EVALUATION OF A COMMUNITY NUTRITION INTERVENTION TO DECREASE HYPERTENSION RISK

by

GAIL M. HANULA

(Under the Direction of Mark Wilson)

ABSTRACT

Culturally appropriate interventions for decreasing dietary risk factors for hypertension are important in reducing morbidity and mortality. The purpose of the Hypertension Education Risk Reduction study was to evaluate a community-based nutrition intervention to decrease dietary risk factors for hypertension in a low-income population. This study evaluated whether a Health Belief Model-based curriculum was more effective than the standard curriculum used in the Expanded Food and Nutrition Education Program (EFNEP) in increasing consumption of fruits, vegetables, and milk group foods and in decreasing sodium using a quasi-experimental non-equivalent control group design. Participants (n=219) were primarily Black females who received some type of Federal assistance. The intervention curriculum consisted of six learner-centered sessions featuring experiential learning and active food experiences. The primary outcome variable was dietary intake, measured by 24-hour diet recalls at baseline and follow-up. Data were analyzed using NEERS5 software for dietary analysis and SPSS version 15 for statistical analysis. Behavioral constructs measured were perceived benefits of, barriers to, and self-efficacy for consuming a hypertension-protective diet.

Results of independent samples t-tests showed a statistically significant increase in vegetable intake in the intervention group receiving the Health Belief Model-based curriculum compared to the control group (standard curriculum). Intake of fruits and milk group foods increased and sodium decreased, but not significantly. In both groups, dietary intake of vegetables, fruits, and milk group foods was less than recommended by MyPyramid and the DASH diet. Positive trends toward increased self-efficacy and an increase in the perceived benefits of a hypertension-protective diet were observed, along with a decrease in perceived barriers.

Hypertension affects a disproportionate number of Black adults and diet is a major risk factor for this disease. Community nutrition education through EFNEP can play an important role in decreasing dietary risk factors for hypertension.

INDEX WORDS: EFNEP, Expanded Food and Nutrition Education Program, hypertension, nutrition education, nutrition intervention

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GAIL M. HANULA

B.S.H.E., UNIVERSITY OF GEORGIA, 1982

M.H.E., UNIVERSITY OF GEORGIA, 1983

Ed.S., UNIVERSITY OF GEORGIA, 1984

A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

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GAIL M. HANULA

Major Professor: Mark Wilson

Committee: Pamela Orpinas
Rebecca Mullis
James Bason

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
The University of Georgia
May 2009

DEDICATION

This dissertation is dedicated to the staff of the Expanded Food and Nutrition Education Program (EFNEP) at The University of Georgia. You are the heart of EFNEP and your dedication is a tremendous inspiration.

I would also like to dedicate this to my family: to my husband, Jim, for his encouragement and support; to my daughter, Kristin, for her patience and understanding; and to my mother, Jean Mooney, for instilling in me a love of learning.

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CHAPTER 1

INTRODUCTION

The need to develop culturally appropriate interventions for decreasing dietary risk factors for hypertension is important to reduce morbidity and mortality (Whelton, Beevers, & Sonkodi, 2004). It is crucial that interventions address the needs of minority populations who bear a disproportionate burden of chronic disease. Georgia's Expanded Food and Nutrition Education Program (EFNEP) reaches the underserved with nutrition education. EFNEP is funded by the United States Department of Agriculture (USDA) to educate families on the importance of nutrition to health and ways to plan, purchase and prepare healthy meals on a limited budget. This community nutrition education program, which has been funded for 40 years, reaches clientele at risk for hypertension and could play an important role in decreasing morbidity and mortality from cardiovascular disease.

EFNEP participants in Georgia represent a population at increased risk for hypertension. In 2006, 78% of EFNEP participants received some type of Federal assistance and 65% were Black adults. Program participants were primarily women with children in their care (Hanula, 2006). Mothers play an important role as the nutrition gatekeepers in the home. According to Wansink (2006, p. 165), the person who prepares and buys the family food controls about 72% of the food eaten by the family. In 2006, there were 3,726 adult participants in Georgia's EFNEP with a total of 8,687 children. Nutrition education through EFNEP has the potential to improve the health of entire families.

Foods that play a role in decreasing the risk for hypertension are often lacking in the diets of participants in Georgia's EFNEP. In 2006, baseline dietary intake data indicated that 53% of participants did not eat any fruits, 26% did not eat any vegetables, and 52% did not consume any milk or dairy foods (Hanula, 2006). A culturally appropriate, theory-based nutrition intervention focusing on increasing intake of these important foods could help decrease morbidity and mortality from hypertension.

Significance of the Study

This research addressed some of the deficiencies in the current literature in regard to the effectiveness of community-based nutrition interventions to increase intake of fruits, vegetables, and milk group foods, and reduce dietary sodium in minority populations, primarily low-income Black women. The study enhances the body of knowledge in this area and will be important in informing the future development of theory-based, culturally appropriate interventions to improve the nutritional well-being of limited resource women and their families. Increasing fruit, vegetable, and low-fat dairy food consumption, and decreasing sodium could play an important role in decreasing morbidity and mortality from hypertension and cardiovascular disease.

Purpose of the Study and Research Questions

The purpose of this study was to compare the effectiveness of two curricula used in teaching nutrition in Georgia's EFNEP on increasing dietary intake of fruits, vegetables, and milk group foods, and reducing dietary sodium. The first approach was the standard curriculum (control) and the second a Hypertension Education Risk Reduction (HERR) curriculum based on the Health Belief Model. It was hypothesized that the Health Belief Model-based curriculum, which focused specifically on fruits,

vegetables, and milk group foods to prevent hypertension, would be more effective in increasing consumption of these foods than the standard curriculum. The standard nutrition education curriculum used in the University of Georgia's EFNEP is a general nutrition curriculum with lessons on all five food groups. The standard curriculum has been effective in the past in increasing consumption of foods that are protective against hypertension, but intake levels of these foods following completion of EFNEP in 2006 were still far below recommended levels (Hanula, 2006). This study sought to examine empirical data concerning the effects of a Health Belief Model-based curriculum versus a non-Health Belief Model-based curriculum on nutrition behaviors to investigate the best theoretical foundation for a nutrition education intervention to increase consumption of a hypertension-protective diet. The questions that guided this study are as follows:

1. Does the Health Belief Model-based curriculum result in greater consumption of fruits, vegetables, and milk group foods, and decreased sodium intake than the control curriculum among participants in the EFNEP?
2. Is the Health Belief Model-based curriculum more effective than the control in decreasing perceived barriers to the consumption of fruits, vegetables, and milk group foods?
3. Is the Health Belief Model-based curriculum more effective than the control in increasing self-efficacy for making dietary changes to decrease the risk for hypertension, including the preparation of meals containing fruits, vegetables, and milk group foods?

4. Is the Health Belief Model-based curriculum more effective than the control curriculum in increasing self-efficacy for the interpretation of nutrition labels to determine the salt content of foods?

The answers to these questions will inform future nutrition interventions to decrease dietary risk factors for hypertension.

Culturally appropriate community nutrition interventions can play an important role in reducing morbidity and mortality from hypertension, especially in underserved populations who bear a disproportionate burden of chronic disease. Nutrition education through EFNEP can play an important role in the effort to reduce health disparities among the economically disadvantaged, and this project will add to the body of literature in this area.

CHAPTER 2

REVIEW OF THE LITERATURE

The purpose of this literature review is to examine the research that informed a nutrition intervention to decrease morbidity and mortality from hypertension. The chapter is divided into seven sections: 1) epidemiology of hypertension, 2) health disparities and hypertension, 3) diet and hypertension, 4) dietary intake studies, 5) behavioral constructs, 6) behavioral interventions, and 7) summary.

Epidemiology of Hypertension

Cardiovascular disease is the leading cause of death in the United States, accounting for 39% of all deaths in 2001, 32% of which occurred in individuals under 75 years of age (Dietary Guidelines Advisory Committee, 2005; United States Department of Health and Human Services & United States Department of Agriculture, 2005). Modifying the controllable risk factors that impact the development or progression of cardiovascular disease could play a significant role in decreasing morbidity and mortality. Elevated blood pressure is one of these modifiable risk factors (Dietary Guidelines Advisory Committee).

Over half of the adults in the United States are affected either by hypertension, defined as systolic blood pressure ≥ 140 mmHg and diastolic blood pressure ≥ 90 mmHg, or pre-hypertension, defined as systolic blood pressure of 129-139 mmHg and diastolic blood pressure of 80-89 mmHg (Chobanian et al., 2003). Over one-fourth of the population in the United States has hypertension. The prevalence increased from 25% in

1988-1991 to 29% in 1999-2000 according to data from the National Health and Nutrition Examination Survey (Hajjar & Kotchen, 2003). It was highest in Black adults (34%), women (30%) and adults 60 years of age and older (65%). Pre-hypertension is also common. Hsia et al. (2007) found pre-hypertension present in 40% of White postmenopausal women and 32% of Black post-menopausal women. In addition, approximately 90% of non-hypertensive adults will develop hypertension during their lifetimes (Vasan et al., 2002). It is estimated that as little as a 3 mmHg reduction in systolic blood pressure could lead to an 8% reduction in stroke mortality and a 5% reduction in mortality from cardiovascular disease (Stamler, et al., 1989). Clearly, community-based efforts to reduce blood pressure and prevent hypertension should be considered a public health priority.

Health Disparities and Hypertension

The 2005 Dietary Guidelines Advisory Group report states that, "Health disparities are substantial among racial and ethnic minorities and among the economically disadvantaged" (Dietary Guidelines Advisory Committee, 2005, p. 3). Black persons tend to have a greater incidence of blood pressure-related diseases, such as stroke and kidney failure, than non-Black persons, and an overall higher prevalence of elevated blood pressure (Fiscella & Holt, 2008; USDHHS & USDA, 2005; Wang & Wang, 2004). Poor blood pressure control is a common problem that contributes to significant morbidity and mortality among Black adults. In a study by Bosworth et al. (2006), Black persons were more likely than White persons to be non-adherent to their medications and in poor blood pressure control. Brown and Segal (1996) studied the health perceptions of Black persons with hypertension and reported they were more

present-oriented than White persons regarding daily experiences with hypertension management. Those with present-orientations perceived themselves to be less susceptible to the consequences of hypertension, believed less in the benefits of prescribed medication, and believed more in the benefits of home remedies. It is possible, therefore, that members of this population might be receptive to methods of decreasing blood pressure through diet.

Health disparities also exist among the economically disadvantaged (Brown & Segal, 1996; Kotchen et al., 1998). Adults over the age of 25 with less than 12 years of education have a higher death rate from chronic diseases than adults with higher levels of education (National Center for Health Statistics, 2009, p. 223). Members of minority population groups who are poor and have less than a high school education are likely to have limited literacy skills, which may impair communication between patients and health care providers (Kotchen et al.; Ruud et al.). Interventions to reduce morbidity and mortality from hypertension should address the needs of underserved populations who bear a disproportionate burden of chronic disease.

Diet and Hypertension

Diet plays an important role in the prevention or postponement of cardiovascular disease. Elevated blood pressure is one of the risk factors for cardiovascular disease that is modifiable by diet (Cook et al., 2007). The roles of sodium and potassium in the regulation of blood pressure have been well-documented (Whelton, 1994). Population-based studies indicate that fruits, vegetables, and dairy products have beneficial effects on blood pressure (Appel et al., 1997; Svetkey et al., 2005).

Electrolytes

Electrolytes play an important role in regulating blood pressure. The relationship of sodium to blood pressure regulation has been well-documented (Whelton, 1994). On average, the higher the dietary sodium intake, the higher the person's blood pressure. For this reason, the Dietary Guidelines for Americans recommends limiting sodium intake to less than 2,300 mg per day, the Upper Limit (UL) established by the Institute of Medicine (Dietary Guidelines Advisory Committee, 2005). Usual intake of sodium by many Americans exceeds this Upper Limit, in some cases by two to three times, primarily due to the high sodium content of many processed foods (USDHHS & USDA, 2005). Racial differences exist in regard to the effects of sodium on blood pressure. Black persons tend to be more sensitive to sodium and experience a greater increase in blood pressure in response to increased intakes of sodium than non-Black persons (Alderman, 1994). For this reason, the Dietary Guidelines recommendation for Black persons is to aim to consume no more than 1,500 mg of sodium each day (USDHHS & USDA).

Potassium is another electrolyte that plays a role in the regulation of blood pressure. It has the opposite effect of sodium, in that increased intake of potassium helps lower blood pressure. Potassium also has the beneficial effect of blunting the blood pressure-raising effects of sodium. When potassium is present in sufficient quantities in a high-sodium diet, the increase in blood pressure is diminished (Morgan, Myers, & Teow, 1984; Morris, Sebastian, Forman, Tanaka, & Schmidlin, 1999; USDHHS & USDA, 2005; Whelton, 2004). Black individuals tend to be more sensitive than White individuals to potassium's blood pressure-lowering effects. Therefore, including potassium-rich

foods in the diet is especially beneficial to this population (USDHHS & USDA; Douglas, Ferdinand, Bakris, & Sowers, 2002).

Fruits and Vegetables

Diets high in fruits and vegetables are associated with a reduced risk of stroke and other chronic diseases (USDHHS & USDA, 2005). Observational studies show that increased intakes of fruits and vegetables lower blood pressure and decrease the risk of stroke (Appel et al., 1997; Bazzano et al., 2002; Gillman et al., 1995; Johnsen et al., 2003; Joshipura et al., 1999; Rissanen et al., 2003; Sauvaget, Nagano, Allen, & Kodama, 2003; Steffen, et al., 2003; Svetkey et al., 2005; USDHHS & USDA). In addition to observational studies, two clinical trials found significant reductions in blood pressure with increased fruit and vegetable intake (Appel et al., 1997; John et al., 2002). Mean blood pressure reductions were 2.7/1.9 mmHg and 4.0/1.5 mmHg, respectively. The mechanism(s) for the reduction in blood pressure with increased consumption of fruits and vegetables has not been clearly established. However, since most fruits and vegetables are good sources of potassium, at least part of the beneficial effect of fruits and vegetables on blood pressure is likely due to the resulting increase in potassium consumption (USDHHS & USDA; Whelton et al., 2004).

Dairy Foods

The addition of low-fat dairy products to the diet resulted in decreased blood pressure in several studies (Appel et al., 1997; Sacks et al., 2001; Svetkey et al., 1999). In the Dietary Approaches to Stop Hypertension (DASH) study, the addition of three cups of milk to a diet high in fruits and vegetables (8-10 servings) resulted in twice the reduction in blood pressure of a diet high in fruits and vegetables alone (Appel et al.).

Other studies have shown an association between higher milk product consumption and decreased risk of stroke, hypertension and coronary artery disease (Djousse et al., 2006; Elwood, Pickering, Fehily, Hughes, & Ness, 2004; Ness, Smith, & Hart, 2001). In the National Heart Lung and Blood Institute (NHLBI) Family Heart Study, dairy food consumption was associated with a decrease in systolic blood pressure but not diastolic (Djousse et al.). The effect was mainly seen in individuals consuming diets low in saturated fat and was independent of calcium intake. The mechanism(s) for the beneficial effects of dairy consumption is unclear, but may be attributable to the nutrients in milk, alone or in combination, including potassium, calcium, magnesium, vitamin A, and vitamin D.

Dietary Intake Studies

A diet rich in fruits, vegetables, and low-fat dairy products is beneficial to health, but many Americans, especially those with limited resources, consume diets that are lacking in these foods. Studies of dietary intake in lower socioeconomic status populations have reported greater consumption of foods low in nutrient density, including soft drinks and desserts, along with foods high in fat and sodium, such as potato chips and processed meats (Deshmukh-Taskar, Nicklas, Yang, & Berenson, 2007; Guenther, Jensen, Batres-Marquez, & Chen, 2005; Hulshof, Brussaard, Kruizinga, Telman, & Lowik, 2003; Robinson, et al., 2004). A diet rich in meat, refined grains, fat and sugar is higher in energy-density than a diet rich in fruits, vegetables, low-fat dairy products and whole grains. High energy-density foods provide the most energy at the lowest cost (Andrieu, Darmon, & Drewnowski, 2006; Drewnowski & Darmon, 2005). It has been proposed that increased consumption of foods high in calories but relatively low in other

nutrients is a likely contributor to the health disparities experienced by the poor (Drewnowski & Darmon; Ledikwe et al., 2006; Newby, Weismayer, Akesson, Tucker, & Wolk, 2006).

