EFFECTIVENESS OF A VIRTUAL GROCERY STORE TOUR ON THE
CONFIDENCE AND ABILITY OF PARENTS TO UNDERSTAND AND USE THE
NUTRITION FACTS PANEL

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ABSTRACT

THESIS: Effectiveness of a Virtual Grocery Store Tour on the Ability of Parents to Understand and Use the Nutrition Facts Panel

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Low socioeconomic families must make many difficult decisions when purchasing foods for their family. As a result, many low-income families base their diets on less expensive, nutrient-poor convenience foods. The purpose of this pilot study was to determine the impact of a virtual grocery shopping tour on the ability of low-income Delaware County adults to understand and use the Nutrition Facts Panel. Twenty-one low-income adults participated in the virtual grocery tour that focused on how to use the Nutrition Facts Panel to select healthier food items. Results indicated participants' confidence in their ability to "use the Nutrition Facts Panel" (7.0 ± 3.5 vs. 9.2 ± 1.8 ; $t=2.53$, $p=0.021$) and to identify a low sodium breakfast cereal ($t=3.375$; $p=0.003$) increased after the intervention. However, there was no increase in the participants' confidence to choose healthy items at the grocery store ($t=1.34$; $p=0.196$) or in their ability to identify if a cereal was "high" in fiber ($t=1.714$; $p=0.104$), "high" in iron ($t=0.438$; $p=0.667$), or a "good" source (e.g., 10-19% DV) of calcium ($t=0.438$; $t=0.667$). Future efforts should focus on a narrower curriculum so as not to overwhelm participants.

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CHAPTER 1

INTRODUCTION

In 2011, an estimated 46.2 million Americans -- or 15 out of every 100 citizens -- lived in poverty (U.S. Census Bureau, 2012). In addition, approximately 37% of U.S. adults were obese in 2009 to 2010 (National Center for Health Statistics, 2012). Large disparities exist in obesity and other chronic diseases across racial, ethnic and socioeconomic status (SES) groups in the United States (Wang & Chen, 2011), with minority and low-socioeconomic-status groups disproportionately affected at all ages (Wang & Beydoun, 2007). At an increased risk for obesity, impoverished families have a higher need to understand the benefits of healthy eating habits (Goodman, Slap, & Huang, 2003).

Many low-socioeconomic families experience food insecurity, defined as reduced food intake that leads to hunger and malnutrition. In 2011, 50.1 million Americans lived in food-insecure households (Coleman-Jensen, Nord, Andrews, & Carlson, 2012). For many of these low-income individuals, having three solid meals per day is uncommon (Castetbon et al., 2011). Mothers often report skipping meals in order to provide more food for their children (Miller & Branscum, 2012). Government programs such as the Special Supplement Nutrition Program for Women, Infant, and Children (WIC), the

Supplemental Nutrition Assistance Program (SNAP), and Head Start provide nutrition assistance to underprivileged families through food vouchers and education programs (U.S. Department of Health and Human Services, 2011; USDA, 2012a, 2012b).

Money, ability to travel with ease, and convenience are three main determinants in household food purchases (Yousefian, Leighton, Fox, & Hartley, 2011). Unfortunately, research indicates low-income households prefer to spend their limited incomes on potato chips, pop, and meat rather than fresh fruit or vegetables (Wiig & Smith, 2009). While meat is the most expensive food item on an impoverished families' grocery list, a meat item is often the families' top priority. Low income families are often forced to strategically plan their grocery store purchases based on the bargains offered at various grocery stores, gas prices, and amount of grocery bags one person is able to carry (Webber, Sobal, & Dollahite, 2010).

A potential way to reduce food insecurity among low-socioeconomic families may be to provide healthy grocery shopping techniques. By providing savvy grocery shopping practices, impoverished families would be empowered to overrule the advertisements and convenience foods to select healthy foods within their budget. A virtual grocery shopping tour could be a feasible way for low-socioeconomic families to access this nutritional education.

Problem

For many low-income families, purchasing healthy fresh foods, including fruits and vegetables, is not possible due to their high cost (Yousefian, et al., 2011). As a result, many low-income families base their diets on less expensive nutrient-poor convenience

foods. Many low-income families worry about having enough food to feed their family, causing them to buy sale food items and often skip meals (Coleman-Jensen, et al., 2012; Miller & Branscum, 2012; Webber, et al., 2010). Although grocery store tours that teach adults how to use the Nutrition Facts Panel have been shown to increase low-income adults' ability to shop more wisely (Cooking Matters, 2012), it is often difficult to provide this type of education on a large scale. The focus of this study was to determine if a virtual grocery store tour for low-income adults could impact their confidence and knowledge about how to select healthier food options by learning how to use the Nutrition Facts Panel. If the intervention is effective, teaching the heads of the household to use the Nutrition Facts Panel while shopping might lead to the selection of healthier food items that would help enhance the nutrient intake of all low-income family members.

Purpose

The purpose of this pilot study was to determine the effectiveness of a virtual grocery store tour on the confidence and ability of low-income adults in Delaware County to understand and use the Nutrition Facts Panel to select healthier food items.

Research Questions

The following research questions were addressed in the study:

- RQ #1: What is the impact of a virtual grocery store tour and nutrition education lesson on low-income individuals' confidence in their ability to:
- a) choose healthy items at the grocery store?
 - b) use a Nutrition Facts Panel?

RQ#2: What is the impact of a virtual grocery store tour and nutrition education lesson on low-income individuals' ability to use a Nutrition Facts Panel to identify foods that are:

- a) "high" in a nutrient?
- b) a "good" source of a nutrient?
- c) "low" in a nutrient

Rationale

Grocery store tours have been shown to increase low-income adults ability to shop more wisely (Cooking Matters, 2012), but getting people to the grocery store for tours is often problematic (Jenkins, 2011). The goal of this virtual grocery store tour was to empower low-socioeconomic individuals to make healthier food choices to positively affect their families' future without the inconvenience of having to go to the grocery store to learn.

Assumptions

The researcher made the following assumptions in the implementation of the study and interpretation of the data:

1. The participants understood and could read English.
2. The virtual grocery store tour was effective and easily understood.
3. The parent participating in the virtual grocery store tour would complete all questions on the pre-and post-surveys.
4. Participants would be interested in and pay attention to the information presented during the virtual grocery store tour.

Definitions

For the purpose of this study, the following definitions were used:

1. **Low-income population:** the households or individuals that are living below the government's poverty level.
 - a. **WIC's Income Poverty Level:** between 100% and 185% of the government's poverty level
 - b. **SNAP Income Poverty Level:** between 100% and 130% of the government's poverty level. For a household size of four persons, a gross monthly income of \$2,498 and a net monthly income \$1,921 would fall into this category.
 - c. **Head Start's Income Poverty Level:** between 100% and 130% of the government's poverty level.
2. **Food insecurity:** individuals not able to obtain food on a consistent basis, and may be in extreme hunger.
3. **Poverty threshold:** based on the household's income and number of people in the family. The U.S. Census Bureau determines the levels of poverty at which individuals live each year, whether that is 100% or 180%.

Summary

Government programs, such as Head Start, provide low-income families the tools necessary to help them make healthy choices. Since impoverished households have a higher rate of obesity and a disadvantage when it comes to accessing healthy food options, it is hypothesized a virtual grocery store tour would empower low-

socioeconomic families to make healthier food choices at the grocery store which may, in turn, positively impact their families' nutritional intake.

CHAPTER 2

REVIEW OF LITERATURE

The purpose of this study was to determine the effectiveness of a virtual grocery store tour on the confidence and ability of low-income adults in Delaware County to understand and use the Nutrition Facts Panel to select healthier food items. This chapter will present an overview of poverty, determinants of household food purchases, the relationship between nutrition knowledge and food purchases among low income individuals, federal nutrition assistance programs, and the effectiveness of using multi-media presentations to impart nutrition knowledge, especially among low socioeconomic families.

Poverty

This section of the literature review provides an overview of poverty, including a description of how poverty levels are determined, an estimate of the prevalence of poverty in America, the definition of food security, and the relationship between poverty and health.

Poverty Defined

The federal government uses two indices to measure poverty -- the poverty thresholds and the poverty guidelines -- to estimate the number of Americans who live in poverty each year (HHS.gov, 2012). The Census Bureau updates the poverty threshold levels, or the original version of the federal poverty measure, annually. The 48 threshold levels are used primarily for statistical purposes to estimate the number of Americans who live in poverty each year (U.S. Census Bureau, 2012). The Census Bureau uses income threshold levels that vary by family size and composition to determine which individual/family is living in poverty. If a family's total income is less than the family's threshold level, then that family and every individual in it is considered to be living in poverty (U.S. Census Bureau, 2012).

The federal poverty guidelines, issued each year in the *Federal Register* by the Department of Health and Human Services (HHS), are a simplified version of the federal poverty thresholds. The federal poverty guidelines are used for administrative purposes to determine financial eligibility for certain federal programs, including the SNAP, WIC, and the national school lunch and breakfast programs (HHS.gov, 2012).

Prevalence of Poverty

In 2011, U.S. Census Bureau data indicated the poverty rate in the United States rose to 15.0 percent or approximately 46.2 million people (DeNavas-Walt, Proctor & Smith, 2012). Living in poverty is associated with substandard housing, homelessness, inadequate childcare, a lack of access to health care, unsafe neighborhoods, inadequate nutrition, and food insecurity (APA, 2012). As a consequence of poverty, the food intake

of household members is often reduced, and their normal eating patterns are often disrupted, because the household lacks money and other resources for food (ERS.USDA.gov, 2012).

Food Security

In 2006, the United States Department of Agriculture (USDA) introduced new language to describe ranges of severity of food insecurity (USDA.gov, 2012).

Households that are “food secure” are defined as households that had access at all times to enough food for an active, healthy life for all household members (Coleman-Jensen, Nord, Andrews & Carlson, 2012). The term “food security” was sub-divided into “high food security,” a term defined as “no reported indications of food-access problems or limitations,” and “marginal food security,” meaning one or two reported indications, typically of anxiety over food sufficiency or shortage of food in the house with little or no indication of changes in diets or food intake.

In contrast, the term “food insecurity” means that the food intake of one or more household members was reduced and their eating patterns were disrupted at times during the year because the household lacked money and other resources for food. The term “food insecurity” was subdivided into “low food security” (former label “food insecurity without hunger”), meaning a reduced quality, variety, or desirability of diet with little or no indication of reduced food intake, and “very low food security” (former label “food insecurity with hunger”), meaning multiple indications of disrupted eating patterns and reduced food intake (USDA.gov, 2012). In 2011, 50.1 million Americans –or 14.9% -- lived in food insecure households (Coleman-Jensen, et al., 2012).

Health Disparities among Low-Income Populations

From 2009 to 2010, an estimated 37% U.S. adults and 16.9% children were classified as being obese (National Center for Health Statistics, 2012). Obesity is defined as having a body mass index (BMI) greater than 30, while 68.5% of the population is overweight, defined as having a BMI of 25.0 – 29.9 (Centers for Disease Control and Prevention, 2012). Calculated from a patient's height and weight, BMI is a screening tool for healthcare providers.

Research indicates individuals who are overweight or obese have a higher morbidity rate for a variety of chronic diseases, including cerebrovascular disease, Type 2 diabetes, hypertension, dyslipidemia, coronary artery disease, heart failure, atrial fibrillation, obstructive sleep apnea and asthma (Flegal, Graubard, Williamson, & Gail, 2007; Malnick & Knobler, 2006). Obesity has also been associated with depression (Goodman, et al., 2003).

Wang and Chen (2011) conducted a quantitative study to understand the influence of socioeconomic status and nutrition- and health-related psychological factors affecting United States' ethnic adults' dietary intakes, exercise, and weight status using the U.S. Department of Agriculture's Continuing Survey of Food Intakes by Individuals (CSFII), for 1994 -1996. The 4,356 subjects in this study were asked to complete a questionnaire covering the following topics: nutrition- and health-related psychological factors, nutrition knowledge and beliefs, factors affecting food choices, awareness of nutrition-related health risks, willingness to improve diet, actual dietary intakes and exercise, self-reported weight, and demographic information (e.g. socio-demographic characteristics, geographic region). Results indicated that nutrient dense foods were less important for

Non-Hispanic Black and Hispanic subjects when compared to Non-Hispanic White subjects ($p < 0.0001$).

Wang and Beydoun (2007) conducted a meta-analysis to explore the impact of various factors (e.g. socioeconomic status, self-reported weights) on obesity. Twenty studies were included in this meta-analysis, with most of the data obtained from NHANES, BRSS, Youth Risk Behavior Surveillance System, and National Longitudinal Survey of Adolescent Health. The researchers found the prevalence of obesity increased faster for women than men. Women, especially Non-Hispanic Black women, had a higher prevalence of being overweight. By 2015, the Non-Hispanic Black group is projected to increase in being overweight by 86%; whereas the prevalence of overweight in women is projected to increase by 74%. Men, overall, are expected to increase in being overweight by 77%. For children aged 10-17 years, the trend of low socioeconomic status increased as the prevalence of being overweight also increased.

Large disparities exist in obesity and other chronic diseases across racial, ethnic and socioeconomic status (SES) groups in the United States (Wang & Chen, 2011). The associations of obesity with gender, age, ethnicity, and socioeconomic status are complex and dynamic; nonetheless, data clearly indicates that minority and low-socioeconomic-status groups are disproportionately affected at all ages (Delva, O'Malley, & Johnston, 2006; Wang & Beydoun, 2007).

Determinants of Household Food Purchases

Low-income families face many barriers that can reduce their ability to purchase healthy food items. This section reviews the grocery store selections of low resource

families, factors affecting low-income family's food selection decisions, and their opinions about the types and amount of food purchased.

Nutrient Dense Foods

Diet plays a key role in the future implications for the body's health; as such, consuming a variety of fruits, vegetables, lean meats, and whole grains can benefit the longevity of a humans' health (Whitney & Rolfes, 2008). Fruits, vegetables, and whole grains can be categorized as "nutrient dense foods" which satisfy consumers with optimal nutrients (Blake, 2008).

Connell et al. (2012) conducted a study to compare differences across food groups for food cost, energy, and nutrient profiles of 100 items from a cross-sectional survey of 225 stores in 18 counties across the Lower Mississippi Delta of Arkansas, Louisiana, and Mississippi. Energy, nutrient, and cost profiles for food items were calculated by using the Naturally Nutrient Rich methodology and converting price per 100 gram edible portion to price per serving. Foods were grouped into 6 food groups. Mean differences were compared with ANOVA. Results indicated that although fruits, vegetables, and milk were significantly more nutrient dense than grains and sweets/fats ($p < 0.05$), these nutrient dense foods were also significantly more expensive than sweets, fats and grains ($p < 0.05$).

