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NUTRITIONAL MEDICINE:

EDUCATION FOR ADVANCED PRACTICE PROVIDERS

by

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Doctor of Nursing Practice

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Southern Adventist University

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Abstract

OBJECTIVE: The project's primary goal was to educate the APP and develop positive attitudes and beliefs concerning plant-based nutrition regarding obesity, diabetes, cardiovascular disease, and cancer. The project addressed a crucial gap in healthcare education. APPs were not routinely given the chance to learn nutritional medicine, leading to decreased confidence in providing nutritional guidance in clinical practice.

METHODS: The DNP project participants were practicing advanced practice providers. The Knowledge, Attitude, Behavior (KAB) education theory and CREATION Life were used. This project used Qualtrics to send a pre-and post-intervention survey titled Student Survey for Nutritional Medicine. The intervention was a prerecorded nutritional medicine course covering the benefits of a whole-food/plant-based diet, practical solutions for common misconceptions regarding plant nutrition, and resources for further education.

RESULTS: A total of 10 participants completed the pre-and-post intervention survey. The data was analyzed using a Wilcoxon Signed Rank Test. Results showed a positive change of attitude in discussing whole-food/plant-based diets regarding obesity, diabetes, cardiovascular disease, and cancer, along with an interest in learning more about nutritional medicine.

CONCLUSIONS: The findings of this study showcase the need for continued education and training in nutritional medicine for advanced practice providers. It also shows the critical role of education in shaping advanced practice providers' attitudes and behaviors, promoting improved patient outcomes through evidence-based nutritional practices.

Dedication

I want to thank my family, my parents, Kent and Nancy, and my two children, Annika and Tyler. It has been an extremely long road to get to this point. Thanks to my parents for supporting me for so long in this journey. Thank you to Annika and Tyler for their patience, flexibility, and growing up knowing their mom had to attend college. We finally made it!

For Rodger, I got to meet you on the last leg of this journey. You have improved my life, and I appreciate your daily love and support. You helped me more than you will ever know.

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NUTRITIONAL MEDICINE:

EDUCATION FOR ADVANCED PRACTICE PROVIDERS

Chapter 1

Plant-based diets have gained popularity in the United States, capturing the interest of healthcare providers and patients eager to understand their potential impact. The link between poor diet and chronic diseases is well-established, with the Standard American Diet (SAD) recognized as a significant contributor to these health risks (Locke et al., 2018). Despite the critical implications, healthcare providers often need more education in nutrition within their medical curriculum, focusing primarily on scientific research and biochemistry rather than on practical nutrition counseling or clinical guidelines (Bermejo & Stiegmann, 2020; Pallazola et al., 2019). This gap extends to clinical experiences, where many students need more exposure to or receive outdated nutrition information, leaving providers ill-prepared to guide their patients (Danek et al., 2017). Young adults turn to online resources for nutritional information. However, they perceive healthcare professionals as the most reliable source, creating a potential discrepancy regarding the knowledge levels between the public and health professionals in food and nutrition. Santella et al. (2020) report that nutritional knowledge is the same between healthcare providers and the general population.

The integration of comprehensive dietary education and counseling within clinical settings faces a substantial obstacle linked to the absence of reimbursement from insurance providers. This issue, discussed by Trilk et al. (2019), describes the reduction in insurance reimbursement rates observed for patient encounters that omit medication prescriptions, posing a deterrent to implementing dietary modifications and lifestyle interventions in patient care. The intricate nature of nutritional counseling often extends beyond the time constraints of

conventional patient appointments, involving detailed discussions and continued guidance for effective dietary changes. The lack of financial remuneration for such crucial components of patient care creates an imbalance, steering healthcare providers toward solutions that might not encompass comprehensive nutritional adjustments due to the financial disincentive. Consequently, this not only hampers the holistic approach to patient health but also deters the provision of thorough and personalized nutritional advice, limiting the potential to address chronic conditions through dietary interventions. The need for insurance reimbursement reform to accommodate and value the time and effort dedicated to nutritional counseling becomes increasingly evident, fostering an environment where comprehensive healthcare involves effective dietary education and personalized counseling as integral components of patient-centered care.

Goals

This project aims to achieve two primary goals. Firstly, it strives to enhance the knowledge and confidence of advanced practice providers (APPs) in advocating and discussing the advantages of plant-based nutrition within their practice. Secondly, it endeavors to leverage this newfound knowledge to enhance overall health and wellness for individual patients and within their broader community. This paper will delve into the escalating necessity for APPs to familiarize themselves with the merits of plant-based diets. It will explore the local and global imperative for such initiatives, delineating the tailored design and implementation of the curriculum. Furthermore, the study will meticulously analyze the outcomes, focusing on the changes in APPs' knowledge and comfort levels as they integrate patient counseling on plant-based diets into their practice.

Background and Significance

According to the 2017 Global Burden of Disease Diet Collaborators (2019), an estimated one in five deaths can be attributed to unhealthy diets, particularly those high in sodium, sugar, and fat and low in fruits, vegetables, nuts, and whole grains. Alternately, refined flours, fats, and oils provide nearly half of the consumed calories in the Western diet, while fruits and vegetables provide an estimated 8% (Lessem et al., 2019).

The lack of nutrients in highly processed yet poorly absorbed foods is thought to be the cause of cardiovascular disease, diabetes, and obesity. English et al. (2021) found that diets that consist of food reduction and calorie restriction are not solving the nutrient crisis, as those low-calorie foods are often enhanced for flavor, palatability, and appeal yet continue to be nutrient-poor. English et al. (2021) report that a diet with a high consumption of vegetables, fruits, legumes, nuts, whole grains, unsaturated vegetable oils, and lean meat reduced the risk of all-cause mortality. These diets were low in red and processed meats, high-fat dairy, refined carbohydrates, and sugary beverages. Nutrient-dense diets (DASH, vegetarian, and Mediterranean diets) were associated with lower all-cause mortality regardless of their specific name.

Low nutrient-dense diets are vital contributors to obesity. Since the 1970s, as rates of processed and packaged food sales have increased, rates of obesity have tripled in the United States. It is estimated that by 2030, one in two adults will be obese. Additionally, an estimated 50% of the population in *most* states and not below 25% in *any* of the 50 conditions will be obese and have chronic diseases associated with obesity (Nabrdalki et al., 2021). According to Cooksey-Stowers, Schwartz, and Brownell (2017), one reason for the increased rates of obesity is the availability of food choices, including limited options for healthy and affordable foods

(food deserts) or areas where unhealthy, fast-food and junk food is readily available (food swamps). Access to healthy food, such as a grocery store or local farmers market, increases the consumption of fruits and vegetables. Their research also discovered that the availability of a grocery store alone is not an indicator of community health. Areas considered a food swamp increase the risk of obesity due to the preference or necessity of affordable but unhealthy fast, processed food. We have now started to depend on prepared and packaged foods for our food rather than growing and preparing meals at home (Harari, 2022).

While access to food has improved, sedentary lifestyles are also more pronounced. In 1900, the average life expectancy was 50 years old. Today, it is closer to 80 years old. With increasing longevity and rising healthcare costs, hospitals and healthcare organizations are considering disease prevention and progression factors. Chronic disease development is challenging and has proven to be multifactorial (Ng et al., 2020).

Problem Statement, Purpose, and Project Inquiry

The problem identified is a need for more nutrition education for advanced practice providers (APPs), specifically, the health benefits of a plant-based diet. This project aims to develop a course for APPs to introduce them to plant-based diets and educate them on the importance of nutrition and how to implement acquired knowledge into their own lives and practices. This will begin reducing the disease burden on individuals and communities.

Theoretical Framework

The theoretical frameworks chosen are the Knowledge-Attitude-Behavior (KAB) education theory and the CREATION life theory. The knowledge-attitude-behavior theory attempts to change human behavior by changing the behavior process. This process, known as KAB, is knowledge acquisition, attitude/belief generation, and behavior/practice formation.

There is a positive correlation between knowledge level and behavior. The theory applies to this project as it aims for the APP to acquire knowledge of plant-based nutrition, change their attitude to be more comfortable discussing this diet, and change their behavior to incorporate it into their practice (Lui et al., 2016). Teo et al. (2022) note a significant correlation between nutrition knowledge and dietary behavior. For example, once we know the specific benefits of plant-based foods, we tend to choose those foods for consumption over processed food options.

This aligns with the CREATION Life Theory. According to this theory, the components of proper health consist of choice, rest, environment, trust in God, interpersonal relationships, outlook, and nutrition. These are similar to changing our beliefs and actions to live healthier lives. Combining the KAB Theory, the CREATION Life Theory, and plant-based diets will outline the learning objectives created for education and implementation into a nutritional educational curriculum.

The components of CREATION life have been utilized in many studies to understand how improving nutrition, exercise, and sleep will improve overall health. Dina et al. (2017) questioned whether plant-based diets impacted chronic disease risk factors and all-cause mortality. It was discovered that when compared to an omnivore diet, plant-based diets did have a decrease in risk factors, specifically a 25% decrease in ischemic heart disease and a 15% decrease in cancer mortality. Plant-based consumers also experienced a lower body mass index (BMI) and lower serum levels of total cholesterol, LDL cholesterol, HDL cholesterol, triglycerides, and blood glucose, all associated with diabetes, hypertension, cardiovascular disease progression, and obesity.

