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THE IMPACT OF PERSONAL BARRIERS TO INCORPORATING
THE AMERICAN HEART ASSOCIATION DIET

A Scholarly Project Submitted to the Graduate School in Partial Fulfillment of the
Requirements for the Degree of Doctor of Nursing Practice

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THE IMPACT OF PERSONAL BARRIERS TO INCORPORATING THE AMERICAN HEART ASSOCIATION DIET

An Abstract of the Scholarly Project by
Aaron Bigando

The leading cause of death worldwide is cardiovascular disease. Diet is the most influential, modifiable factor related to the development and progression of cardiovascular disease. The American Heart Association developed a diet that delivers guidelines for diet. Therefore, identifying the most significant factors that hinder the effectiveness of the diet was necessary. These hindrances can be categorized as physical, psychosocial, and socioeconomic barriers. Demographic differences also impact diet.

A survey was developed to identify and account for the most common dietary barriers. The Barriers to Healthy Eating scale addressed different circumstances which impact diet. By using this scale, providers can understand the individualized barriers for each patient. After meeting the inclusion criteria, 152 research participants completed the scale. Once the surveys were completed, a factor analysis was conducted to identify trends in barriers which allows for more effective education and interventions related to diet. This study emphasized the understanding that everyone must deal with unique life circumstances, and they directly impact their diet. With improvements to the quality of diet for patients, cardiovascular deterioration can be reduced.

Keywords: Diet, cardiovascular disease, barriers to healthy eating.

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Chapter I

Introduction

Cardiovascular disease (CVD) is the single leading cause of morbidity and mortality in the world (Ravera et al., 2016). Accounting for approximately one-third of deaths in America, cardiovascular disease is the most important factor influencing the health and vitality of a person in the United States (Ravera et al., 2016). As determined by the Global Burden of Disease Study Mortality and Causes of Death Collaborators (2015), effective dietary choices are thought to be the most valuable target for CVD prevention and treatment.

Description of Clinical Problem

Cardiovascular health is a significant component of health-related quality of life. Cardiovascular health is strongly influenced by dietary choices. For most people in the developed world, improving diet in the direction indicated by the American Heart Association (AHA) diet is the lowest cost way to achieve the best overall health outcomes for an extended period of time. Despite the fact that dietary choices represented by the AHA diet have been repeatedly shown to have a strong positive impact on health-related quality of life, clinicians who recommend the AHA diet to their patients find that many patients are not able to fully incorporate the AHA diet into daily life.

This project was used to identify the value of implementing the AHA diet for short-term and long-term cardiovascular function improvements. Specifically, the project utilized a patient-centered and holistic understanding of a patient's physical, mental, social, and financial circumstances to impart a system for which they could develop the most nutrient-dense diet to provide the most favorable outcomes in achieving or maintaining the highest level of function and vitality possible.

Several provoking questions arose when trying to delve into the research that has already been pursued in this facet of medicine. For example: Could a patient maintain their quality of life over a long-term period if they have not seriously considered the importance of their diet on cardiovascular status? What were the risks to adopting a diet that does not value nutrient-dense foods from the AHA diet on the cardiovascular system in comparison to morbidity and mortality of those who do? What dietary choices were consistent with incorporating the AHA diet to improve or maintain cardiovascular function? These questions were all factors that were considered from the perspective of all involved in the care of the individual. Both providers and patients alike should value primary care preventative practices for the sake of cardiovascular health.

Significance

The goal of this DNP Scholarly Project was to better patient outcomes and quality of life through interventions or modifications that can be made to impact nursing practice (Moran et al., 2020). Consequently, evidence suggested that education from providers directly impacts the health choices of their patients (Quader et al., 2017). However, there were a variety of conflicts with patients who would benefit from primary prevention intervention for the sake of their cardiovascular status. By addressing these discrepancies

within the healthcare setting, the patient could benefit from more effective preventative measures through dietary changes, by whatever means necessary. Researching and studying health education allows changes to be developed so health care providers can impart the most effective dietary education available for patients in regard to cardiovascular status enhancements.

Significance to Patients

By gaining a better understanding of the barriers patients may have to adhering to a prescribed diet, healthcare providers could help patients overcome those barriers to improve dietary compliance with more effective education. This can lead to improved health outcomes, including reduced cardiovascular event risk. The overarching goal of this project was to address these topics actively in an upstream manner in hopes to maintain the highest quality of life possible for each patient rather than in a retrospective manner.

Significance to Nursing and Society

Nursing and society were improved because it gave the provider more effective resources to utilize when providing patient education. Additionally, the patient could incorporate the dietary education they have received to enhance their cardiovascular function and strength. More time may be allocated to discussing risk factors that the patient may develop if they do not address their nutrition. These conditions could incite more appropriate education which can result in patients better understanding their circumstances. These circumstances give the individual the opportunity to adopt the best dietary changes possible for their current and future cardiovascular welfare. By

improving cardiovascular welfare, society could be improved because of the ability to improve overall quality of life.

Specific Aims and Purpose

The purpose of this project was to conduct a survey of patients in a rural health setting which addressed their current diet in order to identify and address physical, psychosocial, and socioeconomic obstacles as well as demographic variables that prevent patients from achieving optimal cardiovascular health through their diet. When dietary education is performed, the concern is how the barriers could be navigated for the patient to successfully incorporate this diet. There were many significant considerations which impacted the viability of incorporating the diet. The goal was to address the most significant factors that hindered the effectiveness of the diet. The physical, psychosocial, and socioeconomic barriers needed evaluation, as well as the connection between factors and demographic variables.

Each patient has circumstances which impact their ability to achieve personalized health goals. Dietary choices play a pivotal role in the results of these outcomes. The goal was to gain a better understanding of the physical, psychosocial, and socioeconomic barriers faced by rural patients who are prescribed the AHA diet. Assessing the conditions of the individual was imperative to cardiovascular health outcomes for patients in primary health prevention.

Theoretical Framework

The theoretical framework of the research was centered on health promotion through a focus on valuable nutritional and dietary choices. Pender's health promotion

model was an appropriate theoretical model because it is centered more closely on patient wellness rather than avoiding illness. Each person had their own circumstances for which their health promotion was influenced, so finding a well-rounded strategy for each individual is the overarching goal for the patient and provider. The goal of this theory was to attain a higher level of wellness and to improve quality of life through health promoting behaviors. The assumptions of the theory are summarized as: (1) individuals seeking to manage their own behavior, (2) individuals interacting and transforming within their environment over time, (3) health professionals influencing patients because they are a part of the interpersonal environment, and (4) interventional influences from person-environment patterns are required for changing behavior (Petiprin, 2016).

The model demonstrates the value of dietary education and assessments based on the nutritional status of the patient. Thirteen statements come from Pender's model. However, there are four that specifically represented the goals of this scholarly project, and Petiprin (2016) elaborated on some essential distinctions. Pender's model states that individuals commit to adopting behaviors that they expect will benefit them. The next statement shows that positive impressions and understanding of a behavior leads to greater perceived self-efficacy to increase positive effects. Following that, Petiprin (2016) implies that people are more likely to devote themselves to health-promoting behaviors when significant others also model, expect, and support the behavior. The last statement related to the project suggested that the external circumstances of an individual can increase or decrease commitment to the participation in health-promoting behaviors. Petiprin (2016) identifies four major assumptions but there are two which coincide with the four previously mentioned statements. The first assumption that applied to dietary

education and the holistic approach to cardiovascular health education notes that healthcare professionals was included in the interpersonal environment of the individual which influences them throughout life. The second assumption claims that “Self-initiated reconfiguration of the person-environment interactive patterns is essential to changing behavior” (Petiprin, 2016, para. 3). Consequently, there must be an internal desire and access to the necessary resources for the individual to effectively adopt changes.

Project Question

The purpose of this scholarly project was to identify factors that inhibit a person from being able to adopt and maintain the AHA diet when recommended. By considering the different individualized factors which impact diet, specific barriers could be isolated to demonstrate their hindrance for the individual. Therefore, the project questions proposed included:

- 1) What are the physical factors that can affect adherence to a prescribed AHA diet?
- 2) What are the psychosocial factors that can affect adherence to a prescribed AHA diet?
- 3) What are the socioeconomic factors that impact adherence to a prescribed AHA diet?
- 4) What are the demographic considerations including age range, gender, ethnicity, and income range that are related to AHA diet adherence?

Definition of Key Terms and Variables

- Diet – liquid and solid foods regularly consumed in normal living (*Taber's Cyclopedic Medical Dictionary*, 2017).
- American Heart Association (AHA) Diet – a diet for optimal cardiovascular health advocated by the American Heart Association (AHA). The AHA recommends meal plans that emphasize fruits, vegetables, whole grains, and fish, but little sodium, fat, or sugar (*Taber's Cyclopedic Medical Dictionary*, 2017).
- Dietary Approaches to Stop Hypertension (DASH) – a diet developed to treat stage 1 hypertension consisting of a substantial quantity of cereals, fruits, and vegetables for fiber, vitamins, and minerals, low-fat dairy, nuts, and lean meats to maximize protein intake without excess saturated fat and cholesterol incorporated (*Taber's Cyclopedic Medical Dictionary*, 2017).
- Mediterranean Diet – a well-tolerated, palatable diet modeled on the traditional cuisine of Italy, Greece, and the islands of the Mediterranean Sea. It centers on fish and other seafood, wine, and olive oil, and derives about twenty-five to thirty-five percent of its calories from fat, but the primary source of fat is olive oil, a monounsaturated fat (*Taber's Cyclopedic Medical Dictionary*, 2017).
- Provider – a professional who gives health care services, or an institution that supervises the rendering of such services (*Taber's Cyclopedic Medical Dictionary*, 2017).
- Primary care provider – the care provider (nurse practitioner, physician's assistant, or physician) a patient will first seek counsel from about a problem with his or her health (*Taber's Cyclopedic Medical Dictionary*, 2017).

- Patient – a person awaiting or receiving medical treatment or care for an injury or illness (Merriam-Webster, n.d.).
- Rural – any population, housing, or territory not included within an urbanized area (*U.S. Census Bureau, 2016*).
- Health-related Quality of life – the degree a person defines as healthy and comfortable enjoy activities of daily living (Merriam-Webster, n.d.).
- Coronary Artery Disease (CAD) – narrowing of the coronary arteries, usually as a result of atherosclerosis (*Taber's Cyclopedic Medical Dictionary, 2017*).
- Atherosclerosis – marked cholesterol-lipid-calcium deposits in walls of arteries that may restrict blood flow (*Taber's Cyclopedic Medical Dictionary, 2017*).
- Hypertension – In adults, a condition in which the blood pressure is higher than 140 mm Hg systolic or 90 mm Hg diastolic on three separate readings recorded several weeks apart. It is one of the major risk factors for major cardiovascular events and kidney failure (*Taber's Cyclopedic Medical Dictionary, 2017*).
- Cholesterol – a monohydric alcohol; a sterol widely distributed in animal tissues. It is synthesized in the liver and is a normal constituent of bile. An elevated blood level of cholesterol increases a person's risk of developing coronary artery disease. Lowering elevated total blood cholesterol levels and the levels of low-density lipoprotein cholesterol reduces the risk of heart attacks both in persons with a prior history of coronary disease and in asymptomatic individuals (*Taber's Cyclopedic Medical Dictionary, 2017*).

- Obesity – a state of an unhealthy accumulation of body fat in which the body mass index is greater than 30 kg/m² (*Taber's Cyclopedic Medical Dictionary*, 2017).
- Metabolic syndrome – the presence of three or more of the following related atherosclerotic risk factors: the use of an antidiabetic medication; elevated fasting blood sugar; hypertension, elevated triglyceride level, reduced high-density lipoprotein cholesterol, and abdominal obesity. This syndrome affects an estimated 40 percent of all Americans and places patients at high risk for type 2 diabetes, cardiovascular disease, and stroke (*Taber's Cyclopedic Medical Dictionary*, 2017).
- Inflammation – an immunological defense against injury, infection, or allergy, marked by increases in regional blood flow, immigration of white blood cells, and release of chemical toxins. Inflammation is one way the body uses to protect itself from invasion by foreign organisms and to repair wounds to tissue (*Taber's Cyclopedic Medical Dictionary*, 2017).

Logic Model of Proposed DNP Project

Purpose and Mission

Cardiovascular disease is a leading cause of morbidity and mortality in the United States, so educating patients on valuable interventions that can be made is paramount to the improvement of cardiovascular health. This scholarly project analyzed individualized characteristics which could impact the ability of patients to implement the AHA diet for their cardiovascular system. The purpose of this scholarly project was to identify

variables that inhibit a person from being able to adopt and maintain the AHA diet when recommended.

Conditions

This DNP Scholarly Project is intended to identify sociocultural disconnects and inequities in resources that might interfere with patients' ability to achieve cardiovascular wellness. There are many trends in healthcare education that focus on diet and cardiovascular disease; the goal was now to identify where programs fail to meet the needs of specific populations so that appropriate adaptations can be made to promote a mindset of primary prevention. Oftentimes sociocultural and economic barriers existed based on level of education, geography, socioeconomic status, prior life experiences, and individual perceptions on the part of the patient or provider. The goal of this project was to minimize the disparities and inequities related to communicating dietary information which can hinder the effectiveness of healthcare interventions addressed to prevention of cardiovascular disease and reduction of cardiovascular risk.