While Americans in the higher socioeconomic status are able to attain healthy foods more easily, low-income families are less likely to be able to afford these nutrient dense foods due to competing expenses (Yousefian et al., 2011). In addition, limited resource families often lack food preparation skills, resulting in many low income families reporting eating meals away from home on a regular basis which drains the

family's minimal resources for food and exposes family members to larger portion sizes and often higher fat food choices (Baker, 2003). In the United States, low-income households spend approximately five to ten cents on food for each additional dollar of income, and with food assistance, low resource families are able to spend forty-seven cents per dollar of income on groceries (Ribar & Hamrick, 2003).

Monsivais and Drewnowski (2009) conducted a cross-sectional study to determine if education and income played a role in the selection of nutrient dense food items. Energy and nutrient intakes for 164 men and women aged 25 to 65 years were obtained using a food frequency instrument. Dietary energy density (kcal/g) was calculated with and without beverages. Energy-adjusted diet costs (\$/2,000 kcal) were calculated using food prices in Seattle. Tertile splits of energy density and energy cost were analyzed using tests for linear trend. Linear regression models tested the association between education, income, and dietary variables, adjusting for age and sex. Results indicated there was a negative association between dietary energy density, education, and household income and a positive association with the energy-adjusted cost of the diet. Education was a stronger predictor of both energy density and energy cost than was household income. The authors concluded that higher-quality diets were not only more costly per kilocalorie but were also consumed with greater frequency by those with a higher educational level.

Finances

Krukowski, McSweeney, Sparks, and West (2012) conducted a qualitative study to identify factors that prompt the choice of a primary food store, particularly among populations vulnerable to obesity and chronic diseases (e.g., individuals living in rural

locations and African-Americans). The authors used purposive sampling to select rural and urban communities (three African-American and two Caucasian focus groups; n=48) in Arkansas from June to November 2010. In this study, primary household food shoppers (96% female, 63% African-American, mean age=48.1±13.9 years old, mean BMI=30.5±7.8) discussed reasons for choosing their primary store. Qualitative analysis techniques, content analysis and constant comparison were used to identify themes. Four themes emerged: proximity to home or work; availability/quality of fruits, vegetables, and meat; store characteristics (e.g., safety, cleanliness/smell, customer service, non-food merchandise availability, and brand availability); and financial considerations and strategies, with relevant factors similar between African-American and Caucasian participants.

Yousefian, Leighton, Fox, and Hartley (2011) conducted a qualitative study to understand how rural families handle providing food for their families. Focus groups were conducted with low-income parents of children enrolled in MaineCare to ask them about their food shopping habits, barriers faced when trying to obtain food, where they get their food, and what they perceive as healthy food. Results indicated cost, travel distance, and food quality were all factors that emerged as influential in rural low-income family's efforts to get food. Parents described patterns of thoughtful and creative shopping habits that involve coupons and sales. Grocery shopping was often supplemented with food that is harvested, hunted, and bartered. The use of large freezers for storing bulk items was reported as necessary for survival in 'tough' times. Families often traveled up to 128.8 km (80 miles) to purchase good quality, affordable food, recognizing that in rural communities traveling these distances is a reality of rural life.

The results indicated that, while low-income families are aware of the healthy benefits from nutritious foods, many low-income families have difficulty supporting a lifestyle built around the purchase, storage, preparation, and consumption of nutritious foods.

Accessibility

Money is not the only barrier low socioeconomic families face when grocery shopping; the biggest barrier may be the travel to the store. Webber, Sobal, and Dollahite (2010) implemented a qualitative research approach based on grounded theory and an ecological conceptual framework. The authors selected 28 low-income rural, village, and inner city heads of households in upstate New York, USA, using purposive and theoretical sampling. The heads of household were interviewed about fruit and vegetable shopping habits, attitudes toward local food stores, and where and how they would prefer to buy produce. Analyses revealed their concerns were centered around five themes: store venue, internal store environment, product quality, product price, and their relationships with the stores. A store identified as a primary food source was not necessarily the store geographically closest to a participant nor shopped at most frequently, but the household usually spent the largest portion of its grocery dollars there over the course of a month.

D'Angelo, Suratkar, Song, Stauffer, and Gittelsohn (2011) conducted a study in Baltimore to understand how low-income, urban families acquire food items. To conserve time, most families shopped at a supermarket, but from the sample ($n=175$) 57.1% walk to the grocery store. In this study, participants who walked to grocery stores were statistically more likely to purchase unhealthy foods than other modes of

transportation, $p < 0.05$. For rural families, if the family had an automobile, gas was the greatest expense, as families would drive approximately 80 miles to obtain food.

Some low-income families do not have the luxuries of a home to keep groceries. Wiig-Dammann and Smith (2010) found homelessness presents a significantly greater chance to purchase fruit drinks, sweet snacks, and meat, $p < 0.001$. The study identified the grocery shopping behavior of Minnesota women and those classified as homeless would like to buy fruits and vegetables if they had extra money.

In order for low-income families to overcome the barriers of money and travel, many have strategies for saving money. Research indicates families search for optimal bargains by going to multiple stores to obtain all the items on one list (Webber, et al., 2010). Miller and Branscum (2012) reported that some families cope with their limited income by decreasing the variety of items on their grocery lists. As a result, their meals tended to be repetitious, containing the same food items to keep costs lower. Other coping mechanisms included only purchasing sale items. One participant from the study stated, “If something isn’t on sale, I haven’t been buying it.” Coupons and weekly flyers from the grocery stores have been shown to persuade families to shop for the bargains (Webber et al., 2010). Bulk food items and freezer foods were purchased most readily for quick, easy storage and preparation, and low cost (Yousefian et al., 2011). To enhance grocery lists, families supplemented their food intake with food stamps or food bank contributions.

Castetbon et al. (2011) conducted a cross-sectional study to better understand the nutritional status of low-income participants receiving food aid in four urban French zones ($n = 1664$, age ≥ 18 years). Socio-demographic and economic characteristics, food

insufficiency, food supply and diet behaviors were assessed using standardized questionnaires. A subsample of participants underwent clinical and biochemical examinations. Descriptive and comparative analyses were performed taking into account sample weights. Results indicated over 70% of participants used food aid as the only source of supply among numerous food groups, and one-quarter of them (27.2%) were using food aid for 3 years or more. Half of the subjects fulfilled the French recommendations for starchy foods (48.7%) and 'meat, fish and eggs' (49.4%); 27.3% met the requirements for seafood. Only a very small proportion of participants met the recommendations for fruits and vegetables (1.2%) and dairy products (9.2%). In addition, 16.7% of subjects were obese, 29.4% had high blood pressure, 14.8% were anemic, 67.9% were at risk of folate deficiency and 85.6% had vitamin D deficiency. These results provide evidence of an unhealthy diet, poor health profiles in severely disadvantaged persons, highlight the importance of food aid in this population, and point to the necessity of improving the nutritional quality of currently distributed food aid.

Wiig and Smith (2009) examined the grocery shopping behavior and food stamp usage of 92 low-income women with children to identify factors influencing their food choices on a limited budget. Focus groups, which included questions based on Social Cognitive Theory constructs, examined food choice in the context of personal, behavioral and environmental factors. A quantitative grocery shopping activity required participants to prioritize food purchases from a 177-item list on a budget of \$50 for a one-week period, an amount chosen based on the average household food stamp allotment in 2005. Key findings suggest that their food choices and grocery shopping behavior were shaped by not only individual and family preferences, but also their economic and environmental

situation. Transportation and store accessibility were major determinants of shopping frequency, and they used various strategies to make their food dollars stretch (e.g. shopping based on prices, in-store specials). Generally, meat was the most important food group for purchase and consumption, according to both the qualitative and quantitative data. The authors concluded that efforts to improve food budgeting skills, increase nutrition knowledge, and develop meal preparation strategies involving less meat and more fruits and vegetables, could be valuable in helping low-income families nutritionally make the best use of their food dollars.

Wiig and Smith (2009) and Webber et al. (2010) found low-income families spend the largest portion of their budget on meat and then have to prioritize food purchases with the remaining left for nonperishables and satisfying foods. In contrast, D'Angelo et al. (2011) found that pop and potato chips were the most common food purchases for low-income families.

Evans et al. (2011) conducted a qualitative study relating the influence of food on 34 Latino low-income families. Results indicated that 35.3% of the mothers reported being constantly worried about the family's food. Among the research collected many families are consistently worrying and planning out monthly food amounts. Yousefin et al. (2011) reported that low-income families utilize their groceries for a greater length of time by watering down juice or milk. Miller and Branscum (2012) reported women sacrificed food for themselves to feed their children an acceptable diet.

Nutritional Knowledge

Low socioeconomic families must make many difficult decisions when purchasing foods for their family. In addition to keeping within a budget, the head of the household needs to understand the basics of good nutrition in order to meet their family's nutrient needs while staying within their budget. Yousefian et al. (2011) indicated deciding between the ability to put food on the table and healthy food items was a constant battle for low-income mothers as they struggled to feed their families. Parents understood the benefits of fruits and vegetables, but due to the high cost they are not able to consistently provide for their family.

Low-income families must seek out alternate locations to obtain healthy food options within their budget. Farmer's markets and fruit and vegetable stands can provide healthy options at a lower price. Farmer's markets are not offered throughout the entire country, which can eliminate the opportunities for families. In addition, rural families and those lacking a mode of transportation often have fewer affordable, healthy options compared to urban families (Krukowski, McSweeney, Sparks, & West, 2012; Yousefian et al., 2011). Urban families have greater access to fast food restaurants than rural families (Jilcott, Laraia, Evenson, & Ammerman, 2009). While most families knew that an excess consumption of fast food is unhealthy, the convenience and taste of prepared foods, combined with the desire to cater to the family's taste preferences led participants to purchase fast food (Jilcott, Laraia, Evenson, & Ammerman, 2009)

Zoellner et al. (2011) identified healthy literacy among low socioeconomic families. Using Healthy Eating Index (HEI) scores as the point of reference, a significant difference among the HEI scores and health literacy categories ($p<0.05$) was detected.

The HEI categories include: whole fruit, vegetables, meat and beans, oils, saturated fat, sodium, alternative sweeteners, and sugar-sweetened beverages. With low-socioeconomic households prioritizing exercise as last, improving health literacy scores can improve families' ability to make healthy food purchases.

The Nutrition Labeling and Education Act (NLEA) of 1966, regulated by the Food and Drug Administration, has provided Americans the ability to select healthy food purchases (U.S. Department of Health and Human Services, 2012). The NLEA requires nutrient amounts be listed for: fat, sodium, cholesterol, potassium, carbohydrates, protein, and vitamins and minerals with established Reference Daily Intakes (RDI). With amendments over the years, the NLEA has provided consumers an avenue to promote healthy eating.

Cook, Burton, and Howlett (2011) analyzed the use of the Nutrition Facts Panel (NFP) among at-risk population's (e.g. hypertension and high cholesterol) using data from National Health and Nutrition Examination Survey (NHANES). The authors hypothesized there would be a difference in the use of the Nutrition Facts Panel by people with various health disparities, such as high cholesterol and high blood pressure. The participants were categorized based on their cholesterol and blood pressure levels. Participants were asked if they looked at the information: fat, total fat, saturated fat, trans fat, cholesterol, sodium, carbohydrates, fiber, and sugar. Results indicated morbidity conditions were significantly ($p < 0.001$) related to the use of the NFP. Respondents having high blood pressure and high serum cholesterol reported using the NFP to identify sources of cholesterol, sodium, and sugar information from the NFP significantly ($p < 0.05$) more than consumers with low blood pressure and cholesterol.

Ollberding, Wolf, and Contento (2011) conducted a study to determine the relationship between the NFP use and food intakes. Data from NHANES was collected in 2005-2006, and in-home interviews were completed with a 24-hour recall to assess the participants' knowledge of the NFP. Participants were categorized as food label users with such responses, "always" or "most of the time," and non-food label users were categorized based on the responses, "rarely" or "never." Food label users reported eating approximately 150 kilocalories less than non-food label users per day ($p<0.001$). Once again compared to non-food label users, food label readers consumed approximately 8 grams less of fat per day with saturated fat being decreased by approximately 3.5 grams less daily ($p<0.001$).

Jenkins (2012) completed a quasi-experimental study to identify the effectiveness of a grocery store tour on the serum iron levels in iron deficient children. The mothers of 10 children identified from the Supplemental Women, Infant, and Children Program as having an iron deficiency at their 18-month certification were recruited for this study. The subjects were divided into a control group and a treatment group. Parents in the control group completed a knowledge survey and the child's hemoglobin level was obtained from WIC records. Parents in the treatment group completed the knowledge survey and participated in a grocery store tour that focused on identifying kid-friendly foods that were high in iron and how to use unit pricing to buy inexpensive iron-rich food sources. Both groups were given nutritional handouts about good food sources of iron and the health benefits of iron. The treatment group significantly increased their knowledge of iron-rich foods ($p<0.05$). However, in the 3-month follow-up there was no

significant increase in the knowledge of iron-rich foods. In addition, the average hemoglobin levels did not significantly increase after the grocery store tour.

Healthy eating is a habit that can be initiated by promoting weekly family dinners. Share Our Strength (Cooking Matters, 2012) found that 78% of low-income families eat at home most or every day. Approximately 1,500 participants were randomly selected to understand the perceptions, behaviors, motivations, and coping mechanisms regarding healthy eating and cooking. By understanding how low-income families obtain their meals throughout the week, Share Our Strength hopes to end childhood hunger in America.

Anderson and Whitaker (2010) conducted a cross-sectional study about the effect of family dinner impacting childhood health. 8,550 children were assessed using data from the Early Childhood Longitudinal Study, Birth Cohort. Variables analyzed included body mass index (BMI) status, household routines reported by mothers, and families' demographics. Results of the study indicated children's obesity risk was decreased with the addition of at least five routine meals per week ($p=0.0007$). Zoellner et al., (2011) reported that parents who participated in supplemental program obtained a higher nutritional knowledge than their counterparts (Zoellner et al., 2011). By providing their families with basic healthy habits, low socioeconomic families are giving their families an advantage.

Federal Nutrition Assistance Programs

The United States' government provides assistance for families through several nutrition programs including the Special Supplemental Nutrition Program for Women,

Infant, and Children (WIC); Supplemental Nutrition Assistance Program (SNAP); and Head Start. WIC, funded by the United States Department of Agriculture (USDA), provides pregnant and lactating women and children five years old and younger nutrition education, health screenings, and food vouchers (USDA, 2012a). To receive the grant-funded support, the children and mothers must have a nutritional deficiency and be at or below 185% of the federal poverty line. WIC strives to decrease low birth weight infants, increase serum iron levels, and promote healthy maternal habits. Through the food vouchers and nutritional education, mothers can learn how to provide their families with a healthy diet. Nutritional counseling, group sessions, and handouts all provide the WIC clients changes to a healthier lifestyle. Revisions in 2009 provided WIC mothers a greater incentive for breastfeeding by receiving: juice, milk, eggs, whole grains, canned fish, beans, peanut butter, and compensation for fruits and vegetables. Breastfeeding is supported in full through WIC clinics across the country. In 2010, 9.17 million citizens received WIC benefits that year with 4.86 million being children and 2.17 million being infants (USDA, 2011). Throughout 2011, an average of 167, 877 Hoosiers were served monthly in the state (Indiana State Department of Health, 2011). Among Hoosier's WIC participants, 51.2% are children with 25.2% being infants and 23.6% are women (Indiana State Department of Health, 2011).