The KAB theory is essential to this project because it has defined multiple areas of change and how to achieve change through education and improved understanding. The KAB

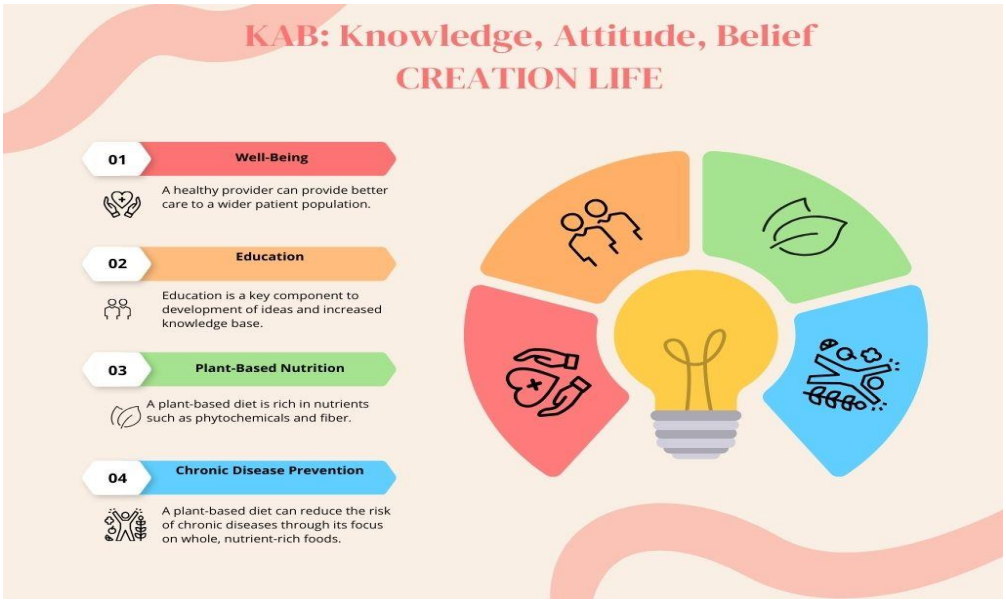
theory discusses the need to show the need for change (knowledge acquisition) to lead to a different attitude towards the problem and subsequent evolution of behavior.

Meshing these two theories together builds the foundation for the project to focus on the importance of nutritional medicine education. Practitioners must identify dietary factors that may harm their patients' health, know how to correct them, and educate them about transitioning from unhealthy to healthy habits. However, this education is typically presented in something other than traditional medical and nursing schools. Therefore, offering these continuing education courses is vital to progress that knowledge and ability.

Figure 1 represents a visual display of the combined theories. The components of CREATION life are the pillars of the project. The KAB theory explains how new information can be utilized for improved health.

Figure 1

KAB and CREATION Life Theories



Chapter 2

Review of Literature

There has been a dramatic increase in chronic diseases in the past several decades in the United States. An estimated 6 in 10 adults have one chronic illness, and 4 in 10 have two or more chronic diseases. These conditions require long-term management, reduce quality of life, and diminish health outcomes. However, many diseases are related to a poor diet and decreased nutritional status. By including nutritional medicine education in the curriculum, the hope is that many of these chronic diseases can be prevented, helping reduce patient visits and improving overall health. More attention needs to be given in the medical curriculum to implementing clinical guidelines, advice on how to introduce nutritional counseling into practice, and the importance of continued learning in nutritional medicine.

Database

Research was undertaken by utilizing the following: Academic Search Premier, CINAHL, Health Source: Nursing/Academic Edition, Medline, and PubMed. Databases were selected due to the relevancy of topic material, significance to current practices, and availability of peer-reviewed resources. The following search terms were used: nutritional medicine, nutrition, nutritional curriculum, nutritional prescription, whole-food/plant-based, advanced practice nutrition curriculum, nutrition interventions, KAB, theory of knowledge, attitude, behavior, and dietary myths, plant-based diet, cardiovascular disease, hypertension, cancer, and mental health. Inclusion criteria included recent publications no older than five years and peer-reviewed sources that included randomized controlled trials, meta-analyses, systematic reviews, and lifestyle medicine-related nomenclature. Exclusion criteria included publications older than five years, case studies, too-small studies, and opinion pieces.

Presentation of Literature

Nutritional medicine, which includes education on the benefits of nutrition, behavior change, and dietary myths and misconceptions, is an emerging evidence-based clinical discipline. It emphasizes provider counseling on healthy lifestyle behaviors and modifications to prevent and reduce the disease burden of chronic diseases (Trilk et al., 2019). Despite the mounting evidence that nutritional medicine is crucial to patient wellness, the medical curriculum focuses on physical and diagnostic assessment with diagnosis, prognosis, and subsequent intervention (Hivert et al., 2017). This continued educational method leads to new practitioners needing to prepare to discuss nutrition, nutritional goals, and behavior changes during patient encounters, preferring to refer to other specialties (Pojednic et al., 2015).

Lack of education. It is well established that there needs to be more medical education regarding nutritional medicine. This includes general knowledge about nutrition, skills needed (such as what tools will aid in assessment), and a positive attitude towards food. International medical students report an inadequate or dissatisfactory education and an overall feeling of needing to be prepared to discuss nutrition in their clinical practice. However, providers with favorable personal health behaviors were more likely to counsel patients about lifestyle habits than providers with unfavorable ones. Increasing nutrition knowledge and confidence to discuss nutrition as a student also increases nutritional self-awareness and appreciation for a healthier diet in their emotional health, helping them overcome potential barriers to nutritional counseling once in practice (Crowley et al., 2019).

Training needs to be done at all levels of medical education to increase the likelihood that a provider will be able to discuss nutrition comfortably. This includes nutrition courses in medical school, classes during the clinical or residency portion, and continuing education courses

available for practicing providers. Nutrition classes and a change in curriculum to a disease prevention-based model, a transition from a disease-treatment model, will need to be implemented. The best way to make this transition is still being studied, and there needs to be more evidence on adding nutrition to the medical curriculum. An additional concern is the specific role of the medical provider as part of the multidisciplinary team in providing nutritional care, as it is also established that it is unrealistic for all patients to be referred to dieticians (Macaninch et al., 2020).

Nutrition/culinary medicine. This idea is using nutrition as a tool to prevent health conditions. One popular diet showing positive health benefits is the Mediterranean Diet. This eating pattern is primarily plant-based, emphasizing whole grains, fruits, vegetables, unsaturated fats, reduced dairy, red meat, and wine in moderation. A healthy lifestyle of physical activity, good sleep hygiene, and reduced stress reduces obesity, diabetes, cardiovascular disease, cancer, and mental health disorders (Santella et al., 2020).

The provider must have foundational nutrition knowledge to influence a healthy eating pattern. Nutritional education is critical to increasing nutritional status. People with the correct information are likelier to perform in a manner that uses it. When an individual knows the foods to eat and those to avoid, they can make better dietary choices, delaying the onset of chronic disease. Providers with strong nutrition knowledge can educate patients more effectively and provide evidence-based recommendations and resources (Santella et al., 2020).

Without adequate training in nutritional science, practitioners feel it is not their responsibility to provide this education, or they lack confidence in discussing nutrition with their patients. Patients are then likely to find other resources, such as social media, blogs, books, and television, that provide false nutritional information and utilize that information as fact.

Current research shows that many new practitioners feel uncomfortable discussing lifestyle modifications such as nutrition, physical activity, and stress reduction with their patients. Some causes of their discomfort relate to the lack of education and knowledge regarding food and physical activity, preferring to refer these opportunities to nutritionists or sports medicine specialists (Santella et al., 2020).

Benefits of a plant-based diet. Research is beginning to show the help of a plant-based diet, particularly in health and disease prevention. Plant-based diets have been shown to reduce obesity, lower blood pressure and cholesterol levels, and reduce the risk of type 2 diabetes, cardiovascular disease, and cancer. However, continued beliefs of needing animal protein, along with potential socioeconomic burdens of a plant-based diet such as financial cost and a fear of "missing" culturally important foods, prevent some providers from discussing the benefits of plant-based nutrition.

Weight loss. Tran et al. (2020) report that a plant-based diet can contribute to a lower body weight, less cardiovascular disease, lower rates of type 2 diabetes mellitus, and lower rates of rheumatoid arthritis. The weight loss is thought to be due to an increased intake of fiber and plant proteins and a reduced consumption of saturated fats and animal proteins. Saturated fat and animal proteins are known causes of weight gain. People who predominantly eat plant-based weigh about 30 pounds less than those who follow more traditional Western diets. In 2017, the BROAD study, which was a 12-week randomized controlled trial that examined New Zealanders living in an area with the highest rates of obesity, was completed. Overweight individuals were randomized into two groups. One group was given standard medical care. The second group is assigned semi-weekly classes on how to eat a low-fat diet that consists of fruits, vegetables, whole grains, and legumes. No meals were provided; the only intervention was information and

education about plant-based eating and how to incorporate it into a diet. There was no weight change in the control group, but the plant-based education group lost 19 pounds by the end of the 3-month study (Greger, 2020).