Inputs and Resources

The inputs and resources for the study would include an array of patients within the area to represent affected individuals in the most realistic way. The DNP Scholarly Project committee was available to affirm the viability of the survey selected for the project. The facilities' administration authorized participation prior to distributing the surveys after explaining the procedure for obtaining input from volunteers. The survey brought into question what resources were available to patients in association with the participating organization.

Interventions

The survey provided information that could help guide future care and included quantitative data. The survey included some questions to help quantify thoughts, impressions, and feelings, but also allowed the participant the opportunity to elaborate on the reason that they answer questions the way they did. The project incorporated a study aimed at addressing patient experiences and perceptions about their physical, psychosocial, and financial circumstances and how they feel it impacts their cardiovascular health. The study took place in Southeast Kansas and was distributed through a local primary care community health clinic. The greatest barrier involved patient participation because the assessment included some questions that are used to evaluate several factors that some participants found to be innately private.

Outputs

The study goal for patient participation was 158. Although this was not a large number of patients to represent the entire surrounding rural patient population, it was calculated that 158 participants would achieve a 95% confidence interval. The outputs would be indicated through quantitative analysis by use of a validated instrument.

Results and Outcomes

The effects of the interventions could change the way dietary education is presented by providers, as well as the resources or provisions adopted to ensure that the most valuable information is accessible by patients. The short-term outcome included being able to understand patient-specific barriers to adopting the AHA diet while

teaching the patient cardiovascular health enhancement through dietary education and counseling. Intermediate or medium-term outcomes can reflect objective data through vital signs, weight loss, and laboratory testing by quantifying the intentionality and focus of diet. Lastly, long-term outcomes could be reflected in the reduction of morbidity and mortality with the reduction or stabilization of various cardiovascular risk factors after incorporating a dietary plan that is most feasible for the individual.

Summary

Cardiovascular health is strongly influenced by dietary choices. Health-related quality of life and vitality are affected by these choices. Individual characteristics and circumstances impact the potential for achieving optimal cardiovascular health. Comprehensively understanding the physical, mental, social, and financial circumstances of a patient impacts dietary education and counseling. Appropriate dietary recommendations could be presented for the patient to feasibly implement the most nutrient-dense diet possible when understanding the individual person.

The education presented as a form of primary prevention affects health choices. Disparities exist which could inhibit the quality of nutrition an individual might seek for primary cardiovascular prevention based on physical, social, and financial position. By addressing these inequities, the patient could benefit from more effective preventative counseling through appropriately allocated resources. Future cardiovascular risk can be decreased when addressing risks in a proactive manner. Improving cardiovascular welfare contributes to society because it can improve the vitality of each individual. The goal was to address the most significant factors which can hinder the effectiveness of the diet.

Pender's health promotion model focuses on optimizing health wellness rather than avoiding illness. Each person has their own circumstances for which health promotion is influenced. Finding a well-rounded strategy for each individual is the goal for the patient and provider.

To improve patient outcomes and quality of life further evaluation of personalized complexities is needed. This scholarly project was intended to address downfalls, inequities, and disconnects with nutrition education and implementation for the sake of cardiovascular wellness. The study incorporated a study aimed at addressing patient experiences and perceptions about their physical, psychosocial, and financial circumstances and how they feel it impacts their cardiovascular health. The effects of the interventions may change the way dietary education is presented by providers, as well as the resources or provisions adopted to ensure that the most valuable information was accessible by patients.

Chapter II

Review of Literature

There are several potential interventions that may stem from the research of the American Heart Association (AHA) diet to promote the longevity of cardiovascular function. Different modalities are more appropriate based on a variety of intrinsic and extrinsic factors of both the patient and provider (Baudet et al., 2019). Possible barriers to the AHA diet included: 1) geographic setting which can limit or enhance access to nutrient sources, 2) medical conditions which alter the nutrients the body needs to function optimally, 3) the motivation of the patient and support system to encourage the patient and hold them accountable to their goals, and 4) financial circumstances which affect the quality and quantity of products accessible to adopt the diet to its maximum feasibility. Based on these factors, the provider could assess the readiness and viability for instruction to the patient which allows for the most appropriate means of health education for the sake of cardiovascular wellbeing. The different modes for education are directly linked and adapted to the health circumstances the patient is currently facing including physical, psychosocial, and socioeconomic effects. This can determine the education that is the most important factor for understanding and pursuing the health goals of each patient.

The literature review process involved the identification of relevant studies which contributed to the knowledge base and specific aim of the project. Analysis of previous studies provided input that fosters a strong foundation for future research. The knowledge was organized in a way that validates the importance of further study by identifying and understanding the effect education has on managing one's behavior, transforming patients' environment, influence of health care providers, and interventions for changing behaviors. To achieve this knowledge, a review of literature was undertaken utilizing scholarly nursing and discipline related peer-reviewed journals. A review of the journals CINAHL, PubMed, and UpToDate provided specific research studies that were unique to cardiovascular health through diet.

Diet

Diet is a crucial factor that impacts the growth and development of a person across the lifespan, so addressing dietary concerns throughout life influences the risk of disease development and progression. Diet can impact a patient at any stage of their health and could be promoted within primary, secondary, or tertiary preventative measures.

The AHA Diet is unique in that it used themes of several diets including the plant-based diet, the Mediterranean Diet, and Dietary Approaches to Stop Hypertension (DASH) Diet (Arnett et al., 2019). The AHA Diet was developed to decrease morbidity and mortality by increasing cardiovascular strength and supporting the bodily function through nutrient-dense sources. Mozaffarian (2016) concluded:

“...it is now evident that dietary habits influence diverse cardiometabolic risk factors, including not only obesity and LDL cholesterol but also blood pressure (BP), glucose-insulin homeostasis, lipoprotein concentrations and function, oxidative stress, inflammation, endothelial health, hepatic function, adipocyte metabolism, cardiac function, metabolic expenditure, pathways of weight regulation, visceral adiposity, and the microbiome” Mozaffarian, 2017, para. 4).

Social structure, socioeconomic conditions, or access to care and resources also impact how beneficial the diet can be. Modifications are also necessary to make for the individual based on pre-existing health conditions or those at high-risk to develop a more significant health condition. Lastly, racial and ethnic considerations change how the diet is incorporated because of how cultural differences impact dietary choices.

Prevention

Nursing and nursing practice education center around the understanding that the best treatment for health conditions is prevention. The forward-thinking mindset of preventative medicine imparts the importance of early intervention through education for the physical and mental endurance needed to achieve and sustain the highest quality of life possible (Baudet et al., 2019). The AHA diet is very similar to the Mediterranean diet because of the emphasis it places on nutrient-dense foods. These nutrient-dense foods include fruits, vegetables, lean proteins, fish, whole grains, and legumes (Arnett et al., 2019). Dietary education is invaluable because it applies concepts which can be introduced to anyone.

Primary Prevention

By understanding the typical nutrition of a person prior to increasing health-event risk, the provider could instill guidance that can help positively modify dietary choices through dietary counseling. A randomized controlled study of 131 children in the 2nd grade across three schools in a Midwestern state in the USA was conducted in 2019 aimed at understanding the effect of nutrition education on improving fruit and vegetable preferences in young children (Schmitt et al., 2019). One group of children received the nutrition education curriculum set by the National Health Education Standards which includes the MyPlate, Two-Bite Club, and Put a Rainbow on Your Plate programs, and the education was delivered in alignment with the Social Cognitive Theory approach (Schmitt et al., 2019). Along with the education, the intervention group had tastings of a variety of nutrient-dense foods to associate nutrition with taste (Schmitt et al., 2019). By using a multiple regression analysis with 82 children in the intervention group and 49 children in the control group, the intervention group took two child-level assessments to test the efficacy of the intervention. The results showed that the intervention group had significantly higher scores on the nutrition and health survey and showed greater preferences for fruits and vegetables than the control group (Schmitt et al., 2019). By introducing and imparting the value of these fruits and vegetables at a young age, children are more receptive to them which leads to more consistently consuming these foods.

A 12-week study of whole-food, plant-based nutrition education program was conducted in Quebec, Canada to analyze its effectiveness in prevention of cardiovascular disease (Morin et al., 2019). The mixed-methods research design used qualitative and

quantitative measurements of cardiovascular risk and compared them with different food choices. The results showed an improvement in weight, waist circumference, cholesterol, and LDL improvements with a 95% confidence interval (Morin et al., 2019). By seeing these improvements to cardiovascular risk factors within a mixed methods review, both the patient and provider can more holistically understand ways to develop an individualized dietary plan for success.

Secondary Prevention

Secondary prevention for cardiovascular health and dietary education comes in the form of screening tools (Norris, 2019). These tools can help clinicians understand each patient and make decisions which can guide education to minimize cardiovascular event risks such as stroke, myocardial infarction, cardiovascular disease, hypertension, hyperlipidemia, and chronic inflammatory conditions more comprehensively. These secondary tools are most frequently utilized at primary care and cardiology appointments through assessing laboratory values and imaging studies.

The provider has several options for identifying the health risks of a patient based on their diet. These inflammatory markers are found in routine lab draws. These laboratory values, combined with the individual characteristics of the patient, is important to developing a plan for improving health risks. The improvement in health risks oftentimes involves an enhancement or adjustment in diet and can be supported by the objective secondary screening tools available such as through lab results. Most commonly, providers will screen their patients with a complete blood count (CBC), comprehensive metabolic panel (CMP), and lipid panel yearly. Based on the current health diagnoses, presenting problem, or health risks of the patient, additional labs can be

drawn. This may include a hemoglobin A1c, microalbumin, and urinalysis which are used in the diagnosis or exclusion of diabetes mellitus, or other specific inflammatory markers such as C-reactive protein and erythrocyte sedimentation rate (ESR).

The CBC allows the provider to know the size, shape, quality, and amount of red blood cells in a specimen as well as white blood cells and platelets. Certain types of anemias and thrombocytopenia can be directly impacted by diet. Vitamin B12 deficiency anemia or folate deficiency anemia are treated with dietary modifications as a lifestyle option (Dunphy et al., 2019). The risk for thrombocytopenia and thrombocytosis could be minimized by adopting a higher quality diet such as the Mediterranean diet which promotes similar types of foods that the AHA diet does (Henaez et al., 2021). The options listed include extra-virgin olive oil, nuts, and low amounts of fat.

A CMP is also a very common laboratory test ordered by providers. This test shows the metabolic function of the liver and kidneys through several different markers in the blood (McPherson & Pincus, 2021). Among these tests, sodium, potassium, calcium, chloride, glucose, creatinine, total protein, and albumin are the most indicative of dietary influence. With instability in the CMP, the provider targets an improvement in diet first. Potassium can be directly influenced by the intake of potassium in the diet as is calcium and chloride. The optimal function of the kidneys and liver are, therefore, impacted by the quality of nutrition that is eaten. It is common for the provider to tell the patient to fast for 8 hours prior to drawing the lab to get an overall sense of baseline values because they can be so significantly affected by diet.

The lipid panel is drawn as a fasting value as well because of the well-known influence diet has on cholesterol. The AHA recommends limiting the intake of fatty or

fried foods and promotes vegetable consumption in higher concentrations partly due to its effect on total cholesterol, low-density lipoprotein, and triglycerides (Aumueller et al., 2019). These levels indicate the quality of nutrition that the patient has had over the course of several months. In order to correct imbalances in these lab values, providers will stress the importance of better eating habits, water intake, and may even need to prescribe medication to support the reduction of cholesterol in the body.

Imaging studies can be performed to give reference to providers of the potential harms to the cardiovascular system for patients. An example of imaging studies for cardiovascular event risk is the diagnosis of peripheral artery disease (Norris, 2019). It is often multifactorial in origin, but it is noted as chronic low-grade ischemia to tissues of extremities affected by atherosclerosis. Diagnostic methods include doppler ultrasound, magnetic resonance imaging (MRI) and spiral computerized tomographic arteriography. Once documented, this informs the provider of the patient's increased risk for coronary and cerebrovascular atherosclerosis. Although multiple lifestyle modifications are often required for maintenance, patients often have the comorbidities of hypertension, hyperlipidemia, and diabetes mellitus. All of these comorbidities can be managed, at least to a significant degree, by dietary adjustments that can come in the form of the AHA diet guidelines. This shows the patient the deterioration from their optimal health status, and it allows the provider an opportunity to educate the patient on nutritional changes to regain the best coronary and cerebrovascular function possible.

Tertiary Prevention

Being able to avoid the transition from secondary to tertiary care needs is ideal; however, that does not always happen. "Secondary prevention focuses on reducing the

impact of the disease by early diagnosis prior to any critical and permanent damage. This facilitates avoiding life threatening situations and long term impairments from a disease. Tertiary prevention is used once long term effects set in, by helping the patients to manage pain, increase life expectancy, and increase the quality of life” (Karunathilake & Ganegoda, 2018, p.1). Once cardiovascular function is compromised to the extent which warrants surgical intervention, the importance of education is only exemplified. Following procedures such as a heart catheterization with percutaneous coronary intervention, coronary artery bypass grafting, or pacemaker implantation the patient is at a significant risk for further cardiovascular morbidity and mortality (Norris, 2019). A major concern for many patients is the significant cost of tertiary intervention, knowing they are at a high risk for additional cardiovascular complications, and still needing to adjust their diet to help support the tertiary intervention (Karunathilake & Ganegoda, 2018). To help combat these stressors, the provider and patient can address goals for future care and the basic improvements that diet can help support.