The USDA funds the largest entitlement program, SNAP, which served more than 28 million low-income families in 2008 (SNAP, 2008). Not only does SNAP provide families with a resource to obtain healthy food items through food vouchers, but nutrition education is given to families through a program called Supplemental Nutrition Assistance Program Education (SNAP-Ed). With the Healthy, Hunger-Free Kids Act of

2010, SNAP-Ed has reinvented the focus onto obesity prevention. Following the Dietary Guidelines for Americans and MyPlate, SNAP-Ed encourages physical activity, fruit and vegetable intakes, and maintaining appropriate calorie balance through handouts, counseling sessions, and community outreaches. In order for families to be eligible for this program they must meet the criteria of household's net monthly income falling below 100% federal poverty and worth being at least two thousand dollars (USDA, 2012b). Based on the household's net monthly income and size of family, the vouchers are established monthly for them to grocery shop. Families are able to buy healthy foods with their voucher, but not unhealthy foods, like candy, sports' drinks, bakery items, alcohol, plastics, vitamins and medicines, seasonal foods, or seafood. In 2011, about 45 million people received SNAP benefits, which is about 1 out of 7 Americans (USDA, 2012c). As of 2012, approximately 900,000 Hoosier citizens received monthly benefits from SNAP (USDA, 2013).

The Head Start program, funded by the Department of Health and Human Services, provides low-income children younger than five years old the opportunity to enhance their development skills necessary for school. Social, cognitive, emotional, and physical aspects are the center of the children's growth (U.S. Department of Health and Human Services, 2011). Children learn through the environment created at Head Start, where they are able to create and explore. Families are welcomed at Head Start as mothers attend, and family meals are served every day. Handouts and daily sessions at the Head Start program fuels learning incentives for the family to provide healthy, lifelong changes. For this program, children and families must fall below the federal poverty level. Over 900,000 children were inspired in 2009 through the Head Start

program, which engaged the whole family through more than 850,000 parent volunteers (U.S. Department of Health and Human Services, 2010). In the fiscal year 2011, Head Start served over 1 million families with approximately 44,000 families experiencing homelessness (Head Start Program, 2011). Indiana had approximately 15,000 participants enrolled in the same year (Head Start Program, 2011).

The government's Farm Bill affects many of the federal nutrition programs listed above, but the Farm Bill also touches the nation's ability to fund hunger relief programs, like Gleaner's Food Bank. In Indiana, Gleaner's Food Bank served approximately 120,000 citizens weekly within 2010. Part of Feeding America network, Gleaner's Food Bank took part in the Hunger in America 2010, which reported the states' profile of insecurity and impact made within the lives of Hoosier citizens. Mabli, Cohen, Potter, and Zhao (2010) conducted the Hunger in America report across the nation. Similar to other states, citizens utilizing the resources from food banks were questioned about food insecurity and frequency of visiting the food shelter, kitchen, or pantry. Indiana reports 78%, approximately 130,000 Gleaner's Food Bank household incomes, fall below the federal poverty line (Gleaner's Food Bank, 2013). Within the nation's Hunger Report, 62% or 37,873 citizens reported having less than a 1,000-dollar monthly income (Mabli, Cohen, Potter, & Zhao, 2010). Among the nation, approximately 11 million Feeding America clients were food insecure in 2010; whereas, approximately 63,000 Hoosier households experienced very low food insecurity (Gleaner's Food Bank, 2013; Mabli, et al., 2010).

Strategies to Increase Participant Involvement

Providing nutritional interventions to impoverished demographics can be difficult. Review of research offer strategies to increase recruitment and involvement throughout the entire study. The past research had success at increasing their involvement from low-income populations, while they did not discuss major failures. Pyatak et al. (2013) conducted a quantitative study about the challenges observed in a randomized control study, Redesign for Pressure Ulcer Prevention in Spinal Cord Injury. The study focused on a demographic of low socioeconomic status, ethnicity, and disability. Methods of how the study was able to recruit and maintain participants' involvement are provided. Language barriers, ethnicity subgroup barriers, and life chaos are the problems the study points out. Life chaos is a term defined as an individual lacking structure and organization daily, which leads to the inability to form habits and plan for the future. From life chaos, researchers may have difficulty fully understanding why the participants are not fully engaged or participating in the study. In order to offset the subject's chaos, the study's staff was seen as a mediator to provide support between the study's regulations and the events occurring in the participants' lives. Staff members obtained training in the demographics' culture and preferences. To increase participation, attention was placed on six specific action-areas: tracking and scheduling subjects consistently, retaining staff, collecting accurate data, negotiating health and socioeconomic tradeoffs, understanding life and medical histories, and defining the scope of intervention.

Barnett et al. (2012) conducted a quantitative study about successful retention and recruitment strategies utilized in two NIH clinical trials to increase breastfeeding among

ethnically diverse, low-income women in urban medical centers. The study utilized bilingual study materials by having handouts in Spanish and English. Recruitment spanned over a long period of time, from February 2008 to July 2010 with follow-up ending in September 2011. Interviews were convenient for the participants as they were conducted over the telephone. A monitoring system was in place to keep track of participants' contact information and appointments with healthcare provider. If subjects could not be reached over the telephone, researchers would meet them at their homes or physician's appointment. Overall, three themes were identified as increasing retention rates: maximum access to participants, study accessibility, and quality incentives. Postcards were sent to subjects to remind them of their upcoming telephone interview, and a bilingual staff eased the ability to talk with a diverse group. The study worked hard to create a good rapport with the participants. Participants were also given gift cards to Babies 'R' Us. From the participants' view, three themes were obtained as to why they remained involved in the study: rapport with researchers, perception of study, and convenience of process. One subject commented, "I liked that, you know, the people are not forcing you to really answer question," in regards to the relationship with the researchers. Participants' perception of the study was educational and useful with the intervention providing "a lot of information and a breast pump – they were very hands on, which is very important."

Nicholson et al. (2011) discussed the retention and recruitment methods used by the MOMS Study (Making Our Mealtimes Special). The longitudinal research study provides several recruitment strategies: piloting recruitment strategies, personal approach, training research staff, and incentives. The study tested their study's materials prior to

conducting the actual research for two months. The researchers also were in contact with every discipline involved in the study and would conduct monthly meetings about the intervention.

Media Playing a Role for Nutrition Interventions

Several studies have utilized innovative ways to reach low-income families with nutrition education. Campbell, Honess-Morreale, Farrell, Carbone, and Brasure (1999) reinvented nutrition education lessons by creating a soap opera for subjects to learn low-fat healthy options and the behavior changes required. This study used a behavior change model called Transtheoretical Model of Behavior Change, where subjects go through five stages: precontemplation, contemplation, action, maintenance, and relapse. At the precontemplation and contemplation stages the subjects are aware of their current behaviors while slowly wanting to change. During the action stage the subject changes his/her behavior by learning a new lifestyle. The maintenance stage is where the subject reinforces the learned behaviors to keep reverting to their old habits in the relapse stage. After a one to three-month follow-up period, the study saw a significant increase in the intervention's nutrition knowledge about fat. More importantly for these subjects, they wanted to actively change as the intervention group significantly transitioned to the action and preparation stage.

Irvine, Ary, Grove, and Gilfillan-Morton (2004) were able to increase subjects' self-efficacy by distributing the nutritional education through an interactive multimedia. The study focused on lowering fat content in diet through a tool combining audio, video, graphics, and handouts. Subjects were given the individuality of a counseling session

while being able to have control of their lessons. Each session contained a testimony piece, which provided the subject with motivation. After the two-month follow-up, subjects were significantly more confident in their ability to decrease fat in their diet once completing the interactive media tool.

Tessaro, Rye, Parker, Mangone, and McCrone (2007) used a video program *Cookin' Up Health* to provide nutritional information. The purpose of this educational program was to reduce cardiovascular disease risk by decreasing foods with high fat content and increasing daily servings of fruits and vegetables. Video demonstrations provided healthy alternatives, healthy cooking methods, portion sizes, and nutrition label reading. Additional information, like recipes, was accessible after watching the main demonstrations. Subjects would watch these videos in the waiting area before the appointment with their main healthcare provider. At the three-month follow-up, subjects reported they enjoyed the information, especially the recipes, and the knowledge of dietary fat increased significantly. However, subjects stated they were not following the five fruit and vegetable per day because of limited finances and acceptance for all family members.

Jantz et al., (2002) conducted a study to understand the effectiveness of adapting a nutrition education curriculum to an interactive computer program. The study had difficulty maintaining recruitment of the target population, Hispanic, low-income women living in Colorado. The program was formed from *La Cocina Saludable*, a basic nutrition curriculum. "Make a Great Start" was the computer-based program created covering importance of breakfast and how to plan for breakfast. The Likert scale and Prochaska's Stages of Change Model were used to evaluate the subjects' knowledge and program's

effectiveness. An intervention group was compared to the control group to determine the program's effectiveness. The intervention group's knowledge ($p < 0.0001$), attitude ($p < 0.006$), and total ($p < 0.0001$) scores were significantly different than control. The study had seen difficulty with participants utilizing the paper and pencil method so they sought out the computer-based programs. Study found that the computer saves times, may eliminate anxiety of taking the paper and pencil evaluation, less intimidating (especially for low-literates), and more private. Audio files were utilized for the curriculum, thus no reading skills were required to answer. A brief demonstration and practice questions were provided to decrease anxiety.

Slusser et al., (2011) conducted a qualitative study to understand parents' knowledge and interest in nutrition education in the Los Angeles Unified School District (LAUSD) Title 1 School. While participants reported relatives, physicians, and food markets as their main source for nutrition education, low-income families identified handouts, demonstrations, and media as recommended ways to reach their demographic. However, some participants expressed that physicians often did not provide any guidance related to nutrition and their overweight children, suggesting the physician visit is a missed opportunity for this population. Low-income families reported being interested in the following topics: healthy cooking, healthy substitutions, portion sizes, role of vitamins and minerals, and reading Nutrition Facts Panels.

Subjects in several research studies provided specific recommendations and indicated their preference of nutritional education methods. In general, cooking demonstrations were the preferred modality. Videos were also mentioned as a preferred type of nutrition education. Participants in the study conducted by Campbell et al., (1999)

indicated they were concerned about their own and their children's nutrition, but did not want to participate in nutrition education sessions because they would be "boring – like something out of the 70s." Parents in the study conducted by Miller et al. (2012) and Webber et al. (2010) indicated they were interested in learning about the logistics of meal planning, utilizing coupons, saving money, tracking expenses, and calculating food costs.

Even though current studies have produced innovative ways for low socioeconomic status families to obtain nutrition information, a search of the literature indicated only one multimedia program that focused on decreasing dietary fat. While several multimedia tools have been used to teach a variety of nutrition education topics, a search of the literature did not find a study that examined the impact of a virtual grocery shopping tour on subjects' knowledge about the nutrient content of the foods or their ability to purchase healthier, less expensive items.

Summary

Members of low-socioeconomic households have a greater chance of becoming obese due, in part, to lack of resources and knowledge. Several government programs such as WIC, SNAP, and the Head Start Program have made teaching underprivileged low-income families their top priority. These federal programs have positively impacted many food insecure American families. Virtual programs have been used to provide this demographic with recipes, food demonstrations, and nutrition education about low-fat foods. Additional nutritional education virtual programs focusing on healthy grocery shopping could be essential for low socioeconomic families' health prevention.

CHAPTER THREE

METHODOLOGY

The purpose of this pilot study was to determine the effectiveness of a virtual grocery store tour on the confidence and ability of low-income adults in Delaware County to understand and use the Nutrition Facts Panel to select healthier food items. This chapter will describe the methods used to conduct the study.

Institutional Review Board

The researcher conducting this analysis completed the Collaborative Institutional Training Initiative training (Appendix A-1). The original study and the study modifications were approved as exempt by the Ball State University Institutional Review Board (Appendix A-2).

Subjects

Participants were recruited from the Delaware County's Head Start Program and Blood 'N Fire, a food pantry within Delaware County. Since few participants were obtained from the Head Start Program, the study recruited participants from Blood 'N Fire. An addendum was accepted for the intervention's site change (Appendix A-2). Inclusion criteria for the study included participants over the age of 18 years old and who

have at least one child enrolled in the Delaware County Head Start Program in the spring of 2013. For participants from Blood 'N Fire, the first seventeen participants were recruited. With a pilot study, the sample consisted of a minimum of 23 participants.

Instruments

The “Healthy Meals, Healthy Families” survey (Appendix B) was used to collect the data. The “Healthy Meals, Healthy Families” pretest (Appendix B-1) was given before the intervention to measure subjects’ baseline confidence and knowledge related to the Nutrition Facts Panel (NFP). The “Healthy Meals, Healthy Families” post-test (Appendix B-2) was given at the completion of the intervention to measure the impact of the virtual grocery store tour on the participants confidence and ability to use the NFP to make healthier choices for their families at the grocery store. The survey included questions utilized by Wrieden et al., (2007), Barton et al., (2011), Tessaro et al., (2007), and Share Our Strength’s No Kid Hungry report (2012).

Each survey was pre-coded and placed into a packet for the subjects (e.g., 01, 02, 03...40). The pre-coded, completed pre-tests were collected before the presentation began. Upon completion of the presentation, the subjects were asked to complete the post-test. The pre-tests were matched with the post-tests for paired analysis. No identifying information (other than demographic data) was collected from the participants. Face and content validity of the revised instrument used in this study was determined by a group of experts in the field, including three registered dietitians and a health promotion expert.

Methods

Subjects were volunteers from either Delaware County's Head Start Program or Blood 'N Fire. Subjects from Delaware County's Head Start Program had at least one child enrolled in the program during the spring of 2013. Participants from Blood 'N Fire's attended the weekly meals and was present on the day of the intervention. A flyer (Appendix E) was sent home to the parents at the Head Start Program two months, two weeks, and one week prior to the presentation that invited a family member to attend the session. Head Start faculty created a poster advertising the intervention for three weeks (Appendix E-2). Two sessions were held, one in the morning at 8:45 a.m. and one in the afternoon at 12:45 p.m. to increase the opportunity for Head Start parents to attend the educational session.

Participants from Blood 'N Fire were self-selected from individuals who came to the site for the free weekly meal on the day of the intervention. A flyer (Appendix E-4) was posted in the building three weeks prior to the intervention and an announcement was made to participants one month prior. The Blood 'N Fire session was at 4 pm to ease the accessibility of those receiving a meal.

Each participant who attended a session at either Head Start or Blood 'N Fire was given a nutritional resource packet that included the pretest, posttest, a slow cooker cookbook, educational materials/handouts, and a Nutrition Facts Panel sheet. Each participant's code number was placed into a drawing to receive a slow cooker.