Consumption of Fruits and Vegetables

Americans' consumption of fruits and vegetables is far less than optimal (Centers for Disease Control and Prevention, 2007; LaForge, Greene, & Prochaska, 1994; Patterson, Block, Rosenberger, Pee, & Kahle, 1990; Subar et al., 1995). Data from the 2005 Behavioral Risk Factor Surveillance System (BRFSS) indicate that only 33% of adults consumed fruit two or more times per day and 27% consumed vegetables three or more times per day (Centers for Disease Control and Prevention). Adults with limited resources have been reported to consume fewer fruits and vegetables than those of higher socioeconomic status (Havas et al., 1998). A National Cancer Institute study found that median daily fruit and vegetable consumption was 3.1 servings for the lowest income group in comparison to 3.7 for the highest income group (Subar et al.). When fruits and vegetables are provided through federal assistance programs, such as the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), mean daily consumption of fruits and vegetables is higher. Havas et al. found that WIC participants consumed 4.1 servings per day of fruits and vegetables, including juice. National EFNEP data reveal that clients enrolled in the program in 2004 consumed an average of 3.6 servings of fruits and vegetables a day (USDA, 2006). The Dietary Guidelines and MyPyramid recommendations call for the equivalent of 9 servings a day for the reference 2,000 calorie diet (4.5 cups of fruits and vegetables), an increase of 80% over the 1992 recommendation of 5 servings a day, which was approximately 2.5 cups of fruits and

vegetables (USDA, 2005). There is clearly a need for nutrition education regarding the importance of fruits and vegetables and for research on barriers to the consumption of these important foods.

Calcium Consumption

Data on calcium consumption indicates that the majority of American adults do not consume the Daily Recommended Intake (DRI) for calcium. The problem is especially severe in Black persons. In a study on barriers to calcium intake in Black women, Zablah, Reed, Hegsted, and Keenan (1999) reported that 80% of clients interviewed consumed less than 75% of the Recommended Dietary Allowance (RDA) for calcium of 1,000 mg/day. The mean calcium intake was 485 mg. In a study of dairy intake in Black adults and children in the United States, Fulgoni et al. (2007) reported that none of the participants in the study met the DRI for calcium, nor did any of the participants meet the milk group recommendation of the 2005 Dietary Guidelines for Americans of 3 cups of milk or milk products per day (USDHHS & USDA, 2005). Black males consumed one serving of dairy products and Black females 0.8 servings of dairy products per day. Similarly dismal statistics for intake of dairy products are seen in Georgia's EFNEP population. In 2006, 51% of clients consumed less than half of the recommended amount of calcium. The mean number of servings of milk group foods was 0.9 cups compared to the recommendation of three cups, with 52% of the participants reporting no milk group food consumption (Hanula, 2006).

Sodium Intake

Usual intake of sodium by many Americans exceeds the Upper Limit for sodium established by the Institute of Medicine, in some cases by two to three times (Dietary

Guidelines Advisory Committee, 2005). The high sodium content of many processed foods is the primary reason for this (USDHHS & USDA, 2005). Many people lack awareness of the importance of lowering dietary sodium. In a study by Neily et al. (2002), 86% of patients were unaware of dietary sodium recommendations. In addition, 42% could not interpret the sodium content on the Nutrition Facts label on food containers to categorize foods as high or low sodium in a sorting exercise. After an educational intervention, 92% of the participants were able to determine the sodium content of foods by reading the Nutrition Facts label. Education can play an important role in helping clients choose foods lower in sodium.

Behavioral Constructs

The Health Belief Model is a conceptual framework for understanding why individuals engage, or do not engage, in health-related actions (Janz & Becker, 1984; Strecher, DeVellis, Becker, & Rosenstock, 1986). Constructs of this model include perceived severity, susceptibility, benefits, barriers, cues to action, and self-efficacy. In regard to severity, hypertension and renal disease ranked as the 13th leading cause of death in 2004 (Minino, Heron, Murphy, & Kochanek, 2007). Hypertension affects a large percentage of the population of the United States. It has been estimated that it will affect 90% of adults in this country during their lifetimes (Vasan et al., 2002). The prevalence of hypertension increased from 25% in 1988-1991 to 29% in 1999-2000 according to data from the National Health and Nutrition Examination Survey (Hajjar & Kotchen, 2003). Based on these statistics, it is likely that many adults perceive that they are susceptible to hypertension. In addition, the majority of EFNEP participants are Black females, and Black adults tend to have a higher incidence of blood pressure-related

diseases, such as stroke and kidney failure, than White adults and an overall higher prevalence of elevated blood pressure (USDHHS & USDA, 2005). Awareness of hypertension was reported by 81% of respondents to the Maywood Cardiovascular Survey, the majority of which were Black adults (Freeman, Rotimi, & Cooper, 1996). The high prevalence of hypertension and reported awareness of this disease among Black adults is likely to result in a fairly high degree of perceived susceptibility.

Barriers to Consuming a Diet Protective of Hypertension

In spite of the seriousness and prevalence of hypertension, barriers exist to practicing health behaviors that can reduce morbidity from this disease. In regard to diet, each day individuals make over 200 food-related decisions (Wansink, 2006, p. 1). While it could be argued that determinants exist for each individual food consumed, most studies have been conducted on general determinants of food choice. The leading determinants are taste, cost, and convenience. Nutrition was not one of the top three reasons why consumers stated that they chose their foods, according to a study by Glanz, Basil, Maibach, Goldberg, and Snyder (1998). This has implications for nutrition interventions since standard practice is to promote foods for their nutritional value. To maximize the effectiveness of a nutrition intervention, consideration should be given to both psychological and environmental factors influencing food choices, including taste, cost and convenience, as these can be barriers to the consumption of foods that help protect against hypertension.

Taste

Taste is the most important determinant of food choice (Glanz et al., 1998). This makes intuitive sense, as most people elect to eat foods they enjoy if they have the

opportunity to choose. When people are asked why they are eating a certain food, they almost automatically reply, "because I like it," or "because it tastes good." According to Wansink (2006, p. 94), however, the reasons why we eat certain foods are actually much more complex than taste alone. In one study, stale popcorn was provided free of charge to patrons of a movie theater. It was consumed in large quantities by the majority of people to whom it was served. Although the popcorn was not fresh, hot or crunchy, the majority of participants stated that they ate the popcorn because it tasted good (Wansink & Kim, 2005). In another study by Wansink, the taste of menu items with descriptive names, such as "Succulent Italian Seafood Filet," was rated much higher than items with less descriptive names, such as "Seafood Filet," even though the two items were exactly the same food served in the same restaurant (Wansink, 2006, p. 126). It appears that many factors influence the perceived taste and acceptability of food. This has implications in regard to modifying the eating environment to favor the consumption of foods that may decrease the risk of hypertension, since taste is sometimes perceived as a barrier to consumption (Campbell et al., 1998; Reicks, Randall, & Haynes, 1994). Recipes developed for promotion in nutrition interventions should be given names that sound appealing to increase the likelihood of acceptability. In addition, exploring reasons why people choose to eat or not to eat certain foods could be an important strategy for enabling participants to overcome barriers to the consumption of hypertension-protective foods.

Cost

The cost of food is an important determinant of food choice. Cost is the second most important reason why people choose to eat certain foods (Glanz et al., 1998). "All-

you-can-eat" buffet restaurants and "dollar menus" at fast food restaurants are popular and appeal to consumers interested in getting the most food for their money. In the United States, far less of our disposable income is spent on food than in many countries. There is some concern that dietary recommendations, such as those to eat more fresh fruits and vegetables, may be too expensive for people with limited financial resources (Campbell et al., 1998; Eikenberry & Smith, 2004; Lutz & Blalock, 1993; Reicks et al., 1994; Treiman et al., 1996). In a recent study, the average cost of fruits and vegetables was 21 cents per serving (Cassady, Jetter, & Culp, 2007). Prices varied greatly among stores, even within low income areas. In addition, expenditures for food require a larger percentage of income when income is relatively low. A USDA survey found that the percentage of after-tax income spent on food was 34% for households with incomes between $5,000 and $9,999, but only 9% for households with incomes of $70,000 or more (Clausen, 2008). Although federal food assistance programs are available for people living at or near the poverty level, low-income families may still experience some degree of food insecurity, defined as not having assured access at all times to enough food for an active, healthy life (Nord, Andrews, & Carlson, 2006). According to USDA, 12.6 million households were food insecure in 2005 (Nord, Andrews, & Carlson). In Georgia, 18% of EFNEP participants reported running out of food before the end of the month *Most of the Time* or *Almost Always* (Hanula, 2006). Fewer than 20% of EFNEP clients enrolled during 2006 reported that they never ran out of food before the end of the month (Hanula). Food insecurity creates an additional barrier to eating a healthful diet. Interventions designed to increase the consumption of a more healthful, but also more costly diet, need to be sensitive and culturally appropriate when targeted to groups at risk

for food insecurity (Newby et al., 2006). Creating awareness of food assistance programs in the community, along with education on food budgeting and methods of preparing low-cost, nutritious foods, could help lessen the effect of cost as a barrier to the consumption of a healthful diet.

Barriers to fruit and vegetable intake

The majority of research on determinants of the intake of specific foods has been in regard to fruits and vegetables. Barriers reported by limited resource participants include too much time and effort required to prepare fruits and vegetables, preference for other foods, not liking the taste, families eating fruits and vegetables too quickly, lack of availability, inadequate space for storing canned and frozen fruits and vegetables, difficulty transporting canned foods from the grocery store, and cost (Campbell et al., 1998; Lutz & Blalock, 1993; Reicks et al., 1994; Treiman et al., 1996). Focus group data reveal that many women, especially those in their late teens and twenties, do not cook extensively and prefer to spend a minimal amount of time in food preparation (Neumark-Sztainer, Story, Perry, & Casey, 1999). If nutrition education interventions are to be effective with young adults, it appears that recipes for meals and snacks that include fruits, vegetables and low-fat dairy products must be quick and easy, both to prepare and to clean up.

Fruit and vegetable purchases vary with income level. Blisard, Stewart and Jolliffe (2004) reported that in any given week, approximately 19% of low-income households purchased no fruits or vegetables and that low-income households spent significantly less per person per week on fruits and vegetables compared to higher income households. They also found that small increases in income translated into

additional fruit and vegetable expenditures by higher income households but not by low-income households. This may reflect a lower priority placed on these foods by lower-income households. Promoting a diet high in fruits and vegetables as helpful in lowering blood pressure may increase the perceived benefit of these foods.

Environmental barriers

Environmental factors influence the foods we choose and consume, and the amount of food we eat. Lack of available fresh fruits and vegetables has been reported as a barrier to fruit and vegetable consumption, especially in the inner cities where grocery stores are less plentiful (Campbell et al., 1998). While influencing environmental factors, such as the availability of certain foods in grocery stores, has not been a focus of EFNEP in Georgia, the home environment is one that could be influenced. In the home, more of a particular food may be consumed if it is easy to see and obtain. Wansink (2006, pp. 78-79) studied candy consumption and found that the largest amount of candy was consumed when it was placed in a clear dish where it could be easily seen and accessed. In the home, consumption of hypertension-protective foods might be increased if these foods were visible and accessible in ready-to-consume form. Examples of this would be baby carrots or grapes in snack-size bags, clearly visible on an eye-level shelf in the refrigerator for easy "grab and go" snacks.

Beliefs regarding the food/health relationship

Beliefs among the lay public regarding the relationship of food to health may differ substantially from evidence-based information reported in the scientific literature. Street intercept interviews and focus groups conducted in a metropolitan census tract in Texas comprised primarily of Black adults revealed that 35% related high blood pressure

to eating pork or other foods that thickened the blood (Wilson et al., 2002). Hypertension was causally linked to pork consumption in 8 of the 12 focus groups. High blood pressure was thought to be treatable with vitamins, garlic and other herbs in 11 of the 12 groups, and vinegar was mentioned as a remedy for high blood pressure. Participants listed dietary salt as a cause of high blood pressure in 8 of the 12 groups; however, some participants believed that consumption of Epsom salts would cure hypertension.

Efforts to prevent or control hypertension through nutrition education should take into consideration that lay beliefs may diverge sharply from current medical approaches to hypertension. Although research evidence linking garlic and vinegar to blood pressure regulation is lacking, there is no harm in consuming these foods, as long as they do not substitute for blood pressure-lowering medications. It is possible that using garlic and vinegar as ingredients in recipes promoted in an intervention to decrease dietary risk factors for hypertension could enhance the credibility of the educator among participants and increase acceptance of the recipes.

Self-Efficacy

Self-efficacy is an important construct of the Health Belief Model and a strong relationship exists between self-efficacy and a number of health-related behaviors, including diet (Brug, Glanz, & Kok, 1997; Schwarzer & Fuchs, 1995). Schwarzer and Fuchs reported that a strong sense of personal efficacy was related to better health and that behavior change was facilitated by a personal sense of control. If people believe they can take action to solve a problem, they become more inclined to do so and feel more committed to this decision. The belief that one understands and can effectively apply a

strategy leads to a greater sense of control over the outcome, which promotes self-efficacy and motivation to apply the strategy (Pintrich & Schunk, 1996).

Brug et al. (1997) reported that self-efficacy expectations toward increasing fruit consumption were significantly lower among people who indicated that they had no desire to consume more fruit. Participants who increased their fruit consumption reported significantly higher self-efficacy expectations for this behavior. Self-efficacy for fruit and vegetable consumption can lead to greater increases in servings of fruits and vegetables than either changes in knowledge or attitudes (Havas et al., 1998). However, the perceived unattainability of a goal may have a negative effect on self-efficacy, according to Roncolato and Huon (1998). This raises concerns regarding the desirability of promoting the consumption of 9 servings of fruits and vegetables a day, which is over twice what the average EFNEP client consumed in 2006 (Hanula, 2006). In 2006, EFNEP clients consumed an average of 1.1 servings of fruit per day and 3 servings of vegetables. Of even greater concern is that 53% of EFNEP clients reported consuming no fruit and 26% consumed no vegetables. The "Fruits and Veggies: More Matters!" slogan may be a more culturally appropriate message to promote in a short-term intervention with low-income participants, with the goal of increasing overall consumption of fruits and vegetables, but not necessarily to the optimal levels recommended for each subgroup (green vegetables, legumes, etc.) according to MyPyramid.gov (USDA, 2005).

Benefits of Consuming Fruit, Vegetables and Dairy Products

The health benefits of consuming fruits, vegetables and low-fat dairy products have been well established for many years, however, evidence that these foods are beneficial to blood pressure regulation is fairly recent. The Dietary Approaches to Stop

Hypertension (DASH) clinical trial provided strong evidence that diet can have a major effect on blood pressure (Appel et al., 1997; Moore et al., 2001; Svetkey et al., 1999). The DASH trial, sponsored by the National Heart, Lung and Blood Institute (NHLBI), was a large (n=459) controlled feeding study that tested the impact of three dietary patterns on blood pressure over an eight week period. The control diet was a fairly typical American diet, low in fruits, vegetables and dairy products, and with a fat content similar to the average of 37%. The first intervention diet was similar to the control diet in fat content, but higher in fruits and vegetables. The second intervention diet was a "combination diet," higher than the control in fruits, vegetables and low-fat dairy products and lower than the control in saturated fat, total fat (27%), and cholesterol. Sodium and calories were held constant across all three diets in order to test the effects of the diets without interference from the known effects of decreased sodium and weight on blood pressure. The target for sodium was 3,000 mg/day, which is higher than the 2,300 mg recommended in the Dietary Guidelines for Americans, but less than the majority of Americans typically consume (USDHHS & USDA, 2005). The "combination diet," high in fruits, vegetables, and low-fat dairy products, and low in fat, reduced blood pressure more than the control diet. In non-hypertensive patients, systolic blood pressure was reduced by 3.5 mmHg more and diastolic blood pressure by 2.1 mmHg more in the treatment group than in the control group. The effect was even more pronounced in patients with high blood pressure at baseline (n=133), where the reduction in systolic blood pressure was 11.4 mmHg and diastolic 5.5 mmHg more in the treatment group than in the control group. The authors also reported that the DASH combination diet was more effective in minorities, particularly Black persons (Svetkey et al.).

The Dietary Approaches to Stop Hypertension 2 Study (DASH 2) was designed to study the main and interactive effects of three levels of sodium intake and two dietary patterns on blood pressure in 400 participants, 50% of whom were Black adults. All participants had either above-optimal blood pressure or Stage I hypertension (Svetkey et al., 2005). The dietary patterns were the DASH control diet, average in fat (37%) and low in fruits, vegetables, and dairy products, and the DASH combination diet, high in fruits, vegetables, and low-fat dairy products and low in total fat (27%), saturated fat, and cholesterol. Whereas in DASH 1, sodium levels were kept constant at 3,000 mg per day, DASH 2 used three different sodium levels. The highest level was similar to DASH 1 and reflected current consumption levels in the United States. The intermediate sodium level reflected the Upper Limit of current recommendations for sodium and the lowest level was the optimal sodium level for lowering blood pressure.