Following cardiovascular intervention therapies, several lifestyle factors must be considered by the patient. They are often referred to cardiac rehabilitation which address several lifestyle practices such as exercise, nutrition, smoking cessation, psychosocial management, and education. Finding the areas of nutrition that need adjustment can be the difference in the patient achieving or maintaining the highest functional quality of life. The frequency, intensity, and duration of a prescribed cardiac rehab depends on a multitude of factors and one of which is their diet which is ultimately what sustains their internal function.

For some, cardiac rehabilitation can be effective even as a home-based intervention. Dietary education is also included in cardiac rehabilitation. A randomized prospective trial was conducted to assess the quality of life, aerobic capacity, and readmission rate for patients with chronic heart failure (Chen et al., 2018). The study of 37 participants was divided that 18 patients were assigned to a control group and 19 patients were assigned to an intervention group at random. Statistically significant improvement was found in the intervention group based on maximal 6-minute walking distance, aerobic threshold, and quality of life by 37% while readmission rate decreased from 14% to 5% over the 90 day timeframe. Rural communities can provide obstacles to cardiac rehabilitation but modern telehealth visits may help minimize these factors. A randomized controlled trial was conducted concerning weight management telehealth intervention for overweight and obese rural cardiac rehabilitation participants (Barnason et al., 2019). Among the results of the 12-week telehealth study of 43 subjects post coronary bypass surgery or percutaneous coronary intervention, there were no significant differences in physical activity of the intervention group. However, the intervention group averaged a weight loss of 13.8 pounds over 4 months. The intervention group had significantly higher total scores on the Diet and Exercise Self-Management survey. This study showed the value of dietary enhancement even after tertiary intervention by understanding the specific eating habits and diet behavior of each individual.

Social Considerations

Social influences include a variety of contributing factors which have the potential to affect the health risks of a person. These factors may include health education and background, resources, housing, finances, stress, health behaviors, and familial

considerations (Hamad et al., 2019). Health education and background provided the individual with a general knowledge base to identify valuable foods. Personal resources, housing, finances, and stress combine as social factors which collectively can challenge the ability to obtain the recommended foods. For the patient to be able to incorporate the recommended foods and sustain them in their diet consistently, they must be able to develop a plan that can also fit within the social construct of their unique circumstances. The Health and Retirement Study was quasi-experimental research that included 30,000 members of a cohort from 1992-2012 (Hamad et al., 2019). The study used an instrumental variables analysis to show the impact of socioeconomic status and cardiovascular disease and risk factors. The results showed statistically significant alterations between education and reduced smoking, depression, and heart disease suggesting that health behaviors and stress are important health mechanisms. According to a qualitative study by Santana et al. (2020) of research platforms and top-ten priorities for cardiovascular health, seven of the ten can be influenced by psychosocial factors or health disparities. These included: access to cardiovascular care, communication with providers, use of eHealth technology, patient experiences, patient engagement, transitions and continuity of care, and integrated cardiovascular care (Santana et al., 2020). The importance of addressing these health disparities will improve patient outcomes.

Social factors include social support, social class, socioeconomic status and social norms/expectations (Mozaffarian, 2016). They have great influence on an array of factors which can enhance or complicate the access to care and incorporation of dietary advisement. This could be quantified by a cumulative social risk score that accounts for one or more social risk factors that could potentially impede medical care and was

applied to risk for silent myocardial infarction (Patel et al., 2020). A case-control cohort study was conducted of 6708 participants from the third National Health and Nutrition Examination Survey. Initially, these participants were determined to be without clinical cardiovascular disease at the time of enrollment after identifying various baseline social risk factors (Patel et al., 2020). Individualized statistical analyses for sub-categories of CSR 1, 2, and 3+ with 2-sided p-value scoring with 95% confidence interval with average 14-year follow-up showed a statistically significant increase in mortality risk from silent myocardial infarction (Patel et al., 2020). The variety of potential barriers for seeking care directly impact the mortality risk, and therefore, impact primary, secondary, and tertiary cardiovascular intervention.

Being able to adapt lifestyle and dietary choices must also be considered from a financial perspective. If an individual has the desire to follow a specific diet, they must also consider the decision related to their finances. Bessems et al. (2020) conducted a study of 108 individuals who were participating in the Good Affordable Food (GAF) program for promoting better quality nutrition for adults with a low socioeconomic status. The quasi-experimental control group showed improvements from pre-test to post-test scores for identifying affordable, quality foods (Bessems et al., 2020). The most common changes noted were that they were more aware of promotions, expensive products, and awareness within the supermarket environment. Each provider must consider what the individual needs in their diet and what resources are available for the patient to develop a plan catered to their best chances for success. Combining pricing and health information in nutrition education allows for effective nutrition education and applicability even in low-income groups.

Condition-Based Considerations

Based on the medical diagnoses and history of an individual, variations in the AHA diet may be necessary for certain patients. This emphasizes the importance of developing a plan of care catered to the needs of each individual. Care can be more effective when the patient and provider both agree on short- and long-term dietary goals. This can only be attained by developing a rapport between the provider and patient. Taking a thorough medical history and review of systems gives the care team an organized method for evaluating and caring for the patient with preexisting medical conditions. Some of the most significant different conditions that need dietary consideration include diabetes mellitus, hypertension, and other chronic inflammatory conditions.

Considerations for Diabetes Mellitus

A common adjustment made to the diet involves adaptations for patients with diabetes mellitus (Abiemo et al., 2013). The particular cross-sectional study is conducted by studying a Mediterranean-style diet which aligns with the AHA diet standards because of its emphasis on fruits, vegetables, fish, nuts, legumes, and unrefined grains. Although the AHA diet has restrictions on grains, individuals with diabetes are encouraged to be even more aware of grains, starches, and sugars that are eaten. The study suggested that over the course of a 20-year span, consumption of this Mediterranean style diet by diabetic patients was associated with significantly lower risk for cerebrovascular disease, coronary artery disease, and stroke.

The AHA diet has been researched and updated periodically as new studies and information have been discovered. A study published in the *British Journal of Nutrition* by de la Iglesia et al. (2014) used the AHA dietary recommendations as a control for studying the effectiveness of long-term dietary effects of the Metabolic Syndrome Reduction in Navarra (RESMENA) diet for the treatment of metabolic syndrome which often leads to the development of diabetes mellitus type 2. The sample included 93 individuals (52 males and 41 females) split randomly. The focus for the study was on anthropometry which is most commonly calculated with body mass index (BMI) in the United States is an important factor which is often linked to diabetes mellitus. The study utilized a two-month nutritional education intervention for the RESMENA diet with a nutritional assessment made every 15 days (de la Iglesia et al., 2014). The control group followed the AHA dietary recommendations with no additional interventions and it was concluded that there was no significant differences in overall anthropometry between the control and intervention groups. This further validates the impact of the AHA diet in that even with a diet specifically designed for metabolic syndrome it did not lead to significant differences in anthropometry.

Type 1 diabetes mellitus is characterized by insulin deficiency due to the destruction of insulin-producing beta cells in the pancreas requiring supplementation to the body (Pietropaolo, 2021). The quality of diet for individuals with Type 1 diabetes mellitus is paramount to their health. The consistency of diet was essential to patient success as well as minimizing the disease progression (Delahanty, 2021). The recommendations for an individual with Type 1 diabetes mellitus directly aligned with the AHA diet. Avoiding excessive carbohydrates, added sugars, artificial sweeteners,

saturated and trans-fats, and alcohol but replacing those with a diet rich in fruits, vegetables, whole grains, legumes, and lean proteins are among the most important considerations. By following the AHA diet, the necessary steps could be taken to avoid hypoglycemic events, maintain a stable blood glucose throughout the day, and minimized the need for fluctuations in insulin supplementation.

Considerations for Hypertension

Patients are at higher risk for development or further progression of hypertension based on their diet (Lichtenstein et al., 2006). By thinking of the diet as a fuel source for the body, one can understand the importance of consuming nutrient dense foods that can supplement the functions of the body. Hypertension is known as “the silent killer” because of how significantly it affects the rest of the body systems and because there are no obvious symptoms for its onset and progression (American Heart Association, 2017). To a certain degree, patients can support their own body’s effort to maintain a homeostatic state of normotension by having the awareness of what nutrients are in the foods that they are eating.

According to a systematic review of randomized-controlled trials conducted in the 1990s by the American Heart Association, consuming a diet rich in fruits, vegetables, whole grains, and low-fat dairy products, with reduced content of saturated and total fats, a patient can have a decrease of up to 11 mm Hg in systolic blood pressure (Eckel et al., 2014). That shift alone could be the difference between needing to begin pharmacological interventions for blood pressure or not. Additionally, that decreases ASCVD scores and allow for improved quality of life.

One of the most common dietary problems directly related to hypertension included excessive sodium intake. Reducing sodium intake can slow age-related changes which result in increased systolic blood pressure as well as reduce their risk for cardiovascular disease (National Academies of Sciences, Engineering, and Medicine, 2019). The most common sources of sodium come from processed foods, packaged foods, foods prepared outside of the home, and foods from restaurants which account for 75% of an individual's sodium intake (Harnack et al., 2017). However, a diet rich in potassium is generally more nutrient dense and has less sodium. This consideration is particularly effective for individuals who have already been diagnosed with hypertension (National Academies of Sciences, Engineering, and Medicine, 2019). The goal for the patient and the provider, therefore, was to adopt a diet that was sustainable and also provided the most valuable nutrition possible for the individual.

Considerations for Chronic Inflammatory Conditions

Chronic inflammatory conditions were also notable medical considerations for adjustments that should be assessed for an individual beginning the AHA diet (Arcangelo et al., 2017). Rheumatoid arthritis and inflammatory bowel disease are among the most common chronic inflammatory conditions diagnosed. Specific to rheumatoid arthritis, weight loss programs are important because not only does it decrease the stress on the body but can also be a useful tool for cardiovascular maintenance. Inflammatory bowel disease and bowel motor dysfunction can be associated with inflammation and neurotransmitter changes. Nutrients are often more difficult to absorb for these patients because of the frequency of bowel movements. Therefore, the ideal consumption of heart-healthy foods were not as readily introduced into the bloodstream to supply tissues

and organs with necessary nutrients. A meta-analysis was performed of six different studies of dietary patterns with inflammatory bowel disease up to 2017 from the online research databases PubMed and Scopus (Khorshidi et al., 2020). The study determined that of the 1099 cases evaluated, the highest and lowest categories of diet showed significant difference and Crohn's disease based on a 95% confidence interval.

Prescribing and adhering to the AHA diet gives the individual an understanding of the nutrients that the body needs most abundantly to function at its peak. Additionally, foods such as berries have high concentrations for which contain anti-inflammatory properties needed to minimize exacerbated symptoms.

Ethnic and Racial Considerations

Cardiovascular event risk and, therefore, education are also influenced by racial differences (Bhimla et al., 2017). Traditional foods and lifestyle practices had nuances which may exemplified more specific cardiovascular risks through diet. African Americans, South Asian populations, and Latinos were among the most common populations which have genetic differences that predisposed unique cardiovascular characteristics driven by diet.

Considerations for African Americans

African Americans are genetically susceptible to developing and seeing the effects of hypertension (Van Horn et al., 2016). In addition, African Americans were disproportionately more likely to experience stroke, obesity, diabetes mellitus–type 2, and coronary heart disease mortality in comparison to the general population. Van Horn et al., (2016) continued by explaining that in some ethnic groups, the higher prevalence is

directly linked to diets that reflect less compliance with nutritional suggestions, substitutions, and exclusions. African Americans were more likely to have a higher fat intake in adolescence and young adulthood and are significantly less likely to seek medical care for their diet compared with Caucasians (Satia, 2009). By delaying care, the patient was at increased risk of developing or progression of cardiometabolic disease.

The impact of nutrition education and dietary change can be especially effective for those who commit wholeheartedly to the change. A study performed by Williams et al. (2021) of 44 African American volunteers demonstrated this over the course of only a 5-week trial of the AHA diet. By taking baseline labs and then post-intervention labs, the objective values were analyzed to determine the magnitude of the intervention. The participants were given pre-packaged meals in accordance with the macro- and micronutrient specifications of the AHA diet and were to only eat what is provided to them (Williams et al., 2021). Among the results were significant improvements in serum insulin levels with a decrease of 43%, weight loss of an average of 10.2 pounds, LDL cholesterol decrease by 21%, total cholesterol decrease by 12%, high sensitivity C-reactive protein reduced by an average of 16%, and the mean 10-year ASCVD risk was reduced from 10.8 to 8.7% (Williams et al., 2021). The African American population was already at an increased risk of a multitude of cardiovascular conditions, so the AHA diet could be a valuable tool when applied by African-Americans and could yield significant results quickly.

Considerations for South Asian Populations

South Asian populations, including Chinese, Korean, Japanese, and Filipino, were more likely to suffer the impact of coronary heart disease and stroke in comparison to the

general population (Bhimla et al., 2017). Although South Asians report adhering to a diet slightly lower in fats than the average American diet, they were much higher in sodium (Van Horn et al., 2016). Additionally, inconsistent and inadequate intake of fruits and vegetables was associated with a two- to three-fold incident increase related to cardiovascular disease. Bhimla et al. (2017) conducted a health needs assessment study of 200 Filipino Americans in the Greater Philadelphia area in 2014 and 2015. Of the participants, 99.5% of them report not achieving the 4-5 servings of fruits and vegetables per day while nearly 75% reported adding salt to already cooked foods “often” or “with every meal”. The needs assessment, based on a chi-square analysis, showed that lifestyle interventions specifically targeting diet are needed.