The hour-long presentation was divided into two segments: a cooking demonstration using a slow cooker (not described in this proposal) and a virtual grocery store tour (the topic of the present proposal). The healthy grocery-shopping segment

included a picture presentation and interactive questioning after the lesson on using NFP to select healthy foods (Appendix D). The pictures were taken at Marsh, a local grocery store in Delaware County. The healthy grocery-shopping presentation helped participants use the NFP and comprehend how to select healthier foods on a budget. Clips of selecting healthy food items, unit pricing diagrams, and Nutrition Facts Panels were utilized in order to explain how to interpret the information from the presentation.

Before the presentation began, participants were asked to complete the “Healthy Meals, Healthy Families” pre-test survey (Appendix B-1), which was part of the nutritional resource packet provided. The researchers introduced the topic, and began the 60-minute intervention. Upon completion of the intervention, a second researcher continued the nutritional intervention by demonstrating how to cook healthy meals in a slow cooker. Once the nutritional intervention was completed the participants were asked to complete the “Healthy Meals, Healthy Families” post-test survey. Once all survey instruments were collected, a drawing was held to give away two slow cookers as a reward for the subjects’ participation.

Letter of Consent and Permission

A letter of permission was obtained from the Director of the Delaware County Head Start allowing this researcher to conduct the study (Appendix F-1). Additionally, a letter of permission was obtained from the Director of Blood ‘N Fire allowing this researcher to conduct the study (Appendix F-2). A letter of consent was given to each participant (Appendix D). The letter informed the participants of the study’s intentions, eligibility criteria, and nutritional intervention’s procedure. The letter of consent provided

each participant the information to contact the researchers for further questions, and gave the participants the ability to deny the study.

Data Analysis

Data was analyzed using Statistical Package for the Social Sciences (SPSS) v.19.0 for Windows (SPSS, 2011). Descriptive statistics were run on all data. Data was presented as means $\pm$ standard deviations and percent of total. A paired t-test was run to determine if there were any significant changes in the subjects' confidence in and ability to use the NFP. Cross tabulation was run to determine the participants' number of correctly answered questions for "Read the Label: Make Your Calories Count" and "Read the Label: Breakfast Cereal." Bivariate pairwise correlation was run to examine the relationship between the participants' confidence to use a NFP to select healthy food and the participant's mealtime patterns and between the participant's confidence to eat healthy. Statistical significance was set at $p \leq 0.05$.

Summary

This study identified the impact of a virtual grocery store tour on the nutritional knowledge and food selection confidence of Delaware County adults. A pretest and posttest instrument was used to determine the participants' change in knowledge and confidence as a result of the hour-long nutrition intervention comprised of a virtual grocery store tour and healthy cooking demonstration for a slow cooker.

CHAPTER FOUR

RESULTS

The purpose of this pilot study was to determine the effectiveness of a virtual grocery store tour on the confidence and ability of low-income adults in Delaware County to understand and use the Nutrition Facts Panel to select healthier items. This chapter will describe the results of the study.

Participants

Participants for this study were recruited from parents of children who attend the local Head Start (n=7) and adults who visited the Blood 'N Fire (n=16) soup kitchen on April 21, 2013, in Muncie, Indiana (Table 1). Both agencies provide services to low income individuals. A total of 23 participants (Head Start =7; Blood 'N Fire = 16) volunteered to participate. Of the 23 participants, fifteen (65%) were female, and eight were male (35%). Subjects ranged in age from 20 to 69 years, with the mean age of the participants 46 ± 13 years. Eighty-three percent (n=19) of the participants reported being unemployed. Of the remaining participants, two (9%) reported being employed full-time, one (4%) indicated part-time employment, and one (4%) reported being a student. Most of participants were Caucasian (83%) and married (61%). The number of children ranged from zero to five, with a mean of 1.2 ± 1.4 children per household (Table 1).

Table 1. Demographic Description of Participants (n=23).

	N	Frequencies
Gender		
Male	8	35%
Female	15	65%
Employed		
Full-time	2	9%
Part-time	1	4%
Student	1	4%
At Home	19	83%
Race		
White	19	83%
Black	3	13%
Other	1	4%
Marital Status*		
Single	8	35%
Married	14	61%
Age		
20-30	2	9%
31-40	6	26%
41-50	7	30%
51-60	4	17%
61-70	4	17%
# of Children in household*		
0 children	9	39%
1 child	2	9%
2 children	6	26%
3 or more children	3	13%
# of Adults in household*		
1 adult	11	48%
2 adults	5	22%
3 or more adults	6	26%

* = missing data

RQ #1: Impact of the Intervention on Participant's Confidence

The first research question examined the participants' confidence in their ability to choose healthy items at the grocery store, use a Nutrition Facts Panel (NFP), and set a budget for their family. Three questions on the "Health Meals, Healthy Families" pre-test and post-test (questions 6, 7 and 8) were used to assess participant's confidence at

baseline and after the intervention. Response options ranging from zero (cannot do at all) to ten (extremely certain I can do). Each question was analyzed individually to detect a difference between pretest and posttest (Table 2). In addition, an overall confidence score was calculated by summing the participant's confidence number for each of these three questions. Only individuals who answered each question on both the pre-test and the post-test were included in the paired analysis (n=19).

The first question measured the participant's confidence in their ability to "choose 'healthy' items at the grocery store." At baseline the participant's mean self-reported confidence level was 8.2 ± 2.4 on a scale of zero to ten. After the intervention, the paired t-test indicated the participant's mean confidence level rose insignificantly to 9.1 ± 2.0 ($t=1.343$, $p=0.196$) (Table 2).

The second question measured the participant's confidence in their ability to "use the Nutrition Facts Panel." At baseline, the participant's mean self-reported confidence level was 7.0 ± 3.5 . After the intervention, the paired t-test indicated participant's mean confidence rose significantly to 9.2 ± 1.8 ($t=2.53$, $p=0.021$) (Table 2).

The third question measured the participant's confidence in their ability to "set a budget for your family." At baseline, participant's mean confidence level was 8.3 ± 2.8 . After the intervention, the paired t-test indicated participant's mean confidence rose, but insignificantly, to 9.2 ± 2.3 ($t= 1.41$, $p=0.176$) (Table 2).

When the responses to these three confidence questions were summed, participant's confidence score rose significantly from 23.5 ± 7.5 at the pre-test to 27.4 ± 5.7 at the post-test ($t= 2.12$, $p=0.048$) among the 19 participants who answered all three questions on both the pre-test and the post-test.

Table 2. Participants' Self-Reported Confidence to Make Healthy Changes (n=19).

Confidence to:	Mean $\pm$ SD	df	t	p
Choose Healthy Items		18	1.34	0.196
Pretest	8.2 $\pm$ 2.4			
Posttest	9.1 $\pm$ 2.0			
Read a Nutrition Facts Panel		18	2.53	0.021
Pretest	7.0 $\pm$ 3.5			
Posttest	9.2 $\pm$ 1.8			
Set a Budget for Family		18	1.40	0.176
Pretest	8.3 $\pm$ 2.8			
Posttest	9.2 $\pm$ 2.3			
Confidence Score†		18	2.12	0.048
Pretest	23.5 $\pm$ 7.5			
Posttest	27.4 $\pm$ 5.7			

Participants' confidence in their ability to “use the Nutrition Facts Panel” score was correlated with their confidence in the ability to “choose healthy items at the grocery store” score (Table 3). Bivariate pairwise correlation analysis indicated a significant, positive relationship at baseline ($r=0.722$, $p<0.001$). After completion of the virtual grocery store tour presentation, the relationship between participants' confidence to use the NFP and their confidence to choose healthy items at the grocery store strengthened ($r=0.861$, $p<0.001$).

Table 3. Correlation between Participants' Confidence to Use a Nutrition Facts Panel and their Ability to Select Healthy Foods at a Grocery Store.

	n	r	p
Pretest	20	0.722	< 0.001
Posttest	22	0.861	<0.001

RQ#2: Intervention's Impact on Knowledge

The second research question examined participants' knowledge about how to use a NFP. Only individuals who answered every question were included in the analysis (n=21). Two series of nutrition panels were used to measure the constructs: "Read the Label: Make Your Calories Count" and "Read the Label: Breakfast Cereal."

Read the Label: Make Your Calories Count

In the "Read the Label: Make Your Calories Count" section of the pre- and post-test, participants were presented with a picture of a low-fat chocolate milk Nutrition Facts Panel and a fat-free milk Nutrition Facts Panel. Subjects were asked to use the panels to identify which milk product had fewer calories, less saturated fat, more calcium, and would be the overall "smarter choice." Respondent's answers were coded as "correct" or "incorrect." A mean score of 1.0 would indicate every person correctly answered that question; the closer the mean score was to zero, the fewer participants who correctly answered the question.

Crosstab analysis indicated there was no change in the number (n=15) of respondents who could correctly compare the calories in one serving of low fat chocolate or fat free white milk upon completion of the presentation (Table 4). Seventeen (77%) respondents correctly compared the saturated fat content of the two milk products on the pre-test; this number decreased to 16 (72%) on the post test. Twelve individuals (57%) correctly compared the calcium content of the two types of milk on the pretest; this number increased to 16 (76%) on the post-test. Seventeen individuals (77%) were able to correctly identify which product was the smarter choice when thinking about calories,

saturated fat, and calcium per serving on the pretest; this number reduced to 15 (68%) on the post-assessment.

Table 4. Number and Percent of Participants who Correctly Answered the “Read the Label: Make Your Calories Count” Nutrition Facts Panel Questions.

Question	N	Pretest	Posttest
Caloric Content			
Correct Answer	22	15 (68.2%)	15 (68.2%)
Incorrect Answer		7 (31.8%)	7 (31.8%)
Saturated Fat			
Correct Answer	22	17 (77.3%)	16 (72.7%)
Incorrect Answer		5 (22.7%)	6 (27.3%)
Calcium			
Correct Answer	21	12 (57.1%)	16 (76.2%)
Incorrect Answer		9 (42.9%)	5 (23.8%)
Making Healthy Choices			
Correct Answer	22	17 (77.3%)	15 (68.2%)
Incorrect Answer		5 (22.7%)	7 (31.8%)

To determine if a significant change occurred in the participant’s response to these four questions, a paired t-test was run for each question. Results indicated no significant changes in participant’s knowledge about how to compare two Nutrition Facts Panels to choose the healthier product after completing the presentation (Table 5).

In addition, the number of correct answers for each of the four questions was summed for each participant. A paired t-test was run to determine if there was a difference in the summed score (e.g., number correct) between pre-test and post-test.

Overall, respondents answered 2.86 ± 1.3 out of four questions correctly on the pre-test and 2.90 ± 1.3 out of four questions correctly on the post-test. Paired analysis indicated there was no significant improvement in the overall summed score ($t=0.139$; $p=0.890$) in the “Read the Label: Make Your Calories Count” section.

Table 5. Paired Analysis Indicating Participants' Knowledge about Making Your Calories Count: Reading the Nutrition Facts Panel (n=21).

	Mean $\pm$ SD	df	t	p
Caloric Content		20	0.439	0.666
Pretest	0.71 ± 0.46			
Posttest	0.67 ± 0.48			
Comparing % DV: Saturated Fat		20	0.439	0.666
Pretest	0.81 ± 0.40			
Posttest	0.76 ± 0.44			
Comparing % DV: Calcium		20	1.284	0.214
Pretest	0.57 ± 0.51			
Posttest	0.76 ± 0.44			
Making Healthy Choices		20	0.370	0.715
Pretest	0.76 ± 0.44			
Posttest	0.71 ± 0.46			
Knowledge Score†		20	0.139	0.890
Pretest	2.86 ± 1.35			
Posttest	2.90 ± 1.37			

† = overall summed scores from tests to see change in comprehension

Read the Label: Breakfast Cereal

Next, participants were shown a Nutrition Facts Panel (NFP) of a breakfast cereal to determine if they could identify if a food item was “high” in (e.g., 20% Daily Value

[DV] or higher), a “good” source of (e.g., 10-19% DV), or “low” (e.g., 5% DV or less) in specified nutrients. Respondent’s answers were coded as “correct” and “incorrect” and analyzed individually using crosstabs and a paired t-test.

Crosstab analysis indicated the percent of respondents who correctly identified whether or not a cereal was high in fiber increased from 70% at baseline to 90% after the presentation (Table 6). Ten individuals (50%) correctly indicated that the cereal was not “high” in iron at baseline; only nine people (45%) made the correct choice on the post-test. Likewise, there was no change in the number of individuals who could identify that the cereal was not a good source of calcium. The percent of respondents who correctly identified that the cereal was “low in sodium,” however, increased from 37% at baseline (n=7) to 84% (n=16).

Table 6. Number and Percent of Participants who Correctly Answered the “Read the Label: Breakfast Cereal” Nutrition Facts Panel Questions.

Is this cereal....	N	Pre-Test	Post-Test
High in Fiber			
Correct Answer	20	14 (70%)	18 (90%)
Incorrect Answer		6 (30%)	2 (10%)
High in Iron			
Correct Answer	20	10 (50.0%)	9 (45%)
Incorrect Answer		10 (50.0%)	11 (55%)
Good Source of Calcium			
Correct Answer	21	13 (65%)	13 (65%)
Incorrect Answer		7 (35%)	7 (35%)
Low in Sodium			
Correct Answer	22	7 (37%)	16 (84%)
Incorrect Answer		12 (63%)	3 (16%)

A paired t-test was run for each of these four questions to determine if a significant change occurred in the participant's response. Results indicated no significant change in participant's knowledge about how to identify if the cereal was "high" (e.g., 20% DV or higher) in fiber ($t=1.714$; $p=0.104$), "high" in iron ($t=0.438$; $p=0.667$), or a "good source" (e.g., 10-19% DV) of calcium ($t=0.438$; $p=0.667$) after completing the presentation (Table 7). There was, however, a significant change in the participant's ability to identify that the breakfast cereal was low in sodium ($t=3.375$; $p=0.003$) after attending the presentation.

Table 7. Paired Analysis of Participants' Knowledge about Reading the Nutrition Facts Panel (n=19).

	Mean $\pm$ SD	df	t	p
High in fiber?		18	1.714	0.104
Pretest	0.68 $\pm$ 0.48			
Posttest	0.89 $\pm$ 0.32			
High in iron?		18	0.438	0.667
Pretest	0.53 $\pm$ 0.51			
Posttest	0.47 $\pm$ 0.51			
Good source of Calcium?		18	0.438	0.667
Pretest	0.53 $\pm$ 0.50			
Posttest	0.68 $\pm$ 0.48			
Low in Sodium?		18	3.375	0.003
retest	0.37 $\pm$ 0.50			
Posttest	0.84 $\pm$ 0.37			
Summed Knowledge Score†		18	2.974	0.008
Pretest	2.21 $\pm$ 0.86			
Posttest	2.89 $\pm$ 0.88			

† = overall summed scores from tests to see change in comprehension

Confidence Impacting Healthy Meal Times

Participants rated the importance of various dinnertime activities (i.e., making and eating dinner at home; making dinner from scratch; making dinner using prepackaged foods; eating fast food for dinner; eating a healthy, balanced meal; or eating together as a family) on a scale of 0 (not at all important) to ten (extremely important) (Figure 1).