Plant-based diets are trending in diet culture, and many things labeled on packaging as plant-based are refined and processed and do not give the benefits of a whole-food plant-based diet. Processed and refined plant foods do not contribute to weight loss, have anti-inflammatory properties, and do not improve health or wellness or decrease the risk of developing chronic disease. Najjar and Feresin (2019) define unhealthy plant-based diets as fruit juice, refined grains, desserts, and sugar-sweetened beverages. Healthy plant-based diets are whole grains, fruits, vegetables, nuts, and legumes. Unhealthy plant-based diets had a 32% increased risk of cardiovascular disease, while healthy plant-based diets had a 25% reduced risk. Likewise, unhealthy plant-based diets increase the risk of developing type 2 diabetes mellitus, while a healthy plant-based diet reduces the risk.

Benefits of a plant-based diet on type 2 diabetes. The two most influential factors in reducing the risk of developing type 2 diabetes are lifestyle and diet modifications. A plant-based diet consisting of legumes, whole grains, vegetables, fruits, nuts, and seeds is especially useful in reducing the risk of developing T2DM and minimizes macro- and microvascular complications. A plant-based diet should focus not on specific macronutrients but on actual foods. The current research states that the type of and source of macronutrients should be considered, such as unrefined versus refined carbohydrates and plant versus animal protein. A plant-based diet will promote a healthy body weight by reducing insulin resistance. Plant foods are typically high in fiber, antioxidants, and magnesium. These promote insulin sensitivity and reduce insulin resistance. Antioxidants reduce glucose absorption, stimulate insulin secretion, reduce hepatic

glucose output, and enhance glucose uptake. Fiber is only found in plant foods, regulates post-meal glucose response, and also aids in the digestion of foods, which will improve the glucose response and cellular insulin sensitivity. Fiber also creates a feeling of fullness, leading to fewer calories, especially high-fat/high-sugar calories, reducing insulin resistance (McMacken & Shaw, 2017).

While the benefits of a plant-based diet on the risk of developing T2DM are well established, some patients would find this diet difficult to follow. However, for those not inclined to consume a total plant-based diet, increasing plant-based food will help. Chen et al. (2018) state that increasing fruit from 95 to 200 g/day, increasing vegetable intake from 100 to 260 g/day, and decreasing red meat from 129 to 55 g/day will lower the risk of developing T2DM by 13%.

Cardiovascular disease. Diet has been extensively studied in the prevention or promotion of cardiovascular disease. Plant-based diets, as defined by the consumption of whole grains, fruits, vegetables, and nuts, are particularly beneficial. The Dietary Guidelines for Americans 2015-2020 recommend a vegetarian diet for overall improved health. Satija and Hu (2018) point out that a healthy diet is not about specific nutrients; it is about an overall balanced diet of grains, fruits, vegetables, and legumes in a whole and unprocessed form. Plant-based diets are thought to be effective in preventing the risk of developing cardiovascular disease for several reasons. A plant-based diet can significantly lower LDL, HDL, and non-HDL cholesterol. Plant-based diets reduce blood pressure, aid in weight loss, and improve glycemic control due to their high fiber content. Plant foods also contain polyphenols, known to reduce oxidative stress, more commonly called antioxidants.

Cancer risk. In 2020, there was an estimated 1.8 million new cancer diagnoses in the United States. An estimated 606,000 people will die from the disease. The most common cancers for women are breast, lung, and colorectal; for men, it is prostate, lung, and colorectal (National Cancer Institute, 2020). As such, we should determine every strategy to reduce the risk of developing cancer and increase the chance of survival. Plant-based diets have been extensively studied for cancer. Godos et al. (2017) report that a plant-based diet can reduce the risk of colorectal cancers. While other cancers (breast and prostate) did not have a significant finding of reduced risk with a vegetarian diet, it is expressed that more research is needed. Despite plant-based diets not reducing the risk of all cancer types, it does reduce the risk of colorectal, which is the third leading cause of cancer and cancer mortality. This warrants further research and a discussion with patients about the benefit of a plant-based diet on overall health. The explanation for the cancer risk reduction is that a plant-based diet will reduce inflammation and oxidative stress, reducing the chance of cellular DNA disruption and mutation, causing malignant cells to replicate (Zhao et al., 2022).

Need for training

Lifestyle modifications, including a healthy diet, can prevent an estimated 80% of chronic diseases. However, less than half of PCPs in the United States provide specific nutrition or dietary assessment guidelines. An estimated 27% of medical schools offer the recommended education for nutrition (Pojednic et al., 2015). According to Macaninch et al. (2020), only 26% of doctors are confident in their nutritional knowledge, and most providers (74%) discuss nutrition in their practice less than once a month. This was stated as needing more knowledge, time, and confidence. However, only 28% of medical providers referred to specialists.

One concern over specialty services was the ease of finding a self-described nutritional medicine practitioner. These practitioners frequently have questionable testing and treatments of herbal remedies, injections, intravenous vitamin infusions, bioidentical hormone replacement therapy, and screening for food intolerances. Conflicts identified include provider ownership of supplements and vitamin formulation and subscriptions to newsletters, books, or online lifestyle coaching. While the usefulness of lifestyle medicine is not being questioned, the practitioners' intentions are. Adequate training in medical schools would help with validated assessment tools and care plans instead of the practitioners using their opinions and unvalidated testing methods (Nunan et al., 2021).

There is also a lack of availability for nutritional medicine to persons who are of lower socioeconomic status or otherwise disadvantaged. This concern is partly due to cultural attitudes and behaviors within communities. These communities also tend to have high rates of chronic conditions that nutritional medicine can prevent, such as diabetes, obesity, and hypertension. There are adequate resources at local, national, and global levels, and changing dietary habits is likely to succeed in these programs (Nunan et al., 2021).

Additionally, economic instability is a known detriment to good health, and financial stress is one of the main drivers. Persons who suffer from economic instability are more likely to engage in smoking, consuming alcohol, have poor nutritional status, lack exercise, and inability to access adequate healthcare (White et al., 2019).

Tools for implementing nutritional medicine in practice. The logistics of incorporating nutritional therapy into a busy medical routine often seem like they need to be more feasible. However, Black Delichatsios & Story (2020) have provided five tactics for implementation. First, assess body mass index at every visit. An assistant can accomplish this by getting an

accurate height and weight at the beginning of each patient encounter. Add obesity or overweight, with the appropriate diagnosis code, to a saved or "favorite" problem list in the electronic medical record. Third, assess the diet. This can be done through an assessment tool like Start the Conversation (Appendix A). The patient can fill this out before their appointment or include it in new patient paperwork so the provider can quickly assess problems in the diet or nutritional deficiencies. Fourth, be mindful of language. Use words that will not evoke shame, guilt, or judgment. Five, write a nutrition prescription. An example is "consume a piece of fruit at every meal for the next week." This gives the patient achievable goals and specific directions to add nutrients to their diet.

Media influences. Despite ample research, public nutrition knowledge is obtained almost exclusively from the media in the United States. Despite being the first patient to encounter nutrition-related diagnoses, medical providers typically refer to dieticians or nutritionists for nutritional education. Only an estimated one-third of obese patients are diagnosed and educated about nutrition. The referral process leads people to seek alternative nutrition education methods and often will find unqualified nutrition advisors, health coaches, personal trainers, bloggers, and celebrity chefs (Blunt & Kafatos, 2019).

Media messages reinforce inaccurate nutritional beliefs held by the public. Unproven and controversial nutritional claims are expressed online through lifestyle blogs, social media, and various platforms. This information is then transferred through an "echo chamber," when solitary views are shared and echoed back, leading to acceptance of the message as truth. Many fad diets and trends gain traction with the public through these methods. This is also a factor in food production. When specific nutrients or ingredients are singled out (fat, gluten, high fructose corn

syrup, sugar), food companies then design products to match the message, regardless of whether the information is not accurate (Katz et al., 2018)

Barriers to healthy eating. A study in Australia identified major impediments to healthy eating, including the availability of unhealthy fast food, time constraints for cooking or preparing healthy meals, and a need for more motivation for healthy food preparation (Ashton et al., 2017). In contrast, nutritional medicine advocates prioritizing time for healthy eating and physical activity while equipping patients with the knowledge and strategies needed to overcome perceived time limitations and the additional effort required for home-cooked meals and exercise.

Summary and Synthesis of Evidence

While there is emerging evidence of the potential to reverse and prevent chronic disease through lifestyle medicine, medical schools are slow to incorporate these concepts into their curriculum. The outcome is that providers need to prepare to educate or utilize these concepts in their practices. Health insurance companies need to be faster to incorporate lifestyle medicine into reimbursement scales, reducing the practicality of implementation into practice. Despite these obstacles, the DNP project aims to educate APPs on the effectiveness and benefit of lifestyle medicine and give them the confidence and knowledge they need for practice implementation.