Clinical feeding trials provide compelling evidence of the beneficial role diet can play in decreasing hypertension risk. However, in free-living populations, dietary behavior change can be extremely difficult and complex. The results of the DASH studies are impressive and highlight the benefits of a diet rich in fruits, vegetables, and low-fat dairy products, and moderate in sodium in lowering blood pressure. However, the DASH studies were clinical trials where all food was provided to the participants, who were asked not to eat anything other than the food provided during this time. Highlighting the benefits of a hypertension-protective diet may help individuals make positive dietary changes. However, health behavior research indicates that knowledge of the benefits of a protective behavior alone may not be sufficient to motivate individuals to change.

Behavioral Interventions

Multi-component Lifestyle Interventions

A number of behavioral studies have explored the effect of multi-component lifestyle interventions on decreasing hypertension. These studies support the important role of multiple-component lifestyle interventions, although Appel et al. (2003) state that it has been well-documented that the combined effect of an intervention that implements two or more blood-pressure reducing components is less than the sum of blood pressure reductions from interventions that implement each component alone. This is believed to be due to the effort and complexity of making multiple lifestyle changes.

The Primary Prevention of Hypertension (PPH) study tested the impact of reduced sodium, alcohol and caloric intake, along with increased physical activity, on hypertension incidence in a largely White male population (n=201). This 5-year trial significantly reduced the risk of hypertension. The effect on blood pressure was related primarily to the degree of weight loss, the average of which was 2.7 kg. Sodium intake was reduced by 25% and alcohol intake decreased by 30%. The majority of intervention participants reported increased physical activity (Stamler et al., 1989).

The Hypertension Control Program (HCP), tested a similar diet without the emphasis on physical activity, also in a largely White male population, primarily with hypertensive individuals (n=189) who were taken off their medications to control blood pressure and either followed the diet low in sodium, alcohol, and calories (intervention) or their typical diet (control). After four years, 39% of those in the intervention group remained normotensive without drug therapy compared to 5% who did not take medication to control blood pressure or follow the intervention diet (Stamler et al., 1987).

The Trials of Hypertension Prevention Phase II (TOHP-2) trial tested the effects of weight loss, reduced sodium intake, or a combination of both on the incidence of hypertension in 2,383 overweight adults (66% male, 82% non-Black adults) over a 48-month period. The incidence of hypertension at 6 months, which was the height of intervention adherence, was lowest in the combined weight loss/reduced sodium group (3%), followed by the weight loss group (4%) and the reduced sodium group (5%). It was highest in the usual care group (7%). The incidence of hypertension was significantly less than the control in each lifestyle group at 48 months, but there was no significant difference among the intervention groups (Cook et al., 2007).

The PREMIER study was a multi-session, behavioral intervention to treat elevated blood pressure in free living individuals (n=810). The goal was to develop a lifestyle intervention that could be easily transferred into general health care settings. The intervention was designed to be culturally relevant for Black persons and other minorities and it was Social Cognitive Theory and behavioral self-management-based (Funk et al., 2006). Participants were recruited at four clinical centers: Johns Hopkins (Maryland), Duke (North Carolina), Kaiser Permanente (Oregon), and Pennington (Louisiana). Demographics indicated that the average age of participants was 50 years of age, 62% were female, and 34% were Black adults. The participants were randomly assigned to one of three groups. The first consisted of advice only, the second was a comprehensive behavior change program (established), and the third was a comprehensive behavior change component plus the DASH diet (established plus DASH). The control group participated in a 30-minute session with a health practitioner, generally a Registered Dietitian. The behavioral interventions consisted of a total of 18 face-to-face contacts

during the 6-month intervention, 4 of which were individual sessions and 14 group sessions. Both behavioral interventions significantly reduced weight and intakes of sodium and fat compared to the advice only (control) group. At the end of the 6 months the established plus DASH intervention group significantly increased intakes of fruits, vegetables, and dairy products as measured by 24-hour diet recalls. Total servings of fruits and vegetables increased from baseline to follow-up as follows: 4.4 to 4.9 in the control group, 4.6 to 5.1 in the established group and 4.8 to 7.8 in the established plus DASH group. Servings of dairy products changed from baseline to follow-up as follows: 1.6 to 1.7 in the control group, 1.7 to 1.5 in the established group and 1.8 to 2.3 in the established plus DASH group (Appel et al., 2003). The established intervention caused statistically significant reductions in blood pressure in those under and over 50 years of age and the established plus DASH intervention lowered blood pressure in both those under and over 50 years of age, but significantly more so in the older age group.

Follow-up of participants in the PREMIER study continued for an additional 12 months. Reductions in blood pressure in the intervention groups were not significantly different from the controls at the follow-up 18 months after the original baseline (Elmer et al., 2006). However, the established plus DASH group significantly increased servings of fruits, vegetables, and dairy products, although not to the levels consumed in the original DASH feeding studies (9-12 servings of fruits and vegetables). Servings at baseline, 6 months and 18 months post were as follows: Fruits: control group, 1.8, 1.9, 1.8; established group 1.7, 2.2, 2.0; established plus DASH group, 1.8, 4.0, 3.5; Vegetables: control group 2.6, 2.9, 2.8; established group 2.8, 2.9, 2.7; established plus DASH group 2.9, 3.9, 4.0; Dairy products: control group 1.6, 1.7, 1.6; established group,

1.7, 1.5, 1.5; established plus DASH group 1.8, 2.3, 2.1. Sodium intake decreased in each group, but the average intake in each of the groups still exceeded the target goal of less than 2300 mg per day (Lin et al., 2007).

These studies highlight the fact that multiple behavior changes can be achieved at essentially the same time. However, it should be noted that in each of these studies, the participants were motivated and the populations were slightly skewed towards persons with higher education and incomes. It may not be possible to generalize the results of these studies to the EFNEP population, which is predominantly of the Black race, female, and poor. In addition, many of the participants in EFNEP do not self-select enrollment in EFNEP classes, rather, they participate in the program when it is offered through other agencies where they obtain services, such as the Department of Family and Children's Services and women's resource centers.

Community-Based Nutrition Education Interventions

The *DASH - Dinner with Your Nutritionist* intervention was community-based in a university-neighborhood health care center (Rankins, Sampson, Brown, & Jenkins-Salley, 2005). Participants were low-income African-American adults with hypertension. This eight-week, Social Cognitive Theory-based intervention featured nutrition presentations and DASH-diet dinners to which participants could bring a guest for social support. Out of 280 eligible participants at the health care center with a hypertension diagnosis, 92 provided informed consent. Of these individuals, 82 chose to enroll in the study. The mean age of participants was 55 years of age. The primary outcome variable was blood pressure, which decreased significantly from pretest to posttest (-8.4 mmHg systolic, $p < .05$ and -4.3 mmHg diastolic, $p < .05$) in participants who attended at least six

of the eight sessions. Serum folate was used as a biomarker for following the DASH diet. Participants who attended at least six sessions (n=32) had significantly higher serum folate levels at posttest than at pretest. This study was unique in that it offered the opportunity for education and social support along with free dinners for the participants and their guests. The authors report that they were encouraged by the fact that 79% of the participants came to at least one meeting and 54% attended more than half of the sessions, since the health care center staff estimated that less than 15% of the patients they refer for nutritional counseling follow up on the referral. However, the fact that less than half of these individuals, who had been diagnosed with hypertension and chose to participate in the study, took advantage of the opportunity to participate in at least six of the eight sessions highlights the difficulty in reaching low-income African-American adults with nutrition education.

The *Sisters in Health* intervention was a community-based nutrition education program taught by paraprofessionals in New York State, with the goal of increasing fruit and vegetable consumption among low-income women (Devine, Farrell, & Hartman, 2005). The intervention consisted of six group sessions, each 90 minutes in length. The curriculum emphasized active food experiences in a positive social setting. The control group received classes on parenting or budgeting and a pamphlet on nutrition. Of the 269 participants, the majority were female. The outcome measure was increased fruit and vegetable consumption, measured by the six-question screener used on the Behavioral Risk Factor Surveillance Survey. At follow-up, the intervention group was 0.44 times more likely than the control group to eat fruits and vegetables five times a day. The intervention group consumed fruits and vegetables significantly more times per day than

the control group, 1.6 times versus 0.8 times per day. Participants also completed a seven item scale measuring attitudes toward fruit and vegetable consumption. There were no significant differences between the groups at baseline, but the intervention group had a greater mean increase in attitude scale scores than the control at follow-up (p=.04). This study provides evidence that community nutrition education programs featuring group support and active food experiences can be effective in increasing fruit and vegetable consumption.

Community-based, federally funded nutrition education programs are available in each state and U.S. territory through the EFNEP, a partnership between USDA, land grant universities, and local county governments. The goal of the EFNEP is to increase the capacity for healthful food choices among low-income families with children. EFNEP classes are taught by paraprofessionals who have been trained in nutrition, food safety, and food resource management. Program guidelines specify that to the extent possible, the paraprofessional aides should be recruited and hired from the target population based on research supporting the effectiveness of lay nutrition and health educators (USDA, 2006).

EFNEP nutrition curricula are based on MyPyramid.gov and the Dietary Guidelines for Americans (USDHHS & USDA, 2005). The standard curriculum used in Georgia is a modification of Eating Right is Basic III, developed by Michigan State University. The modifications reflect current USDA nutrition recommendations and the dietary guidance system that was revised in 2005. Core lesson topics include each of the major food groups, food safety, and food shopping skills. A minimum of six lessons is required in Georgia for clients to receive a certificate of completion. Typically the core

lessons are taught, with the addition of classes on special interest topics such as breakfast, maternal and infant nutrition, and child nutrition, where appropriate and when time permits. The federal partner requires evaluation of the program. The measure for dietary intake is 24-hour diet recalls completed at baseline and follow-up. In 2006, 89% of EFNEP graduates in Georgia made a positive change in their diets at follow-up. Improvement was seen in number of servings from each of the food groups, although intake still fell short of recommended levels (Hanula, 2006).

The EFNEP has been in existence since 1969. The program began as a home-based intervention, reaching limited resource clients by recruiting door-to-door in low-income housing areas and through other agencies reaching similar clientele. The majority of clients now participate in EFNEP through group programs at community agencies, including adult literacy programs, women's resource centers, county health departments, parent resource centers at local schools, and substance abuse recovery programs. Research at Cornell University sheds light on understanding the experiences and motivations of EFNEP participants (Devine, Brunson, Jastran, & Bisogni, 2006). Participants' motives for enrolling in the program include, "want to be healthy," "for job/program," and "care for kids" One mother initially expressed little interest in learning about foods and nutrition, but continued in the program because she liked and trusted the paraprofessional educator, and she began to develop an interest in changing her family's food habits. The authors suggested that readiness for change varies with individual clients and that tailoring programs for participants at various stages may be useful. This poses a challenge when working with groups of individuals. However, it is clear from this

research that efforts must be made to engage participants in the learning process and to insure that sessions are enjoyable and relevant to participants' daily lives.

Cox, Gonzales-Vigilar, Novascone, & Silva-Barbeau (1996) conducted a Health Belief Model-based intervention with EFNEP clientele in Virginia designed to decrease diet-related cancer and cardiovascular disease risks. The intervention consisted of 18 lessons delivered over a 6-month period, 9 of which were from the traditional EFNEP curriculum and 9 experimental chronic-disease prevention lessons. The chronic disease prevention lessons emphasized reducing dietary intake of fat and salt and increasing intake of low-fat milk products, vegetables, fruits, whole grains, fiber, calcium, potassium, and antioxidants. Discussions were held with clients on perceived susceptibility to cancer and heart disease, perceived severity, perceived benefits, and perceived barriers to making dietary changes, including ways to overcome these barriers. The experimental group significantly increased their fruit and vegetable intake over controls. Fruit intake increased significantly in the intervention group from 1.5 to 2.6 servings compared to 1.4 servings both pre and post in the control group ($p=.002$). Vegetable servings increased from 0.9 to 1.6 servings in the intervention group compared to 0.6 to 0.8 servings in the control group ($p=.038$). The intervention group did not significantly decrease their sodium intakes or improve their milk consumption. Sodium intake decreased from 2,723 mg to 2,464 mg in the intervention group, and increased in the control group from 2,406 mg to 2,474 mg ($p=.750$). Milk intake increased in both groups, from 0.6 to 1.0 servings in the intervention group and from 0.3 to 0.8 servings in the control group ($p=.587$). This study supports the use of a Health Belief Model-based curriculum to decrease risk factors for cardiovascular disease in a low-income population.

Summary

In conclusion, the literature supports the effectiveness of nutrition interventions to decrease morbidity and mortality from hypertension. The Health Belief Model is an appropriate framework for such an intervention. Due to the prevalence of hypertension in low-income, Black adults, an intervention focused on reducing the risk of hypertension could play an important role in enabling participants to change dietary behaviors.

CHAPTER 3

METHODS

This chapter details the methodology of this study and is composed of six sections. Section 1 presents the purpose of the study and research questions. Section 2 explains the study design. Section 3 describes the participants and how the sample was obtained. Section 4 discusses the measures used in the study. Section 5 describes the data management and analysis. The final section, Section 6, describes the development of the intervention.

Purpose of the Study and Research Questions

The purpose of this study was to evaluate a community-based nutrition education intervention designed to decrease dietary risk factors for hypertension in a low-income population. The study evaluated whether a Health Belief Model-based nutrition education curriculum was more effective than the standard curriculum used in The University of Georgia's EFNEP in increasing consumption of potassium-rich foods and in reducing dietary sodium to levels recommended in the 2005 Dietary Guidelines for Americans (USDHHS & USDA, 2005). The theoretical framework for this intervention was the Health Belief Model (Janz & Becker, 1984). Constructs of the model incorporated were benefits, barriers, and self-efficacy. The theoretical model of the intervention is depicted in Figure 3.1. According to the model, the health behavior of consuming a hypertension-protective diet will increase when barriers to consuming this diet decrease, the perceived benefits of the diet increase, and self-efficacy for performing the behaviors increases. The

specific dietary modifications emphasized in this intervention were increasing intake of fruits, vegetables, and milk group foods, and decreasing dietary sodium.

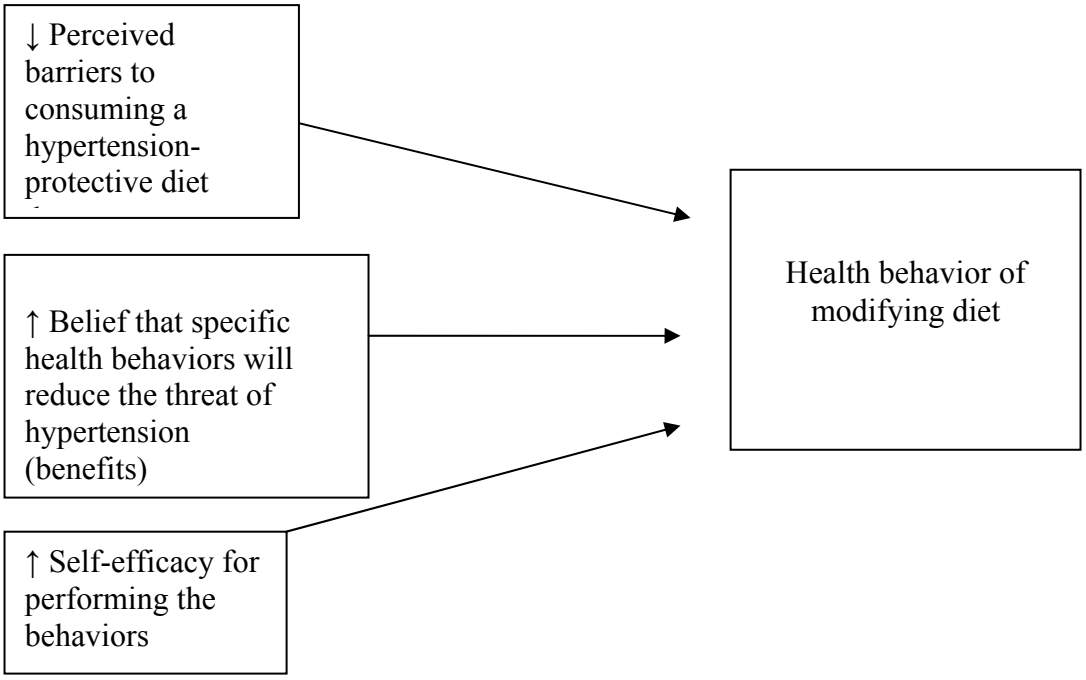

Figure 3.1. Theoretical Model of the Hypertension Education Risk Reduction Study.