Figure 1. Importance of Select Dinner Time Activities to Participants.

The dinner time activity of “eating together as a family” had the highest mean of 9.1 ± 2.0 ($n=19$), followed by “eating a healthy, balanced meal” (8.6 ± 2.5) ($n=21$) and “making and eating dinner at home “(8.6 ± 2.7) ($n=21$). Of moderate importance to the participants was “making dinner from scratch” (6.6 ± 3.7) and “using easy-to-prepare, packaged foods” (5.2 ± 3.2). The least important dinner time activity was the importance of “eating fast food for dinner” (2.3 ± 1.9).

Participants were asked how frequently, in a typical week they engaged in a variety of meal time activities. Responses included “never,” “1-2 days per week,” “3-4 days per week,” “5-6 days per week,” and “daily.” The most frequently cited meal time activity was “make and eat dinner at home” (4.2 ± 1.1) followed by “eat together as a family” (4.0 ± 1.4). The least likely activity was “eat fast food for dinner” (2.0 ± 1.1).

Table 8. Frequency in which Families Engaged in Various Meal Time Activities.

Meal Time Activity	N	Mean $\pm$ SD
Make dinner with packaged food	22	3.0 ± 1.4
Make dinner from scratch	23	3.3 ± 1.4
Make and eat dinner at home	23	4.2 ± 1.1
Eat fast food for dinner	23	2.0 ± 1.1
Eat a balanced meal	22	3.9 ± 1.2
Eat together as a family	21	4.0 ± 1.4

Participants’ ability to make healthy choices during meals could be affected by their confidence to select healthy choices. To measure this, the summed confidence score to make healthier choices (see Table 2) was correlated with the participants’ mealtime patterns (see Table 8). However, Pearson’s correlation coefficient indicated there was no relationship between the participants’ confidence in their ability to select healthy foods and their frequency of making dinner from packaged food, frequency of making dinner from scratch, frequency of eating at fast food restaurants or their frequency of eating together as a family (Table 9). There was, however, a significant correlation between participant’s confidence to make healthier choices score and the frequency with which

they “make and eat dinner at home” ($r=0.56$, $p=0.007$) and the frequency with which they “eat a balanced meal” ($r=0.57$, $p=0.007$).

Table 9. Correlation between Participants' Confidence for Healthy Eating Score and Score Affecting Healthy Meal Times.

Dinner Time Activity	N	r	p
Make dinner with packaged food	22	0.07	0.752
Make dinner from scratch	23	0.23	0.305
Make and eat dinner at home	23	0.56	0.007
Eat fast food for dinner	23	0.09	0.704
Eat a balanced meal	22	0.57	0.007
Eat together as a family	21	0.36	0.119

Use of Kitchen Equipment

Participants identified the kinds of kitchen equipment they use in a typical week (Figure 2). More people reported using a refrigerator (87%) than any other kitchen equipment item, followed by a stove (78%), and a microwave (70%). The least used kitchen items included a skillet (13%), toaster (17%), and slow cooker (30%).

Figure 2. Percent of Respondents who Use Kitchen Appliances in a Typical Week.

Summary

Mixed results were obtained from participants who attended a virtual grocery store tour that emphasized how to use the NFP to choose healthier foods. Specifically, analysis of the data indicated that participants had:

- An increased confidence in their ability to “use the Nutrition Facts Panel” (7.0 ± 3.5 vs. 9.2 ± 1.8 ; $t=2.53$, $p=0.021$).
- An increased summed confidence score that indicates an increased confidence in their ability to make healthier changes by choosing healthier items at the grocery store, using the NFP, and setting a budget for their family (23.5 ± 7.5 vs. 27.4 ± 5.7 ; $t= 2.12$, $p=0.048$).
- A stronger, more positive correlation between their confidence to use the NFP and their confidence to choose healthy items at the grocery ($r=0.722$, $p<0.001$ vs. $r=0.861$, $p< 0.001$).
- A greater ability to identify a low sodium breakfast cereal ($t=3.375$; $p=0.003$).
- A significant correlation between participant’s confidence to make healthier choices score and the frequency with which they “make and eat dinner at home” ($r=0.56$, $p=0.007$) and “eat a balanced meal” ($r=0.57$, $p=0.007$).
- No increase in their confidence to choose healthy items at the grocery store ($t=1.34$; $p=0.196$).
- No increase in their confidence to set a budget for their family ($t=1.40$; $p=0.176$).
- No difference was noted in participants’ ability to identify if a cereal was “high” in fiber ($t=1.714$; $p=0.104$), “high” in iron ($t=0.438$; $p=0.667$), or a “good” source (e.g., 10-19% DV) of calcium ($t=0.438$; $t=0.667$).

CHAPTER FIVE

DISCUSSION

The purpose of this pilot study was to determine the effectiveness of a virtual grocery store tour on the confidence and ability of low-income adults in Delaware County to understand and use the Nutrition Facts Panel to select healthier food items. This chapter discusses the results of the present study in light of current research.

RQ #1: Intervention's Impact on Confidence

Results of the present study indicate a virtual grocery store tour that emphasizes how to use the Nutrition Facts Panel (NFP) to make healthier food choices is associated with an increase in participant's confidence in their ability to "use a nutrition food label." However, there was no increase in confidence in the subjects' ability to choose healthy items at the grocery store or in their ability to set a budget for their family.

Several studies indicate environmental factors can influence low-income families' confidence to select healthy foods. Traveling and finances have been shown to discourage low-income families from adopting healthier lifestyle habits and behaviors (D'Angelo, Suratkar, Song, Stauffer, & Gittelsohn, 2011; Webber, Sobal, & Dollahite, 2010). Although the current study did not identify life situations that might hinder

participant's selection of healthy foods, the results do indicate that participants' confidence to select healthy foods and to use the NFP increased.

One tip participants in the current study were taught was to use unit pricing and to buy fruits and vegetables by the ounce to optimize the purchase of healthier foods without going over their budget. Purchasing bulk items, like brown rice, was recommended as another way to help families stick to a budget. Connell et al. (2012) emphasized the importance of teaching low-income participants about budgeting for healthy items because an increased grocery bill will occur if families do not reduce the amount of expensive items, like meat or convenience foods. The current study presented buying meat in whole, like chicken, versus buying retail cuts, like chicken breasts.

Incorporating legumes and raw vegetables could provide more satiety for low-income families while extending the servings of food. Cooking Matters (2012) data indicates that, although barriers to attain healthy foods could be overcome, the main obstacle for participants was cost. Participants believed they could attain the goal of cooking healthy meals for the family by learning how to budget healthy foods within their means (Cooking Matters, 2012). Previous research has found financial constraints impacted low-income families' decision about selecting healthy food options (Krukowski, McSweeney, Sparks, & West, 2012; Webber et al., 2010; Yousefian, Leighton, Fox, & Hartley, 2011). Yousefian et al. (2011) studied how low-income families select and buy healthy foods. A participant in that study stated, "I am buying what fits in my budget and it is cheap...I have got to stretch what dollars I have got." While healthy foods like fruits and vegetables are more nutrient dense than sweets, purchasing nutrient dense foods are also more expensive than sweets or convenience

foods (Connell et al., 2012). Results from the current study indicate the virtual grocery store tour was not successful in increasing the participants' confidence to set a family budget. The current study did not expect to see a change in the participants' confidence to set a family budget because the presentation focused primarily on the NFP.

Educational level, often used as a proxy for socioeconomic status, has been shown to be a strong predictor of whether or not a person consumes a healthy diet (Monsivais & Drewnowski, 2009). These authors concluded that, while the healthier diets were more expensive, the participants recruited from the previous study were able to afford the luxuries of a varied diet, as they were university employees with salary means ranging from \$1,408 to \$13,924 per month. Evans et al. (2011) has reported that, even though low-income families have the confidence to set a budget, the family's reality of selecting healthy foods could portray a different picture. These authors report that low-income families were consistently worrying about the family's food and planning out monthly food amounts (Evans et al., 2011).

RQ#2: Intervention's Impact on Knowledge

Having confidence alone does not mean individuals will acquire knowledge or adopt healthier behaviors. In the present study, despite a self-reported increase in confidence to use a nutrition label, no improvement was seen in the participant's ability to actually use two Nutrition Facts Panels to choose the healthier products. In addition, despite the significant improvement in the participant's increased ability to identify if a food was low in sodium, no difference was noted in participants' ability to identify if a cereal was "high" in fiber, "high" in iron, or a "good source" of calcium. Clearly it takes

more than confidence to apply what has been learned about how to make healthier decisions.

Previous research on the NFP has focused on teaching participants how to detect the amount of fat or iron within that food item (Jenkins, 2012; Tessaro, Rye, Parker, Mangone, & McCrone, 2007). None of these studies used a virtual grocery tour that focused on using the NFP to identify healthier food items. The current research presented the NFP to participants as a way to determine healthy foods for making healthy, balanced meals. Participants analyzed the NFP from a breakfast cereal to determine if the item had a “low,” “good,” or “high” amount of specific nutrients. Although participants were able to correctly identify that the cereal was “low” in sodium, participants were unable to use the percent Daily Value (DV) on the NFP to correctly identify foods that were “high” in or a “good” source of a nutrient. Therefore, it is doubtful if the participants in this study would be able to take the knowledge learned during the virtual grocery store tour to an actual grocery store and use the information to select healthy foods based on the NFP.

Having confidence in one’s ability, and having knowledge about a specific domain (e.g. “adopting healthier behaviors”), does not necessarily result in a person engaging in that specific action or behavior. Participants in a study conducted by Webber et al. (2010) acknowledged that eating produce would benefit their own and their children’s health. Despite this acknowledgement, their food records and individual narratives demonstrated that the participant’s knowledge did not lead straight to action. Although this study did not follow-up with the participants to determine if the knowledge imparted during the presentation was used to make different food choices at a grocery store, participants did seem interested in how to use the NFP as evidenced by the

questions they asked throughout the interactive presentation. For example, one participant asked how an individual with kidney stones could use the NFP to select foods for this health problem.

Cook, Burton, & Howlett (2011) analyzed NHANES data to obtain a representative sample of the U.S. population from various socioeconomic levels. The participants were asked to detect healthy food items based on the NFP. Results for participants 45 years or older show that consumers diagnosed with both high blood pressure and high cholesterol were more likely to access sodium and cholesterol NFP information than consumers with only one or neither condition, most likely due to their greater opportunity for exposure to nutrition education from the medical community.

Government programs, such as Head Start and WIC, are required to provide low-income families nutrition education about fruits and vegetables, MyPlate recommendations, cooking healthy options, and how to read a NFP to incorporate healthy foods into family meals. Participants from the current study could have received nutrition education from a government program that helped them identify low sodium foods.

Low-income families have difficulty selecting healthy foods because healthy foods are less accessible, more expensive, and not as easy to prepare (Krukowski, et al., 2012; Webber, et al., 2010). Webber et al. (2010) focused on understanding why low-income participants selected certain food items and to identify the barriers that interfere with low-income families' ability to make healthy meals. D'Angelo et al. (2011) recruited participants from an area of Baltimore with limited access to supermarkets and limited availability to healthy food options. These researchers found that unhealthy foods were more likely to be selected from grocery store shelves when these low income

families had to walk to the grocery store (D'Angelo, et al., 2011). Participants from the current study were observed utilizing the Delaware County's bus services or walking to the intervention sites, possibly increasing the difficulty of obtaining healthy foods when grocery shopping.

Participants from the current study indicated the importance of eating together as a family, eating a balanced meal, and eating dinner at home. Although the actual consumption of healthy foods was not obtained, results of the present study indicated participants' self-reported summed confidence score to choose healthy foods and use a NFP was highly correlated with families who "made and ate dinner at home" and families that "consumed a healthy balanced meal."

Castetbon et al (2011) recruited participants who frequently required help from soup kitchens and food banks, indicating the participants would not have consistent access to healthy food options. Results indicated few low-income families met the requirements of fruits, vegetables, and dairy products. Tessaro et al (2007) found that, after completing a multimedia nutrition intervention, participants were not following the five fruit and vegetable recommendation per day because of limited finances and acceptance for all family members. The participants in the present study were low-income parents of a child enrolled in Head Start and adults who came to the Blood 'N Fire soup kitchen to obtain a hot meal. It is possible that learning how to use the NFP to make healthier choices is not a priority for these families as their life circumstances cause them to rely on the food they are able to afford or obtain from a food pantry or soup kitchen.

Kitchen Equipment Impacting Healthy Meals

Limited resource families often report eating meals away from home on a regular basis, which depletes the family's minimal resources for food (Baker, 2003). When this occurs, impoverished families are often exposed to larger portion sizes, which can increase the risk for health disparities such as obesity, high blood pressure, and anemia (Castetbon et al., 2011).

In order to avoid eating out, a variety of kitchen equipment is needed in order to prepare families' meals at home. Participants in the current study indicated the kitchen equipment they used the most frequently during the previous week were the refrigerator, stove, and microwave. Even though the majority of participants used these main kitchen appliances, their use was not unanimous. In retrospect, this researcher wishes the wording of the question had asked, "do you have access to" the various pieces of kitchen equipment rather than "what kinds of equipment do you use in a typical week?" In addition, even if a family had access to a refrigerator and stove, the lack of a can opener, knife or saucepan could constrain their abilities to serve healthy foods to their families.

Difficulties Encountered in the Present Study

There are many reasons why the intervention may not have been as successful as anticipated. Participants in the present study were self-selected. Despite volunteering to attend the nutrition intervention, many participants made complaining comments throughout the intervention. One participant stated, "I would rather be out [in the other room] with my friends" several times while waiting for others to finish the pretest and during the beginning of the intervention. In addition, participants' attention was not fully focused throughout the presentation as many side conversations occurred amongst the

participants. The intervention at the Head Start center was interrupted several times by a faculty member who repeatedly came into the room to acquire supplies, which further distracted the participants' attention. Lastly, several participants in the present study indicated they "felt forced" to fill out another (i.e., the post-test) survey. Barnett, Aguilar, Brittner, and Bonuck (2012) reported success in their intervention because the participants reported they did not feel "forced" to answer questions. Although the researchers from the current study did not force the participants to complete the posttest, the intervention was not as comprehensive as initially envisioned to be considerate of the participants' time. The researchers estimated it took approximately ten to fifteen minutes for participants to finish the pretest, however the participants spent approximately fifteen to twenty minutes on the pretest. The extra time spent on the questionnaire made the one-hour nutritional intervention run longer than the stated one-hour time.

To decrease the boredom often reported during nutrition interventions, researchers have used soap operas, novellas, and computer-type games as the media (Campbell, Honess-Morreale, Farrell, Carbone, & Brasure, 1999; Tessaro, et al., 2007). Campbell et al. (1999) presented nutrition education about low-fat options through a soap opera style program and infomercials. The present study used its resources by creating a grocery store tour participants could see without traveling to the store. Pictures, price comparisons, and food selecting tips were given throughout the virtual grocery store tour by way of PowerPoint. Perhaps in the present study, the virtual grocery store presentation did not have enough "excitement" or "hands-on activities" to fully capture the audiences' attention.

