCES
References


Tate, D., Jackvony, E., & Wing, R. (2006). A randomized trial comparing human e-mail counseling, computer-automated tailored counseling, and no counseling in an internet weight loss program. *Archives of Internal Medicine, 166*, 1620-1625.