A cross-sectional study using the 2006 guidelines of the AHA diet and lifestyle recommendations was utilized to understand to correlation of diet and lifestyle modification and bone mineral density in older Chinese adults (Chen et al., 2017). A total of 2092 women and 1051 men between age 40 and 75 years were included. The study assessed a 79-item food frequency survey through interviews at the baseline of the individual and 3 years later. Comparative bone mineral density assessments through dual-energy X-ray absorptiometry of a variety of bone sites showed that this diet has protective properties among middle-aged and elderly Chinese population. With adherence to these recommendations, the diet was not only cardioprotective but was also conducive to physical wellbeing and decreased bone demineralization and bone aging.

Korean Americans have a higher risk for cardiovascular disease and diabetes due to dietary sodium intake (Ko et al., 2018). In 2015, the American Heart Association put more strict guidelines on sodium intake for individuals with diabetes by recommending

less than 1500mg per day. Clinical guidelines also recommended that people with Type 2 diabetes mellitus take on additional measures to keep their blood pressure maintain at or below target levels. This posed another major challenge to manage hypertension for people with diabetes. By taking the sample population of 232 Korean Americans with uncontrolled diabetes based on a Hemoglobin A1c greater than or equal to 7.0, Ko et al. (2018) aimed to understand what factors were most influential in predicting sodium intake. Among Korean Americans, the strongest independent factors were associated with the energy intake of the participant followed by gender and marital status (Ko et al., 2018). The results showed that education in a culturally appropriate manner about dietary sodium is needed for Korean Americans with type 2 diabetes mellitus.

Considerations for Latinos

Latinos are at increased risk for various cardiovascular events which can be linked to cultural and ethnic eating patterns (Van Horn et al., 2016). Cardiovascular diseases were linked to changes that occur throughout life but there are several risk factors that can influence cardiovascular susceptibility early in life. Latinos are the fastest-growing ethnically diverse group in the United States but they are also among the most overweight and obese ethnic groups of children in the United States (Ochoa & Berge, 2017). Several factors play into this, but of the five main factors identified, diet played a part in two of them. Parental influences such as family feeding practices and modeling by children influence diet. Additionally, socioeconomic status and food security concerns impact how the diet is approached.

Cardiovascular risk is often heightened in Latinos because of a diet high in refined grains and sodium. However, many Hispanics maintain a diet that is inherently

higher in dietary fibers than other groups. Being able to identify susceptible dietary causes for enhanced proportions of cardiovascular events specific to each patient should be important to the provider and the patient alike. This can provoke a sense of rapport between the two to find commonalities for improvement in nutritional intake. The provider can elicit tools for the patient to utilize to assess the value of individual foods and possibly suggest substitutions to increase dietary gain which can be evidenced by improved cardiovascular status and minimizing risk.

Education Impact

The influence education has on diet is immeasurable and can be the difference between the success or failure to adopt new eating habits. A study by Zhang et al. (2018) was conducted to identify the relationship between AHA diet counseling and added sugar intake among participants with metabolic syndrome. For the study, 119 participants were offered 2 individual education sessions and 12 group sessions during a 1-year counseling period by a registered dietitian with a mean attendance of 7.9 sessions. Three separate 24-hour random recalls of all food intake was done after a 3-, 6-, and 12-month time period. After the 1-year counseling period, 48% of participants still exceeded the AHA recommended limit of sugar intake per meal. However, the sessions also led to an average decrease of 23.8 grams of sugar per day. By imparting effective and continued education for patients, the quality of nutrition could be improved through the AHA diet.

Evidence suggested that education from providers directly impacts the health choices of their patients (Quader et al., 2017). In comparison, Quader et al. (2017) noted that in eighty-three percent of adults who reported being educated by their providers on health improvement strategies will implement at least one of those options to their lives,

while only forty-four percent of adults would implement the same health improvement strategies. This led to the consideration of how important providers see dietary and health education for patients. A study performed by Porter Novelli (2017) of over 2000 providers in 2010 then followed up on in 2015 reported seventy-eight percent of them agreed that decreasing dietary sodium, for instance, would be beneficial to a majority of their patients (Quader et al., 2017). However, the same study determined that fewer providers are counseling on decreasing dietary sodium intake in comparison to follow up from 2010.

Dietary education is paramount to the success of maintaining the highest possible quality of life. Diets are often chosen based on whether or not it will support the goals of the individual. The patient and provider must sustain a rapport that helps develop a plan to meet those goals. Patients are often unsure of their next steps to find a diet that works for them. According to one qualitative study on seeking dietary advice, six common themes appeared: confusion of where to seek dietary advice, skepticism of national dietary guidelines, personal approaches to diet, dietary change barriers, judging the effectiveness of a new diet, and wanting condition-specific dietary guidelines (Russell et al., 2021). The most common person for a patient to seek counsel about their current and future diet was their primary care provider. The provider, therefore, has an obligation to impart their knowledge of viable diets available to the individual, and the most inclusive and standard for dietary education is based on the AHA diet.

Summary

Providers and patients play integral roles in the understanding of dietary improvements for the sake of cardiovascular event risk reduction. The interdependent

relationship established a platform for maximizing the quality of life of the individual through assessment to guide education. Each individual has their own interpretation of nutrition which impacts the effectiveness of the AHA diet. The American Heart Association diet provides a quantifiable method for which provider education can be based, while adapting to patient-specific needs. Cardiovascular event risk is specific to the patient and should be addressed in that manner. Social factors influence the health risks of each person and can be linked to support, class, finances, and expectations. The variety of potential barriers for seeking care directly impact mortality risk, and therefore, impact primary, secondary, and tertiary cardiovascular intervention. By considering the circumstances of the patient individually, it asserted the importance of understanding the physical and psychosocial factors that influence education and care. Current and previous medical history, race/ethnicity, and dietary preference are additional factors that need consideration in advocating the most beneficial dietary pattern for patients. With further investigation into specific options for providers and patients alike, the greatest outcomes for the individual can be identified and reached.

Chapter III

Methodology

The aim of this project was to understand the barriers and potential hinderances patients have to the American Heart Association (AHA) diet. This is particularly important because of how significantly diet impacts cardiovascular health. By identifying these obstacles as an early interventional strategy, the provider and patient can both develop a working relationship to understand the risks of not adhering to the diet while measuring the potential benefit to cardiovascular health. The fundamental recommendations for the diet include all healthy adults and children over the age of 2, and those who have a variety of systematic and multisystem comorbidities such as hypertension, diabetes mellitus, and chronic inflammatory conditions (Eckel et al., 2013). This chapter described how the study was conducted, including the project design, instrument, protection of human subjects, target population and sample, inclusion and exclusion criteria, procedure, the analysis of results, treatment of data, and plan for sustainability.

Project Design

The project design utilized input from the target population sample who met the inclusion and exclusion criteria. The basis for the design required an understanding of the

value of the AHA diet for patients because it was developed through extensive research of the macro- and micronutrients, vitamins, and minerals needed for the body to function optimally. These foundational dietary recommendations included focusing on increasing or sustaining high intake volumes of vegetables, fruits, whole grains, fish, nuts, and non-tropical vegetable oils while limiting the intake of salt, sweets, sugar-sweetened beverages, and red meats (Pallazola et al., 2019). Additionally, dietary habits should be adjusted based on the needs of the individual and/or their medical conditions (Pallazola et al., 2019).

To be able to conduct a productive study, there must be an established knowledge base for each participant on the AHA diet. The known similarities of subjects prior to participation included geographic location and having previously been educated on the diet by their provider. By assuring that each participant had been educated on the diet, the results could be applied more reliably to the potential adjustments a patient should consider.

The project used a quantitative study of the impact of barriers to healthy eating for patients who were advised to follow the AHA diet for cardiovascular wellness.

Research questions included:

- 1) What are the physical factors that can affect adherence to a prescribed AHA diet?
- 2) What are the psychosocial factors that can affect adherence to a prescribed AHA diet?

- 3) What are the socioeconomic factors that impact adherence to a prescribed AHA diet?
- 4) What are the demographic considerations including age range, gender, ethnicity, and income range that are related to AHA diet adherence?

The project design used a survey called the Barriers to Healthy Eating (BHE) scale to quantify the types of barriers to the diet. The scale uses an anchored scoring system and was presented to participants in an outpatient clinical setting where they presented for a previously established appointment.

The design allowed the impact of the results to be applied to current and future patients. Participants in the study completed the survey and the results were analyzed to better understand what types of obstacles participants experience to following the AHA diet. The potential participants were approached by the researcher while checking in for their previously established appointment and introduced to the study. They were offered the opportunity to participate in the study. For those interested in participating, the study was thoroughly explained through a letter of explanation (see Appendix A). The explanation letter described the aims of the study, what was required of them, their rights in relation to the study, and the potential risks of participation. Participation in this research study was voluntary with minimal risk to subjects, so informed consent was not needed. Participants used their cellular device to scan a QR code which took them directly to the survey on the SurveyMonkey website. The survey consisted of five demographic questions (age range, sex, ethnicity, average household yearly income range, and whether or not the participant lives within the city limits of Joplin, Missouri) followed by the 22-question BHE scale. The survey was completed at one time. At the

completion of the survey, the results were stored within a password-secured account of SurveyMonkey to maintain the participant's rights to confidentiality. The responses to the survey were only viewed by the researcher and the committee who were directly involved in the project. There was no additional contact between the researcher and participant. Upon completion of the research project information collected for analysis was stored in a secure location in the School of Nursing and destroyed after three years.

Instrument

This project used the Barriers to Healthy Eating (BHE) scale (See Appendix B). This scale was developed by Jeffery, Wing, and Thorson in 1993 (Sun et al., 2019). The scale was originally constructed to further analyze and strengthen behavioral interventions for weight loss. It was later modified in 1998 by Burke and Smith and has been validated for measuring barriers to healthy eating with consideration to psychometric properties as well (Burke & Wang, 2011).

The BHE scale consisted of a survey with twenty-two items (Sun et al., 2019). The BHE used an anchored scoring scale to investigate the impact of a multitude of variables which may or may not impact the diet of an individual. The BHE scale can be broken down into subscales which categorize generalized factors which can influence diet (Sun et al., 2019). The scale is organized on a 5-point scale rating from 1 to 5 where a score of 1 indicates that the item is "not at all a problem for me" and 5 indicates that the item is "a very important problem to me". The BHE scale is designed for the participant to specifically recall how they feel with regard to each item over the past 6 months. At the end of the survey, they were scored and the results with higher scores correlated with barriers to the diet.

The BHE scale used in the study by Sun et al. (2019) used Cronbach's alpha to evaluate the internal consistency of the scale and its subscale scores. The team took data from four different studies which included a total of 631 participants. Cronbach's alpha coefficients at 0.80 and above are considered to be evidence of good reliability for a scale. The scoring for the four studies ranged from 0.849 to 0.881 (Sun et al., 2019). Additionally, convergent and predictive validity were examined through the Pearson Product-Moment Correlation or Spearman's Rank-Order correlations, as deemed appropriate. These scales were designed to measure the strength of a linear association between two variables to determine if there is a relationship, and if so, help quantifiably indicate the extent of the relationship (Laerd Statistics, 2018). In this case, the scales helped demonstrate that each item in the survey was being used to appropriately measure what it was intended to. The BHE scale and subscale scores showed a moderately negative correlation and symbolized good convergent validity for the instrument (Sun et al., 2019). The survey must be completed in its entirety before it can be accepted, processed, and analyzed for final scoring. Surveys that were incomplete were not included for data analysis.

Protection of Human Subjects

The survey and interactions between the researcher and participants remained anonymous. The survey included identification of age range, sex, ethnicity, and average household yearly income range. Every effort was made to maintain confidentiality and there is no more than minimal potential for loss of confidentiality upon participating in the research. Participants were at minimal risk of harm or harassment. According to IRB guidelines, data will be stored for 3 years in a secure location and then destroyed. Any

electronic data used in the study through SurveyMonkey was stored on a School of Nursing password-protected computer. At the end of 3 years, the data will be destroyed as electronic data will be deleted from computers. Participants were not asked to provide information that would endanger them or their secure, personal health information. There is no more than a minimal risk of embarrassment, emotional stress and discomfort, or psychological stress and discomfort. Participants were assured that their participation or decision not to participate would not in any way impact the care they receive at the clinic. The study conducted required approval from the Institutional Review Board of both the university and the participating health care system and did not begin until both were obtained. The research complied with the regulations and requirements of both the university and the participating community health care system.

Target Population & Sample

Participants were recruited from established patients within the healthcare clinic based in the rural health setting. Eligible participants previously received patient education on the AHA diet and were present for a subsequent in-person medical appointment. With the establishment of care, providers discussed dietary habits, concerns, and recommendations for the AHA diet at the first encounter, so all established patients met the criteria of having received patient education about the AHA diet from a previous clinic visit. Participants were over 18 years of age and were able to read and understand English. Participation was entirely voluntary, and participants were not compensated. Participants were recruited at the rural community health clinic.

Inclusion & Exclusion Criteria

The inclusion criteria for the study was generalized because of the extent to which the AHA diet is recommended. The inclusion criteria included those who were interested in the study and willing to participate in completing the survey that best represents their circumstances. Each participant was 18 years of age or older. Each participant was previously established within the healthcare system and had been educated on the American Heart Association Diet previously. The participant was able to read and understand English.