The literature shows a need for continued lifestyle medicine curriculum development for all current and future APPs. Providing education and practical applications can decrease healthcare costs and improve the quality of life for patients. Lifestyle medicine has reduced the disease burden of many chronic but preventable diseases like cardiovascular disease, obesity, diabetes, and some cancers. Educating APPs about the usefulness and purpose of nutritional

medicine will directly impact patient care locally and globally. Community-partnered education is being more widely requested, and medical schools are slow to make the changes needed. This leads patients to seek help with concerns the provider requires formal training on, making them less comfortable giving evidence-based advice (Katz et al., 2018).

It is estimated that by 2030, half of the global population will be obese or overweight. Learning to discuss nutritional modifications to treat and reduce obesity sustainably will make the most significant changes (Deutsche Welle, 2022).

Chapter 3: DNP Project Plan

With increasing rates of chronic disease, including obesity and the concurrent health hazards it can lead to, lifestyle modification of improved nutrition is the most beneficial treatment for long-term success. However, despite the evidence showing the advantages of food, it continues to be a low priority in the curriculum found in APP education. The need for nutritional medicine courses is becoming more prevalent in the United States. The emergence of chronic disease is not unique to the United States alone, as many industrialized countries face increases in obesity, cardiovascular disease, and type 2 diabetes mellitus, all of which can be prevented or treated through nutrition. While many health experts agree that food can improve chronic illness, it is still not considered an essential part of training programs. This DNP project will help fill APP nutritional medicine education and knowledge gaps. It is intended to provide education to increase the ability and comfort of discussing plant-based dietary patterns and provide ongoing support and learning opportunities, patient handouts, and referral sources for care.

Type of Project

The DNP project is a virtual education course that teaches advanced practice providers about the benefits and potential risks of plant-based diets. Due to the increased interest but the need for a formal curriculum implementation, this project fills a unique need for nutritional education in this demographic. The DNP project will be a one-hour virtual class that defines a plant-based diet, the medical conditions that can be prevented and treated through a plant-based diet, and common misconceptions regarding plant-based diets. The DNP project will recruit APPs interested in nutritional medicine yet need more training and feel more comfortable

discussing nutrition with their patient population. Instead, they refer this educational opportunity to nutritional experts (Santella et al., 2020).

Stakeholders and Champions

The DNP project has two main stakeholders: the APP and the patient. The project is designed to be an educational resource to improve the health and wellness of patients and healthcare providers. The APP will learn how to improve health and wellness through a plant-based or plant-dominant diet. The APP will then be able to teach the importance of nutrition to their patients. In turn, the APP will also know these skills and can begin being more involved in their care. APPs are also needed to champion change in healthcare (Keyes & Gardner, 2020). The idea that changes start at the top applies to this project. One of the core competencies of lifestyle medicine advocates for healthcare providers to be personal health champions through modeling their health behaviors, including proper nutrition (Wetherill et al., 2018).

American College of Lifestyle Medicine (ACLM) is a stakeholder. This organization needs healthcare providers to forward the message of nutritional medicine, especially plant-based diets, as a sustainable health option. With direct interest and support, ACLM would be able to make a global impact as they are trying to do. Without this organization to advocate for better insurance coverage and be involved politically, it would affect what the provider can do individually. Supporting national organizations and forwarding the message of nutritional medicine strengthens this specialty's overall idea (Nunan et al., 2021).

Congruence of Organization's Strategic Plan

This project aims to improve individuals' and communities' health and quality of life. An estimated 85% of healthcare costs are attributed to chronic health conditions. Preventing those conditions is the only way to sustain the current healthcare system. Nutritional medicine offers

sustainable, cost-effective options without side effects and can be created into individual treatment plans. The US spent approximately $4.1 trillion UDS on healthcare in 2020. Any savings would significantly impact the healthcare system (Beckman, 2018).

Project Assumptions

The project has three assumptions. First, APPs will find the information valuable and easy to implement in their practice. The course will be designed for the currently practicing APP with resources for further education and manageable ways to add nutritional medicine to a routine provider visit. The second assumption is that the APP will be able to retain knowledge based on the microlearning platform. The third assumption is that the DNP project will increase interest in nutritional medicine plant-based diets and promote further research into this specialty.

Project Objectives

The DNP's role is to showcase nutritional medicine content expertise and increase knowledge. It is aligned with the APRN's role of promoting health and wellness.

The DNP project aims to help identify the need for nutritional education in the NP/PA curriculum and identify the benefits and objectives leading to a more balanced and experienced staff.

Financial

Healthcare globally would benefit from this project. Improving the APP's knowledge and ability to discuss nutritional medicine with their patients can improve their health and their community's healthcare. Obesity-related non-communicable diseases accounted for over five million deaths globally each year, with half occurring in people less than 70 years old. Obesity impacts the economy in many different forms. Some of it is indirect costs related to lost and reduced productivity. People who are obese miss more days of work and work at less than full

capacity when they are at work. Obesity also increases the risk of unemployment and affects wages. Premature death from obesity-related disease leads to a loss of potential future contributions. This all contributes to weight bias (Okunogbe et al., 2021). Teaching APPs about nutrition will reduce the impact of obesity on patient populations. Additionally, this is a virtual education project. The overall reach of the information can be spread very easily and quickly using technology such as educational platforms, social media, and other technological sources of communication.

Policy

One major challenge facing nutritional medicine practitioners is the need for insurance reimbursement. Many providers need reimbursement for nutritional coaching or education with their patients. Others say there are lessened payments from insurance companies when medications are discontinued or not prescribed at a patient encounter. It is essential to be involved in policy-making to improve the quality of care given and educate patients on using nutritional medicine.

Sampling Plan

The DNP project has an inclusion criterion of currently practicing and student nurse practitioners and physician assistants in all specialty areas. Exclusion criteria include anyone who is not an APP. The virtual classroom is accessed through a prerecorded link that participants can watch from home or office without identifying measures. The pre-and post-intervention surveys will also be sent via a survey website (Qualtrics) with no identifying criteria or need to create a profile.

Protection of Human Subjects

Informed consent was obtained from advanced practice provider participants. It was voluntary, and there was no risk to human health or wellness. All information from evidence-based research was created for educational purposes without any underlying opinion. See Appendix B for IRB approval information.

Measurement Tools/Instruments

The previously validated Likert scale will be used to evaluate pre- and post-training opinion, knowledge, and comfort with discussing plant-based nutrition in clinical practice. The Likert scale is helpful as it is commonly used in medical education research. The Likert scale used in this project was previously designed for a similar project done in a medical school that gauges the opinion and knowledge of plant-based diets in clinical care. These questions asked about age, gender, professional degree, if they were a nurse practitioner or a physician assistant, practicing or student, and length of time in practice.

Study Intervention

The intervention portion was performed from February to July 2023. Recruitment efforts were begun in February 2023 and continued through July 2023. Participants were selected utilizing the inclusion/exclusion criteria. Those chosen to participate signed informed consent and were sent links to the pretest, online lecture, and posttest to complete the project.

Procedure

Participant recruitment was obtained through social media, acquaintances, and interest groups of lifestyle medicine and obesity specialty groups. The participants signed informed consent forms, which clearly stated the objectives of the DNP project, along with the privacy protection. Once enrolled in the study, each participant was emailed three links: pre-intervention

scale, online lecture, and post-intervention scale. The online course could be completed at their own homes or offices. Each participant was given a month to complete the study and post-test.

Data Collection

Data collection included gender, professional degree, and pre-and post-intervention Likert survey comparison. The data was collected through Qualtrics, which did not save identifying information but could assign a number to an email, which the researcher did not have access to, to compare pre-and post-intervention Likert scales.

Plan for Data Analysis

The Wilcoxon Signed Rank Test was used to compare pre-and post-test scales. P-values were calculated using SPSS 2.0, and $p<0.05$ was significant.

Scientific Merit

Evaluation tools will be deemed valid through consultation with faculty, lifestyle, and obesity medicine content experts, and a thorough literature review to provide the most current and applicable information to date.

Evaluation Plan

Evaluation of the project will be done through a section on the final survey instrument with additional questions regarding opinions about the value of the project and if it contributed to increased knowledge of plant-based diets.

Statement of Mutual Agreement with Southern Adventist University

The DNP project aligns with the values, traditions, and academic standards of Southern Adventist University, particularly in the pursuit of advancing the field of lifestyle medicine. This project advocates for the advanced nurse practitioner through education and inspiration and fosters collaborative relationships with peers and faculty.

Chapter 4: Results

The purpose of this project was to educate advanced practice providers regarding the importance of plant-based diets in healthcare and to improve their knowledge of how nutrition can help reduce rates of obesity, type 2 diabetes mellitus, cardiovascular disease, and cancer. A Wilcoxon Signed Rank Test will allow discernment of statistical differences between pre-and post-intervention survey data, helping to bring awareness to the potential benefits and outcomes of adopting a plant-based dietary approach. The Wilcoxon Signed Rank Test will provide evidence that can help providers educate regarding nutritional recommendations and contribute to a better understanding of plant-based nutrition's role in promoting health and wellness.