Tessaro and colleagues (2007) concluded that participants preferred videos and cooking demonstrations for nutritional interventions. However, research indicates the cost associated with multimedia presentations can be a setback and sufficient resources should be organized before creating the program (Campbell, et al., 1999; Jantz, Anderson, & Gould, 2002). To keep the participant's attention in the current study, the presentation included a variety of animations to create smooth transitions and a cooking demonstration/taste-testing session using a slow cooker.

The chaos occurring in each of the participants' lives may also be a determining factor that caused distraction during the current study. Pyatak and colleagues (2013) discovered the benefits of utilizing staff as a mediator between participants' life stressors and the study because the participants understood the study's benefits while the study could support the participants during difficult times.

This researcher made an effort to form a relationship with personnel at each of the two intervention sites (i.e., Head Start and Blood 'N Fire). Several meetings were held prior to the data collection at both sites. A week prior to the presentation, this researcher visited Head Start to pass out flyers and have personal contact with parents. For several weeks before the intervention at Blood 'N Fire, this researcher volunteered to help prepare and serve food, providing the researcher with the opportunity to talk with faculty and clients at Blood 'N Fire. Previous research indicates forming a relationship with the participants helps to increase recruitment (Barnett, Aguilar, Brittner, & Bonuck, 2012; Nicholson et al., 2011). While the current study did work at forming relationships with the participants at each site, the strong relationship participants had with the Director of Blood 'N Fire was evident. Many participants were ready to become involved when

Blood 'N Fire's Director informed them about the program. Even though participants recognized the researchers, a relationship between participant and researcher would have produced greater outcomes. According to Barnett et al. (2012), by forming a relationship with participants, the researcher can understand participants' lives and point them in the direction to receive more information. In addition, the participants will feel more comfortable with the researcher. Tracking and meeting participants at their homes have been suggested to increase participant involvement (Barnett, et al., 2012; Nicholson, et al., 2011).

Tessaro et al. (2007) offered a multimedia program about decreasing fat in the waiting areas of healthcare providers. Unfortunately the researchers were not able to track who viewed the programs. The current researchers set the intervention times and dates when the participants would be already at the location. The Head Start participants took their children every day to either the morning or afternoon classroom sessions. The two interventions held at Head Start were scheduled immediate after the participants took their children to class. A weekly meal is served at Blood 'N Fire every Saturday. Clients start to come at approximately 4 p.m. to play basketball or sit with their family and friends until the 5 p.m. meal is served. Thus, the Blood 'N Fire intervention was scheduled for 4 p.m. on a Saturday to optimize participants' attendance while still giving adequate time to eat their meal.

Convenience is not the only way to increase recruitment for low-income participants. Past researchers found great success with providing giveaways (Barnett, et al., 2012). The current study provided handouts about healthy food options and cooking tips, a cookbook, recipes, and the opportunity to win a slow cooker upon the completion

of the post-test. When the nutrition intervention was advertised to Blood 'N Fire the participants clapped. One participant shouted, "You just changed the game by mentioning a slow cooker." One Blood 'N Fire participant stated, "I will come if I can win a slow cooker." Even though participants were excited to come to the intervention, giveaways should not be the only reason to attend because the focus will be the reward, or giveaway, and not the education the low-income families would receive. Tessaro et al. (2007) concluded from participant interviews at the three-month follow-up that participants enjoyed learning the information about healthy options and receiving the recipes. Since the current study provided participants and their families with cookbooks and nutritional handouts about cooking, the participants have the ability to apply this information to their lives for years to come.

Summary

The current research presented the NFP to participants as a way to identify healthy foods for making healthy, balanced meals. Limited resource families may not be able to prepare healthy meals based on cost, convenience, and ability to access healthy foods. Participants from the current study indicated the importance of eating together as a family, eating a balanced meal, and eating dinner at home. However, low-income families' acknowledgement of healthy, balanced meals does not always translate into purchasing healthy food items. Limited resource families' willingness to purchase healthy food may be limited to the act of going to the grocery store. Education is beneficial for low-income families to understand that healthy foods can be consumed within their means and preparing healthy foods is an attainable goal.

CHAPTER SIX

CONCLUSIONS, LIMITATIONS, RECOMMENDATIONS

The purpose of this pilot study was to determine the effectiveness of a virtual grocery store tour on the confidence and ability of low-income adults in Delaware County to understand and use the Nutrition Facts Panel to select healthier food items. This chapter discusses the conclusion, limitations, and recommendations from the study.

Conclusions

After attending a virtual grocery store tour that emphasized using the Nutrition Facts Panel (NFP) to select healthier foods, Head Start parents and Blood 'N Fire clients reported being more confident in their ability to “use a nutrition food label.” The virtual grocery store tour, however, did not increase the participants’ ability to choose healthy items at the grocery store or set a budget for their family. While there was no improvement in the participants’ knowledge to choose healthier food items when comparing two Nutrition Facts Panels, the participants were able to identify whether or not a food was low in sodium. However, the participants were not able to identify if the food item was “high” in fiber, “high” in iron, or a “good” source of calcium based on the NFP. There was a positive correlation between the participants’ self-reported summed

confidence score to choose healthy foods and families who “made and ate dinner at home” and families that “consumed a healthy balanced meal.” More research is needed to identify effective ways to help low income individuals use the NFP to select healthier foods.

Limitations

Several limitations of the present study should be identified.

1. The results from this study are not generalizable to the population due to the size of the sample.
2. The intervention was limited to participants whom could understand English.
3. Despite the attempt to keep the reading level low, some participants may have been limited by the wording on the pre- and post-tests, the handouts, and the PowerPoint used during the intervention.
4. While experts ensured the questionnaires were appropriate for the population, the present study was limited by not using a control as a reliable index.
5. The intervention sites did not support a learning environment where the participants were not distracted. The presentation room at the Head Start center had a closet with supplies that were needed by several teachers throughout the presentation. The Blood ‘N Fire presentation had to be given in a room lined with mirrors. As a result, the only place to show the PowerPoint presentation was on the back of the three foot by three foot poster board, making it difficult to read the print.
6. Lastly, participation in the present study was limited to a one-hour intervention; no follow-up with participants about the potential impact of this nutrition intervention occurred.

Strengths

Despite the limitations, this study had several strengths.

1. This study created a nutrition intervention intended to increase low-income families' confidence and knowledge about the NFP and how to select healthy foods.
2. This study developed a virtual grocery store tour that provided both convenience and appeal to participants.
3. This study was tailored to the needs of low-income families.

Recommendations for Future Research

This researcher makes the following recommendations for future research to expand upon and clarify these findings:

1. In order to make a study more generalizable, increase the sample size by presenting the nutrition intervention to multiple groups within the same demographics several times.
2. Examine the surveys to ensure every question is necessary for the participants to answer. Also, conduct a control trial of the survey to ensure reliability.
3. Examine the participants' accessibility to kitchen equipment and healthy foods on a weekly basis. For example from the current study, change the survey question, "What kinds of kitchen equipment do you use in a typical week?" to "What kind of kitchen equipment is accessible to use when preparing meals for your family?"
4. Provide a follow-up portion to the nutrition intervention to indicate how the presentation has impacted the family over a length of time. For example, participants could meet at a grocery store to indicate which healthy changes their family now selects.

5. Create a multimedia intervention that utilizes an audio format. By creating a presentation with the option of listening to the education, more participants could comprehend the information. The audio files should be attached to the nutritional handouts, surveys, and presentation. Ideally, adding the option of language type to the presentation would be beneficial to participants.
6. Identify the participants' idea of a healthy meal. On the questionnaire, create an additional open-ended question asking, "What is your definition of a 'healthy meal?'" The participants' answers could bring insight into why they chose certain foods and what types of meals are important for their families to consume as each person may view the term, "healthy," differently.

Summary

Despite limitations to this study, most notably sample size and no control group, this study did have several strengths. This study used a multimedia "virtual" grocery store tour to help participants learn how to use the NFP to choose healthier foods for their family. The study increased low-income participants' confidence in their ability to use the NFP to select healthy foods at a grocery store. Despite the increase in confidence, limited evidence was collected to indicate that participants were able to harness their confidence to actually use the NFP to select foods that were lower in calories, saturated fat, and calcium or foods that were "high" in or a "good" source of various nutrients. The majority of participants were able to detect whether or not a food was "low" in sodium. The data collected in this study can be added to the pool of research about nutritional interventions for low-income families.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD MATERIALS

A-1 CITI CERTIFICATE OF COMPLETION

A-2 LETTER OF EXEMPTION AND AMENDMENT MODIFICATION LETTER

Appendix A-1 – CITI Certificate of Completion

CITI Collaborative Institutional Training Initiative

Social & Behavioral Research - Basic/Refresher Curriculum Completion Report

Printed on 9/12/2012

Learner: Tarrah McCreary (username: tmccreary)

Institution: Ball State University

Contact Information Department: Family and Consumer Science

Email: temccreary@bsu.edu

Social & Behavioral Research - Basic/Refresher: Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in Social/Behavioral Research with human subjects.

Stage 1. Basic Course Passed on 09/12/12 (Ref # 8670323)

Required Modules	Date Completed	Score
Belmont Report and CITI Course Introduction	09/11/12	3/3 (100%)
Students in Research	09/11/12	10/10 (100%)
History and Ethical Principles - SBR	09/11/12	5/5 (100%)
Defining Research with Human Subjects - SBR	09/11/12	5/5 (100%)
The Regulations and The Social and Behavioral Sciences - SBR	09/11/12	4/5 (80%)
Assessing Risk in Social and Behavioral Sciences - SBR	09/11/12	5/5 (100%)
Informed Consent - SBR	09/11/12	5/5 (100%)
Privacy and Confidentiality - SBR	09/11/12	5/5 (100%)
Research with Prisoners - SBR	09/11/12	3/4 (75%)
Research with Children - SBR	09/11/12	4/4 (100%)
Research in Public Elementary and Secondary Schools - SBR	09/11/12	4/4 (100%)
International Research - SBR	09/11/12	3/3 (100%)
Internet Research - SBR	09/11/12	4/5 (80%)
Research and HIPAA Privacy Protections	09/12/12	5/5 (100%)
Vulnerable Subjects - Research Involving Workers/Employees	09/12/12	3/4 (75%)
Conflicts of Interest in Research Involving Human Subjects	09/12/12	3/5 (60%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research	09/12/12	2/3 (67%)
Ball State University	09/06/12	no quiz

Stage 1. RCR Passed on 09/11/12 (Ref # 8670324)

Required Modules	Date Completed	Score
Ball State University	09/06/12	no quiz
Introduction to the Responsible Conduct of Research	09/06/12	no quiz
Research Misconduct 2-1495	09/06/12	4/5 (80%)
Data Acquisition, Management, Sharing and Ownership 2-1523	09/06/12	5/5 (100%)
Publication Practices and Responsible Authorship 2-1518	09/07/12	5/5 (100%)
Peer Review 2-1521	09/09/12	5/5 (100%)
Mentor and Trainee Responsibilities 01234 1250	09/11/12	5/5 (100%)
Using Animal Subjects in Research 13301	09/11/12	8/8 (100%)
Conflicts of Interest and Commitment 2-1462	09/11/12	5/6 (83%)
Collaborative Research 2-1484	09/11/12	5/5 (100%)
Human Subjects 13566	09/11/12	5/5 (100%)
The CITI RCR Course Completion Page	09/11/12	no quiz

A-2 LETTER OF EXEMPTION AND AMENDMENT MODIFICATION LETTER

Institutional Review Board

DATE: February 20, 2013
TO: Carol Friesen, PhD, RD, CD
FROM: Ball State University IRB
RE: IRB protocol # 431807-1
TITLE: Healthy Meals, Healthy Families
SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS
DECISION DATE: February 20, 2013

The Institutional Review Board reviewed your protocol on February 20, 2013 and has determined the procedures you have proposed are appropriate for exemption under the federal regulations. As such, there will be no further review of your protocol, and you are cleared to proceed with the procedures outlined in your protocol. As an exempt study, there is no requirement for continuing review. Your protocol will remain on file with the IRB as a matter of record.

Editorial notes:

1. Approved- Exempt

While your project does not require continuing review, it is the responsibility of the P.I. (and, if applicable, faculty supervisor) to inform the IRB if the procedures presented in this protocol are to be modified or if problems related to human research participants arise in connection with this project. **Any procedural modifications must be evaluated by the IRB before being implemented, as some modifications may change the review status of this project.** Please contact please contact John Mulcahy at (765) 285-5106 or jmulcahy@bsu.edu if you are unsure whether your proposed modification requires review or have any questions. Proposed modifications should be addressed in writing and submitted electronically to the IRB (<http://www.bsu.edu/irb>) for review. Please reference the above IRB protocol number in any communication to the IRB regarding this project.

Reminder: Even though your study is exempt from the relevant federal regulations of the Common Rule (45 CFR 46, subpart A), you and your research team are not exempt from ethical research practices and should therefore employ all protections for your participants and their data which are appropriate to your project.

Institutional Review Board

DATE: April 19, 2013
TO: Carol Friesen, PhD, RD, CD
FROM: Ball State University IRB
RE: IRB protocol # 431807-2
TITLE: Healthy Meals, Healthy Families
SUBMISSION TYPE: Amendment/Modification
ACTION: DETERMINATION OF EXEMPT STATUS
DECISION DATE: April 19, 2013

The Institutional Review Board reviewed your protocol on April 19, 2013 and has determined the procedures you have proposed are appropriate for exemption under the federal regulations. As such, there will be no further review of your protocol, and you are cleared to proceed with the procedures outlined in your protocol. As an exempt study, there is no requirement for continuing review. Your protocol will remain on file with the IRB as a matter of record.

Editorial notes:

1. Modification Approved.

While your project does not require continuing review, it is the responsibility of the P.I. (and, if applicable, faculty supervisor) to inform the IRB if the procedures presented in this protocol are to be modified or if problems related to human research participants arise in connection with this project. **Any procedural modifications must be evaluated by the IRB before being implemented, as some modifications may change the review status of this project.** Please contact please contact John Mulcahy at (765) 285-5106 or jmulcahy@bsu.edu if you are unsure whether your proposed modification requires review or have any questions. Proposed modifications should be addressed in writing and submitted electronically to the IRB (<http://www.bsu.edu/irb>) for review. Please reference the above IRB protocol number in any communication to the IRB regarding this project.

Reminder: Even though your study is exempt from the relevant federal regulations of the Common Rule (45 CFR 46, subpart A), you and your research team are not exempt from ethical research practices and should therefore employ all protections for your participants and their data which are appropriate to your project.

APPENDIX B
SURVEY INSTRUMENTS

B-1 PRETEST

B-2 POSTTEST

Appendix B-1 Pre-Test

Healthy Meals, Healthy Families!

DIRECTIONS: Using a number from 0 to 10 where 0 is "I cannot do this at all" and 10 is "I am extremely certain I can do it," circle the number to indicate how **confident** you feel about your ability to....