The specific research questions that guided this study and the hypotheses are as follows:

1. Does the Health Belief Model-based curriculum result in greater consumption of fruits, vegetables, and milk group foods and in decreased sodium intake than the control curriculum among participants in the EFNEP?

   Hypothesis 1: The nutrition education curriculum that incorporates constructs of the Health Belief Model will be more effective than the control curriculum in increasing intake of fruits, vegetables, and milk group foods, and decreasing intake of sodium.

2. Will the Health Belief Model-based curriculum be more effective than the control in decreasing perceived barriers to the consumption of fruits, vegetables, and milk group foods?

   Hypothesis 2: The Health Belief Model-based curriculum will be more effective than the control curriculum in decreasing perceived barriers to the consumption of fruits, vegetables, and milk group foods.

3. Is the Health Belief Model-based curriculum more effective than the control curriculum in increasing self-efficacy for making dietary changes to decrease the risk for hypertension, including the preparation of meals containing fruits, vegetables, and milk group foods?

   Hypothesis 3*:* The Health Belief Model-based curriculum will be more effective than the control curriculum for increasing self-efficacy for preparing healthy meals.

4. Is the Health Belief Model-based curriculum more effective than the control curriculum in increasing self-efficacy for the interpretation of nutrition labels to determine the salt content of foods?

   Hypothesis 4: The Health Belief Model-based curriculum will be more effective than the control curriculum in increasing self-efficacy for the interpretation of nutrition labels to determine the salt content of foods.

Study Design

This study, referred to as the Hypertension Education Risk Reduction (HERR) study, used a quasi-experimental non-equivalent control group design (Campbell & Stanley, 1963, p. 47). This design is widely used in educational research involving experimental and control groups, both of which are given pretests and posttests, where it cannot be assumed that the control and experimental groups have pre-experimental sampling equivalence. The groups in this study constituted naturally assembled collectives of individuals who were participants in community nutrition education programs designed for clients with limited financial resources. The control group received the standard curriculum used in The University of Georgia's EFNEP (X_0). The intervention group received the Health Belief Model-based curriculum (X_1), referred to as the Hypertension Education Risk Reduction (HERR) curriculum, described in detail in the last section of this chapter. The design of the study was follows:

Intervention (X_1) Group: HERR Curriculum	O	X_1	O
Control Group (X_0): Standard Curriculum	O	X_0	O

The non-equivalent control group design controls for the main effects of history, maturation, testing and instrumentation (Campbell & Stanley, 1963, p. 48). According to

Campbell and Stanley, the addition of a control group reduces the equivocality of interpretation over what is obtained in the one-group pretest-posttest design. A disadvantage of the non-equivalent control group design is regression, which presents a potential problem with internal validity (Campbell & Stanley, p. 49). However, the control group was not selected based on its extreme scores on the pretest and groups were not matched. This control is also more effective if the groups are similar in their scores on the pretest and in their recruitment. The recruitment process did not vary.

Power calculations were conducted prior to the study to determine the sample size needed to detect an intervention effect (www.dssresearch.com/toolkit/spcalc/power_a1.asp, accessed 11/21/2006). A sample size of 74 was calculated to provide 95% power using an effect size of 0.4 and alpha of .05. The effect size was based on the expected increase in servings of milk group foods seen in a previous study (Cox et al., 1995). The increase in milk group foods was expected to be lower than the increase in servings from the fruit and vegetable groups based on previous data (Hanula, 2006). The goal was to have approximately 100 individuals in each of the control and intervention groups for the study to have enough power to detect an intervention effect and to allow for a 25% attrition rate.

The study was conducted in Georgia from February 2008 to September 2008. Eight EFNEP sites were assessed for eligibility. Criteria for inclusion were classes taught primarily in English, location in an urban area, and approval of Cooperative Extension administration. Four sites were excluded because they did not meet the criteria. Of the remaining four sites, two were non-randomly assigned to the intervention and two were assigned to the control group. Intervention sites were Atlanta (Fulton County) and

Columbus (Muscogee County) and control sites were Augusta (Richmond County) and Macon (Bibb County). All had Cooperative Extension staff willing to participate in the study by teaching either the intervention or control curriculum and administering the evaluation.

The University of Georgia Institutional Review Board approved this project on January 31, 2008 as an amendment to Project Number 2007-10317-2, On-going Family and Consumer Sciences Extension Evaluation of Education Programs. The amendment met the criteria for exempt (administrative) review procedures so written consent from participants was not required. A letter outlining the purpose of the study was attached to each survey and informational letters were provided to program staff. A copy of the letter to participants is found in Appendix A.

Participants

Participants in this study were individuals enrolled in EFNEP, a federally-funded program with the goal of providing food and nutrition education for limited resource families with children. A total of 219 participants completed 24-hour diet recalls at baseline and immediately following the intervention. Table 3.1 shows demographic data for these participants. The majority of participants in the intervention and control groups were Black females who received some type of federal assistance. Significantly more males than females participated in the intervention group ($p=.002$). The age range of participants in each group was almost identical; however, the mean age of participants in the intervention group was 41 years of age, 9 years older than the control group ($p<.001$). Control group participants were significantly more likely to receive some type of federal assistance than intervention group participants ($p<.001$).

Of the total participants, 153 individuals completed the Hypertension Education Risk Reduction (HERR) surveys at both baseline and follow-up. Table 3.2 presents demographic data of these 153 participants. As in the total sample, the majority of participants in both groups were Black females who received some type of federal assistance. Control group participants in the subsample were significantly more likely to receive some type of federal assistance than intervention group participants ($p=.037$). The mean age of participants in the intervention group subsample was also significantly higher than the control group subsample ($p<.001$). Gender differences between groups were not statistically significant.

Table 3.1: Demographic Data of Participants

Item		HERR (n=111)	CONTROL (n=108)
Gender[a]	% Female	75	91
Race	% Black	91	87
	% White	4	9
	% Other	5	4
Percent receiving Federal assistance[b]		67	90
Age[c]			
Mean (SD)		41 (11.92)	32 (11.90)
Range		18-66	18-64

[a] Significance p = .002
[b] Significance p <.001
[c] Significance p < .001

Table 3.2: Demographic Data of Participants Completing the HERR Survey

Item		HERR n=84	CONTROL n=69
Gender	% Female	80	90
Race	% Black	89	84
	% White	5	10
	% Other	6	6
Percent receiving Federal assistance[a]		71	86
Age [b]			
Mean (SD)		41 (12.12)	32 (12.35)
Range		18-65	18-64

[a] Significance p = .037
[b] Significance p < .001

Measures

Baseline data were collected by paraprofessionals at intervention and control sites beginning in February 2008. Post-testing was conducted immediately following the last lesson. This study used the following measures: 1) 24-hour diet recall (Appendix B), 2) Hypertension Education Risk Reduction (HERR) survey (Appendix C). All measures were self-reported. Procedures for administering the instrument were supplied to the paraprofessional educators who conducted the evaluation (Appendix D). Protocol included reading information on the forms aloud to participants.

The *24-hour diet recall* is a measure of dietary intake. Respondents record all foods and beverages consumed during the past 24 hours or on the previous day. The 24-hour diet recall is the most widely used dietary method in population studies, as its principal use is to describe the average dietary intake of a group (Hankin & Wilkens, 1994). It is an efficient method for quantifying dietary intake and comparing groups of people. The 24-hour diet recall method has been tested for validity and group mean nutrient estimates from 24-hour recalls have been found to be similar to observed intakes.

The *Hypertension Education Risk Reduction (HERR) survey* was developed for this study in order to assess constructs of the Health Belief Model, including benefits of, barriers to, and self-efficacy for consuming a hypertension-protective diet. According to the conceptual framework of the intervention, an increase in the perceived benefits of the dietary modifications, a decrease in perceived barriers, and an increase in self-efficacy for these behaviors would increase the likelihood of the health behaviors being adopted.

Barriers to fruit and vegetable consumption identified in two studies with limited resource clients were addressed (Havas et al., 1998; Reicks et al., 1994). Similar

questions were developed for milk group foods (yogurt and low-fat cheese) and low-salt foods. A total of 18 questions assessed perceived barriers. An additional nine questions addressed the health benefits of fruits, vegetables, and milk group foods, along with the benefits of consuming a diet low in salt. Seven questions assessed self-efficacy for consuming a hypertension-protective diet. The response choices for these questions were based on a study reported by Townsend and Kaiser (2005) on the development of a tool to assess psychosocial indicators of fruit and vegetable intake for use in federal nutrition education programs. The authors reported that participants preferred a choice of three responses over four. The response choices used on the California survey were used on this scale. For assessing the behavioral constructs of benefits and self-efficacy, the response choices were *Agree* (2), *Agree or Disagree* (1), *Disagree* (0). The response choices for assessing barriers were *Agree* (0), *Agree or Disagree* (1), *Disagree* (2). Scores for the constructs of barriers, benefits, and self-efficacy were added and then divided by the total number of questions assessing the respective constructs.

Six questions from the California Fruit and Vegetable Inventory were included on the HERR survey. Three of these questions addressed dietary intake in a food frequency format. The response choices, with the scores in parentheses, were *almost always* (3), *often* (2), *sometimes* (1), *never* (0). Food purchasing and preparation responsibilities were assessed with two questions. Response choices were *I am* (2), *shared decision* (1), *and someone else* (0). Perception of diet quality was measured with one question with the response choices of *excellent* (5), *very good* (4), *good* (3), *fair* (2), *poor* (1).

The HERR survey was pilot tested with program staff in Athens, Atlanta, and Augusta. Questions were reviewed for cultural relevance, word usage, clarity, visual

appeal, and face validity by program staff in Athens. Two University of Georgia Cooperative Extension faculty members reviewed the instrument for content validity. The final survey consisted of 47 questions on two double-sided pages, printed in color to enhance its appeal and usability. Red was used for alternating questions to visually separate rows of response choice bubbles. The final version of the HERR survey was tested for reading level using Microsoft Office 2007. The Flesch-Kincaid Grade Level was 3.5 and the Flesch Reading Ease score was 84% for the survey alone. The addition of the cover letter to participants raised the Flesch-Kincaid Grade Level to 5.3 and lowered the Flesch Reading Ease score to 73%.

Reliability testing was conducted for the subtests from baseline administration of the survey (n=153 respondents). Internal consistency was defined as Cronbach's alpha. The reliability coefficient for each subtest was as follows: barriers .76 (n=18 items), benefits .67 (n=9 items), self-efficacy .57 (n=7 items), seriousness of hypertension .71 (n=2 items), food frequency .77 (n=7 items), and food preparation and buying .81 (n=2 items). Item-total statistics were examined for the construct of self-efficacy to determine if reliability could be improved with deletion of any of the items, but it could not.

Data Management and Analysis

Enrollment data, exit data, and 24-hour diet recall information were entered into the NEERS5 software, version CRS5.1, by program staff. Original copies of the data were retained in the County Extension offices in secure areas. Data were transmitted electronically to the EFNEP Data Management Specialist in Athens, who stored the data on a password-protected computer in a locked office. The Data Management Specialist reviewed the county data for completeness and the principal investigator reviewed dietary

intake data for reasonableness. Unusually high total amounts of food group servings or nutrients were investigated by reviewing individual diet recalls for data entry errors.

Original copies of the standard EFNEP evaluation forms will be stored for six years and then shredded, as per University of Georgia records and retention procedures. The HERR surveys were sent to the principal investigator for data entry. Original data is being stored in a secure location and will be retained by the principal investigator for five years and then shredded, as per University of Georgia Graduate School policy.

Baseline differences between intervention and control groups were evaluated by independent samples t-tests for the continuous variables of age, dietary intake of fruits, vegetables, milk group foods, and sodium. Baseline differences between intervention and control groups were also evaluated for categorical variables, including race, gender, and receipt of Federal assistance. Individual samples t-tests were used to compare changes in the outcome variables between intervention and control counties. For all hypotheses, the unit of analysis was at the individual level. All statistical analyses were performed using SPSS (version 15.0, 2006, SPSS, Inc., Chicago, IL). Statistical significance was defined as $p < .05$.

Development of the Intervention

To develop an effective health promotion program to improve eating behaviors, it is important to use a structured process based on theory and informed by research and practice (Bartholomew, Parcel, Kok, & Gottlieb, 2001). The process of intervention mapping was used in the development of this intervention. Intervention mapping uses a social ecological approach in which health is viewed as a function of individuals and their environments – family, social networks, organizations, communities and societies. An

important component of intervention mapping is the involvement in the planning process of all stakeholders, including the target audience. Bartholomew et al. emphasize that effective health promotion programs cannot be planned in a vacuum by "experts." Ongoing interaction between program planners, educators, and participants is necessary to create the most effective program possible. Therefore, stakeholder input was obtained from EFNEP staff in Athens, Atlanta, and Augusta for development of the intervention and evaluation. The planning team included one paraprofessional in Atlanta who taught the intervention curriculum, County Extension Agents in Athens, Atlanta, and Columbus, a retired County Extension Agent, and the principal investigator.

Needs Assessment

Intervention mapping depends on a thoroughly conducted needs assessment to guide the process. A literature review was conducted as part of the needs assessment for this intervention and is found in Chapter 2. The PRECEDE-PROCEED model was used as the framework for conducting the needs assessment (Green & Kreuter, 1991). This model provides structure for applying theory to identify the most appropriate intervention strategies. It is based on the premises that an educational diagnosis should come before an intervention plan and that the most powerful interventions are those that are based on the most potent determinants of the behavior that are amenable to change (Bartholomew et al., 2001). Potency refers to the strength of the association of a predictive factor to the outcome behavior, often reported as the percent variance in behavior the factor predicts. Unfortunately, in the area of dietary behavior, there is no unified theoretical model describing the relation among determinants of eating habits and behavior. Many of the identified determinants are not amenable to change through a nutrition intervention,

including level of education and socioeconomic status (Lytle et al., 2003; Neumark-Sztainer et al., 1999). However, the determinants most frequently identified in the literature are closely aligned with three constructs of the Health Belief Model: benefits, barriers, and self-efficacy. This model was, therefore, used as the framework for the intervention.

The constructs of benefits, barriers and self-efficacy are somewhat responsive to change, although dietary behaviors are extremely complex. A review of the literature revealed that interventions focusing on specific problem eating behaviors were more effective than those focusing on general behaviors, such as improving eating habits (Luepker et al., 1994; Nicklas, Johnson, Myers, Farris, & Cunningham, 1998). Specific, measurable objectives of the intervention included increasing consumption of fruits, vegetables, and milk group foods, and decreasing dietary sodium with the goal of decreasing dietary risk factors for hypertension. A description of each of the steps and tasks in the intervention mapping process follows.

Step 1, Task 1: Identification of Target Population

The target population was predetermined as low-income adults participating in the EFNEP. It was predicted that the sociodemographic characteristics of the population would be similar to participants in Georgia's EFNEP in previous years. In 2006, 97% of the clients were female, 65% were Black adults, and 78% received some form of Federal assistance (Hanula, 2006).

Step 1, Task 2: Performance Objectives

Performance objectives are an observable subset of behaviors necessary for individuals to reach a goal, which in this case was to decrease the risk of hypertension. Four performance objectives were developed for this intervention. They were:

1. Consume at least 1 cup of milk group foods a day.
2. Eat 1 cup of fruit or drink 1 cup of juice at least once a day.
3. Eat at least 1 cup of vegetables a day.
4. Consume less than 3,300 mg sodium a day.

Step 1, Task 3: Determinants of Performance Objectives

Determinants of the four performance objectives were identified using predisposing, enabling and reinforcing factors identified in the literature and by the planning team. Mediating factors included awareness development, interest stimulation, and knowledge and skills training (Nicklas et al., 1998). The Health Belief Model constructs of benefits, barriers, and self-efficacy could be used to explain these behaviors. Barriers to fruit and vegetable consumption identified in two studies with limited resource clients were addressed (Havas et al., 1998; Reicks et al., 1994).

Step 1, Task 4: Learning Objectives

A matrix of learning objectives for increasing the intake of fruits, vegetables, and milk group foods, and decreasing sodium was developed and served as a checklist for development of the intervention (Table 3.3).