Discussion of Results

Overall, the intervention did not significantly impact pre-and-post intervention surveys. Of the interventions tested, no statistically significant difference existed between "before" and "after" responses. This suggests that the intervention did not significantly change participants' perceptions or attitudes in the tested areas. Several interventions did have a significant impact, suggesting that the educational course successfully positively influenced participants' perspectives. One crucial change was getting more education and evidence-based information overall regarding nutrition. This could be a potential avenue for future research.

Description of Sample

Ten subjects participated and completed the intervention portion. Inclusion criteria included currently practicing as an advanced practice provider in any specialty. Exclusion criteria included not being an advanced practice provider and not presently practicing (student or retiree).

Demographics

There were three male participants, two physician assistants, and one nurse practitioner. There were seven female participants; three were physician assistants, and four were nurse practitioners. No other demographic information was obtained.

Project Data Analysis

The project was designed with the null hypothesis: The mean difference in APP survey scores before and after the educational intervention equals zero. The alternative hypothesis was thus defined as: The mean difference in APP survey scores before and after the educational intervention is not equal to zero.

Data was collected through a 5-point Likert scale questionnaire. There were 45 questions evaluated pre-intervention and 43 considered post-intervention, with the pre-intervention survey having two demographic questions. A Wilcoxon test was performed meeting these assumptions:

1. Independence: Each pair was independent of each other
2. Random sampling
3. Ordinal data: Each pair was measured on an ordinal scale

Five introductory questions were asked: I try to follow a healthy diet; my overall health would be better if I followed a more nutritious diet; I am familiar with or have heard of a whole-food/plant-based diet; I currently follow a whole-food/plant-based diet, and I have followed a whole-food/plant-based diet in the past.

For the questions: I try to follow a healthy diet, no participants strongly disagreed OR disagreed with the statement, two did not agree or disagree, seven agreed, and one strongly agreed.

My overall health would be better if I followed a healthier diet; one participant neither agreed nor disagreed, six agreed, and three strongly agreed. There were no changes in this question from pre-to-post intervention.

The null hypothesis is accepted for these two questions. This would be expected as the same dietary intervention would remain after one educational class.

Table 1
Comparison of pre-and-post-survey dietary belief

Test Statistics[a]

	Z	Asymp. Sig. (2-tailed)
Post: I try to follow a healthy diet - I try to follow a healthy diet	.000[b]	1.000
Post My overall health would be better if I followed a healthier diet - My overall health would be better if I followed a healthier diet	-1.414[c]	.157
Post: I am familiar with or have heard of a whole-food plant-based diet - I am familiar with or have heard of a whole-food plant-based diet	-1.732[c]	.083
Post I currently follow a whole-food plant-based diet, or variation (vegan, vegetarian, semivegetarian, etc.) - I currently follow a whole-food plant-based diet, or variation (vegan, vegetarian, semivegetarian, etc.)	.000[b]	1.000
Post: I have followed a whole-food plantbased diet or variation in the past (vegan, vegetarian, semivegetarian, etc.) - I have followed a whole-food plantbased diet or variation in the past (vegan, vegetarian, semivegetarian, etc.)	.000[b]	1.000

a. Wilcoxon Signed Ranks Test
b. The sum of negative ranks equals the sum of positive ranks.
c. Based on positive ranks.

The second step was to evaluate potential reasons an APP would recommend following a plant-based diet. These questions were: To lose weight, to lower blood pressure to normal levels, to manage or cure diabetes, to manage or cure heart disease, to slow down/prevent cancer, to lower cholesterol to normal levels, to lower saturated fat intake, to go off of prescription medications, and to prevent chronic disease.

For the question *of preventing chronic diseases*, the null hypothesis was retained. This suggests the intervention did not change the belief or attitude towards nutrition and this variable. However, when data was reviewed, there was already a positive correlation to how food impacts chronic disease.

However, for the remainder of the questions, to lose weight, to lower blood pressure to normal levels, to manage or cure diabetes, to manage or cure heart disease, to slow down/prevent cancer, to lower cholesterol to normal levels, to lower saturated fat intake, to go off prescription medications, the null hypothesis was rejected.

Table 2

Comparison of recommendations for a whole-food/plant-based diet

Test Statistics[a]

	Z	Asymp. Sig. (2-tailed)
Post:To lose weight - To lose weight	-2.530[b]	.011
Post:To lower blood pressure to normal levels - To lower blood pressure to normal levels	-2.549[b]	.011
Post:To manage or cure diabetes - To manage or cure diabetes	-2.121[c]	.034
Post:To manage or cure heart disease - To manage or cure heart disease	-2.585[b]	.010
Post:To slow down / prevent cancer - To slow down / prevent cancer	-2.251[b]	.024
Post:To lower cholesterol to normal levels - To lower cholesterol to normal levels	-2.558[b]	.011
Post:To lower saturated fat intake - To lower saturated fat intake	-2.565[b]	.010
Post:To go off of prescription medications - To go off of prescription medications	-2.271[b]	.023
Post:To prevent chronic diseases - To prevent chronic diseases	-1.633[c]	.102

a. Wilcoxon Signed Ranks Test
b. Based on positive ranks.
c. Based on negative ranks.

To evaluate the overall attitude towards the above reasons to recommend a whole-food/plant-based diet, the question was asked: How likely would you be to recommend a whole-food plant-based diet for ANY of the above reasons? Significance is $p>0.025$, so we reject the null hypothesis and accept the alternative view that there is a difference in mean values.

Table 3

Overall comparison of recommending a WFPB diet

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.[a,b]	Decision
1	The median of differences between How likely would you be to recommend a whole-food plant-based diet for ANY of the above reasons? and Post:How likely would you be to recommend a whole-food plant-based diet for ANY of the above reasons? equals 0.	Related-Samples Wilcoxon Signed Rank Test	.025	Reject the null hypothesis.

a. The significance level is .050.

b. Asymptotic significance is displayed.

The next step was to evaluate concerns an APP would have over recommending a whole-food/plant-based diet. These questions were: They do not like vegetables, they will not want to change their diets/lifestyle, they will not want to try new foods, they will not have enough willpower, they will not get enough to eat, they would not get enough iron, they would not get enough protein, they would not get enough calcium, they would not know what to buy at the grocery store, they would not know what to cook, they would not know what to order at restaurants, they would not have enough time, their household would not eat plant-based foods, they do not have access to a grocery store with a variety of produce, it would give them indigestion, gas, and stomach upset, they would miss eating meat, they would miss eating cheese/dairy, they would miss eating eggs, they would miss eating going out to eat, and it would be too expensive.

There was a statistical difference in the following questions: They do not like vegetables (0.004), they will not want to try new foods (0.011), they would not know what to buy at the grocery store (0.014), they would not know what to order at restaurants (0.020), they would not have enough time (0.025), they do not have access to a grocery store with a variety of produce (0.034), and it would give them indigestion, gas, and stomach upset (0.010). As such, the null

hypothesis is rejected, and we accept the alternative view that scores change to reflect a potential shift in beliefs and attitudes.

Alternately, there was not found to be a statistical difference in the questions: They will not want to change their diets/lifestyle (0.136), they will not have enough willpower (0.226), they will not get enough to eat (0.477), they would not get enough iron (0.254), they would not get enough protein (0.187), they would not get enough calcium (0.059), they would not know what to cook (0.102), their household would not eat plant-based foods (0.157), they would miss eating meat (0.059), they would miss eating cheese/dairy (0.052), they would miss eating eggs (0.380), they would miss eating going out to eat (0.087), and it would be too expensive (0.052). We retain the null hypothesis and no differences in attitudes/beliefs in this set of questions.

Table 4

Comparison of concerns of a WFPB diet

Test Statistics[a]

	Z	Asymp. Sig. (2-tailed)
Post:They do not like vegetables - They do not like vegetables	-2.913[b]	.004
Post:They will not want to change their diets/lifestyle - They will not want to change their diets/lifestyle	-1.492[b]	.136
Post:They will not want tto try new foods - They will not want to try new foods	-2.558[b]	.011
Post:They would not have enought willpower - They will not have enough willpower	-1.211[b]	.226
Post:They would not get enough to eat - They would not get enough to eat	-.711[b]	.477
Post:They would not get enough iron - They would not get enough iron	-1.140[b]	.254
Post:They would not get enough protein - They would not get enough protein	-1.318[b]	.187
Post: They would not get enough calcium - They would not get enough calcium	-1.890[b]	.059
Post:They would not know what to buy at the grocery store - They would not know what to buy at the grocery store	-2.460[b]	.014
Post:They would not know what to cook - They would not know what to cook	-1.633[b]	.102
Post:They would not know what to order at restaurants - They would not know what to order at restaurants	-2.333[b]	.020
Post:They would not have enough time - They would not have enough time	-2.236[b]	.025
Post:Their household would not eat plantbased foods - Their household would not eat plant-based foods	-1.414[b]	.157
Post: They do not have access to a grocery store with a variety of produce - They do not have access to a grocery store with a variety of produce	-2.121[b]	.034
Post: It would give them indigestion, gas, and/or stomach upset - It would give them indigestion, gas, and/or stomach upset	-2.565[b]	.010
Post: They would miss eating meat - They would miss eating meat	-1.890[b]	.059
Post:They would miss eating cheese/dairy - They would miss eating cheese/dairy	-1.947[b]	.052
Post:They would miss eating eggs - They would miss eating eggs	-.879[b]	.380
Post:They would miss going out to eat - They would miss going out to eat	-1.710[b]	.087
Post: It would be too expensive - It would be too expensive	-1.947[c]	.052

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

c. Based on negative ranks.