Prisoners, individuals who were less than 18 years of age, unable to read or understand English, or not able to give informed consent were excluded, as were individuals not established within the community health organization or who were unwilling to share information about their health barriers and dietary limitations.

Procedure

The procedure for executing the research study required permission and cooperation from all of the participating organizations. The Institutional Review Board for the university and the participating health care system provided approval to conduct the study. The potential participants were offered the chance to participate in the study while checking in for their previously established appointment. The researcher presented the research explanation and participation agreement which thoroughly described the aims of the study, what is required of participants, their rights in relation to the study, and the potential risks of participation. Participants accessed the survey online through SurveyMonkey via a QR code which the researcher made available after voluntary

participation was agreed upon. This was to be completed prior to the outpatient clinic appointment. Once the survey was completed, the results were stored in SurveyMonkey. The results were secured on a password protected computer and were only accessible to the researcher and committee members directly involved in the study. The results were stored securely in order to maintain their rights to confidentiality through HIPAA. There were no additional contact between the researcher and participants. No specific identifying information or personal health information were required for the study. Once the sample size was achieved, the data was analyzed and the results were reported, interpreted, and discussed in the subsequent chapters.

Treatment of Data/Outcomes/Evaluation Plan

The data received through the survey abided by HIPAA guidelines for confidentiality. There were no personalized identifiers. The health care system participating in the study will be provided with the aggregated data. The aggregated data was also available to individual participants if requested. The participant surveys were securely stored at the School of Nursing for the required 3-year timeframe and will then be destroyed. The data collected was analyzed using the appropriate statistical analyses and the outcomes of the study was recorded in the results section of the student's scholarly project paper.

Plan for Sustainability

This project remains sustainable because it used a scale that has been validated for more than 20 years. It will remain relevant because it is used to address cardiovascular health through diet. The older population is currently the fastest growing population in the United States with 43.1 million in 2012 and is projected to nearly double by 2050

(Dunphy et al., 2019). With aging comes greater risk for the development of comorbidities which can lead to cardiovascular issues. By addressing the barriers to the AHA diet at clinic appointments, the provider and patient can be more aware of how to make recommendations and provide the necessary resources to combat cardiovascular health risks. Potential sustainability may be attained by requesting patients to complete the survey at yearly appointments to provide a sense of ongoing evaluation of situational barriers to the AHA diet because of how much can change in a patient's life year-to-year. Great progress has been made to combat cardiovascular disease in a primary preventative manner, but still remains a vital component to healthcare. To provide holistic care to patients, the relationship between care provider and patient has a strong impact on the potential success of adopting the AHA diet. The sustainability of the AHA diet is strong and will only improve in strength and reliability as continued studies are completed concerning the connection between diet and cardiovascular health.

Summary

The project used a research-based structure which included a survey shown to be a valid and reliable tool. The target population was based on the inclusion and exclusion criteria for the study. It was crucial that the participants be previously educated on the AHA diet prior to completing the survey. Participants completed the Barriers to Healthy Eating scale survey, the data was analyzed, and results were discussed on completion of the study. It is the researcher's belief that the data results will help health care providers to understand patients' individual circumstances which highlight obstacles to the diet for the local rural population.

Chapter IV

Evaluation of Results

Restatement of Purpose

The purpose of this project was to gain a better understanding of the physical, psychosocial, and socioeconomic barriers faced by local patients who are prescribed the American Heart Association (AHA) diet. This was achieved by conducting a study based on a previously validated survey tool called the Barriers to Healthy Eating (BHE) Scale. The tool was provided to patients in a rural health setting which addressed their current diet in order to identify physical, psychosocial, and socioeconomic factors that prevent them from achieving optimal cardiovascular health through dietary choices.

Dietary choices play a pivotal role in health outcomes so assessing the conditions of the individual is imperative to primary health prevention. Therefore, the overarching goal of the study was to find which factors provided the most significant barriers to adopting and maintaining the AHA diet as part of their lives. Different individualized factors and specific barriers were isolated to assist in determining and exposing any impact they had for each participant. The project questions proposed included the following:

- 1) What are the physical factors that can affect adherence to a prescribed AHA diet?
- 2) What are the psychosocial factors that can affect adherence to a prescribed AHA diet?
- 3) What are the socioeconomic factors that impact adherence to a prescribed AHA diet?
- 4) What are the demographic considerations including age range, gender, ethnicity, and income range that are related to AHA diet adherence?

Population Description and Sample

After approval from Pittsburg State University School of Nursing, Pittsburg State University Institutional Review Board, and the participating rural community healthcare clinic, data collection began. Data was collected from August 25, 2022, through September 23, 2022. The selection criteria for the study was based on voluntary participation in which the subjects were informed of their rights to decline participation and discontinue participation at any point without risk of repercussion in any manner. The participants were also required to meet all inclusion criteria. Inclusion criteria for participation in the study were:

- 1) Subjects who are interested in the study and willing to participate in completing the survey.
- 2) The subjects must be 18 years of age or older.

- 3) The subjects must be a patient previously established within the healthcare system and have been educated on the American Heart Association diet previously.
- 4) The participants must be able to read and understand English.

The study did not discriminate against specific populations due to race, religion, or ethnicity. A convenience sampling method was used to select the sample. The potential participants were offered the chance to participate in the study while checking in for their previously established appointment. The researcher presented the research explanation and participation agreement. Those willing to participate accessed the survey online through SurveyMonkey via a QR code. The survey was completed prior to the outpatient clinic appointment. Once each survey was completed, the results were securely stored in the SurveyMonkey database. No specific identifying information or personal health information were required for the study. The results are reported, interpreted, and discussed in this chapter.

Survey Results

The Barriers to Healthy Eating (BHE) Scale used consisted of a survey with twenty-two items (Sun et al., 2019). The BHE Scale was validated in 1998 for its ability to reliably measure barriers to healthy eating with considerations of psychometric properties (Burke & Wang, 2011). An anchored scoring scale was used to understand the impact variables can have on diet.. The BHE Scale broke into subscales that categorized generalized factors based on physical, psychosocial, and socioeconomic influences. The scale was organized on a five-point scale rating from 1 to 5 where a score of 1 indicated

that the item is “not at all a problem for me” and 5 indicated that the item was “a very important problem to me” (Sun et al., 2019, p.702). The BHE Scale was designed for the participant to specifically recall how they felt about each item over the past six months. Each item was recorded numerically to calculate mean and standard deviation.

Data collection was based on 158 surveys. Six of the surveys were started but not completed, so they were removed. Therefore, 152 surveys were scored and analyzed.

Each individual factor was correlated with the demographic data by completing a specific test to understand the possible connection between variables. Kendall’s Tau-C calculation was used for evaluating the link between age range and each individual factor of the scale. This same calculation was used with income range. This calculation was used because it helps determine the strength of association between two variables and the direction of the relationship when data are ranked by quantities (Magiya, 2019). Gender was studied using an Eta measurement because it evaluates dichotomous variables, such as being male or female (Becker, 1998). Ethnicity was evaluated using a Cramer’s V calculation, which helped understand the relationship strength between two nominal variables with unique categorical values (Zach, 2021). This calculation was used because of the unique ethnic background(s) a person may have.

The responses from the survey were collected and analyzed with a correlation analysis to determine whether there were correlations between variables. After using the correlation analysis, it was determined there were no correlations between variables. So, the results were recorded based on rank and association through mean and standard deviation. This allowed for correlations between a single dependent variable (BHE scale) and several independent variables and is recorded to determine whether different

variables yielded significant changes (Kim, 2016). The overall mean and standard deviation for each item in the tool were calculated. Based on the survey responses, ranking was organized from least to most commonly a problem for participants.

Table 1

<i>Barriers to Healthy Eating Scale: All Items</i>	Mean	Std. Deviation
My friends do not support me when I try to change my eating.	1.55	.975
My family does not support my efforts to change my diet.	1.65	1.123
Appropriate foods are not available in my home.	1.74	1.155
I don't know what foods I should eat to lose weight.	1.96	1.307
I don't see any benefits from my efforts to lose weight.	2.16	1.362
It is difficult to shop for one person in the grocery store.	2.24	1.478
The foods that are reduced in fat and calories cost more than I can afford.	2.25	1.406
I find it difficult to select the appropriate foods when shopping.	2.32	1.279
I have trouble estimating appropriate portion sizes.	2.32	1.384
Changing my diet to reduce calories and fat seems too complicated.	2.51	1.347
I have difficulty controlling my eating when I am with friends.	2.52	1.478
I never feel that my appetite is satisfied when I am trying to lose weight.	2.53	1.376
Resisting tempting high-fat/high-calorie foods in my work setting is difficult.	2.57	1.458
When I am with my family I find it difficult to watch what I eat.	2.71	1.374
I feel deprived when I have to restrict so many foods.	2.80	1.406
The taste of low-fat/low-calorie foods is different.	2.85	1.521
When I am busy or feeling overwhelmed, I find it difficult to remember all the rules about what foods are appropriate.	2.87	1.472
I use food as a reward or treat for myself	2.92	1.520
It is difficult to motivate myself to eat appropriately.	2.97	1.400
It is difficult to find time to plan appropriate meals for myself.	2.99	1.500
Losing weight is rewarding but I have trouble staying motivated to keep off the weight I lost.	3.08	1.454
When I am very hungry I have trouble controlling what I eat.	3.11	1.476

(Rating scale: 1-5 where 1 indicated “not at all a problem for me” and 5 indicated “a very important problem for me”)

Analysis of Research Questions

Research Question #1

The first question to be analyzed was “What are the physical factors that can affect adherence to a prescribed AHA diet?” The physical factors addressed in the BHE scale included items 3, 6, 9, 13, 15, and 18. From the highest- to lowest-rating of a problem reported, item 6 was “It is difficult to find time to plan appropriate meals for myself.”, and the mean score was 2.99 with 1.500 standard deviation. Item 18 was “The taste of low-fat/low-calorie foods is different.” and the mean score was 2.85 with a standard deviation of 1.521. Item 13 was “Changing my diet to reduce calories and fat seems too complicated.” and the mean score was 2.51 with a standard deviation of 1.347. Item 3 was “I have trouble estimating appropriate portion sizes.” and the mean score from the study was 2.32 with a standard deviation of 1.384. Item 15 was “I find it difficult to select appropriate foods when shopping.” and the mean score was 2.32 with a standard deviation of 1.279. Item 9 was “I don’t know what foods I should eat to lose weight.” and the mean score was 1.96 and the standard deviation was 1.307. The overall mean score for the physical factors in the survey was 2.49 with a standard deviation of 0.945.

Research Question #2

The second question to be analyzed was “What are the psychosocial factors that can affect adherence to a prescribed AHA diet?” The psychosocial factors addressed in the BHE scale included items 4, 5, 7, 10, 11, 12, 14, 16, 19, 20, and 21. From the highest- to lowest-rating of a problem reported, item 11 was “When I am hungry I have trouble

controlling what I eat.” and the mean was 3.11 with a standard deviation of 1.476. Item 12 was “Losing weight is rewarding but I have trouble staying motivated to keep off the weight I lost.” with a mean of 3.08 and standard deviation of 1.454. Item 4 was “It is difficult to motivate myself to eat appropriately.” with a mean of 2.97 with a standard deviation of 1.400. Item 5 was “I use food as a reward or treat for myself.” and the mean was 2.92 with a standard deviation of 1.520. Item 20 was “When I am busy or feeling overwhelmed, I find it difficult to remember all the rules about what foods are appropriate.” with a mean of 2.87 and standard deviation of 1.472. Item 14 was “I feel deprived when I have to restrict so many foods.” and the mean was 2.80 with a standard deviation of 1.406. Item 21 was “When I am with my family I find it difficult to watch what I eat.” and the mean was 2.71 with a standard deviation of 1.374. Item 19 was “Resisting tempting high fat/high calorie foods in my work setting is difficult.” and the mean was 2.57 and standard deviation of 1.458. Item 16 was “I never feel that my appetite is satisfied when I am trying to lose weight.” and the mean was 2.53 with a standard deviation of 1.376. Item 10 was “I have difficulty controlling my eating when I am with friends.” and the mean was 2.52 with a standard deviation of 1.478. Item 7 was “I don’t see any benefits from my efforts to lose weight.” and the mean was 2.16 with a standard deviation of 1.362. The overall mean for the psychosocial factors in the survey was 2.75 with a standard deviation of 0.936.

Research Question #3

The third question to be analyzed was “What are the socioeconomic factors that can affect adherence to a prescribed AHA diet?” The socioeconomic factors addressed in the BHE scale included items 1, 2, 8, 17, and 22. Ranking from highest- to lowest-rating

of a problem reported, item 17 was “The foods that are reduced in fat and calories cost more than I can afford.” and the mean score for this item was 2.25 with a standard deviation of 1.406. Item 8 was “It is difficult to shop for one person in the grocery store.” and the mean score was 2.24 and standard deviation of 1.478. Item 1 was “Appropriate foods are not available in my home.” and the mean score was 1.74 and the standard deviation was 1.155. Item 2 was “My family does not support my efforts to change my diet.” and the mean score was 1.65 with standard deviation of 1.123. Lastly, item 22 was “My friends do not support me when I try to change my eating.” and the mean score was 1.55 with a standard deviation of 0.975. The overall mean score for the socioeconomic factors within the BHE scale for this study was 1.89 with a standard deviation of 0.784.