Cooking and Shopping Confidence	Cannot Do At All										Extremely Certain I Can Do																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
1. Cook from basic ingredients or “from scratch”	0	1	2	3	4	5	6	7	8	9	10																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

Food Safety Knowledge: Please **circle** the answer that you think is correct:

1. How long should you thoroughly wash your hands before preparing food?	A. 5 seconds	D. 1 minute
	B. 20 seconds	E. I am not sure
	C. 30 seconds	
2. What temperature range is the "Temperature Danger Zone" where bacteria grow the fastest?	A. 0° to 40°F	D. 140° to 160°F
	B. 40° to 140°F	E. I am not sure
	C. 60° to 125°F	
3. It is a good idea to cool a leftover meatloaf at room temperature for 2 to 3 hours before refrigerating it.	A. True	
	B. False	
	C. I am not sure	
4. How long can foods be in the Temperature Danger Zone before they should be thrown out?	A. 30 minutes	D. 6 hours
	B. 2 hours	E. I am not sure
	C. 4 hours	

Meal Time:

In a typical week, **how often** does your family do the following for dinner? Place an "X" in the column.

Days Per Week	Never	1-2 day	3-4 days	5-6 days	Daily
1. Make dinner using mostly easy-to-prepare, packaged foods					
2. Make dinner from scratch					
3. Make and eat dinner at home					
4. Eat fast food for dinner					
5. Eat a balanced meal					
6. Eat together as a family					

Read the Label: Make Your Calories Count

Nutrition Facts	
Serving Size 8 fl oz (240mL)	
Servings Per Container 8	
Amount Per Serving	
Calories 160	Calories from Fat 25
% Daily Value *	
Total Fat 2.5g	4 %
Saturated Fat 1.5g	8 %
Trans Fat 0g	
Cholesterol 5mg	2 %
Sodium 150mg	6 %
Total Carbohydrate 26g	9 %
Dietary Fiber 1g	5 %
Sugars 26g	
Protein 8g	
Vitamin A	10 %
Vitamin C	4 %
Calcium	30 %
Iron	4 %

**Low Fat
Chocolate Milk**

Nutrition Facts	
Serving Size 8 fl oz (240mL)	
Servings Per Container 8	
Amount Per Serving	
Calories 80	Calories from Fat 0
% Daily Value *	
Total Fat 0g	0 %
Saturated Fat 0g	0 %
Trans Fat 0g	
Cholesterol <5mg	0 %
Sodium 125mg	5 %
Total Carbohydrate 12g	4 %
Dietary Fiber 0g	0 %
Sugars 12g	
Protein 8g	
Vitamin A	10 %
Vitamin C	4 %
Calcium	30 %
Iron	0 %

**Fat Free
Milk**

DIRECTIONS: Please circle the answer you think is most correct.

- How do the **calories** for 1 serving of each of these compare?
 - Low fat chocolate milk has fewer calories
 - Fat free milk has fewer calories
 - They have the same calories
 - I am not sure
- How does the percent Daily Value of **saturated fat** for 1 serving of each of these products compare?
 - Low fat chocolate milk is lower in saturated fat
 - Fat free milk is lower in saturated fat
 - They are both low in saturated fat
 - I am not sure
- How does the percent Daily Value of **calcium** for 1 serving of each of these products compare?
 - Low fat chocolate milk is higher in calcium
 - Fat free milk is higher in calcium
 - They are both high in calcium
 - I am not sure
- Which product is the **smarter choice** when thinking about calories, saturated fat, and calcium in a serving?
 - Low fat chocolate milk
 - Fat free milk
 - They are both the same
 - I am not sure

READ THE LABEL: Breakfast Cereal

DIRECTIONS: Use the Nutrition Facts Panel on the left to answer these questions.

Nutrition Facts	
Serving Size 1 cup (53g)	
Servings Per Container about 8	
Amount Per Serving	
Calories 190	Calories from Fat 25
% Daily Value *	
Total Fat 3g	5 %
Saturated Fat 0g	0 %
Trans Fat 0g	
Cholesterol 0mg	0 %
Sodium 95mg	4 %
Total Carbohydrate 36g	12 %
Dietary Fiber 8g	32 %
Sugars 13g	
Protein 9g	
Vitamin A	0 %
Vitamin C	10 %
Calcium	4 %
Iron	10 %

- Is this cereal **HIGH** in fiber?
 - Yes
 - No
 - I am not sure
- Is this cereal **HIGH** in iron?
 - Yes
 - No
 - I am not sure
- Is this cereal a **GOOD** source of calcium?
 - Yes
 - No
 - I am not sure
- Is this cereal **LOW** in sodium?
 - Yes
 - No
 - I am not sure

MYPLATE QUESTIONS: Please *circle* the answer you think is correct.

- Dry beans, eggs, and nuts are in which MyPlate food group?
 - Protein foods group
 - Vegetable group
 - Grains group
 - Dairy group
 - I am not sure
- How much of the food on your plate should be fruits and vegetables?
 - One-quarter (1/4)
 - One-third (1/3)
 - One-half (1/2)
 - Two-thirds (2/3)
 - I am not sure
- Which of the following is a **whole grain**?
 - Wheat bread
 - Flour tortilla
 - White rice
 - Oatmeal
 - I am not sure

Directions: Using a number from 0 to 10 where 0 is “not important at all” and 10 is “extremely important”, circle the number to indicate how **important** it is that you and your family...

How **important** is it to you that your family ...

Dinner Time	Not at all Important										Extremely Important
1. Make and eat dinner at home	0	1	2	3	4	5	6	7	8	9	10
2. Make dinner from scratch	0	1	2	3	4	5	6	7	8	9	10
3. Make dinner using easy-to-prepare, packaged foods	0	1	2	3	4	5	6	7	8	9	10
4. Eat fast food for dinner	0	1	2	3	4	5	6	7	8	9	10
5. Eat a healthy, balanced meal	0	1	2	3	4	5	6	7	8	9	10
6. Eat together as a family	0	1	2	3	4	5	6	7	8	9	10

Directions: Using a number from 0 to 10 where 0 is “completely disagree” and 10 is “completely agree”, circle the number to indicate how much you agree or disagree with **barriers to cooking healthy meals**...

How much do you agree or disagree that these items are **barriers to cooking healthy meals**?

Barriers to Cooking Healthy Meals	Completely Disagree										Completely Agree
1. It costs too much	0	1	2	3	4	5	6	7	8	9	10
2. We do not have the time	0	1	2	3	4	5	6	7	8	9	10
3. I don't like to cook	0	1	2	3	4	5	6	7	8	9	10
4. We don't have the information needed	0	1	2	3	4	5	6	7	8	9	10
5. We don't have the equipment or tools needed	0	1	2	3	4	5	6	7	8	9	10

A Bit About You:

Gender

- ☐ Male
☐ Female

Age: _____ years

Number of Children in Household: _____

Employed (check all that apply):

- ☐ Full time
☐ Part time
☐ Student
☐ At home

Number of Adults in Household: _____

Race (check all that apply):

- ☐ White
☐ Black
☐ Hispanic
☐ Other

What kinds of kitchen equipment do you use in a typical week (check all that apply)?

- ☐ Refrigerator
☐ Stove/Oven
☐ Microwave
☐ Electric Skillet
☐ Slow Cooker/Crock-Pot
☐ Toaster Oven

Are you a single parent:

- ☐ Yes
☐ No

Healthy Meals, Healthy Families!

DIRECTIONS: Using a number from 0 to 10 where 0 is "I cannot do at all" and 10 is "Extremely certain I can do it!", circle the number to indicate how **confident** you feel about your ability to....

Cooking and Shopping Confidence	Cannot Do At All										Extremely Certain I Can Do												
	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10	
1. Cook from basic ingredients or “from scratch”																							
2. Follow a simple recipe																							
3. Taste foods that you have not eaten before																							
4. Prepare and cook new foods and recipes																							
5. Prepare and cook a healthy, balanced meal																							
6. Choose healthy items at the grocery store																							
7. Use a Nutrition Facts Panel																							
8. Set a budget for your family																							

Food Safety Knowledge

Please **circle** the answer that you think is correct:

- How long should you thoroughly **wash your hands** before preparing food?
 - 5 seconds
 - 20 seconds
 - 30 seconds
 - 1 minute
- What temperature range is the "Temperature Danger Zone" where **bacteria grow** the fastest?
 - 0° to 40°F
 - 40° to 140°F
 - 60° to 125°F
 - 140° to 160°F
- It is a good idea to cool a leftover meatloaf at room temperature for 2 to 3 hours before refrigerating it.
 - True
 - False
- How long can foods be in the Temperature Danger Zone before they should be thrown out?
 - 30 minutes
 - 2 hours
 - 4 hours
 - 6 hours

Read the Label: Make Your Calories Count

Nutrition Facts	
Serving Size 8 fl oz (240mL)	
Servings Per Container 8	
Amount Per Serving	
Calories 160	Calories from Fat 25
% Daily Value *	
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Saturated Fat 1.5g	8 %
Trans Fat 0g	
Cholesterol 5mg	2 %
Sodium 150mg	6 %
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Dietary Fiber 1g	5 %
Sugars 26g	
Protein 8g	
Vitamin A	10 %
Vitamin C	4 %
Calcium	30 %
Iron	4 %

**Low Fat
Chocolate Milk**

Nutrition Facts	
Serving Size 8 fl oz (240mL)	
Servings Per Container 8	
Amount Per Serving	
Calories 80	Calories from Fat 0
% Daily Value *	
Total Fat 0g	0 %
Saturated Fat 0g	0 %
Trans Fat 0g	
Cholesterol <5mg	0 %
Sodium 125mg	5 %
Total Carbohydrate 12g	4 %
Dietary Fiber 0g	0 %
Sugars 12g	
Protein 8g	
Vitamin A	10 %
Vitamin C	4 %
Calcium	30 %
Iron	0 %

**Fat Free
Milk**

DIRECTIONS: Please circle the answer you think is most correct.

- How do the **calories** for 1 serving of each of these compare?
 - Low fat chocolate milk has fewer calories
 - Fat free milk has fewer calories
 - They have the same calories
- How does the percent Daily Value of **saturated fat** for 1 serving of each of these products compare?
 - Low fat chocolate milk is lower in saturated fat
 - Fat free milk is lower in saturated fat
 - They are both low in saturated fat
- How does the percent Daily Value of **calcium** for 1 serving of each of these products compare?
 - Low fat chocolate milk is higher in calcium
 - Fat free milk is higher in calcium
 - They are both high in calcium
- Which product is the **smarter choice** when thinking about calories, saturated fat, and calcium in a serving?
 - Low fat chocolate milk
 - Fat free milk
 - They are both the same

READ THE LABEL: Breakfast Cereal

DIRECTIONS: Use the Nutrition Facts Panel on the left to answer these questions.

Nutrition Facts	
Serving Size 1 cup (53g)	
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Amount Per Serving	
Calories 190	Calories from Fat 25
% Daily Value *	
Total Fat 3g	5 %
Saturated Fat 0g	0 %
Trans Fat 0g	
Cholesterol 0mg	0 %
Sodium 95mg	4 %
Total Carbohydrate 36g	12 %
Dietary Fiber 8g	32 %
Sugars 13g	
Protein 9g	
Vitamin A	0 %
Vitamin C	10 %
Calcium	4 %
Iron	10 %

- Is this cereal **HIGH** in fiber?
A. Yes
B. No
- Is this cereal **HIGH** in iron?
A. Yes
B. No
- Is this cereal a **GOOD** source of calcium?
A. Yes
B. No
- Is this cereal **LOW** in sodium?
A. Yes
B. No

MYPLATE QUESTIONS: *Please circle* the answer you think is correct.

- Dry beans, eggs, and nuts are in which MyPlate food group?
A. Protein foods group
B. Vegetable group
C. Grains group
D. Dairy group
- How much of the food on your plate should be fruits and vegetables?
A. One-quarter (1/4)
B. One-third (1/3)
C. One-half (1/2)
D. Two-thirds (2/3)
- Which of the following is a **whole grain**?
A. Wheat bread
B. Flour tortilla
C. White rice
D. Oatmeal

INTEREST IN FUTURE ACTIVITIES:

Are you **interested** in any of the following activities? If so, check "Yes"

	Yes	No
1. Learning more about cooking healthy meals that taste good?		
2. Learning more about how you can make healthier food choices for your family?		
3. Learning more about how to cook healthy meals for your family?		
4. Learning how to better budget your money for healthy meals?		
5. Having your children learn more about how to make healthier food choices?		

APPENDIX C

CURRICULUM FOR NUTRITION INTERVENTION

Virtual Grocery Store Tour Curriculum

Nutrition Label

Objective: Increase participants' knowledge and **confidence** in the Nutrition Facts Label when shopping at the grocery to choose healthy food items.

Assessment: Participants will complete a posttest survey measuring their knowledge on Nutrition Fact Labels when compared to the pretest survey. Also, the virtual grocery store tour will provide a short game to "test" the subjects' skills on the curriculum in order to provide feedback.

Content: During the virtual grocery store tour, participants will learn about the Nutrition Facts Panel and how to use this viable information to make healthy choices in the grocery store. The segment will define the following information when comprehending a Nutrition Food Label:

- Amount of servings per container and a visual of 1 serving size
- How to determine healthy food items based on:
 - Total fat grams per total calories in 1 serving
 - Daily Value Percentages
 - >20% = a lot of one nutrient, once in a while treats
 - 10-15% = good amounts of one nutrient, incorporate throughout the week
 - <5% = good choices, can have every day
 - Type of fat content, sodium, cholesterol
 - Dietary fiber
 - Vitamins and Minerals

Daily Value Percentages will be the main piece of the segment for subjects to learn how to quickly judge if a food item is healthy. Curriculum from the Food and Drug Administration website, "Make Your Calories Count – Use the Nutrition Facts Label for Healthy Weight Management: Judge if it's right for you," will be utilized for the end of the segment to create an interactive assessment with the entire group prior to the posttest survey

(<http://www.accessdata.fda.gov/videos/CFSAN/HWM/hwmsk03.cfm>).

Selecting Healthy Food Items

Objective: Once learning how to comprehend a Nutrition Facts Label, subjects will learn how to go through a grocery store aisle and pick healthy food items from each food group.

Assessment: Participants will complete a posttest concerning reading Nutrition Food Labels. Also, the virtual grocery store tour will provide a short game for them to "test" their skills on the curriculum in order to provide feedback.

Content: The food items used as examples will relate to the “Slow Cooking” cookbook given to participants. Pictures will be taken from a local, Delaware County grocery store to illustrate a virtual grocery store tour. A voiceover will provide instruction on how to look for healthy items on the grocery shelves and how to pick fresh fruits and vegetables. Once again, participants will be taught how to use the Nutrition Facts Label to choose the healthier food item on the grocery shelves. Picking fruits and vegetables will be touched on as to how to select these healthy food items, and a seasonal list for fruits and vegetables will be distributed for the participants to use when grocery shopping.