Table 3.3: Learning Objectives for the HERR Curriculum

Determinant	Learning Objective
Performance Objective 1: Consume at least 1 cup of milk group foods a day.	
Self-Efficacy	1. Express confidence that one can make and enjoy a recipe using yogurt. 2. Express confidence that one can make and enjoy a recipe using low-fat cheese. 3. Express confidence that one can prepare a balanced meal to include milk group foods.
Benefits	1. Discuss the benefits of milk group foods to health, including blood pressure. 2. Analyze the fat and calcium content of various milk group foods by using the Nutrition Facts label.
Barriers	1. Plan to purchase milk group foods by making a grocery list. 2. Identify milk group foods that are appropriate for the lactose intolerant, including yogurt and reduced-lactose milk. 3. Compare the cost and nutrient value of milk to soft drinks. 4. Judge the taste of milk group foods that are shelf-stable. 5. Evaluate the taste of recipes that include low-fat milk group foods.
Performance Objective 2: Eat 1 cup of fruit or drink 1 cup of juice at least once a day.	
Self-Efficacy	1. Express confidence that one can make and enjoy a low-fat fruit dessert. 2. Express confidence that one can prepare a balanced meal to include fruit.
Benefits	1. Discuss the benefits of fruit to health, including blood pressure. 2. Recognize that all forms of fruit are beneficial: canned, frozen, dried, and fresh.
Barriers	1. Compare the cost of generic versus name brands of canned fruit. 2. Distinguish between the price per pound and the price per item of fruit. 3. Plan a meal or snack that includes fruit. 4..Create a grocery list that includes fruit. 5. Evaluate the taste of recipes that include fruit. 6. Compare the cost of fruit to candy.

Performance Objective 3: Eat at least 1 cup of vegetables a day.

Determinant	Learning Objective
Self-Efficacy	1. Express confidence that one can make a vegetable the family will enjoy. 2. Express confidence that one can prepare a balanced meal to include a vegetable.
Benefits	1. Discuss the benefits of vegetables to health, including blood pressure. 2. Discuss the importance of eating a variety of colorful vegetables. 3. Recognize that all forms of vegetables are beneficial: canned, frozen, and fresh.
Barriers	1. Compare the cost of generic versus name brands of canned vegetables. 2. Distinguish between the price per pound and the price per item of vegetables. 3. Plan a meal or snack that includes vegetables. 4. Create a grocery list that includes vegetables. 5. Evaluate the taste of recipes that include vegetables. 6. Compare the cost of vegetables to salty snack foods. 7. Discuss changing taste preferences and tips for introducing new foods.

Performance Objective 4: Consume less than 3,300 mg of sodium a day.

Determinant	Learning Objective
Self-Efficacy	1. Express confidence that one can analyze a Nutrition Facts label to determine the salt content of a food. 2. Express confidence that one can reduce sodium in foods by rinsing vegetables and using salt-free seasonings. 3. Express confidence that one can make and enjoy a reduced salt recipe.
Benefits	1. Discuss the benefits to blood pressure of decreasing sodium. 2. Discuss the importance of regulating blood pressure to health. 3. Recognize that herbs and spices add delicious flavors to food.
Barriers	1. Compare the amount of sodium in fresh versus processed foods. 2. Identify sodium on the Nutrition Facts label as a measure of salt. 3. Evaluate the taste of recipes made with salt-free seasonings.

Steps 2 and 3: Methods and Strategies

Methods are techniques for influencing changes in the determinants of behavior defined in Step 1. The goal was to match methods to the determinants because it is the methods that form the basis of intervention components to change the performance objectives listed in Step 1 by answering the question, "How can we influence people to meet the learning objectives?" Bartholomew et al. (2001) state that it is best to select methods from several levels, including individual, interpersonal, community and societal, to match the determinants. The methods in this intervention were limited to the individual and interpersonal levels to comply with EFNEP guidelines. The planning team developed the lessons within the framework of learner-centered education (Norris, 2003, pp.58-60).

A challenge in developing an intervention is to cover all of the objectives while creatively translating methods to strategies. It was important to obtain input from those who would be conducting the intervention to ensure that the methods and strategies developed were culturally appropriate and practical. The methods selected for this intervention were information transmission, reevaluation, identification of barriers and of potential and immediate solutions, and modeling. The planning team reviewed the methods and strategies with input from paraprofessional staff. The strategies selected included learner-centered education with ample opportunity for dialog with participants, experiential learning activities, and recipe demonstrations. Clear messages about the benefits of consuming high potassium, low sodium foods were developed along with information on barriers to consuming protective foods and strategies for overcoming these barriers. Each session provided the opportunity for testimony from an individual who implemented one of the target behaviors.

The construct of self-efficacy for consuming fruits, vegetables, and milk group foods was addressed through culturally-appropriate recipes using many foods available from food assistance programs. The majority of recipes were developed specifically for this intervention because existing recipes meeting all of the established criteria were not readily available. Miller, Burgess, and Mason (1999) suggested that recipes for limited resource audiences have the following characteristics: easy-to-prepare and cook, quick, require no special equipment, use low-cost ingredients, and be nutritious and tasty. These criteria were included. Additional criteria were established to ensure that hypertension-protective foods were highlighted, for ease and practicality of demonstration (including time constraints), and to ensure food safety. Main dish recipes were required to contain a vegetable and foods from at least two other food groups. Dessert and snack recipes were required to include fruit and a low-fat food from the milk group. Recipe preparation had to be completed in 15 minutes or less, and an electric skillet was the only allowable equipment for heating foods. Reduced fat dairy foods were used in an effort to lower fat. To lower sodium, herbs, salt-free seasonings, and small portions of foods high in sodium were used. All recipe ingredients had to be readily available at a large grocery store chain located near each intervention site.

Food safety was of particular concern for the recipe demonstrations since the majority of classes are conducted in locations without cooking facilities. Cooperative Extension Agents or Specialists trained all staff in food safety prior to the intervention. Due to the potential hazard of cross-contamination, uncooked meats and unpasteurized eggs were not used in recipe demonstrations. Foods from the meat group included canned chicken and tuna, pasteurized eggs or egg substitute, pre-cooked ground turkey,

and fully-cooked ham. To decrease the risk of Listeriosis in pregnant women, cold fully-cooked ham was heated until steaming hot as recommended by the Centers for Disease Control and Prevention (http://www.cdc.gov/nczved/dfbmd/disease_listing/listeriosis_gi.html#prevented, accessed 11-08-08). Each lesson plan specified that copies of the recipes were to be distributed to participants prior to sampling so they could check the ingredient list for possible allergens. Another safety consideration was that all recipes were designed to be made with lightly serrated plastic knives since some partner agencies do not allow the use of sharp knives in their facilities.

The principal investigator developed all recipes following guidelines specified for the development of recipes for audiences with limited resources (Miller et al., 1999; Reed & Schuster, 2002). Colleagues conducted informal recipe sampling. Recipes that were appealing in taste and texture were then tested by intervention staff in local County Extension offices. Recipes rated *excellent* by the majority of testers were evaluated for practicality, ease of demonstration, and food safety hazards. A minimum of three individuals tested each recipe. Successful recipes were tested for clarity of instructions. Nutrition analyses were conducted using nutritiondata.com (www.nutritiondata.com).

All recipes were consistent with the educational goals of the intervention (Robinson, Wong, Rodgers, Bielamowicz, & Konzelmann, 2005). Teaching tips consistent with the identified educational goals were developed for each recipe and included in the curriculum. Recipes were distributed to participants at each session and combined into a cookbook that was distributed at the conclusion of the six-lesson series.

Nutrition Facts labels and nutrition and food safety information were provided for the recipes to enhance the teaching value.

An overview of the sequence and scope of the Hypertension Education Risk Reduction curriculum, *Food Talk,* is found in Table 3.4. Single copies of the *Food Talk* curriculum and the *EFNEP Meals in Minutes* recipe book are available from the author upon request.

Table 3.4: Sequence and Scope of the HERR Curriculum

Sequence	Scope of Behavioral Constructs
1. Your Food, Your Choice Turkey & Curly Noodles Harvest Muffins	Self-Efficacy Preparing a healthy meal that includes: vegetables low-salt foods
2. Stress-Free Mealtimes Chicken Divan Chocolate Cloud/ Cinnamon Dip	Self-Efficacy Preparing a healthy meal that includes: vegetables low-fat cheese low salt foods fruit Label reading for salt content Barriers Taste of low-fat cheese, vegetables Preparation of vegetables Planning to include vegetables Benefits Eating less salt can reduce blood pressure Lowering blood pressure can improve health
3. Color Me Healthy Fiesta Quesadillas Peach Crumble	Self-Efficacy Preparing a quick and healthy meal that includes: vegetables (beans as a protein source) fruit milk group foods (plain yogurt) Barrier Cost of fruits and vegetables Benefits Fruits, vegetables and low-fat milk group foods can decrease blood pressure
4. Winning Ways with Fast Food Breakfast Burritos Blueberry Parfaits	Self-Efficacy Preparing a quick and healthy meal that includes: vegetables fruit low-fat cheese low-lactose milk group foods Benefits Low-fat milk group foods can decrease blood pressure

	Barriers Taste of low-fat milk group foods Taste of lower salt foods Cost/value of milk and cheese Cost of vegetables – fresh vs. frozen Planning to include milk group foods Preparation time for vegetables
5. Keep Yourself Well! Famous Fried Rice Creamy Pineapple Pudding	Self-Efficacy Preparing a quick and healthy meal that includes: low-salt foods vegetables fruit Benefits Nutrition is important to good health Barriers Cost of food is less if you keep it safe/decrease waste Taste of lower-salt foods Taste of vegetables Taste of low-fat milk group foods Taste of fruit
6. Keep Your Health Out of Jeopardy Festive Tuna Salad Easy Cheesy Broccoli Soup Amazing Banana Pudding	Self-Efficacy Preparing a quick and healthy meal that includes: vegetables fruit low-fat milk group foods Barriers Cost of milk – shelf-stable milk decreases waste Taste of non-fat dry milk Taste of vegetables

Step 4: Adoption and Implementation

The fourth step in intervention mapping is the adoption and implementation of the intervention. To facilitate successful adoption and implementation, the intervention curriculum was developed with significant input from the EFNEP staff. During the development phase, the lessons were tested for feasibility and acceptability.

Training on implementation of the curriculum, including recipe demonstrations and activities, was provided to staff at the intervention sites. Materials provided included detailed lesson plans, outlines, recipes with teaching points, and educational materials for participants. Paraprofessional staff members were trained in learner-centered education and the expectation was that the sessions would be less formal than traditional lecture-based classes. Those teaching the intervention were asked not to share any of the intervention materials with staff members in other counties.

Step 5: Evaluation

The goal was for the intervention curriculum to be implemented as intended, therefore the implementation plan guidelines were thorough and specific. Since lack of fidelity can be a problem in community interventions, paraprofessionals who taught the intervention were asked to complete a brief, confidential process evaluation following each teaching session. The process evaluation was available as an on-line survey through Survey Monkey (www.surveymonkey.com) (Appendix E). Questions included components of the lesson taught, whether a recipe demonstration was conducted, satisfaction with the curriculum, and perceived participant satisfaction with the session and recipes. In addition to the process evaluations, regular informal communication with

staff in intervention counties was conducted to insure that all concerns regarding process were addressed.

Comparison of Intervention Curriculum to Control (Standard)

Table 3.5 outlines the major differences between the intervention curriculum and the standard curriculum used in The University of Georgia's EFNEP. The primary difference is that the intervention curriculum emphasized nutritional adequacy rather than optimal nutrition. In 2006, 89% of EFNEP clients in Georgia made at least one positive change in their diets following completion of the EFNEP series of classes (Hanula, 2006). However, only 5% of clients achieved optimal nutrition, defined as consuming the recommended number of servings from each food group according to the 1992 Food Guide Pyramid, and over 50% reported consuming no fruits or dairy products. The increased amount of milk, fruits, and vegetables recommended in the 2005 MyPyramid made it even less likely that EFNEP clients would achieve optimal nutrition following a relatively low-dose intervention. The intervention curriculum was designed to focus on the food groups most often lacking in the diets of EFNEP clients. It is these same food groups that clinical studies have found beneficial in decreasing the risk of hypertension. The intervention curriculum emphasized the importance of daily consumption of milk and low-fat dairy products, fruits, and vegetables in regard to decreasing blood pressure. According to the Health Belief Model, belief in a health threat will influence health behavior. Due to the prevalence of hypertension among Black adults with limited resources, the prediction was that participants would have a strong belief in the health threat of hypertension and would be more likely to adopt dietary changes in an effort to

decrease this immediate health threat (intervention curriculum) than if the same dietary changes were presented as important for improving general health (standard curriculum).

Table 3.5: Comparison of EFNEP Control (Standard) and Intervention Curricula

Control	Intervention
Optimal nutrition	Nutritional adequacy
Food Guidance System: MyPyramid	Food Guidance System: Dietary Approaches to Stop Hypertension (DASH diet)
Sessions focus on all 5 food groups: milk, fruits, vegetables, grains, meat and beans	Sessions focus on 3 of the 5 food groups: milk, fruits, vegetables
Amount of food needed from each food group every day emphasized (number of servings and serving sizes)	Importance of eating at least one food from each food group every day emphasized
Benefits of each food group to overall health and prevention of chronic disease emphasized	Benefits of increasing milk, fruits, and vegetables to blood pressure emphasized
Recipe demonstrations suggested, but recipes not specified for each lesson	Recipes specified for each session consistent with the educational goals of the intervention

CHAPTER 4

RESULTS

This chapter presents the results of the Hypertension Education Risk Reduction (HERR) study, a community intervention to decrease dietary risk factors for hypertension in a low-income population. There are five sections in this chapter. Section 1 responds to the first research question on dietary intake, "Was the Health Belief Model-based curriculum more effective than the standard curriculum used in The University of Georgia's EFNEP in increasing consumption of potassium-rich foods and reducing dietary sodium to levels recommended in the 2005 Dietary Guidelines for Americans?" Section 2 responds to the second, third and fourth research questions on behavioral constructs, "Will the Health Belief Model-based curriculum be more effective than the control in decreasing perceived barriers to the consumption of fruits, vegetables, and milk group foods?, "Was the Health Belief Model-based curriculum more effective than the control curriculum in increasing self-efficacy for making dietary changes to decrease the risk for hypertension, including the preparation of meals containing fruits, vegetables, and milk group foods?," and "Was the Health Belief Model-based curriculum more effective than the control curriculum in increasing self-efficacy for the interpretation of nutrition labels to determine the salt content of foods?" Qualitative data from participant evaluations is presented in Section 3. Section 4 discusses the process evaluation, and Section 5 summarizes the chapter.

Dietary Intake

Baseline

Dietary intake data were obtained from 24-hour diet recalls self-reported by study participants (n=219). Data were analyzed using the NEERS5 software, Version CRS5.1. Independent samples t-tests were performed using SPSS Version 15. An alpha level of .05 was used for all statistical tests. Table 4.1 shows dietary intake data. At baseline, mean intakes of fruits, vegetables, milk group foods, and sodium were higher in the control group than in the intervention (HERR) group, but only the difference in vegetable intake between the two groups was statistically significant ($p = .03$). The mean baseline intake of vegetables among control group participants was 1.52 cups compared to 1.07 cups consumed by the HERR group. Mean intake of fruit was 0.87 cups at baseline in the control group and 0.55 cups in the HERR group. Milk intake at baseline was also higher in the control group, 0.66 cups, compared to 0.57 cups in the HERR group. Sodium intake also differed between the two groups, with the control group consuming a mean of 2,941.47 mg of sodium at baseline compared to the HERR group, which consumed a mean of 2,709.70 mg.

Table 4.1: Dietary Intake at Baseline and Follow-up

Food Group	HERR n=111 Mean	(SD)	% Change	Control n=108 Mean	(SD)	% Change	Significance
Fruit[a]							
Baseline	0.55	(1.42)		0.87	(1.50)		0.11
Follow-up	0.84	(1.15)		0.94	(1.03)		
Mean change	0.29	(1.65)	53%	0.07	(1.68)	8%	0.34
Vegetables[a]							
Baseline	1.07	(1.17)		1.52	(1.76)		0.03*
Follow-up	1.34	(1.19)		1.22	(1.11)		
Mean change	0.28	(1.62)	26%	-0.31	(1.97)	-20%	0.02*
Milk[a]							
Baseline	0.57	(0.84)		0.66	(0.75)		0.37
Follow-up	0.70	(0.93)		0.65	(0.86)		
Mean change	0.13	(1.11)	23%	- 0.01	(1.00)	-2%	0.32
Sodium[b]							
Baseline	2709.70	(1972.82)		2941.47	(2090.35)		0.40
Follow-up	2701.64	(1906.12)		2505.35	(1447.06)		
Mean change	-8.07	(2151.00)		-436.12	(2297.04)		0.16

*p<.05
[a]Food group intake reported in cups
[b]Sodium intake reported in milligrams (mg)

Outcomes

Participation in the intervention was significantly and positively associated with increased vegetable intake. The difference in the mean intake of vegetables from baseline to follow-up of 0.28 cups in the intervention group vs. -0.31 cups in the control group was significant at the p=.02 level (Table 4.1). Mean differences in intake of fruits and milk group foods were also greater in the intervention group than the control group, but the differences were not statistically significant.