The final portion of the survey assessed the advanced practice providers' interest in ways to learn more about plant-based nutrition through the following statements: Incorporating more whole-food/plant-based nutrition into current APP education, more focus on whole-food/plant-based nutrition on national board examinations, attending a whole-food/plant-based cooking class as an elective in APP education, adding whole-food/plant-based nutrition competencies to family practice certification requirements, adding whole-food/plant-based nutrition competencies to cardiology training, doing my researching on whole-food/plant-based nutrition, seeing that a whole-food/plant-based diet works for others in clinical practice, seeing a nutritionally-complete and detailed meal plan, and getting more information or evidence in general.

There was a statistical difference in the following answers: Adding whole-food/plant-based nutrition competencies to cardiology training (0.046), seeing a nutritionally complete and detailed meal plan (0.014), and getting more information or evidence in general (0.014). Therefore, we reject the null hypothesis and ascertain a change in attitudes and beliefs.

There was no statistical difference found in the answers: Incorporating more whole-food plant-based nutrition into current APP education (0.317), more focus on whole-food/plant-based nutrition on national board examinations (0.564), attending a whole-food/plant-based cooking class as an elective in APP education (0.096), adding whole-food/plant-based nutrition competencies to family practice certification requirements (0.066), doing my research on whole-food/plant-based nutrition (0.257), and seeing that a whole-food/plant-based diets work for others in clinical practice (0.102). We retain the null hypothesis that there was no significant change from the baseline in the attitudes and beliefs.

Table 5

Comparison of WFPB nutrition education options

Test Statistics[a]

	Z	Asymp. Sig. (2-tailed)
Post: Incorporating more whole-food/plant-based nutrition into current APP education - Incorporating more whole-food plant-based nutrition into current APP education	-1.000[b]	.317
Post: More focus on whole-food/plant-based nutrition on national board examinations - More focus on whole-food plantbased nutrition on national board examinations	-.577[b]	.564
Post: Attending a whole-food plant-based cooking class as an elective in APP education - Attending a whole-food plantbased cooking class as an elective in APP education	-1.667[b]	.096
Post: Adding whole-food plant-based nutrition competencies to family practice certification requirements - Adding whole-food plant-based nutrition competencies to family practice certification requirements	-1.841[b]	.066
Post: Adding a whole-food/plant-based nutrition competencies to cardiology training - Adding whole-food plant-based nutrition competencies to cardiology training	-2.000[b]	.046
Post: Doing my own research on whole-food/plant-based nutrition - Doing my own research on wholefood plant-based nutrition	-1.134[b]	.257
Post:: Seeing that a whole-food/plant-based diet works for others in clinical practicie - Seeing that a whole-food plantbased diet works for others in clinical practice	-1.633[b]	.102
Post: Seeing a nutrionally-complete and detailed meal plan - Seeing a nutritionally-complete and detailed meal plan	-2.449[b]	.014
Post: Getting more information or evidence in general - Getting more information or evidence in general	-2.449[b]	.014

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Summary

The project's data analysis helps discern the effectiveness of the nutritional education class on influencing attitudes and perceptions related to knowledge and comfort level of discussing plant-based nutrition in patients who have obesity, diabetes, cardiovascular disease, or cancer. While some of the interventions showed successful changes in attitudes and belief systems regarding whole-food/plant-based nutrition, overall, there was no significant change. These findings emphasize the importance of targeted and evidence-based interventions in promoting plant-based diets. Some perceptions may resist change, requiring more comprehensive educational strategies. Further research is needed to explore the long-term effects of educational resources for advanced practice providers in nutritional medicine.

Chapter 5: Discussion

Practice Inquiry and Purpose Discussion

The purpose of the Doctor of Nursing Practice project was to provide an educational course for advanced practice providers in the field of nutritional medicine. The project intended to educate APPs about the benefits of a whole-food/plant-based diet on obesity, diabetes, cardiovascular disease, and cancer. In this chapter, the discussion will focus on data analysis and findings, observations, and limitations of the project, the impact on nursing research, current and future, and its impact on evidence-based practice. Additionally, there is an overview of the DNP Essentials and how this project upheld nursing research principles. Most importantly, information regarding how the DNP project has the potential to impact patient populations and nursing curricula will be reviewed.

Discussion of Findings

The DNP project aimed to bring awareness to the benefits of a whole-food/plant-based diet for improving population health by focusing on educational material for advanced practice

providers. Overall, APP education needs to be improved in courses aimed at nutritional medicine. While many chronic diseases respond well to improved dietary interventions, the APP may need more knowledge to give nutritional guidance to their patients. The DNP project aimed to bridge that gap by providing evidence-based material on discussing nutrition, mainly whole-food/plant-based foods, in their clinic setting. The DNP project successfully changed attitudes and beliefs about the benefits of a plant-based diet while discovering new channels for further research. The data analysis showed that APPs were not interested in adding whole-food/plant-based nutrition training to family practice education. There was interest in specialty groups for cardiology and in getting more information and evidence.

Most interestingly, the project identified several statistically significant areas for potential benefit. The DNP project focused on how whole-food/plant-based nutrition would help with obesity, diabetes, cardiovascular disease, and cancer. There was a change in the belief system of participating APPs in these areas. In the literature review, Macaninch et al. (2020) pointed out that training needs to be done at all levels of medical education, from didactic classes to clinical rotations and then as continuing education. The results of the DNP project furthered this idea, showing an interest in further education with meal plans, more information, and training specific to cardiology specialists. When reviewing the DNP project in relation to current research, there were similar findings of inconsistent data on learning experiences. There is a high degree of variability in methods of instruction, assessment, and learning outcomes without clear evidence of which, if any, way is effective (Bassin et al., 2020).

Compared to the research performed by Morton et al. (2021), we had similar findings in the statements that getting more general information and seeing a detailed nutrition plan would be very helpful. Of particular interest, there were also identical findings that participants would

need help finding adding information about a whole-food/plant-based diet to board examinations would be helpful. In the original research by Morton et al. (2021) and the DNP project, accessing a grocery store with various produce was a barrier to advocating for a whole-food/plant-based diet. Other potential barriers, such as expense or family involvement, were not found to be reasons to avoid suggesting a whole-food/plant-based diet.

Observations and Limitations

The DNP project had several barriers to success. Creating engaging course material that was more relevant, informational, and educational than anticipated was challenging. However, several resources were available to help create content and organize material in the form of templates and instruction from experts in the field. Another barrier was recruitment. It took more work to find participants than expected. Many people said they were interested, liked the idea of an educational course, or would like to participate, but only ten people completed the virtual academic course.

The sample size was small at 10 participants. Many participants who completed the project were already interested in or well-educated regarding plant-based nutrition. It is easier to analyze success when pre-intervention knowledge is thoroughly discussed. This may have changed the project's outcome if participants who needed more interest in nutritional medicine had been recruited. An example is the survey question on how nutrition can prevent chronic disease. There was no statistical change in belief or attitude. However, a strong impression was already that food could stop chronic disease.

There was also a limiting factor for long-term follow-up. This could have been assessed through a third survey completed a month or two post-interventions to see if there were any changes in the APP's comfort in discussing nutrition in the clinical setting.

Impact on the Doctor of Nursing Practice Degree

The data on interventions related to attitudes and perceptions towards plant-based diets can promote education in nursing practice by highlighting the importance of evidence-based educational strategies and creating educational content tailored to specific concerns and barriers that APPs face when discussing nutritional medicine in clinical practice. There are many misconceptions and myths surrounding nutrition, and with evidence-based content created to learn from, it propagates continued falsehoods and faulty belief systems. The DNP project started practical solutions for implementing whole-food/plant-based nutrition into patient assessment and treatment plans.

DNP essentials

The DNP project used the DNP Essentials as a framework for creating a successful plan and scheme.

Essential 1: Scientific Underpinnings for Practice. This emphasizes the importance of a solid scientific foundation. The DNP project showed commitment to evidence-based practice, furthering scientific research and methodology.

Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking. DNP-prepared nurses are expected to participate in and lead quality improvement efforts. Understanding the improvement process and how to create a well-designed plan will further organizational leadership. The DNP project was completed to improve the quality of nutritional education for advanced practice providers.

Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice: The DNP project was designed to educate APPs about evidence-based nutritional education. The data was analyzed through a Wilcoxon Signed Rank Test to determine any belief and attitude change.

Essential IV: Information Systems and Technology: Technology was utilized extensively throughout this project. The project was designed to be a virtual education course that could be completed from a home/office computer. Technology made electronic surveys possible and created methods to ensure participant confidentiality.