APPENDIX D

LETTER OF INFORMED CONSENT

Letter of Informed Consent

Study Title

Healthy Meals, Healthy Families

Study Purpose and Rationale

The purpose of this study is to determine the effectiveness of a community nutrition education intervention at improving nutrition knowledge, grocery shopping skills, and confidence in cooking ability among low-income individuals. Findings from this study may be used to further develop and implement community programs that successfully impact nutrition knowledge, as well as grocery shopping and food preparation skills, enabling individuals to better provide nutritionally adequate meals for themselves and their families.

Inclusion/Exclusion Criteria

To be eligible to participate in this study, you must be 18 years of age.

Participation Procedures

For this project you will be asked to complete a pretest questionnaire, view a nutrition education presentation, and then complete a posttest questionnaire. It will take approximately 5-10 minutes to complete each questionnaire. The duration of the entire project will be approximately 1 hour. Everyone who participates will receive a slow cooker recipe book and several educational handouts. In addition, all participants will be eligible for a drawing to receive a slow cooker.

Data Confidentiality or Anonymity

All data will be collected anonymously. You will not be asked to provide any identifying information.

Storage of Data

The questionnaire responses will be stored in a Ball State University faculty's locked office, and will be destroyed after one year. The data will also be entered into a software program and stored on the researcher's password-protected computer. Only members of the research team will have access to the data.

Risks or Discomforts

There are no anticipated risks from participating in this study. You may choose not to answer any question that makes you uncomfortable. You may also quit the study at any time.

Who to Contact Should You Experience Any Negative Effects from Participating in this Study

Should you experience any feelings of anxiety, there are counseling services available to you through Still Waters Professional Counseling, LLC in Muncie, (765) 284-0043. You will be responsible for the costs of any care that is provided. It is understood that in the unlikely event that treatment is necessary as a result of your participation in this research project, Ball State University, its agents, and employees will assume whatever responsibility is required by law.

Benefits

Benefits to participating in this study may include increased nutrition knowledge, a better understanding of the grocery shopping process, and improved confidence in one's ability to prepare meals.

Voluntary Participation

Your participation in this study is completely voluntary, and you are free to withdraw your participation for any reason without penalty or prejudice. Please feel free to ask any questions of the investigator before signing this form and at any time during the study.

IRB Contact Information

For one's rights as a research subject, you may contact the following: Office of Research Integrity, Ball State University, Muncie, IN 47306, (765) 285-5052, irb@bsu.edu

Study Title

Healthy Meals, Healthy Families

Researcher Contact Information

Stacey Driver, Graduate Student
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APPENDIX E

- E-1 EVENT MATERIALS
- E-2 EVENT POSTER
- E-3 EVENT SIGN-UP
- E4 EVENT FLYER (BLOOD 'N FIRE)

Free Cookbooks!!!

Healthy Meals, Healthy Families

8:45 am or 12:45 pm

Win a Slow Cooker!

Free Food!!!

March 20th, 2013

Want to save time and money?? Learn how to get great deals at the grocery store and make family meals with a slow cooker!

Sign up at the front office for the time that best fits your schedule.

APPENDIX E-2 EVENT POSTER

APPENDIX E-3 EVENT SIGN-UP

Healthy Meals, Healthy Families Event

March 20th

Sign-up Sheet

[illegible]

***You will learn about shopping and cooking healthy foods. A slow cooker, cookbook, and food will be given away for free as part of the event.**

Free Cookbooks!!!

Healthy Meals, Healthy Families

4:00 pm

Win a Slow Cooker!

Class space
limited

April 27th, 2013

Want to save time and money?? Learn how to get great deals at the grocery store and make family meals with a slow cooker!

Free Samples of the Recipe will be distributed.

APPENDIX F
SUPPORT LETTERS

F-1 HEAD START

F-2 BLOOD 'N FIRE

Appendix F-1

**TRANSITION RESOURCES CORPORATION
TRC HEAD START PROGRAM
3900 E. WYSOR ST.
MUNCIE, IN 47303
(765)288-3000 PHONE * (765) 288-3003 FAX**

February 19, 2013

Dr. Carol Friesen
Department of Family and Consumer Sciences
AT 150
Ball State University
Muncie, IN 47306

February 14, 2013

Dear Dr. Friesen,

Head Start of Delaware County is excited about working with you and your graduate students in the development of the Healthy Meals, Healthy Families initiative! We welcome you to our facility and we will do all we can to encourage our students' parents to attend one of your presentations.

In addition to supporting your project, we would be more than willing to serve as your community partner in your grant application to the Ball Brother's Foundation. We look forward to working as a team to help improve the knowledge and skill-set of our Head Start families in hopes of helping them develop healthier habits that can last a lifetime.

Please not hesitate to let me know how we can further assist you in these endeavors.

Sincerely,

Char Peak
Site Manager, Muncie Head Start
Transition Resources Corporation
3900 E Wysor
Muncie, IN 47303

APPENDIX F-2

Dr. Carol Friesen
Department of Family and Consumer Sciences
AT 150
Ball State University
Muncie, IN 47306

February 14, 2013

Dear Dr. Friesen,

Blood-N-Fire is excited about working with you and your graduate students in the development of the Healthy Meals, Healthy Families initiative! We welcome you to our facility and we will do all we can to encourage our students' parents to attend one of your presentations.

We look forward to working as a team to help improve the knowledge and skill-set of our families in hopes of helping them develop healthier habits that can last a lifetime.

Please do not hesitate to let me know how we can further assist you in these endeavors.

Sincerely,

Bob Ball
300 N. Madison Street
Muncie, IN 47305

APPENDIX G

NUTRITIONAL EDUCATION HANDOUTS

In the Home

Parents have lots of opportunities to discuss nutrition with their kids. And even though busy schedules mean that sometimes families can't eat together, there are plenty of times to talk about healthy eating habits at home with your child — even away from the dinner table.

It's What's On the Back (or Side) That Counts

When they're snacking, remind your kids that the front isn't the most important part of the package. Let them know they should check out the black and white **Nutrition Facts Label** on food packages. That's where they can "**Spot The Block**" and find out the nutrition information they need to know.

Compliment Label Reading

If you see children **reading a label**, make sure to compliment and encourage their action. Let them know they are taking important steps towards managing their own health and nutrition!

Make the Shopping List Together

Have your child **Spot The Block** in the **pantry** and **refrigerator** by using the Nutrition Facts Label on food packages. Encourage your child to pay particular attention to those foods that have more nutrients to get more of and fewer nutrients to get less of. Then, invite your child to add "restocking" items to the family shopping list using this new knowledge as a guide.

Guess the Serving Size

When your kids are choosing snacks, challenge them to **measure out** what they *think* is one serving. Then have them measure out what the *actual* serving size is according to the Nutrition Facts Label on the food package.

Discuss any difference in amounts so they can see **how many servings** they're really eating, and remind them to always check out the serving size.

Prepare Individual Servings of Snacks

Have your child check the Nutrition Facts Label on the food packages of their favorite snacks and measure out **single servings**. Keep individual servings in resealable plastic bags or containers.

Have a Snack Food Scavenger Hunt

Invite each family member to choose a favorite snack food in the kitchen, and have your child lead everyone in finding which food is **highest or lowest in a particular nutrient**.

For example, compare the number of calories in one serving of each food. Find the nutritional "winner" with the lowest calories. Use different nutrients on different days: on another day, **Spot The Block** for foods high in nutrients to get more of and find those "winners." Remind your kids to choose nutrients wisely when deciding on snacks.

Spot The Block with Friends

When your child has friends over, **challenge them** to **Spot The Block** when they want a snack. Encourage them to see who can find the most interesting fact on a Nutrition Facts Label and try to stump the others. They can use questions such as, "How big is one serving of these chips?" Have them choose the snacks lowest in nutrients to get less of.

At the Supermarket

Challenge your child to **Spot The Block** on different items at the supermarket. This is a great opportunity to compare different foods and use the Nutrition Facts Label on food packages!

Select Canned Fruit with the Fewest Grams of Sugar

Have your child check out the Nutrition Facts Label on different **canned fruit** to find the one with the lowest amount of sugar.

Find Vegetables with the Highest Percentage of Vitamin A

Send your child to the freezer section to **Spot The Block** on **different frozen vegetables**, including types with and without sauce. Ask him or her to find the one with the lowest fat content and the highest amount of vitamin A. Remind your child that vitamin A is a nutrient to get more of.

Choose the Cereal with the Fewest Grams of Sugar

Ask your child to find a cereal that is **low in sugar** and **high in fiber**. Have him or her compare that cereal to one you currently have at home. Remind your child to choose nutrients wisely.

Find the Frozen Pizza with the Lowest Total Fat

Ask your child to **Spot The Block** on frozen pizzas to see which has the **lowest fat and sodium**, two nutrients to get less of. Choose the one that is highest in nutrients to get more of, such as calcium and iron.

Check Out the Nutrition Facts Label on Nuts and Dried Fruits

Nuts and dried fruits can make great snacks because they often contain nutrients to get more of. However, too many servings can add up to a lot of calories. Have your child check out the serving sizes for peanut butter, nuts and dried fruit. Remind him or her that **serving size is important**.

Continue the Dialogue After Leaving the Store

Make the car ride home and the unpacking of groceries into **teachable moments**. Ask your kids if they learned anything interesting while reading labels. Use their answers as a springboard for discussing how easy it is to use the Nutrition Facts Label on food packages.

You and your kids can check out labels while putting away groceries. Have your tween choose which food he or she thinks was the best purchase that day and use the Nutrition Facts Label on the food package to explain why.

With these practical **Spot the Block** tips for parents, you can **help your kids get their food facts first**. They'll be learning healthful dietary habits that can last a lifetime!

LIVE WELL! THE NUTRITION FACTS LABEL... YOUR GUIDE TO NUTRIENT-RICH FOODS

The Nutrition Facts label is your guide to making the most nutrient-rich food choices while staying within your daily calorie budget. You'll find it on most packaged foods in the supermarket and frequently on posters and in brochures for fresh foods such as produce, fish and meat.

Here's what the Nutrition Facts label shows you:

Serving Size

The serving size for this food is one package. All the nutrition numbers listed are based on this amount. Compare the serving size to the amount you eat and adjust the numbers as needed. For example, if you ate only half the package of this food, you'd divide the numbers shown by two (e.g., 130 calories).

Servings Per Container

Note carefully! This package contains one serving, but sometimes even small packages contain more than one serving.

Nutrition Numbers

The label lists the number of Calories and the number of Calories from Fat in one serving. Also listed are the grams of Total Fat, Saturated Fat, Trans Fat, Total Carbohydrate, Dietary Fiber, Sugars, Protein and milligrams of Cholesterol and Sodium. Sometimes labels list extra information. For example, this label lists the grams of Monounsaturated Fat and Polyunsaturated Fat and milligrams of Potassium.

Percent Daily Values

These percentages show how much of each nutrient one serving provides in a 2,000-calorie diet. For this label, one serving of food provides 11% of the Total Fat and 15% of the Calcium recommended for the day.

Hit Your Targets...Not Too High

For nutrients we sometimes get too much of (Fat, Saturated Fat, Cholesterol and Sodium), your daily goal is to total 100% or less of the Daily Value. There is no Daily Value for Trans Fat, but experts recommend keeping intake as low as possible.

Hit Your Targets...Not Too Low

For nutrients such as Potassium, Dietary Fiber, Calcium, Iron, Vitamin A and Vitamin C, your daily goal is to reach 100% of the Daily Value. Look for foods that are good sources (10-19% of the Daily Value) or excellent sources (20% or more of the Daily Value) of nutrients like these. This label shows that one serving of the food is an excellent source of Dietary Fiber and Vitamin A and a good source of Potassium, Calcium and Iron.

Did You Know?

Some important vitamins and minerals are not required to appear on the Nutrition Facts Label (although the manufacturer sometimes chooses to list them). For example, a serving of beef stew is an excellent source of vitamin B₁₂ and zinc, but the amounts and % Daily Value may not be on the label. To learn about the nutrients in each of MyPlate's food groups, go to ChooseMyPlate.gov

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Fruits and Vegetables in Season

Fall

Acorn Squash
Apples
Butternut Squash
Cauliflower
Figs
Garlic
Grapes
Leaf Lettuce
Mushrooms
Parsnips
Pears
Pomegranate
Pumpkin
Sweet Potatoes

Winter

Brussels Sprouts
Grapefruit
Kale
Leeks
Lemons
Oranges
Radishes
Tangerines
Turnips

Spring

Apricots
Asparagus
Avocado
Cabbage
Carrots
Collards
Mango
Mustard Greens
New Potatoes
Pineapple
Rhubarb
Spinach
Baby Lettuce
Strawberries
Sugar Snap Peas
Snow Peas
Vidalia Onions

Summer

Beets
Bell Peppers
Blackberries
Blueberries
Broccoli
Chinese Cabbage
Chile Peppers
Corn
Cucumbers
Eggplant
Green Beans
Nectarines
Okra
Peaches
Plums
Raspberries
Summer Squash
Tomatoes
Watermelon
Zucchini

Cooking Fresh Vegetables

Vegetable	How to Prepare	How to Cook	Serving Amounts
Broccoli	Remove leaves and tough stalk ends. Wash. Cut into flowerets or spears.	Place in glass dish; add 2 tbsp. water, cover with plastic wrap, and microwave on HIGH 4 minutes.	3 – 4 per pound
Carrots	Wash; remove ends, rinse, and slice.	Cook, covered, in small amount of water for 8 – 10 minutes.	4 per pound
Corn	Remove husks and silks. Leave on cob or cut off kernels and scrape cob with back of knife.	Cover whole ears with water; boil 10 minutes. Or, place in glass dish with ¼ c. water; cover with plastic wrap; microwave on HIGH 2-3 minutes per ear. Cook cut corn, covered, in small amount of boiling water 8-10 minutes.	4 per 4 large ears
Green Beans	Wash, trim ends, and remove strings. Cut into 1-½ inch pieces.	Cook, covered, in small amount of boiling water 12-15 minutes.	4 per pound
Potatoes	Scrub and peel. Slice, cut in chunks, or leave whole.	Bake whole 1 hour at 400°F. Or, pierce several times with fork, microwave on HIGH 8-10 minutes. Or, cook in small amount of boiling water 30 minutes (whole), 20 minutes (slices or chunks).	3 per pound
Summer Squash	Wash; trim ends, slice or chop.	Cook, covered in small amount of boiling water 8 -10 minutes.	3 per pound
Winter Squash <i>Acorn</i> <i>Butternut</i> <i>Hubbard</i> <i>Spaghetti</i>	Rinse, cut in half, and remove seeds.	Cook in boiling water 20 – 25 minutes. Or, place in shallow dish, cut side down, and add ½ inch of water. Bake, uncovered, at 375°F for 30 minutes. Turn and bake 20 -30 minutes.	2 per pound
Sweet Potatoes	Scrub and peel. Leave whole, slice or cut in chunks.	Bake whole 1 hour at 400°F. Or, pierce several times with fork, microwave on HIGH 5-8 minutes. Or, cook in small amount of boiling water 30 minutes (whole), 20 minutes (slices or chunks).	3 per pound