As hypothesized, the Health Belief Model-based curriculum was more effective than the standard curriculum used in The University of Georgia's EFNEP in increasing consumption of vegetables. However, the data do not support the hypothesis that the Health Belief Model-based curriculum would be more effective in increasing the consumption of fruits and milk group foods, although positive trends were observed. A 53% increase in mean fruit intake was shown in the intervention group, along with a 23% increase in mean intake of milk group foods. The data do not support the hypothesis that the Health Belief Model-based curriculum would be more effective in reducing dietary sodium intake. Sodium intake decreased in both groups, but the decrease was greater in the control group.

Behavioral Constructs

Baseline

Behavioral constructs were measured in participants who completed HERR surveys at both baseline and follow-up (n=153). Independent samples t-tests were used to determine if there were differences at baseline between the control and intervention groups. An alpha level of .05 was used for all statistical tests. The scale for all constructs was 0-2, with 2 as the highest score. For all constructs, scores from individual items were summed and the sum was divided by the total number of items to obtain a mean score for the construct. Table 4.2 presents scores for the behavioral constructs at baseline and follow-up.

At baseline, participants in the intervention group were significantly more likely to be solely responsible for purchasing ($p<.001$) and preparing ($p<.001$) food for their families than control group participants. In regard to hypertension, 41% of the

intervention group agreed with the statement, "I have high blood pressure or believe I could get it" compared to 32% of the control group participants. Participants in both groups recognized the seriousness of hypertension, as 89% of the intervention group and 88% of the control group participants agreed with the statement, "I believe hypertension is a serious disease." Perceived barriers to the consumption of a hypertension-protective diet did not differ significantly at baseline between the intervention and control groups, nor did perceived benefits or self-efficacy.

Table 4.2: Behavioral Construct Scores at Baseline and Follow-up

Item	HERR Mean (SD)	Control Mean (SD)	Significance
Barriers[a]			
Baseline	0.41 (0.27)	0.41 (0.29)	0.96
Follow-up	0.35 (0.24)	0.32 (0.26)	
Mean change	-0.07 (0.21)	- 0.08 (0.26)	0.81
Benefits[b]			
Baseline	1.78 (0.24)	1.78 (0.25)	1.00
Follow-up	1.82 (0.30)	1.85 (0.20)	
Mean change	0.04 (0.26)	0.07 (0.30)	0.48
Self-Efficacy[c]			
Baseline	1.58 (0.36)	1.54 (0.34)	0.53
Follow-up	1.68 (0.35)	1.63 (0.32)	
Mean change	0.11 (0.35)	0.11 (0.32)	0.93

[a]Barriers: HERR n=69, Control n=60
[b]Benefits: HERR n=71, Control n=62
[c]Self-Efficacy: HERR n= 72,Control n=65

Outcomes

The data do not support the hypothesis that the Health Belief Model-based curriculum would be more effective than the control curricululm in decreasing perceived barriers to the consumption of fruits, vegetables, and milk group foods. The mean pretest score for barriers (n = 18 items) was 0.41 for each group. Scores decreased to 0.35 in the intervention group and 0.32 in the control group at follow-up, but the difference was not statistically significant (p=.81).

Scores for the mean of the nine individual items on the benefits scale increased in both the intervention and control groups, but the increase was not statistically significant and there was no significant difference in the mean change between the two groups. An examination of the baseline scores for benefits revealed that there was almost no room for improvement since the initial mean score was 1.78 in each group. This score approaches the ceiling of 2.00, indicating a very high perception of benefits at baseline among all participants in the HERR study.

The data do not support the hypothesis that the Health Belief Model-based curriculum would be more effective than the control curriculum in increasing self-efficacy for making dietary changes to decrease the risk for hypertension, including the preparation of meals containing fruits, vegetables, and milk group foods, and the interpretation of nutrition labels to determine the salt content of foods. However, positive trends were observed in both intervention and control groups. The mean self-efficacy scores increased from baseline to follow-up, although the changes did not approach statistical significance. Scores for self-efficacy did not differ significantly between the two groups and the means were greater than 1.50 at baseline, indicating a high degree of

self-efficacy and little room for measurable change following the intervention. However, examination of the individual items for self-efficacy revealed that in both intervention and control groups, 50% or more of participants with low self-efficacy at baseline increased their self-efficacy at follow-up for five of the seven behaviors. Table 4.3 presents improvements in self-efficacy for individual items

Table 4.3: Improvement in Self-Efficacy for Hypertension-Protective Behaviors

	Participants with Low Self-Efficacy[a]		
Behavior	% of Total	Number	% Who Improved at Follow-up[b]
I can use food labels to tell how much salt is in food.			
HERR	22%	18	67%
Control	25%	17	65%
I can prepare and enjoy food seasoned without salt.			
HERR	30%	24	54%
Control	46%	32	53%
I know how to eat to lower my blood pressure.			
HERR	38%	31	42%
Control	42%	29	55%
I could make and enjoy a recipe using yogurt.			
HERR	46%	38	50%
Control	43%	30	60%
I can make a fruit dessert my family would like.			
HERR	12%	9	67%
Control	15%	10	90%
I can make a vegetable my family would like.			
HERR	13%	10	50%
Control	14%	8	75%
I can use and enjoy low-fat cheese.			
HERR	47%	37	46%
Control	55%	38	32%

[a]Low self-efficacy is defined as responding *Agree or Disagree* (1) or *Disagree* (0) at baseline.
[b]Improvement is defined as moving from *Disagree* (0) to either *Agree or Disagree* (1) or *Agree* (2), or moving from *Agree or Disagree* (1) to *Agree* (2) from baseline to follow-up.

Participant Evaluations

Participants in the HERR study had the opportunity to respond in writing to open-ended questions during their last class session. These questions included, "What was the most important thing you learned?" and "How did this program change your life?" The responses revealed that many participants increased their self-efficacy for preparing healthful meals and snacks and for eating a more healthful diet. The benefits of eating a variety of foods, especially fruits and vegetables, were often noted. Participants stated that what they learned in EFNEP would improve not only their own health, but the health of their children. All of the comments are listed below.

Intervention Group

> This program changed my life. I learned to eat more fruit and vegetables; take care of my body.
>
> Eating vegetables is the best healing food.
>
> I learned that you can eat less food and yogurt is good for you.
>
> How to eat better and handle food.
>
> How to eat healthy.
>
> How to save and how to eat more healthy.
>
> I learned that nutrition is very important and that you must plan properly.
>
> I learned a healthy way for eating.
>
> I learned how to eat right.
>
> This program has made me more aware of what I eat.
>
> This program help me be more aware of what I shouldn't eat and should eat to be more healthy.
>
> I learned how to take better care of myself.

Control Group

I am more aware of what I eat and buy. I use less salt.

I learned how to cook. It was a great program. I learned about sodium, food labels.

To cut salt.

To eat less junk food. I eat more Fruits. Food safety help me since I work at a restaurant.

I eat better. And more vegetables.

I eat more vegetables. I will cook more when I get my children back. I look forward to this class every week.

I learned how to feed my children better. I give them fruits and not so many sweets for snack. I really like this class.

I have learned how to cook. I eat more vegetables and fruits.

To eat more fruit.

The spinach dip was fatabulas.

To eat more fruits and vegetables. I have learned a lot.

To eat a balance meal daily and to include all food groups. I make better choices. I eat more dairy. Thanks for class.

I cook more.

How important nutrition is. It has made me see how quick and easy preparing my own meals can be. I really enjoyed this class.

How to cook healthier and smarter.

How to cook. It taught me to budget my food money.

How to eat good but healthy and to manage money. Taught me to eat healthier.

How to eat healthy. Taught me how to budget my money in the food store.

How to shop on a budget. I bake more. I was glad this class was offered to me.

I do really like this class.

I don't skip meals anymore. I love this class.

I eat better.

I learned a lot. How to thaw frozen food correctly. How to read labels. How to eat healthy and enjoy it.

I learned how to eat better and to prepare food.

I learned how to eat right, and to feed my children right.

I learned how to read food labels, choose healthy snacks. I really enjoyed this class.

I learned how to read labels, and eat more nutritious and healthier foods.

I learned so much in this class. I cook instead of eating out. I learned to save money.

I learned to read labels and to better prepare foods.

I love the samples.

I really enjoyed the program, and its been beneficial. I learned to read food labels and to preplan meals.

I really like this class. I learn to eat whole grains.

It has been very enlightening on watching what I need to use when cooking my food.

I try new things and different foods.

Keep this class going. I am eating healthier and budgeting better.

Learn how to cook healthy. A healthy life. I would love bigger samples.

Learn how to cook without so much fat. It has made dieting and losing weight easier.

My diabetes is under control now. Because of my eating habits.

This program helped me to look at food better. I learned something new every Tuesday.

To cook food more healthy. To eat better. I try to eat from each food group. I love my teachers.

To cook more healthy. To use spices more. To eat more whole grains.

To eat from all food groups. I am eating more healthy now.

To feed my children good food daily. I cook more. My group was wonderful.

How to prepare meals in 30 minutes and how to eat healthy.

This class has given me wonderful eating habits and saved me a lot of money on groceries.

Process Evaluation

Fidelity to the intervention and perceived satisfaction of instructors and participants with the intervention curriculum were evaluated through a brief, confidential process evaluation. Intervention instructors were asked to complete the evaluation on Survey Monkey (www.surveymonkey.com) following each teaching session. Feedback on the recipes was very positive. Instructors rated all dessert recipes as *liked* or *loved* by participants. The same was true for the main dish recipes, with the exception of Festive Tuna Salad. One instructor reported the response to Festive Tuna Salad as *hard to tell*, but the other four respondents rated this recipe as *loved* (n=3) or *liked* (n=1) by participants. The majority of instructors said they would *definitely* use all of the recipes again with the exception of Blueberry Parfaits, where the majority responded *probably.* Feedback on the lesson plans was also very positive. The majority of responding instructors reported that they enjoyed teaching the lessons and activities and perceived that the participants were very engaged during the sessions. In response to the question, "How much do you think your group liked the session?" 11 of 15 respondents replied *a lot* and the remaining 4 responded *loved it*. There were 16 respondents to the question,

"How did most of the participants seem during the session? (check all that apply)." Responses were very favorable: *asked questions related to topic* (8), *lots of discussion* (7), *very into it* (4), *into it* (5), *interested* (5), *asked off track questions* (1), *I couldn't tell how they seemed* (0), *didn't participate* (0), *bored* (0), *not into it* (0). All of the nine respondents to the question about the activity in the lesson plan reported that it *led to a lot of discussion*, seven said *they really got into it* and one said *they liked it, but I changed it a little.* Twelve of 13 respondents reported that they *loved teaching the lesson plan* and one reported that she *liked it, but it needs a few changes*. Of the 15 respondents to the question, "How closely did you follow the lesson guide?" 13 said *exactly* and the other two responded *pretty closely* and *not sure.* The *not sure* response was from the respondent who reported that the group asked off-track questions during the first session. Under "Comments and Suggestions for Improvement," one respondent reported that she enjoyed teaching the session, but was challenged in her time management due to teaching a large group. Another stated,

> These six sessions have provided an opportunity for participants to dialogue with each other and myself. I believe people learn well when they can be involved in the task at hand. Thanks for the opportunity to be a part of this pilot study.

Summary

The purpose of this chapter was to report the results of the study to examine whether a Health Belief Model-based curriculum was more effective than the standard in decreasing dietary risk factors for hypertension. The intervention was successful in significantly increasing vegetable consumption over the control. Intake of fruits and milk group foods also increased in the intervention group at follow-up, but the increases were

not statistically significant. Both groups decreased their sodium consumption. Positive trends were seen in behavioral constructs, although none of the changes was statistically significant. Scores at baseline were quite high for benefits and self-efficacy, and perceived barriers were very low. The process evaluation indicated a high degree of fidelity to the intervention curriculum and instructor and participant satisfaction with the lessons and recipes. Qualitative data in the form of open-ended comments indicated that participants in both groups felt they gained self-efficacy for planning and preparing healthy meals as a result of participating in EFNEP.

CHAPTER 5

DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

The primary focus of this study was to investigate whether a Health Belief Model-based curriculum would result in greater consumption of a hypertension-protective diet than the control curriculum among participants in the EFNEP. According to the conceptual framework of the intervention, participants who received the Hypertension Education Risk Reduction (HERR) curriculum would perceive fewer barriers, more benefits, and greater self-efficacy for consuming a hypertension-protective diet, all of which would lead to a greater likelihood of adopting the recommended dietary behaviors. To answer these questions, 24-hour diet recalls and the Hypertension Education Risk Reduction (HERR) survey were completed at baseline and following the intervention by EFNEP participants in four counties. This chapter discusses the findings and limitations of this study and presents suggestions for further research.

Findings of the Study

The primary research question in this study was whether the Health Belief Model-based curriculum would be more effective than the standard curriculum in increasing dietary intake of vegetables, fruits, and milk group foods. The data support the hypothesis that the Health Belief Model-based curriculum would be more effective in increasing vegetable intake. Positive changes in fruits and milk group foods were observed in the intervention group, although not to the level of significance.

There are several possible explanations for the significant increase in vegetable intake in the intervention group participants. Intervention group participants were significantly less likely at baseline to report receiving some type of federal assistance, which is an indicator of income. It is possible that intervention group participants had higher incomes with which to purchase more vegetables. However, since many of the intervention group participants were clients of a nonprofit agency that provided financial assistance, it is unlikely that income was a factor. Intake of vegetables was actually higher at baseline in the control group, so it is possible that the intervention group had more room for improvement.

The intervention curriculum offers another possible explanation for the significant increase in vegetable intake. Vegetables were emphasized in more recipes in the HERR curriculum than any other food group. All main dish recipes demonstrated in the HERR curriculum lessons contained at least ½ cup of vegetables per recipe serving. Incorporating vegetables in a main dish may be key to insuring that they are included in a meal. Efforts were made to use vegetables that required minimal preparation. Frozen and canned vegetables were used in addition to fresh. Use of the less perishable forms of vegetables may be appealing to individuals who do the bulk of their grocery shopping monthly or who have limited access to grocery stores with high-quality fresh produce (Hersey et al., 2001). Vegetables are also relatively low in cost compared to fruits. The cost of the canned vegetables used in the intervention recipes was less than $1.00 for a 15-ounce can, but the cost of the canned fruit was slightly over $1.00 for a 15-ounce can.

The high cost of fruit may be one of the reasons why the intervention was not effective in significantly increasing fruit consumption. Several studies have found that

cost is a barrier to fruit and vegetable consumption among limited resource individuals, although this study did not provide evidence for this (Havas et al., 1998; Reicks et al., 1994). In this study, 75% of participants reported that the cost of fruit was not a barrier. However, the wording of the cost-related questions on the survey is a concern. The questions were worded to reflect value, i.e., *Fruit is worth the cost*. Individuals with limited resources may feel fruits are of value, but still not allocate funds to purchase these foods. Although the average cost of fruits and vegetables was reported recently as only 21 cents per serving, prices vary greatly among stores and may be higher in small, inner-city markets and convenience stores (Cassady et al., 2007). The study also began in February, a time when locally grown, less expensive fruit is not in season. It should also be noted that food prices were increasing dramatically at the time of this study. According to USDA's Economic Research Service, food prices rose 5.5% in 2008, the highest annual increase since 1990 (http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/ accessed April 15, 2009).

Milk group food consumption did not increase significantly in this study, although a variety of dairy foods were used in the recipes. The intervention curriculum emphasized yogurt and lactose-reduced milk, both of which are appropriate for individuals with lactose intolerance, and shelf-stable non-fat dry milk, for those who cannot get to the grocery store often. Recipes using plain yogurt were well-accepted by participants. However, lack of availability of plain yogurt in small, inner city grocery stores might be a concern. It was not a stock item carried at a small grocery store near the Cooperative Extension office in one of the intervention counties, although the manager offered to

order it. Travelling several additional miles to a larger grocery store to purchase plain yogurt may not be a viable option for EFNEP participants. The cost of milk group foods might also be a concern. Lactose-reduced milk is significantly more expensive than regular fluid milk, and reduced fat cheese is not always available in store brands. Intervention group educators expressed concern that they could purchase regular cheese at a lower price than the reduced-fat cheese specified in the recipes. Purchasing regular cheese and using less is an option for decreasing fat, but in the intervention, the extra cost of the reduced-fat cheese was deemed to be worthwhile because it was felt to be important for participants to have the opportunity to taste the reduced-fat cheese. Increasing milk group foods without significantly increasing fat intake remains a challenge. Intake of milk group foods at follow-up was less than 33% of the recommended amount in both intervention and control groups.