Essential V: Health Care Policy for Advocacy in Health Care: Understanding the implications of plant-based nutrition interventions on health outcomes aligns with this critical emphasis on healthcare policy. Furthermore, the project created potential ideas to continue research, leading to policy changes.

Essential VII: Interprofessional Collaboration for Improving Patient and Population Health Outcomes: Interprofessional collaboration made this project possible. Through conversations with dieticians and other advanced practice providers, understanding the limitations of education helped create the course content.

Essential VIII: Advanced Nursing Practice emphasizes using advanced nursing knowledge and skills to improve patient care. Creating a project to help educate advanced practice providers advances the skills of nurse practitioners.

Application to Theoretical Framework

Using the Knowledge, attitude, and belief educational theory, the academic course was designed to increase knowledge, change attitudes to be more favorable to whole-food/plant-based diets, and promote a positive belief system towards this eating pattern related to improving patient outcomes. For example, interventions that enhance attitudes toward consuming more vegetables or boost confidence in grocery shopping may contribute to individuals acquiring new knowledge about plant-based food options and cooking methods. Attitude was evaluated by examining participant attitude changes before and after the intervention. The data suggests that

interventions can have a significant impact on attitudes. This project showed improved attitudes toward vegetables, increased willingness to try new foods, and reduced concerns about digestive issues. The KAB framework also recognizes the link between knowledge, philosophy, and associated behaviors. By changing moods and perceptions, it will change behaviors. In the DNP project, the behavior change would be utilizing provided resources in clinics and increasing conversations in their clinical practice about the benefit of whole-food/plant-based diets.

The second framework was the CREATION life theory, which promotes a positive relationship with healthy food. Nutrition is one of the core principles in CREATION Life, with emphasis on the importance of making healthy food choices for overall health and well-being. The data aligns with this principle by demonstrating how interventions can influence attitudes and perceptions of utilizing a whole-food/plant-based diet associated with improved nutrition.

Evidence-Informed Practice

The data analysis on interventions related to attitudes and perceptions toward plant-based diets can serve as a valuable foundation for evidence-based practice changes in nutrition, healthcare, and public health. The DNP project could help with policy and program development. The literature review points to a gap in APP education specific to nutritional medicine. Nursing schools/colleges of health promotion could develop programs incorporating lifestyle or nutritional therapy into their curriculum. The data suggests that APPs would be interested in learning more about nutrition and getting specific information, such as creating a balanced meal plan.

There is a need to develop educational material and further training for APPs. Evidence-based practice can incorporate the findings into developing educational materials and resources. The materials can be designed to target specific concerns identified in the data analysis, such as

providing guidance on grocery shopping and cooking with plant-based foods. Further APP training could be incorporated into organizational onboarding and continuing education courses made available.

Implications for Future DNP Projects

The data analysis provided insights into the effectiveness of specific interventions to influence attitudes and perceptions related to plant-based diets. These findings have several implications for future research in nutrition and behavior change. Future research could evaluate the long-term success of nutritional education in clinical practice. A longitudinal study could determine if the intervention made a sustainable change. Patient behavior change is another consideration, as well as how behavior change affects health outcomes. Research into health disparities and socioeconomic status of patients and if there could be the incorporation of whole-food/plant-based eating to help with the financial strain of food or if it was too expensive. More in-depth training, curriculum development, and continuing education could also be researched.

Due to nutritional education being so limited in the curriculum for advanced practice providers, understanding the need for this material to be taught and how it can be helpful to the provider and the patient is critical to further research and development. The data analysis provides valuable insights into the potential effectiveness of interventions in promoting plant-based diets. Future research should build upon these findings by exploring the long-term effects, conducting more targeted interventions, and considering diverse populations and settings to develop evidence-based strategies for encouraging healthier and more sustainable dietary choices.

Conclusion

In conclusion, while the DNP project initially focused on interventions related to attitudes and perceptions toward plant-based diet recommendations for specific chronic diseases, its implications extend far beyond eating patterns. Key takeaways from this DNP project will help further nursing research and contribute to sustainable healthcare practices. The goal of the DNP project was to bring awareness to the benefit and sustainability of a whole-food/plant-based diet and to make the advanced practice provider more comfortable discussing this eating with their patient population.

The data showed the benefit of using evidence-based practices in creating a positive learning experience for the participants and helping to progress sustainable healthcare across diverse populations. The DNP project outlines potential reasons people would oppose a whole-food/plant-based diet and gives applicable resources for implementation into clinical practice. The DNP project highlights the likelihood education has in shaping attitudes and behaviors of advanced practice nurses and opens the door for future research into the benefit of continuing education courses in nutritional medicine and the possibility of adding nutrition courses to the current curriculum.

References

Ashton, L. M., Hutchesson, M. J., Rollo, M. E., Morgan, P. J., & Collins, C. E. (2017). Motivators and barriers to engaging in healthy eating and physical activity. *American journal of men's health*,11(2), 330–343. https://doi.org/10.1177/1557988316680936

Bassin, S. R., Al-Nimr, R. I., Allen, K., & Ogrinc, G. (2020). The state of nutrition in medical education in the United States. *Nutrition Reviews*, *78*(9), 764–780. https://doi.org/10.1093/nutrit/nuz100

Beckman K. (2018). A New Approach for Lifestyle Medicine Payment. American journal of lifestyle medicine,13(1), 36–39. https://doi.org/10.1177/1559827618795410

Bermejo, D. I., & Stiegmann, R. A. (2020). Inspiring medical students to choose primary care through lifestyle medicine education. *American Journal of Lifestyle Medicine*, 14(6), 602–605. https://doi-org.ezproxy.southern.edu/10.1177/1559827620918532

Black MM, Delichatsios HK, Story MT (eds): Nutrition Education: Strategies for Improving Nutrition and Healthy Eating in Individuals and Communities. Nestlé Nutr Inst Workshop Ser. Nestlé Nutrition Institute, Switzerland/S. Karger AG., Basel, © 2020, vol 92, pp 171–181. doi: 10.1159/000499560

Blunt, S. B., & Kafatos, A. (2019). Clinical Nutrition Education of Doctors and Medical Students: Solving the Catch 22. Advances in nutrition (Bethesda, Md.), 10(2), 345–350. https://doi.org/10.1093/advances/nmy082

Britton, Ú., Issartel, J., Fahey, G., Conyngham, G., & Belton, S. (2020). What is health-related fitness? Investigating the underlying factor structure of fitness in youth. *European Physical Education Review*, 26(4), 782–796. https://doi.org/10.1177/1356336X19882060

Chen, Z., Zuurmond, M. G., van der Schaft, N., Nano, J., Wijnhoven, H., Ikram, M. A., Franco, O. H., & Voortman, T. (2018). Plant versus animal-based diets and insulin resistance, prediabetes and

type 2 diabetes: the Rotterdam Study. European journal of epidemiology, 33(9), 883–893. https://doi.org/10.1007/s10654-018-0414-8

Cooksey-Stowers, K., Schwartz, M. B., & Brownell, K. D. (2017). Food Swamps Predict Obesity Rates Better Than Food Deserts in the United States. International journal of environmental research and public health, 14(11), 1366. https://doi.org/10.3390/ijerph14111366

Crowley, J., Ball, L., & Hiddink, G. J. (2019). Nutrition in medical education: a systematic review. The Lancet. Planetary health, 3(9), e379–e389. https://doi.org/10.1016/S2542-5196(19)30171-8

Danek, R. L., Berlin, K. L., Waite, G. N., & Geib, R. W. (2017). Perceptions of Nutrition Education in the Current Medical School Curriculum. *Family medicine*, *49*(10), 803–806.

Dina M, Abbate R, Gensini GF, Casini A and Sofi F. Vegetarian, vegan diets and multiple health outcomes: A systematic review with meta-analysis of observational studies. *Crit Rev Food Sci Nutr* 2017; 57(17):3640–3649.

Deutsche Welle (Producer). (2022, May 26). Obesity and corporate greed [TV broadcast]. Deutsche Welle.

English, L. K., Ard, J. D., Bailey, R. L., Bates, M., Bazzano, L. A., Boushey, C. J., Brown, C., Butera, G., Callahan, E. H., de Jesus, J., Mattes, R. D., Mayer-Davis, E. J., Novotny, R., Obbagy, J. E., Rahavi, E. B., Sabate, J., Snetselaar, L. G., Stoody, E. E., Van Horn, L. V., Venkatramanan, S., … Heymsfield, S. B. (2021). Evaluation of dietary patterns and all-cause mortality: A systematic review. JAMA network open, 4(8), e2122277. https://doi.org/10.1001/jamanetworkopen.2021.22277

Freeman, K. J., Grega, M. L., Friedman, S. M., Patel, P. M., Stout, R. W., Campbell, T. M., Tollefson, M. L., Lianov, L. S., Pauly, K. R., Pollard, K. J., & Karlsen, M. C. (2021). Lifestyle medicine reimbursement: A proposal for policy priorities informed by a cross-sectional survey of lifestyle

medicine practitioners. *International Journal of Environmental Research and Public Health*, 18(21). https://doi-org.ezproxy.southern.edu/10.3390/ijerph182111632

Global Disease Burden 2017 Diet Collaborators (2019). Health effects of dietary risks in 195 countries, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet (London, England), 393(10184), 1958–1972. https://doi.org/10.1016/S0140-6736(19)30041-8

Godos, J., Bella, F., Sciacca, S., Galvano, F., & Grosso, G. (2017). Vegetarianism and breast, colorectal and prostate cancer risk: an overview and meta-analysis of cohort studies. Journal of human nutrition and dietetics: the official journal of the British Dietetic Association, 30(3), 349–359. https://doi.org/10.1111/jhn.12426

Greger M. (2020). A Whole Food Plant-Based Diet Is Effective for Weight Loss: The Evidence. American journal of lifestyle medicine, 14(5), 500–510. https://doi.org/10.1177/1559827620912400

Harari, Y. N. (2022). Sapiens: A brief history of humankind. Signal.