The most commonly reported problem by participants in the study was ‘When I am very hungry I have trouble controlling what I eat’ ($x=3.11$, $SD=1.476$). This item was a psychosocial factor in the survey. The second most common problem reported from survey participants was ‘Losing weight is rewarding but I have trouble staying motivated to keep off the weight I lost’ ($x=3.08$, $SD=1.454$). This item was also associated with the psychosocial factors of the BHE scale. The third most common problem reported by the survey participants was ‘It is difficult to find time to plan appropriate meals for myself’ ($x=2.99$, $SD=1.500$). This item was associated with physical factors in the BHE scale. The fourth most common problem reported by the survey participants was ‘It is difficult to motivate myself to eat appropriately’ ($x=2.97$, $SD=1.400$). This item was associated with psychosocial factors of the survey. The fifth most common problem reported by the participants was ‘I use food as a reward or treat for myself’ ($x=2.92$, $SD=1.520$). This item was also associated with the psychosocial factors of the survey.

Research Question #4

The fourth research question to be analyzed was “What are the demographic considerations including age range, gender, ethnicity, and income range that are related to AHA diet adherence?” This question was included to help understand the connection between demographics and the physical, psychosocial, and socioeconomic factors analyzed within the survey. The largest groups in terms of age were 18-29 year olds (23.7%), 50-59 year olds (23.7%), and 30-39 years olds (22.4%). Age of respondents was analyzed using the Kendall’s Tau-C within the SPSS statistical calculation. Table 2 shows the distribution of ages for participants who completed the survey.

Table 2

<i>Age Range</i>	<i>Frequency</i>	<i>Percent</i>
18-29 years old	36	23.7
30-39 years old	34	22.4
40-49 years old	19	12.5
50-59 years old	36	23.7
60-69 years old	16	10.5
70+ years old	11	7.2
Total	152	100.0

Kendall’s Tau-C resulted as -0.203 with a probability of 0.001 when considering the physical factors and age range. This is statistically significant. So, as age increased, participants rated physical factors as more of a problem for them. Or, as age decreased, participants rated physical factors as less of a problem for them. Table 3 shows the crosstab correlating physical factors with age range.

Table 3*Crosstab of Physical Factors and Age Range*

		What is your age?						Total
		18-29	30-39	40-49	50-59	60-69	70+	
Physical factors	1.00	3	1	1	0	3	3	11
	1.17	0	2	1	2	0	1	6
	1.33	1	0	1	1	0	0	3
	1.50	0	1	0	0	1	1	3
	1.67	1	7	3	5	0	2	18
	1.83	0	1	1	1	2	1	6
	2.00	1	1	0	3	3	0	8
	2.17	4	3	1	2	1	0	11
	2.33	2	0	1	3	0	2	8
	2.50	1	1	1	3	0	0	6
	2.67	2	2	2	2	1	0	9
	2.83	4	5	1	1	3	0	14
	3.00	5	3	1	3	1	1	14
	3.17	2	4	1	3	0	0	10
	3.33	1	0	1	1	1	0	4
	3.50	1	0	0	1	0	0	2
	3.67	1	0	1	2	0	0	4
	3.83	0	1	0	1	0	0	2
	4.00	2	0	0	0	0	0	2
	4.17	2	0	0	0	0	0	2
4.33	1	1	1	1	0	0	4	
4.67	2	1	0	0	0	0	3	
5.00	0	0	1	1	0	0	2	
Total		36	34	19	36	16	11	152

Kendall's Tau-C = -0.203, probability = 0.001

Kendall's Tau-C resulted as -0.169 with a probability of 0.01 when considering psychosocial factors and age range. This was also statistically significant. So, as age increased. Or as age decreased, psychosocial factors were thought of as less of a problem.

Table 4 shows the crosstab table correlating psychosocial factors with age range.

Table 4*Crosstab of Psychosocial Factors and Age Range*

		What is your age?						Total
		18-29	30-39	40-49	50-59	60-69	70+	
Psychosocial factors	1.00	2	1	1	0	3	0	7
	1.09	0	0	1	0	0	1	2
	1.18	0	0	0	1	0	1	2
	1.27	0	0	0	0	0	2	2
	1.36	0	1	0	2	0	1	4
	1.45	0	1	0	1	0	0	2
	1.55	0	1	0	0	1	0	2
	1.64	0	0	1	0	0	0	1
	1.73	1	0	0	3	0	0	4
	1.82	2	0	0	0	1	0	3
	1.91	0	1	0	0	0	0	1
	2.00	0	2	0	2	0	0	4
	2.09	3	1	0	0	2	1	7
	2.18	2	1	0	1	0	0	4
	2.27	0	1	0	3	1	0	5
	2.36	0	0	1	1	0	0	2
	2.45	2	1	1	3	0	1	8
	2.55	1	1	1	1	0	0	4
	2.64	0	2	2	1	1	0	6
	2.73	0	1	1	1	2	1	6
	2.82	1	2	1	2	0	0	6
	2.91	0	1	1	1	0	0	3
	3.00	2	3	1	2	1	0	9
	3.09	1	2	0	0	0	1	4
	3.18	3	1	1	1	0	0	6
	3.27	2	1	0	1	0	1	5
	3.36	0	2	0	0	2	0	4
	3.45	2	2	0	0	0	0	4
	3.55	1	1	1	0	0	0	3
	3.64	3	0	0	1	1	0	5
	3.73	1	0	1	0	1	0	3
	3.82	1	1	1	1	0	0	4
	3.91	3	0	2	1	0	1	7
	4.00	0	0	0	1	0	0	1
4.09	2	2	0	1	0	0	5	
4.27	0	0	0	2	0	0	2	

Kendall's Tau-C = -0.169, probability = 0.01

Lastly, Kendall's Tau-C was used to correlate age range and socioeconomic factors. The results were not statistically significant. Kendall's Tau-C=-0.078 with a probability of 0.205. Table 5 shows the crosstab table correlating socioeconomic factors with age range.

Table 5

Crosstab of Socioeconomic Factors and Age Range

		What is your age?						Total
		18-29	30-39	40-49	50-59	60-69	70+	
Socioeconomic factors	1.00	6	7	3	7	4	3	30
	1.20	2	1	0	1	2	1	7
	1.40	3	8	4	5	2	0	22
	1.60	3	0	3	0	0	2	8
	1.80	6	3	3	6	4	2	24
	2.00	4	3	0	3	1	1	12
	2.20	2	3	2	4	0	0	11
	2.40	1	2	0	2	2	1	8
	2.60	1	1	0	3	1	1	7
	2.80	2	2	1	1	0	0	6
	3.00	1	0	1	1	0	0	3
	3.20	1	3	0	0	0	0	4
	3.40	2	1	1	3	0	0	7
	4.20	1	0	0	0	0	0	1
	4.40	1	0	0	0	0	0	1
5.00	0	0	1	0	0	0	1	
Total		36	34	19	36	16	11	152

Kendall Tau C = -.078, probability = 0.205

For this study, 152 surveys were scored. There were 44 males (28.9%) and 108 females (71.1%). Gender was studied with an Eta value. Physical factors and gender resulted as Eta=0.003. No correlation between gender and physical factors was found. Table 6 shows the crosstab table correlating physical factors with gender.

Table 6*Crosstab of Physical Factors and Gender*

		What is your gender?		Total
		male	female	
Physical factors	1.00	7	4	11
	1.17	1	5	6
	1.33	1	2	3
	1.50	0	3	3
	1.67	6	12	18
	1.83	0	6	6
	2.00	3	5	8
	2.17	2	9	11
	2.33	2	6	8
	2.50	1	5	6
	2.67	2	7	9
	2.83	5	9	14
	3.00	4	10	14
	3.17	0	10	10
	3.33	0	4	4
	3.50	0	2	2
	3.67	2	2	4
	3.83	2	0	2
	4.00	1	1	2
	4.17	2	0	2
4.33	1	3	4	
4.67	1	2	3	
5.00	1	1	2	
Total		44	108	152

Eta = 0.003

Psychosocial factors also showed no correlation between gender. The Eta value connecting these factors and gender was 0.132. This indicated that males and females had relatively similar scores when considering psychosocial factors. Table 7 shows the crosstab table correlating psychosocial factors and gender.

Table 7*Crosstab of Psychosocial Factors and Gender*

		What is your gender?		Total
		male	female	
Psychosocial factors	1.00	6	1	7
	1.09	1	1	2
	1.18	0	2	2
	1.27	1	1	2
	1.36	0	4	4
	1.45	1	1	2
	1.55	0	2	2
	1.64	0	1	1
	1.73	1	3	4
	1.82	2	1	3
	1.91	1	0	1
	2.00	2	2	4
	2.09	2	5	7
	2.18	1	3	4
	2.27	1	4	5
	2.36	2	0	2
	2.45	3	5	8
	2.55	0	4	4
	2.64	1	5	6
	2.73	1	5	6
	2.82	2	4	6
	2.91	0	3	3
	3.00	1	8	9
	3.09	0	4	4
	3.18	1	5	6
	3.27	0	5	5
	3.36	2	2	4
	3.45	2	2	4
	3.55	1	2	3
	3.64	1	4	5
	3.73	2	1	3
	3.82	0	4	4
	3.91	1	6	7
	4.00	1	0	1
	4.09	3	2	5
	4.27	0	2	2

Eta = 0.132

Lastly, the Eta value for socioeconomic factors and gender was 0.075. There was no correlation found. Therefore, males and females felt similarly regarding socioeconomic concerns in the study. Table 8 shows the crosstab table correlating socioeconomic factors and gender.

Table 8

Crosstab of Socioeconomic Factors and Gender

		What is your gender?		Total
		male	female	
Socioeconomic factors	1.00	12	18	30
	1.20	0	7	7
	1.40	7	15	22
	1.60	1	7	8
	1.80	8	16	24
	2.00	4	8	12
	2.20	1	10	11
	2.40	4	4	8
	2.60	1	6	7
	2.80	2	4	6
	3.00	1	2	3
	3.20	0	4	4
	3.40	3	4	7
	4.20	0	1	1
	4.40	0	1	1
	5.00	0	1	1
Total		44	108	152

Eta = 0.075

This study asked each participant to identify their ethnicity for demographic purposes. Table 9 shows the distribution of ethnicities for the participants from the research study.

Table 9

<i>Ethnicity</i>	Frequency	Percent
American Indian or Alaskan Native	6	3.9
Asian or Pacific Islander	2	1.3
Black or African American	2	1.3
Hispanic or Latino	2	1.3
White/Caucasian	140	92.1
Total	152	100.0

As displayed, the overwhelming majority of participants in the study were White/Caucasian (92.1%). This is well-reflective of the community population seen in the participating community health clinic. Ethnicity was evaluated using a Cramer’s V calculation. This helps display the relationship strength between two nominal variables because participants could associate with more than one ethnicity while others do not (Zach, 2021). The Cramer’s V score correlating physical factors and ethnicity scored as 0.290 with a probability of 0.999. This scoring was not statistically significant. Table 10 shows the crosstab table correlating physical factors and ethnicity.

Table 10*Crosstab of Physical Factors and Ethnicity*

		What is your ethnicity?					Total
		American Indian or Alaskan Native	Asian or Pacific Islander	Black or African American	Hispanic or Latino	White/Caucasian	
Physical factors	1.00	1	0	1	0	9	11
	1.17	0	1	0	0	5	6
	1.33	0	0	0	0	3	3
	1.50	0	0	0	0	3	3
	1.67	1	0	0	1	16	18
	1.83	0	0	0	0	6	6
	2.00	0	0	0	0	8	8
	2.17	0	0	0	0	11	11
	2.33	1	0	0	0	7	8
	2.50	0	0	0	0	6	6
	2.67	1	0	0	1	7	9
	2.83	0	1	0	0	13	14
	3.00	2	0	0	0	12	14
	3.17	0	0	1	0	9	10
	3.33	0	0	0	0	4	4
	3.50	0	0	0	0	2	2
	3.67	0	0	0	0	4	4
	3.83	0	0	0	0	2	2
	4.00	0	0	0	0	2	2
	4.17	0	0	0	0	2	2
4.33	0	0	0	0	4	4	
4.67	0	0	0	0	3	3	
5.00	0	0	0	0	2	2	
Total		6	2	2	2	140	152

Cramer's V = .290, probability = 0.999

The Cramer's V score for psychosocial factors and ethnicity was 0.485 with a probability of 0.763. This result was not statistically significant. Therefore, ethnicity differences did not show significant changes related to psychosocial factors. The data shown in Table 11 was used to correlate psychosocial factors and ethnicity.

Table 11

Crosstab of Psychosocial Factors and Ethnicity

		What is your ethnicity?					Total
		American Indian or Alaskan Native	Asian or Pacific Islander	Black or African American	Hispanic or Latino	White/Caucasian	
Psychosocial factors	1.00	1	0	0	0	6	7
	1.09	1	0	0	0	1	2
	1.18	0	0	0	0	2	2
	1.27	0	0	0	0	2	2
	1.36	0	0	0	0	4	4
	1.45	0	1	0	0	1	2
	1.55	0	0	0	0	2	2
	1.64	0	0	0	0	1	1
	1.73	0	0	0	0	4	4
	1.82	0	0	0	0	3	3
	1.91	0	0	0	0	1	1
	2.00	0	0	0	0	4	4
	2.09	1	0	1	0	5	7
	2.18	0	0	0	0	4	4
	2.27	0	0	0	0	5	5
	2.36	0	0	0	0	2	2
	2.45	1	0	0	0	7	8
	2.55	0	0	0	1	3	4
	2.64	0	0	0	0	6	6
	2.73	0	0	0	0	6	6
	2.82	0	0	0	0	6	6
	2.91	1	0	0	0	2	3
	3.00	0	0	1	0	8	9
	3.09	0	0	0	0	4	4
	3.18	1	0	0	0	5	6
	3.27	0	1	0	0	4	5
	3.36	0	0	0	0	4	4
	3.45	0	0	0	0	4	4
	3.55	0	0	0	1	2	3
	3.64	0	0	0	0	5	5
	3.73	0	0	0	0	3	3
	3.82	0	0	0	0	4	4
	3.91	0	0	0	0	7	7

Cramer's V = 0.485, probability = 0.763

Lastly, Cramer's V between socioeconomic factors and ethnicity scored 0.260 and had a probability of 0.970. So, ethnicity did not show a statistically significant value in relation to the BHE Scale for this population. Table 12 shows the crosstab table correlating socioeconomic factors and ethnicity.