Sodium intake decreased in both the intervention and control groups, but not significantly. The mean levels of sodium intake in both groups at follow-up exceeded the Upper Limit for sodium of 2300 mg. The Upper Limit for sodium is even lower for Black adults (1500 mg), so the high levels of sodium are of great concern. The intervention introduced salt-free seasonings in several recipes. The fact that sodium is contained in many processed foods makes it difficult for low-income individuals to decrease sodium intake, especially if they have limited cooking and food storage facilities and have to rely on convenience items and canned food.

The survey data do not support the hypothesis that the Health Belief Model-based curriculum would be more effective than the control curriculum in increasing self-efficacy for preparing healthy meals and in increasing self-efficacy for interpreting

nutrition labels to determine the salt content of foods. Self-efficacy scores were very high at baseline and increased at follow-up in both groups, but the increases were not statistically significant. An important trend was identified, however. Of the participants who were not already confident in their ability to perform these skills, over 50% reported increased self-efficacy at follow-up for each of the seven items. Qualitative data from exit questionnaires completed by participants in both groups indicates that EFNEP in Georgia is having a beneficial effect on the self-efficacy of participants for preparing quick and healthy meals. Although this does not support the benefit of the Health Belief Model-based curriculum over the control, it does provide evidence of the important role of EFNEP nutrition education programs in increasing self-efficacy for preparing and consuming a healthful diet. The skills required to prepare an inexpensive, healthful meal might be more complicated than participants realize before they take the classes, and a retrospective pretest might be a more informative measure for self-efficacy.

Limitations

This study has several limitations. The total number of participants in the study exceeded the goal of 200, but still was rather low. It was approximately 10% of the total EFNEP graduates in Georgia in 2008. Complete HERR survey data was only available for 153 of the 219 participants. Lack of time was mentioned as a barrier to administering the HERR survey by one of the educators in the control group. The survey was in addition to the required EFNEP evaluation measures, and while the importance was emphasized, the HERR survey was not required since the study was conducted as part of the regular EFNEP.

Another limitation was the significant difference in the demographic make-up of participants in the intervention group and control group. There were significantly more males in the intervention group and the mean age was significantly higher. The control group was also significantly more likely to report receiving some type of federal assistance, which was used as an indicator of income. Because the majority of individuals in the intervention group participated in EFNEP through programs at community agencies serving the poor, it is possible that they were among the "working poor" who are not eligible for federal programs, that they were newly poor, or that they simply preferred not to divulge information on the programs they participated in. It would have been helpful to have collected more specific information on income.

Another limitation was that the intervention had a relatively low dose. This may help explain the reasons why dietary changes were not greater. Cox et al. (1996) conducted a series of 18 lessons in their intervention, and reported a significant increase in consumption of fruits and vegetables. Six lessons is the minimum required in EFNEP in Georgia, so for sustainability, the intervention curriculum was limited to six lessons. Consideration should be given to increasing the dose of the intervention in the future, although tripling the dose, as in the Virginia EFNEP study, is probably not feasible due to concerns about attrition and cost-effectiveness (Cox et al.).

An important component of EFNEP is the fact that the program is taught by trained lay educators, paraprofessionals who are recruited primarily from the target audience. While this is a strength of the program, and was the case in both intervention and control groups, it may have introduced bias into the study by potentially influencing the responses of participants on evaluation measures due to social desirability, thus

reducing the validity of the measures. Data were also self-reported and a biomarker of fruit and vegetable intake, such as serum carotenoids, was not employed. Food choices are very personal and participants may have been reluctant to list all foods and beverages consumed. Literacy may also have been a problem.

Staff was provided with a protocol for conducting the evaluation in an attempt to limit bias. However, the protocol may not have been followed at all times. There were a number of cases where one entire page of the survey was not completed by the participant. This would not have been expected to occur if the survey had been read to participants as the protocol indicated.

Fidelity to the intervention curriculum was evaluated and the majority of responses indicated that paraprofessional staff followed the lesson plans almost exactly. However, lessons were not recorded and most were not observed. The standard curriculum included information on reducing dietary sodium, but it was not a major emphasis of the curriculum. It was somewhat surprising that 7% of the open-ended comments on the participant evaluations from control counties were in regard to learning about salt (3 of 45 comments). Informal exploration of this following the study revealed that two of the paraprofessional educators in the control group had a great deal of personal interest in the importance of decreasing salt intake, which may have led to a greater emphasis on this topic in their classes.

In regard to the evaluation, another limitation was that the paraprofessional educators who taught the curricula in the intervention and control counties also administered the evaluations at baseline and follow-up. Although the role of the control groups was explained, it is possible that some *teaching to the test* may have occurred,

perhaps even subconsciously, in an effort to cover material deemed important by the researcher. Although it may be beneficial for another individual to conduct the evaluation without the educator present, the dynamics of the EFNEP groups could be compromised if this were to occur.

There was also concern regarding the scale of the HERR survey. Although Townsend and Kaiser (2005) reported that limited resource clients preferred a survey with no more than three response choices, a ceiling effect was observed in my study when measuring the behavioral constructs of benefits and self-efficacy. It appears that a 3-point scale is insufficient for detecting measurable differences.

Further Research

This study was conducted as an evaluation of two curricula to examine whether the Health Belief Model-based curriculum would be more effective than the standard curriculum used in EFNEP at The University of Georgia in increasing the consumption of hypertension-protective foods. Although the group receiving the standard intervention was referred to as the *control,* the fact that both groups received nutrition education likely influenced the lack of statistically significant differences between the two groups (with the exception of the difference in mean intake of vegetables). Comparisons were made to research conducted by Cox et al. (1996). However, in Cox's study, the control group received 13 lessons on money management that did not include specific information on foods and nutrition. A recommendation for further research is to include a control group receiving no nutrition education. This would require funding apart from EFNEP to hire one or more educators to conduct lessons on a non-nutrition topic, such as financial management or parenting. Also, because the dose of this intervention was fairly low (six

sessions), formative research could be conducted with educators who have taught the intervention lessons and former participants to determine areas for revision and the need for additional lesson topics, especially as they pertain to the Health Belief Model constructs. The curriculum may benefit from an additional emphasis on increasing self-efficacy for food shopping skills, such as making a grocery list, comparison shopping, and meal planning. Hersey et al. (2001) found a significant relationship between engaging in specific shopping practices and meal planning and nutrient availability in Food Stamp-eligible households. A comparison of an extended curriculum, comprised of eight to ten lessons, with the current six-lesson curriculum and a true control (no nutrition education or a delayed intervention), would be informative.

Additional research is needed on the instrument used to measure behavioral constructs. The 3-point Likert scale used on the HERR survey was not sensitive enough to measure changes, as a ceiling effect was observed. Testing the instrument using the more traditional 5-point Likert scale is recommended. A numeric scale could also be tested as an alternative that would require less reading. The questions on the survey, especially in regard to self-efficacy, need further study through qualitative research with individuals or small groups. Reliability of the self-efficacy questions was low, and self-efficacy scores were quite high at baseline and follow-up. A study comparing the use of a retrospective pretest to a pretest-posttest measure of self-efficacy would fill a gap in the literature on evaluation measures for nutrition interventions with limited resource clients.

The primary outcome of importance in this study was dietary intake. It was self-reported and the outcome measure was the 24-hour diet recall. A validation measure, using a biomarker of fruit and vegetable intake such as serum carotenoids, should be

considered in future research (Townsend & Kaiser, 2005). Additional studies should also be conducted to determine if dietary changes are maintained at one, three, and six months post-intervention. This will be challenging since EFNEP clients often move or change telephone numbers and may be difficult to contact. However, incentive items could be provided to participants who provide addresses or mobile telephone numbers at the last class session, and to those who participate in additional follow-up interviews.

The overall goal of the study was to decrease hypertension risk. Efforts should be made in future research to measure blood pressure at baseline and follow-up. Hypertension was identified as a serious disease by 88% of the survey respondents, which was similar to the Maywood Cardiovascular Study with a similar population, where awareness of hypertension was reported by 81% of respondents (Freeman et al., 1996). Although perceived as a serious disease, less than 41% of respondents agreed that they were susceptible to hypertension. The fact that hypertension is a *silent disease* with no symptoms makes it likely that some participants could have hypertension and not be aware of it. Increasing awareness of one's blood pressure could increase the perceived benefits of making dietary changes to decrease the risk of hypertension. Rankins et al. (2005) found that participants with hypertension who attended six of eight DASH diet intervention sessions experienced significant reductions in blood pressure, which reduced their risk of morbidity and mortality from hypertension.

Summary

This study provided evidence that a Health Belief Model-based curriculum was more effective than the standard in decreasing dietary risk factors for hypertension. The intervention was successful in significantly increasing vegetable consumption over the

control and intake of fruits and milk group foods also increased in the intervention group. Positive trends were seen in behavioral constructs, although none of the changes was statistically significant. Qualitative data in the form of open-ended comments indicated that participants in both the intervention and control groups felt they gained self-efficacy for planning and preparing healthy meals as a result of participating in EFNEP. However, there are still many unanswered questions regarding determinants of eating behavior. In this study, the majority of participants indicated that they enjoyed the taste of fruits and felt they were worth the cost. At the same time, fruit consumption was less than 50% of the recommendation of MyPyramid for a 2,000 calorie diet (USDA, 2005). Consumption of milk group foods was even lower, at less than 25% of the MyPyramid recommendation. Clearly, there is a need to explore why consumption of these important foods is so low among Black adults with limited financial resources. Additional research into the determinants of eating behavior in this population will play an important role in helping to reduce health disparities and the burden of hypertension.

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APPENDIX A
INFORMATIONAL LETTER (PARTICIPANTS)

Welcome! My name is Gail Hanula. I am a Ph.D. student of Dr. Mark Wilson's in the Department of Health Promotion and Behavior at the University of Georgia. I am interested in finding out if people enjoy and benefit from food and health classes sponsored by UGA Cooperative Extension. I am studying different lesson topics to see if there is any difference. The title of my study is, "Evaluation of a Community-Based Intervention to Decrease Dietary Risk Factors for Hypertension."

If you volunteer to take part in this study:

- You will be asked to complete surveys at the beginning and end of the sessions during class time. This will take about 20 minutes. The surveys are attached.
- You will help us understand how our programs affect a person's health.
- You may learn more about how you can improve your own health.
- No risk is expected from participating.
- Your participation is voluntary. You can stop taking part without giving any reason and without penalty.
- You can ask to have all of the information you provide returned to you, removed from the program records, or destroyed.
- All of the information on the forms will be kept confidential and stored in files that are accessible only to our project staff.
- Information will not be reported to anyone outside the research project in a way that identifies you personally.

If you have any questions about this project, please call me at the University of Georgia at (706) 542-0541.

Thanks so much for your help.

Gail M. Hanula, (706) 542-0541

Additional questions or problems regarding your rights as a research participant should be addressed to the Chairperson, Institutional Review Board, University of Georgia, 612 Boyd Graduate Studies Research Center, Athens, GA 30602-7411, Telephone (706) 542-3199, email address IRB@uga.edu

APPENDIX B
CLIENT'S 24-HOUR DIET RECALL

Client's 24-Hour Diet Recall

Name:_____

Date Taken:_____

Pregnant: ☐ Yes ☐ No

Nursing: ☐ Yes ☐ No

Taking Nutritional Supplements: ☐ Yes ☐ No

If Yes, list type: _____

Amount spent on food last month: _____

Check which food record:

☐ Entry

☐ Exit

Activity Level:

☐ Less than 30 min.

☐ 30-60 minutes

☐ More than 60 min.

Meal Type:

1 = Morning
2 = Mid-Morning
3 = Noon
4 = Afternoon
5 = Evening
6 = Late Evening

Serving Abbreviations:

Tablespoon	= TBSP
Cup	= c
Teaspoon	= tsp
Pound	= lb
Ounce	= oz
Slice	= sl

What did the client eat and drink in the last 24 hours? (be thorough)

Foods and Beverages consumed. Describe in detail. List one food per line.	AMOUNT EATEN	MEAL TYPE

APPENDIX C
HERR SURVEY

Welcome! My name is Gail Hanula. I am a Ph.D. student of Dr. Mark Wilson's in the Department of Health Promotion and Behavior at the University of Georgia. I am interested in finding out if people enjoy and benefit from food and health classes sponsored by UGA Cooperative Extension. I am studying different lesson topics to see if there is any difference. The title of my study is, "Evaluation of a Community-Based Intervention to Decrease Dietary Risk Factors for Hypertension."

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- You may learn more about how you can improve your own health.
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- Your participation is voluntary. You can stop taking part without giving any reason and without penalty.
- You can ask to have all of the information you provide returned to you, removed from the program records, or destroyed.
- All of the information on the forms will be kept confidential and stored in files that are accessible only to our project staff.
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FOOD AND HEALTH SURVEY

Name_____ Date _____

These questions ask about food and health. ***There are no wrong answers*.**
As you read each item, think about how you usually feel about these dairy foods – milk, yogurt and cheese.

	Agree	**Agree or Disagree**	**Disagree**
1. Yogurt tastes great.	O	O	O
2. My family likes yogurt.	O	O	O
3. I feel I could make & enjoy a recipe using yogurt.	O	O	O
4. Low-fat cheese tastes great.	O	O	O
5. My family likes low-fat cheese.	O	O	O
6. I feel sure I could use & enjoy low-fat cheese.	O	O	O
7. I think about eating dairy foods most days.	O	O	O
8. I feel I am helping my body by eating dairy foods.	O	O	O
9. Dairy foods are worth the cost.	O	O	O
10. I feel dairy foods can help lower blood pressure.	O	O	O

Please think about how you usually feel about all fruits and vegetables, not just fresh.

	Agree	Agree or Disagree	Disagree
1. Most fruit tastes great.	O	O	O
2. My family likes fruit.	O	O	O
3. I can make a fruit dessert my family would like.	O	O	O
4. I think about eating fruit most days.	O	O	O
5. I feel I am helping my body by eating fruit.	O	O	O
6. Fruit is worth the cost.	O	O	O
7. Fruit is worth the effort to fix.	O	O	O
8. I feel fruit could help lower my blood pressure.	O	O	O

	Agree	Agree or Disagree	Disagree
9. Most vegetables taste great.	O	O	O
10. My family likes vegetables.	O	O	O
11. I can make a vegetable my family would like.	O	O	O
12. I think about eating vegetables most days.	O	O	O
13. I feel I am helping my body by eating vegetables.	O	O	O
14. Vegetables are worth the cost.	O	O	O
15. Vegetables are worth the effort to fix.	O	O	O
16. I feel vegetables can help lower blood pressure.	O	O	O

As you read each item, think about how you usually feel. ***We value your opinion*****.**

	Agree	Agree or Disagree	Disagree
1. I have high blood pressure or feel I could get it.	O	O	O
2. I feel high blood pressure can be hard on my heart.	O	O	O
3. High blood pressure is serious enough to kill.	O	O	O
4. I feel I can lower my blood pressure by eating right.	O	O	O
5. I know how to eat to lower my blood pressure.	O	O	O
6. I feel I am helping my body by eating less salt.	O	O	O
7. I feel sure I can use food labels to tell how much salt is in a food.	O	O	O
8. I can prepare and enjoy foods seasoned without salt.	O	O	O
9. I think about cutting back on salt most days.	O	O	O
10. Low-salt foods are worth the cost.	O	O	O
11. Eating less salt could help lower my blood pressure.	O	O	O

	I am	Shared decision	Someone else
1. In your house, who is in charge of what foods to buy?	O	O	O
2. In your house, who is in charge of how to prepare the food?	O	O	O

3. How would you describe your diet?	Excellent	Very good	Good	Fair	Poor
	O	O	O	O	O

These questions ask about how often you eat certain foods – never, sometimes, often or almost always. There are no right or wrong answers.

	Never	Sometimes	Often	Almost Always
4. Eat fruit	O	O	O	O
5. Eat more than one kind of fruit a day	O	O	O	O
6. Eat vegetables	O	O	O	O
7. Eat more than one kind of vegetable a day	O	O	O	O
8. Eat yogurt	O	O	O	O
9. Drink 1% milk or use it in foods	O	O	O	O
10. Eat ham or sausage	O	O	O	O

APPENDIX D
HERR SURVEY INSTRUCTOR'S GUIDE

FOOD AND HEALTH SURVEY

Instructor's Guide

Please use this instruction guide when giving the Food and Health Survey to clients before the first lesson is taught and then again after the last lesson. Possible questions from clients with suggested responses follow many of the questions. Please contact me at ghanula@uga.edu or (706) 340-6022 if you have any questions or concerns.

Cover sheet

- This "information letter" is required for surveys by the University's Board of Human Subjects.
- Note to instructors: The cover sheet is only needed for surveys given at the first lesson. There is no need for clients to complete a survey at the last session if they didn't already complete a survey at the first lesson, but they may if they want to and you may give them an educational extender.
- Explanation:
    - We are evaluating our education programs and I've been asked to distribute this survey so we can see what people are interested in learning about food and health.
    - The only extra thing we are asking is that you fill out a Food and Health Survey today, during our session, and again at the last session.
    - I will read the questions out loud and all you have to do is fill in the circle that describes how you feel. It will take about 5-10 minutes.
    - We have a small token of our appreciation for you at the last session to thank you for participating.
    - If you have any questions about this project, please call Gail Hanula and her telephone number is listed on the first page, which you may tear off and keep.

Page 1: Food and Health Survey

- Explanation:
  - The questions on the survey are about food and health.
  - There are no right or wrong answers – that's why she put the picture of the three tomatoes on here. Some people like their tomatoes green, some yellow and others red! Personally, I like mine _____ .
  - Please put your name and today's date at the top.

  - The first page is about dairy foods – milk, yogurt and cheese.
  - There are three choices for each question. **AGREE, SORT OF AGREE BUT SORT OF DISAGREE, AND DISAGREE**.
  - I'll read the first question if you are ready (see if there are questions).

Question 1. Yogurt tastes great.

- Mark the **first circle if you AGREE** with the sentence.
- Mark the **middle circle if you SORT OF AGREE but SORT OF DISAGREE – you're kind of in the middle, not really sure.**
- Mark the **last circle if you DISAGREE**

Q. Is it all yogurt or just certain flavors or brands?
A. It can be any kind of yogurt.
Q. What if you've never had yogurt.
A. That's not a problem – just think about how you feel it might taste.

Question 2. My family likes yogurt.

AGREE, SORT OF AGREE BUT SORT OF DISAGREE, or DISAGREE.

Q. I'm the only one in my family.
A. You can consider yourself your family or you can think about the family you grew up in and what they liked or didn't like.

Question 3. I feel I could make and enjoy a recipe using yogurt.

Q. I could make a recipe with yogurt but I don't think I would like it.
A. You're right –this is a two part question – asking if you feel you could do both.

Page 1: Food and Health Survey, Continued

Question 4. Low-fat cheese tastes great.

Q. What kind of cheese do you consider low-fat?

A. Some low-fat cheeses are part-skim mozzarella, cheese that says it's made from 2% milk, reduced fat cheese, fat-free cheese would also count.

Question 5. My family likes low-fat cheese.

Question 6. I feel sure I could use and enjoy low-fat cheese.

Question 7. I think about eating dairy foods most days.

Q. I don't think about eating them, but I think about drinking milk.

A. Good point - this includes thinking about drinking milk.

Question 8. I feel I am helping my body by eating dairy foods.

Q. Does this include all dairy foods?

A. It includes milk, yogurt and cheese.

Q. Aren't dairy foods high in fat?

A. Some dairy foods, like whole milk and regular cheese, are higher in fat than others. There are a variety of dairy foods to choose from , though, and many are low in fat.

Question 9. Dairy foods are worth the cost.

Q. What do you mean, worth the cost?

A. Food prices are going up – but are they of value to you? Or do you think, they are too high, I'm not buying them for that price?

Question 10. I feel dairy foods can help lower blood pressure.

Q. Is this for everyone or just for people with high blood pressure?

A. It's for everyone.

Page 2: Food and Health Survey

Explanation:

- Page 2 is on the back of Page 1.
- The first section is about Fruit.
- When you are thinking about fruit, think about all kinds of fruit – fresh, frozen, canned and dried.

Question 1. Most fruit tastes great.

- Mark the **first circle if you AGREE** with the sentence.
- Mark the **middle circle if you SORT OF AGREE but SORT OF DISAGREE – you're kind of in the middle, not really sure.**
- Mark the **last circle if you DISAGREE**

Question 2. My family likes fruit.

Question 3. I can make a fruit dessert my family would like.

Q. Do you consider pies fruit desserts?
A. You could if you make them with fruit.

Question 4. I think about eating fruit most days.

Q. Does this include drinking juice?
A. You could include fruit juice.

Question 5. I feel I am helping my body by eating fruit.

Question 6. Fruit is worth the cost.

Question 7. Fruit is worth the effort to fix.

Question 8. I feel fruit could help lower my blood pressure.

Page 2: Food and Health Survey, Continued

Explanation:

- The second section on this page, below the tomatoes, is about Vegetables.
- When you are thinking about vegetables, think about all kinds – fresh, frozen, canned and dried.

Question 9. Most vegetables taste great.

- Mark the **first circle if you AGREE** with the sentence.
- Mark the **middle circle if you SORT OF AGREE but SORT OF DISAGREE – you're kind of in the middle, not really sure.**
- Mark the **last circle if you DISAGREE**

Question 10. My family likes vegetables.

Question 11. I can make a vegetable my family would like.

Question 12. I think about eating vegetables most days.

Question 13. I feel I am helping my body by eating vegetables.

Question 14. Vegetables are worth the cost.

Question 15. Vegetables are worth the effort to fix.

Question 16. I feel vegetables can help lower blood pressure.

Page 3: Food and Health Survey

Explanation:

- The next page is Page 3
- It is about high blood pressure, or hypertension.

Question 1. I have high blood pressure or feel I could get it.

- Mark the **first circle if you AGREE** with the sentence.
- Mark the **middle circle if you SORT OF AGREE but SORT OF DISAGREE – you're kind of in the middle, not really sure.**
- Mark the **last circle if you DISAGREE**

Q. What do you consider HIGH blood pressure.
A. Blood pressure higher than 140 over 90 is usually considered high blood pressure, or hypertension.

Question 2. I feel high blood pressure can be hard on my heart.

Question 3. High blood pressure is serious enough to kill.

Question 4. I feel I can lower my blood pressure by eating right.

Question 5. I know how to eat to lower my blood pressure.

Question 6. I feel I am helping my body by eating less salt.

Question 7. I feel sure I can use food labels to tell how much salt is in a food.

Question 8. I can prepare and enjoy foods seasoned without salt.

Question 9. I think about cutting back on salt most days.

Q. Do you mean cutting back on salting foods at the table?
A. Sure, or eating fewer foods that have a lot of salt in them.

Question 10. Low-salt foods are worth the cost.

Question 11. Eating less salt could help lower my blood pressure.

Page 4: Food and Health Survey

Explanation:

- The back page is Page 4.
- It is set up a little differently from the other pages.
- Let's talk about the first section.

Question 1. In your house, who is in charge of what foods to buy?

- The first circle is **I AM,**
- Mark the middle circle is it is a **SHARED DECISION**
- Mark the **last circle if SOMEONE ELSE** is in charge of what foods to buy.

Question 2. In your house, who is in charge of how to prepare the food?

- The first circle is **I AM,**
- Mark the middle circle is it is a **SHARED DECISION**
- Mark the **last circle if SOMEONE ELSE** is in charge of how to prepare the food.

Question 3. How would you describe your diet.

- Mark the circle under the word that you would use to describe your diet: Excellent, very good, good, fair or poor.

Q. What do you consider an excellent diet?
A. Actually, here, we're just interested in how YOU would describe it.

Page 4: Food and Health Survey, continued

Explanation for Section 2.

- The section under the tomatoes is set up a little differently.
- We are interested in knowing how often you eat certain foods.
- The choices are:
    - Never – less than once a month
    - Sometimes – once a week or less
    - Often – 2-5 days or times a week
    - Almost Always – almost every day

Question 4. How often do you: Eat fruit

- Never – less than once a month
- Sometimes – once a week or less
- Often – 2-5 days or times a week
- Almost Always – almost every day

Question 5. Eat more than one kind of fruit a day?

Q. Does this include juice?

A. Yes, any kind of fruit or 100% fruit juice.

Question 6. Eat vegetables.

Q. Does this include tomato juice?

A. Yes, any kind of vegetable or vegetable juice.

Question 7. Eat more than one kind of vegetable a day.

Question 8. Eat yogurt.

Question 9. Drink 1% milk or use it in foods.

Q. I drink 2% or whole milk – doesn't that count.

A. You do get calcium, protein and vitamins from 2% and whole milk, but this question just asks about 1% or nonfat/skim milk.

Question 10. How often do you eat ham or sausage?

Q. Does turkey ham count?

A. It does – you can count any kind of ham or sausage.

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Response Summary

Total Started Survey: 19
Total Completed Survey: 19 (100%)

Page: Default Section

1. Which session are you commenting on?

	Response Percent	Response Count
Food Talk	26.7%	4
Stress-Free Mealtimes	26.7%	4
Color Me Healthy	20.0%	3
Winning Ways with Fast Food	13.3%	2
Keep Yourself Well	13.3%	2
Keep Your Health Out of Jeopardy	13.3%	2
Other (please specify) view		1
answered question		15
skipped question		4

2. Was this the first time you used this lesson plan?

	Response Percent	Response Count
Yes	46.7%	7
Not sure	6.7%	1
No	46.7%	7
answered question		15
skipped question		4

3. How much do you think most of your group liked the session?

	Response Percent	Response Count
Not at all	0.0%	0
Not much	0.0%	0
Hard to tell	0.0%	0

A lot	73.3%	11
Loved it	26.7%	4
	answered question	15
	skipped question	4

4. How did most of the participants seem during the session (check all that apply)

	Response Percent	Response Count
Not into it	0.0%	0
Bored	0.0%	0
Didn't participate	0.0%	0
Asked off-track questions	6.3%	1
I couldn't tell how they seemed	0.0%	0
Interested	31.3%	5
Into it	31.3%	5
Very into it	25.0%	4
Lots of discussion	43.8%	7
Asked questions related to topic	50.0%	8
	Other (please specify)	0
	answered question	16
	skipped question	3

5. Please tell us about any DESSERT recipes you used IN THIS SESSION.

What did the participants' do?

	Watched demo and sampled	Sampled only	Only received copy of recipe	Response Count
Amazing Banana Pudding	**100.0% (5)**	0.0% (0)	0.0% (0)	5
Blueberry Parfaits	**100.0% (3)**	0.0% (0)	0.0% (0)	3
Cinnamon Dip	**100.0% (1)**	0.0% (0)	0.0% (0)	1
Creamy Pineapple Pudding	**83.3% (5)**	16.7% (1)	0.0% (0)	6
Harvest Muffins	25.0% (1)	**75.0% (3)**	0.0% (0)	4
Peach Crumble	**71.4% (5)**	28.6% (2)	0.0% (0)	7

How did most feel about the recipe?

	Did not like it at all	Did not like it much	Hard to tell	Liked it	Loved it	Response Count
Amazing Banana Pudding	0.0% (0)	0.0% (0)	0.0% (0)	40.0% (2)	**60.0% (3)**	5
Blueberry Parfaits	0.0% (0)	0.0% (0)	0.0% (0)	**66.7% (2)**	33.3% (1)	3
Cinnamon Dip	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	**100.0% (2)**	2
Creamy Pineapple Pudding	0.0% (0)	0.0% (0)	0.0% (0)	33.3% (2)	**66.7% (4)**	6

Harvest Muffins	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	**100.0% (5)**	5
Peach Crumble	0.0% (0)	0.0% (0)	0.0% (0)	14.3% (1)	**85.7% (6)**	7

Would you use this recipe again?

	Never	Probably not	Not sure	Probably	Definitely	Response Count
Amazing Banana Pudding	0.0% (0)	0.0% (0)	0.0% (0)	20.0% (1)	**80.0% (4)**	5
Blueberry Parfaits	0.0% (0)	0.0% (0)	0.0% (0)	**66.7% (2)**	33.3% (1)	3
Cinnamon Dip	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	**100.0% (2)**	2
Creamy Pineapple Pudding	0.0% (0)	0.0% (0)	0.0% (0)	16.7% (1)	**83.3% (5)**	6
Harvest Muffins	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	**100.0% (5)**	5
Peach Crumble	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	**100.0% (7)**	7
				Other (please specify)	view	3
					answered question	**17**
					skipped question	**2**

6. Please tell us about any MAIN DISH recipes you used IN THIS SESSION.

What did the participants' do?

	Watched demo and sampled	Sampled recipe	Only received copy of recipe	Response Count
Breakfast Burritos	**100.0% (3)**	0.0% (0)	0.0% (0)	3
Chicken Divan	**75.0% (6)**	25.0% (2)	0.0% (0)	8
Easy Cheesy Broccoli Soup	**100.0% (1)**	0.0% (0)	0.0% (0)	1
Famous Fried Rice	**100.0% (6)**	0.0% (0)	0.0% (0)	6
Festive Tuna Salad	**100.0% (5)**	0.0% (0)	0.0% (0)	5
Fiesta Quesadillas	**100.0% (6)**	0.0% (0)	0.0% (0)	6
Turkey & Curly Noodles	**100.0% (7)**	0.0% (0)	0.0% (0)	7

How did MOST feel about the recipe?

	Did not like it at all	Did not like it much	Hard to tell	Liked it	Loved it	Response Count
Breakfast Burritos	0.0% (0)	0.0% (0)	0.0% (0)	**66.7% (2)**	33.3% (1)	3
Chicken Divan	0.0% (0)	0.0% (0)	0.0% (0)	12.5% (1)	**87.5% (7)**	8
Easy Cheesy Broccoli Soup	0.0% (0)	0.0% (0)	0.0% (0)	**100.0% (1)**	0.0% (0)	1
Famous Fried Rice	0.0% (0)	0.0% (0)	0.0% (0)	**50.0% (3)**	**50.0% (3)**	6
Festive Tuna Salad	0.0% (0)	0.0% (0)	20.0% (1)	20.0% (1)	**60.0% (3)**	5
Fiesta Quesadillas	0.0% (0)	0.0% (0)	0.0% (0)	16.7% (1)	**83.3% (5)**	6
Turkey & Curly Noodles	0.0% (0)	0.0% (0)	0.0% (0)	28.6% (2)	**71.4% (5)**	7

Would you use this recipe again?

	Never	Probably not	Not sure	Probably	Definitely	Response Count

Breakfast Burritos	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	**100.0% (3)**	3
Chicken Divan	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	**100.0% (8)**	8
Easy Cheesy Broccoli Soup	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	**100.0% (1)**	1
Famous Fried Rice	0.0% (0)	0.0% (0)	0.0% (0)	16.7% (1)	**83.3% (5)**	6
Festive Tuna Salad	0.0% (0)	0.0% (0)	0.0% (0)	20.0% (1)	**80.0% (4)**	5
Fiesta Quesadillas	0.0% (0)	0.0% (0)	0.0% (0)	16.7% (1)	**83.3% (5)**	6
Turkey & Curly Noodles	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	**100.0% (7)**	7
					Other (please specify)	0
					answered question	**19**
					skipped question	**0**

7. How did you feel about teaching this lesson plan?

	Response Percent	Response Count
Didn't like it, would prefer not to teach it again	0.0%	0
It was OK but I would recommend lots of changes	0.0%	0
Not sure	0.0%	0
Liked it, but it needs a few changes	7.7%	1
Loved teaching it	**92.3%**	**12**
Comments [view]		2
answered question		**13**
skipped question		**6**

8. How did participants' feel about the activity in the lesson plan? (check all that apply)

	Response Percent	Response Count
They didn't get into it	0.0%	0
I didn't use it because I didn't think it would work	0.0%	0
There wasn't an activity	0.0%	0
They liked it alot but I changed it a little	11.1%	1
They really got into it	77.8%	7
It led to alot of discussion	**100.0%**	**9**
answered question		**9**
skipped question		**10**

9. How closely did you follow the lesson guide?

	Response	Response

	Percent	Count
Not closely at all	0.0%	0
Not much	0.0%	0
Not sure	6.7%	1
Pretty closely	6.7%	1
Almost exactly	86.7%	13
answered question		15
skipped question		4

10. Comments and Suggestions for Improvement - Thanks!

	Response Count
view	5
answered question	5
skipped question	14