Table 12

Crosstab of Socioeconomic Factors and Ethnicity

		What is your ethnicity?					Total
		American Indian or Alaskan Native	Asian or Pacific Islander	Black or African American	Hispanic or Latino	White/Caucasian	
Socioeconomic factors	1.00	1	0	1	1	27	30
	1.20	0	0	0	0	7	7
	1.40	2	1	0	0	19	22
	1.60	0	0	0	0	8	8
	1.80	1	0	0	0	23	24
	2.00	0	0	0	1	11	12
	2.20	0	0	0	0	11	11
	2.40	1	0	0	0	7	8
	2.60	0	0	1	0	6	7
	2.80	1	1	0	0	4	6
	3.00	0	0	0	0	3	3
	3.20	0	0	0	0	4	4
	3.40	0	0	0	0	7	7
	4.20	0	0	0	0	1	1
	4.40	0	0	0	0	1	1
5.00	0	0	0	0	1	1	
Total		6	2	2	2	140	152

Cramer's V = 0.260, probability = 0.970

The final demographic consideration reviewed in this study was average household income range. This varied widely among participants, so trying to understand the connection between income and barriers to healthy eating was necessary. Table 13 displays the income ranges divided amongst the 152 participants who completed this survey.

Table 13

<i>Average Household Yearly Income</i>	Frequency	Percent
Less than \$15,000	4	2.6
\$15,000 - 29,999	10	6.6
\$30,000 - 49,999	23	15.1
\$50,000 - 74,999	29	19.1
\$75,000 - 99,999	34	22.4
\$100,000 - 150,000	35	23.0
over \$150,000	17	11.2
Total	152	100.0

The three largest groups in terms of average household income were \$100,000-150,000, \$75,000-99,999, and \$50,000-74,999, respectively. These three groups accounted for 64.5 percent of the respondents in the study. The average household yearly income and BHE subcategories were analyzed using the Kendall's Tau-C. The correlation between physical factors of the BHE Scale and income resulted the Kendall's Tau-C score of 0.022 with a probability of 0.724 which was not statistically significant. Table 14 shows the crosstab table correlating physical factors and average household yearly income.

Table 14*Crosstab of Physical Factors and Average Household Yearly Income*

		What is your average household yearly income?						Total	
		under 15k	15,000 - 29,999	30,000 - 49,999	50,000 - 74,999	75,000 - 99,999	100,000 - 150,000		over 150,000
Physical factors	1.00	2	1	2	2	2	1	1	11
	1.17	0	0	0	3	0	3	0	6
	1.33	0	0	0	1	1	1	0	3
	1.50	0	0	2	1	0	0	0	3
	1.67	0	1	3	1	6	5	2	18
	1.83	0	0	3	0	1	1	1	6
	2.00	1	0	1	1	1	1	3	8
	2.17	1	0	1	2	3	2	2	11
	2.33	0	1	2	0	2	2	1	8
	2.50	0	0	1	2	1	2	0	6
	2.67	0	1	1	2	4	1	0	9
	2.83	0	2	0	2	3	4	3	14
	3.00	0	1	1	4	3	4	1	14
	3.17	0	2	1	2	2	3	0	10
	3.33	0	0	1	0	1	2	0	4
	3.50	0	0	0	1	0	1	0	2
	3.67	0	0	1	1	1	0	1	4
	3.83	0	0	0	0	0	0	2	2
	4.00	0	1	1	0	0	0	0	2
	4.17	0	0	0	1	0	1	0	2
4.33	0	0	1	2	1	0	0	4	
4.67	0	0	1	1	0	1	0	3	
5.00	0	0	0	0	2	0	0	2	
Total		4	10	23	29	34	35	17	152

Kendall's Tau-C = 0.022, probability = 0.724

Psychosocial factors and income revealed a Kendall's Tau-C of 0.071 with a probability of 0.267. This was also not statistically significant. This data is represented in Table 15.

Table 15

Crosstab of Psychosocial Factors and Average Household Yearly Income

		What is your average household yearly income?							Total
		under 15k	15,000 - 29,999	30,000 - 49,999	50,000 - 74,999	75,000 - 99,999	100,000 - 150,000	over 150,000	
Psychosocial factors	1.00	1	0	2	1	2	1	0	7
	1.09	0	0	1	0	1	0	0	2
	1.18	1	0	0	1	0	0	0	2
	1.27	0	0	0	1	0	0	1	2
	1.36	0	1	0	0	0	2	1	4
	1.45	0	0	0	0	1	1	0	2
	1.55	0	0	0	0	1	1	0	2
	1.64	0	0	1	0	0	0	0	1
	1.73	0	0	0	2	1	1	0	4
	1.82	0	0	0	0	2	1	0	3
	1.91	0	0	0	0	0	0	1	1
	2.00	1	0	1	0	1	1	0	4
	2.09	0	0	2	3	1	1	0	7
	2.18	0	1	0	1	1	0	1	4
	2.27	0	0	0	2	1	1	1	5
	2.36	0	0	1	0	0	1	0	2
	2.45	1	0	2	2	2	1	0	8
	2.55	0	1	0	2	0	0	1	4
	2.64	0	0	0	0	0	4	2	6
	2.73	0	1	3	1	0	1	0	6
	2.82	0	0	0	4	0	0	2	6
	2.91	0	0	0	1	0	1	1	3
	3.00	0	1	1	2	4	1	0	9
	3.09	0	1	1	0	1	1	0	4
	3.18	0	0	1	0	5	0	0	6
	3.27	0	0	1	0	1	3	0	5
	3.36	0	0	0	2	0	1	1	4
	3.45	0	0	1	0	1	2	0	4
	3.55	0	0	0	1	1	1	0	3
	3.64	0	1	0	0	2	2	0	5
	3.73	0	0	0	0	0	2	1	3
	3.82	0	1	2	0	1	0	0	4

Kendall's Tau-C = 0.071, probability = 0.267

Lastly, the Kendall's Tau-C score between socioeconomic factors and income was -0.052 with a probability of 0.404. This was also not statistically significant. Table 16 shows the data representing the correlation between socioeconomic factors and average household yearly income.

Table 16

Crosstab of Socioeconomic Factors and Average Household Yearly Income

		What is your average household yearly income?							Total
		under 15k	15,000 - 29,999	30,000 - 49,999	50,000 - 74,999	75,000 - 99,999	100,000 - 150,000	over 150,000	
Socioeconomic factors	1.00	1	1	6	5	8	6	3	30
	1.20	0	0	1	2	2	2	0	7
	1.40	0	0	3	3	6	6	4	22
	1.60	0	0	2	2	1	3	0	8
	1.80	0	1	6	5	3	8	1	24
	2.00	2	1	0	2	3	4	0	12
	2.20	0	2	1	4	1	0	3	11
	2.40	0	0	1	0	2	1	4	8
	2.60	0	0	1	2	1	3	0	7
	2.80	0	2	1	0	1	2	0	6
	3.00	0	1	0	0	1	0	1	3
	3.20	0	0	1	0	2	0	1	4
	3.40	0	1	0	4	2	0	0	7
	4.20	0	1	0	0	0	0	0	1
	4.40	1	0	0	0	0	0	0	1
5.00	0	0	0	0	1	0	0	1	
Total		4	10	23	29	34	35	17	152

Kendall's Tau-C = -0.052, probability = 0.404

Summary

The data analysis of the survey based on the Barriers to Healthy Eating Scale provided relevant results to better understand what barriers patients face with adopting

the American Heart Association diet. There were 152 completed surveys that included the BHE Scale and demographic questions. The BHE scale used 22 questions which addressed physical, psychosocial, and socioeconomic factors that could affect their diet. The BHE Scale was organized into an anchored scale for participants to rank their experience. The study utilized a convenience sampling method, and it was presented to willing participants who met all inclusion criteria.

Research question 1 addressed the impact of physical factors with adherence to the prescribed AHA diet. The mean score for the physical factors within the BHE scale for this study was 2.49 with a standard deviation of 0.945. Research question 2 addressed the impact of psychosocial factors and adherence to the prescribed AHA diet. The mean score for the psychosocial factors within the BHE scale for this study was 2.75 with a standard deviation of 0.936. Research question 3 addressed the impact of socioeconomic factors and adherence to the prescribed AHA diet. The mean score for the socioeconomic factors within the BHE scale for this study was 1.89 with a standard deviation of 0.784.

Lastly, research question 4 accounted for various demographic considerations and how they impact the AHA diet for the survey participants. Each of the demographic considerations were used to assess correlations between the physical, psychosocial, and socioeconomic factors affecting the participant's diet. The correlation between physical factors and psychosocial factors with age range showed statistically significant results. Gender, ethnicity, and annual household income did not show any statistically significant correlations with the physical, psychosocial, or socioeconomic factors.

Chapter V

Discussion

This chapter focuses on the connection between the results of the study with the impact on current and future practice. Basic observations from the study and findings related to each research question are included. Additionally, considerations from the theoretical framework and logic model are discussed. Lastly, healthcare implications and research limitations are discussed.

Relationship of Outcomes to Research

Healthcare providers can help patients overcome individualized obstacles to improve dietary compliance by having a better understanding of their circumstances. This can lead to improved health outcomes, including reduced cardiovascular risk. Using results from this research study can give the provider information to help enhance the value of dietary education. Each patient has considerations that influence their potential to achieve personalized health goals. Diet is the most influential factor affecting the likelihood of reaching these goals. The goal of the research study was to better understand the impact of physical, psychosocial, socioeconomic barriers, and demographic variables in patients who are prescribed the American Heart Association

diet for health promotion. The project focused on the following research questions which will be examined individually in the discussion of results:

- 1) What are the physical factors that can affect adherence to a prescribed AHA diet?
- 2) What are the psychosocial factors that can affect adherence to a prescribed AHA diet?
- 3) What are the socioeconomic factors that impact adherence to a prescribed AHA diet?
- 4) What are the demographic considerations including age range, gender, ethnicity, and income range that are related to AHA diet adherence?

Research Question 1

What are the physical factors that can affect adherence to a prescribed AHA diet?

The Barriers to Healthy Eating (BHE) scale addresses different physical variables in a person's life to assess their impact on someone's diet. These are often the most apparent considerations that can be voiced by patients to their provider. Briefly among the physical factors evaluated, the time to make healthy meals, the taste of low-fat or low-calorie foods, and the lack of knowledge of what is or is not valuable foods were among the most common hinderances in this realm. Teaching someone the importance of purchasing foods as a means of fueling the body can be difficult if the foods that are being promoted take an excessive amount of time to prepare or they do not taste the same as their less-healthy counterparts.

Each physical factor was analyzed with a basic mean and standard deviation calculation. The overall scoring for physical factors on the Likert-type scale showed a mean of $x=2.49$, $SD=0.945$. This means that physical factors were typically impactful on the participant's dietary choices but were most likely not the only reason for their dietary choices. There are commonly psychosocial and/or socioeconomic factors which make physical factors more difficult to overcome (Hamad et al., 2019). Similarly, there are a multitude of physical health conditions that restrict certain foods or food groups from patients including diabetes (de la Iglesia et al., 2014), hypertension (Eckel et al., 2014), and chronic inflammatory conditions like rheumatoid arthritis and inflammatory bowel disease (Khorshidi et al., 2020). Some are modifiable conditions but others are not. Providers can educate patients on ways to adapt their health goals by identifying these individual physical barriers. These are typically the most objective and apparent circumstances a person faces, so they are often the first variables to be addressed.

Research Question 2

What are the psychosocial factors that can affect adherence to a prescribed AHA diet?

In the research study, psychosocial factors were the most significant factors affecting diet among the research participants. The overall mean score for psychosocial factors was $x=2.75$, $SD=0.936$. And, when evaluating each individual question of the BHE scale, it was apparent that this would be a leading factor that can help guide patient and provider conversation and education. Of the twenty-two items on the BHE scale, four of the top five significant factors reported were psychosocial factors. The most influential piece of the scale was *“When I am very hungry I have trouble controlling what I eat.”*

with a mean rating of 3.11 (SD=1.476) which is categorized among the psychosocial factors. There are several of psychosocial factors that affect a patient's ability to adopt the AHA diet (Santana et al., 2020). Psychosocial factors are important variables that can hinder access to care and dietary compliance (Mozaffarian, 2016). Oftentimes, patients and providers do not even consider dietary obstacles from a psychosocial standpoint. They are unique to each person and are often private things that do not get discussed unless there is a significant trust between patient and provider. This makes it a much more complicated variable to address. The provider often does not know everything about every patient that they see, but they do see objective measurements like their height, weight, and body mass index with each appointment. It is easy to promote the AHA diet and general wellness factors to all patients but that often does not reach the root of a person's dietary obstacles. Motivation and self-discipline are often at the center of consistency in dietary and lifestyle choices (Patel et al., 2020). By accounting for what motivates patients or keeps them consistent with their diet, the provider is better equipped to support, guide, and challenge patients to adopt and maintain a more successful diet.

Research Question 3

What are the socioeconomic factors that impact adherence to a prescribed AHA diet?

The BHE scale accounts for socioeconomic considerations that can alter someone's perception or viability of incorporating the AHA diet. Typically, healthier foods that align with the AHA diet are more expensive for patients. Lean proteins, different types of fish, fresh produce, and legumes are among the more expensive items in a grocery store or market. This can force someone with socioeconomic concerns such

as low income or a fixed income to make tough decisions on the quality of food they purchase. Although it can be uncomfortable for providers and patients to discuss, this can be a valuable aspect to consider when reviewing dietary options.

Interestingly, socioeconomic factors overall were reported as the least significant barrier to adopting the AHA diet. There were some patients who felt that this was one of the most significant factors though. The overall mean score from the Likert-type scale for socioeconomic factors was $x=1.89$ with a standard deviation of $x= 0.784$. From a basic perspective, the BHE scale addresses concerns for socioeconomic factors by inquiring about the participant's ability to afford healthier foods, family support, and buying for one person at the grocery store or market. Family support, either financially or by providing healthy options, is key to sustaining AHA diet recommendations. This is especially important during holiday gatherings or social events where usually the food available is not as healthy. Buying for one person is another concern for people focused on improving their diet. Balancing expiration dates and produce or fresh meats spoiling can be complicated when only one person is following this significant dietary change.

Research Question 4

What are the demographic considerations including age range, gender, ethnicity, and income range that are related to AHA diet adherence?

Demographic correlations are helpful for providers in that they help providers understand trends between different populations, so care and education can be catered to each individual and have the most positive impact possible. Each demographic component of the research survey was compared with physical, psychosocial, and

socioeconomic factors to identify any statistical significance in responses. Age range was considered for each participant. The age ranges were broken into six categories that included 18-29, 30-39, 40-49, 50-59, 60-69, and 70+ years old. By using a Kendall's Tau-C calculation, it was determined that there was statistical significance in age for physical and psychosocial factors related to diet. Therefore, as age increased, the participants considered physical and psychosocial factors to be more important in their life. Or, as age decreased, physical and psychosocial factors were less important to them. Accounting for these trends gives the provider a more effective way to educate on ways to combat these obstacles. Given that physical and psychosocial factors were the two most significant barriers to adopting the AHA diet, patients and providers can collaborate on understanding the individual obstacles to adhering to this diet. Consequently, it helps the provider to understand that the other factors and variables were not as impactful on their diet.

Gender was the second demographic consideration reported in the study. Males and females have different dietary needs, challenges, life stressors, body fat storage, energy usage, and hormones. And all of these can affect diet and dietary success. There were a total of 44 males and 108 females who participated. An Eta value was calculated for this variable. Based on the results, there was no statistically significant relationship between gender and physical, psychosocial, or socioeconomic barriers. Although it is not statistically significant, it is still important to inform patients and providers for the future because it means that this variable does not have to be a negative influence on the patient's motivation or support.

Each patient also selected their ethnicity from a variety of choices. And, if it applied, they could choose more than one ethnicity. The Cramer's V was utilized in associating ethnicity with physical, psychosocial, and socioeconomic factors. None of which were found to be statistically significant. The provider and patient can use these to adapt their diet. Although there are often ethnic differences in diet, as described by the review of literature, the individual's perception of the importance of healthy foods is not altered. This enhances the value of education from the provider. The provider can show the patient how to change their diet for better success while maintaining their individual choices. Establishing this baseline for dietary education provides the patient with knowledge to make better dietary choices.

Lastly, household income was an important factor to address because of the variety of backgrounds and circumstances which make up the local population. This can be important to consider when socioeconomic hinderances are present. However, there was no statistically significant correlation between annual household income and physical, psychosocial, or socioeconomic factors after computing the Kendall's TauC. This is still often a concern that some patients have and needs to be addressed by the provider for effective teaching. To some extent, this is a concern for all patients who are trying to change their diet because of the financial strain certain foods come with. Finding resources, discounts, store promotions, or online deals can help alleviate this burden that some patients face.

Observations

For the most part, participants were very intrigued by the premise of the study. It was both interesting and validating to see the engagement of the participants as they

completed the survey. Oftentimes, there was excitement to be a part of the survey. Some participants asked if they could participate before the research study was introduced. However, there were some participants who were willing and voluntarily agreed to participate but were less enthused when trying to utilize the QR code to access the survey. Some began the survey but did not finish it. The vast majority of participants had no problem understanding the value of the survey and were able to navigate the survey without issue. A few participants had clarifying questions about what some items were asking. In addition, some of the providers at the participating health clinic were interested in the survey and the value it could add to their practice. By creating momentum and intrigue among both patients and providers, the open communication about barriers to healthy eating can create more productive conversation in these appointments.

Evaluation of Theoretical Framework

The theoretical framework connected to this research was Pender's health promotion model. It is based on incorporating primary care prevention measures such as dietary changes to promote wellness rather than avoiding illnesses or treatment of conditions. Optimizing diet for a patient is challenging when considering the barriers to healthy eating. Several assumptions of Pender's model are applicable to this research study. Pender's model can be summarized using four overarching themes including (a) individuals involved in changing their health behaviors believe that the changes will improve their health circumstances, (b) understanding the value of changing their behavior will enhance their desire to sustain the new behavior, (c) individuals are more likely to continue with the positive behavioral change when they are around others who

model the same behavior, and (d) the internal and external circumstances of an individual affect the commitment to behavioral changes (Petiprin, 2016).

Overall, the results of the project support Pender's health promotion model as an appropriate conceptual framework. The data collection showed that each person has different circumstances that affect them. Physical, psychosocial, and socioeconomic barriers all play a role in dietary changes. Each person handles a variety of barriers differently. Additionally, one barrier can be more hindering or concerning for one person in comparison to the next. Finding ways to identify these concerns for the sake of the patient helps providers understand how Pender's health promotion model can be used to better promote successful behavioral changes related to diet.

Healthcare Implications

The future for dietary evaluations and patient education can be enhanced by utilizing a similar survey for patients. At minimum, completing this survey yearly can help providers better understand what obstacles patients have regarding diet. It can identify strong areas and weak areas in adopting and sustaining the AHA diet. Providers and organizations can also trend the results of the survey to better understand the overall population and struggles that are often limiting the effectiveness of changing their dietary habits.

Policy and standards of care can be adapted to include these assessments as part of a patient's care plan. It is difficult to thoroughly evaluate each person's diet at each primary care appointment, so making it a point to objectively ask certain questions about their life circumstances would allow for more comprehensive assessments. Policy can be

based on population needs and facility or organization concerns. Certain geographic areas may struggle more with one barrier to healthy eating as opposed to others. So, catering to the needs of the population is pivotal to changes in policy and standards of care. If physical barriers to healthy eating are a concern, then local organizations should try to combat this with alternate food options or recipes within the AHA diet or simpler cooking methods. Psychosocial barriers can be complicated to address because they are unique to each person. Psychosocial barriers to healthy eating can be addressed by primary care providers in that they can coach, educate, and inspire positive dietary change. Socioeconomic barriers are often complicated for patients to discuss but there are meal assistance programs that can mitigate the effects of socioeconomic barriers to obtain nutrient-dense, high-quality foods. These programs include Supplemental Nutrition Assistance Program (SNAP), Medicaid support, and Women, Infants, and Children (WIC) (United States Government, 2019). These are funded federally or at the state level upon qualifying for the program.

Limitations

The project design can be improved for future research by obtaining a larger sample size and not having the time constraints associated with this project. A truly random sample would most likely provide a more accurate representation of the general population's experiences. Additional correlations need to be established to understand extraneous variables not directly addressed in the BHE survey including telehealth appointments or transportation issues which could alter some results. The long-term effects of maintaining the AHA diet for patients could be objectively measured by trending laboratory tests but can also be evaluated subjectively based on how the patient

feels over time. The inclusion of multiple locations would also be a way to gain a more comprehensive understanding of the barriers patients see to improving their dietary choices.

The limitations of the project include several factors. Time constraints did not allow for a larger sample size in conjunction with the pace of the research. There was no monetary funding to further promote the recruitment or advertisement of the survey for participants. The survey needed 158 completed surveys to reach a 95% confidence interval but only 152 surveys were completed. Convenience sampling was a limitation to the research because it was not a truly random sample of the local population who could have been eligible to take part in the research study. Not all individuals who agreed to participate were able to access the survey through the QR code for a variety of reasons. The survey could not be adapted to ask more specific questions related to the participants' dietary choices, living conditions, geographic location, or personal perceptions toward diet because the validity of the tool was established based on the 22 items presented. Although the sample size was representative of the local population, there was little input from diverse ethnic populations. Having a broader perspective would have helped in trending dietary choices across ethnicities.

Conclusion

The purpose of this project was to gain a better understanding of the physical, psychosocial, and socioeconomic barriers faced by local patients who are prescribed the American Heart Association diet. This was achieved by conducting a study based on a validated survey tool known as the Barriers to Healthy Eating (BHE) scale. The tool was provided to patients in a rural health setting and addressed their current diet in order to

identify physical, psychosocial, and socioeconomic factors that prevent them from achieving optimal cardiovascular health through dietary choices. Overall, psychosocial factors were reported as the most important barrier to healthy eating, followed by physical factors and lastly, socioeconomic factors. In relation to demographic considerations, the results suggested statistically significant correlations of age with physical and psychosocial factors. There were no other statistically significant connections between the barriers to healthy eating and gender, ethnicity, or household income. The knowledge gained from this research project can be used to better understand the obstacles patients face with their diet, and it gives providers an opportunity to discuss ways patients can improve their health through the AHA diet.

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Appendices

Appendix A

Research Letter of Explanation and Participation Agreement

TITLE OF RESEARCH STUDY: THE IMPACT OF PERSONAL BARRIERS TO INCORPORATING THE AMERICAN HEART ASSOCIATION DIET

RESEARCH TEAM: Student Researcher Aaron Bigando, 1701 S Broadway St., Pittsburg, KS, 66762. (620)762-6158, abigando@gus.pittstate.edu.

You are being asked to take part in a research study. The study is completely voluntary. It is your right to withdraw from the study if you want, and that decision will not be held against you in any way. This study is about the impact of barriers to incorporating the American Heart Association (AHA) Diet. To take part in the study, you will complete a survey. You will be asked about different situations related to your diet over the past 6 months. You will be asked to answer each part based on your thoughts relating to diet. The goal is to get a better understanding of the physical, psychosocial, and socioeconomic barriers patients have with the AHA diet. Participation requires a one-time visit at an outpatient doctor's appointment. The time needed is 5-10 minutes to read and answer the 22 questions in the survey.

This study will be used for improving education for patients and helping providers understand diet limitations. The results give providers and patients a way to create a plan for improving health with the AHA diet. The study is being conducted in conjunction with the Health Insurance Portability and Accountability Act (HIPAA) rights for participants. This research study is not expected to cause any added risks beyond what you could experience in your everyday life.

The research team will make every effort to keep personal information private within the research study. Survey answers will be securely stored and can only be viewed by the student researcher and the committee members. The results will be physically and electronically secured.

Appendix B

Barriers to Healthy Eating

Demographic Information

Please complete the 5 generalized demographic items for population-based analysis prior to completing the Barriers to Healthy Eating Scale.

***1. What is your current age (in years)?**

- 18-29
- 30-39
- 40-49
- 50-59
- 60-69
- 70+

***2. What is your sex?**

- Male
- Female
- Prefer not to answer

***3. What is your ethnicity?**

- American Indian or Alaskan Native
- Asian or Pacific Islander
- Black or African American
- Hispanic or Latino
- White / Caucasian
- Prefer not to answer
- Other (please specify)

*** 4. Please indicate your average household yearly income.**

- Under \$15,000
- Between \$15,000 and \$29,999
- Between \$30,000 and \$49,999
- Between \$50,000 and \$74,999
- Between \$75,000 and \$99,999
- Between \$100,000 and \$150,000
- Over \$150,000

*** 5. Do you live within the city limits of Joplin, Missouri?**

- Yes
- No

ID Number: _____
(for internal use only)

Date: ___ / ___ / ___
(for internal use only)

Study ID:

0	6	0
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	<i>Not at all a problem for me</i>			<i>A very important problem for me</i>	
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
11. When I am very hungry I have trouble controlling what I eat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Losing weight is rewarding but I have trouble staying motivated to keep off the weight I lost.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Changing my diet to reduce calories and fat seems too complicated.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. I feel deprived when I have to restrict so many foods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. I find it difficult to select the appropriate foods when shopping.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. I never feel that my appetite is satisfied when I am trying to lose weight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. The foods that are reduced in fat and calories cost more than I can afford.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. The taste of low-fat / low-calorie foods is different.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. Resisting tempting high fat / high calorie foods in my work setting is difficult.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. When I am busy or feeling overwhelmed, I find it difficult to remember all the rules about what foods are appropriate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. When I am with my family I find it difficult to watch what I eat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. My friends do not support me when I try to change my eating.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