Hivert, M. F., McNeil, A., Lavie, C. J., & Arena, R. (2017). Training health professionals to deliver healthy living medicine. *Progress in cardiovascular diseases*, 59(5), 471–478. https://doi.org/10.1016/j.pcad.2017.02.004

Katz, D. L., Frates, E. P., Bonnet, J. P., Gupta, S. K., Vartiainen, E., & Carmona, R. H. (2018). Lifestyle as medicine: The case for a true health initiative. *American Journal of Health Promotion*, 32(6), 1452–1458. https://doi-org.ezproxy.southern.edu/10.1177/0890117117705949

Keyes, S., & Gardner, A. (2020). Educating physicians-assistant students as agents of lifestyle medicine. *Clinical Teacher*, 17(6), 638–643. https://doi-org.ezproxy.southern.edu/10.1111/tct.13152

Lessem, A., Gould, S. M., Evans, J., & Dunemn, K. (2020). A whole-food, plant-based experiential education program for health care providers results in personal and professional changes. Journal

of the American Association of Nurse Practitioners, 32(12), 788–794. https://doi.org/10.1097/JXX.0000000000000305

Liu, L., Liu, Y. P., Wang, J., An, L. W., & Jiao, J. M. (2016). Use of a knowledge-attitude-behavior education programme for Chinese adults undergoing maintenance haemodialysis: Randomized controlled trial. The Journal of international medical research, 44(3), 557–568. https://doi.org/10.1177/0300060515604980

Locke, A., Schneiderhan, J., & Zick, S. M. (2018). Diets for health: Goals and guidelines. *American family physician*, *97*(11), 721–728.

Macaninch, E., Buckner, L., Amin, P., Broadley, I., Crocombe, D., Herath, D., Jaffee, A., Carter, H., Golubic, R., Rajput-Ray, M., Martyn, K., & Ray, S. (2020). Time for nutrition in medical education. BMJ nutrition, prevention & health, 3(1), 40–48. https://doi.org/10.1136/bmjnph-2019-000049

McMacken, M., & Shah, S. (2017). A plant-based diet for the prevention and treatment of type 2 diabetes. Journal of geriatric cardiology : JGC, 14(5), 342–354. https://doi.org/10.11909/j.issn.1671-5411.2017.05.009

Morton, K. F., Pantalos, D. C., Ziegler, C., & Patel, P. D. (2021). A Place for Plant-Based Nutrition in US Medical School Curriculum: A Survey-Based Study. American journal of lifestyle medicine, 16(3), 271–283. https://doi.org/10.1177/1559827620988677

Nabrdalik, K., Krzyżak, K., Hajzler, W., Drożdż, K., Kwiendacz, H., Gumprecht, J., & Lip, G. (2021). Fat, Sugar or Gut Microbiota in Reducing Cardiometabolic Risk: Does Diet Type Really Matter?. Nutrients, 13(2), 639. https://doi.org/10.3390/nu13020639

Najjar, R. S., & Feresin, R. G. (2019). Plant-Based Diets in the Reduction of Body Fat: Physiological Effects and Biochemical Insights. Nutrients, 11(11), 2712. https://doi.org/10.3390/nu11112712

National Cancer Institute. (2020, September 25). Cancer statistics. Cancer Statistics. https://www.cancer.gov/about-cancer/understanding/statistics

Ng, R., Sutradhar, R., Yao, Z., Wodchis, W. P., & Rosella, L. C. (2020). Smoking, drinking, diet and physical activity-modifiable lifestyle risk factors and their associations with age to first chronic disease. *International journal of epidemiology*, 49(1), 113–130. https://doi.org/10.1093/ije/dyz078

Nunan, D., Blane, D. N., & McCartney, M. (2021). Exemplary medical care or Trojan horse? An analysis of the "lifestyle medicine" movement. *The British Journal of General Practice: The Journal of the Royal College of General Practitioners*, 71(706), 229–232. https://doi-org.ezproxy.southern.edu/10.3399/bjgp21X715721

Okunogbe, A., Nugent, R., Spencer, G., Ralston, J., & Wilding, J. (2021). Economic impacts of overweight and obesity: current and future estimates for eight countries. BMJ global health, 6(10), e006351. https://doi.org/10.1136/bmjgh-2021-006351

Pallazola, V. A., Davis, D. M., Whelton, S. P., Cardoso, R., Latina, J. M., Michos, E. D., Sarkar, S., Blumenthal, R. S., Arnett, D. K., Stone, N. J., & Welty, F. K. (2019). A Clinician's Guide to Healthy Eating for Cardiovascular Disease Prevention. Mayo Clinic proceedings. Innovations, quality & outcomes, 3(3), 251–267. https://doi.org/10.1016/j.mayocpiqo.2019.05.001

Pojednic, Rachele M. EdM, PhD; Trilk, Jennifer PhD; Phillips, Edward M. *MD Lifestyle Medicine Curricula*, *Academic Medicine*: July 2015 - Volume 90 - Issue 7 - p 840-841 doi: 10.1097/ACM.0000000000000744

Quaidoo, E.Y., Ohemeng, A. & Amankwah-Poku, M. Sources of nutrition information and level of nutrition knowledge among young adults in the Accra metropolis. BMC Public Health 18, 1323 (2018). https://doi.org/10.1186/s12889-018-6159-1

Santella, M. E., Hagedorn, R. L., Wattick, R. A., Barr, M. L., Horacek, T. M., & Olfert, M. D. (2020). Learn first, practice second approach to increase health professionals' nutrition-related knowledge, attitudes and self-efficacy. *International Journal of Food Sciences & Nutrition*, 71(3), 370–377. https://doi-org.ezproxy.southern.edu/10.1080/09637486.2019.1661977

Satija, A., & Hu, F. B. (2018). Plant-based diets and cardiovascular health. Trends in cardiovascular medicine, 28(7), 437. https://doi.org/10.1016/j.tcm.2018.02.004

Teo, C., Burns, S. F., & Kawabata, M. (2022). Developing Nutrition Knowledge and Attitude Measures for Athletes With the Knowledge-Attitude-Behavior Model. Research quarterly for exercise and sport, 1–8. Advance online publication. https://doi.org/10.1080/02701367.2021.1942771

Tran, E., Dale, H. F., Jensen, C., & Lied, G. A. (2020). Effects of Plant-Based Diets on Weight Status: A Systematic Review. Diabetes, metabolic syndrome and obesity: targets and therapy, 13, 3433–3448. https://doi.org/10.2147/DMSO.S272802Hypertension

Trilk, J., Nelson, L., Briggs, A., & Muscato, D. (2019). Including lifestyle medicine in medical education: Rationale for American College of preventive medicine/American Medical Association resolution 959. *American Journal of Preventive Medicine*, 56(5), e169-e175. https://doi.org/10.1016/j.amepre.2018.10.034

Wetherill, M. S., Davis, G. C., Kezbers, K., Carter, V., Wells, E., Williams, M. B., Ijams, S. D., Monlezun, D., Harlan, T., & Whelan, L. J. (2018). Development and Evaluation of a Nutrition-Centered Lifestyle Medicine Curriculum for Physician Assistant Students. Medical science educator, 29(1), 163–172. https://doi.org/10.1007/s40670-018-00655-4

White, N. D., Packard, K., & Kalkowski, J. (2019). Financial education and coaching: A lifestyle medicine approach to addressing financial stress. *American Journal of Lifestyle Medicine*, 13(6), 540-543. https://doi.org/10.1177/1559827619865439

Zhao, Y., Zhan, J., Wang, Y., & Wang, D. (2022). The Relationship Between Plant-Based Diet and Risk of Digestive System Cancers: A Meta-Analysis Based on 3,059,009 Subjects. Frontiers in public health, p. 10, 892153. https://doi.org/10.3389/fpubh.2022.892153

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Appendix A: Institutional Review Board Approval

SOUTHERN ADVENTIST UNIVERSITY — INSTITUTIONAL REVIEW BOARD 1

April 9, 2023

Principal Investigator: Natalie Organ

Research Project: Implementation and evaluation of a plant-based nutritional medicine virtual class for advanced practice providers

IRB Tracking Number: 2022-2023-065

Dear Natalie, The Institutional Review Board has examined your research study proposal, Implementation, and evaluation of a plant-based nutritional medicine virtual class for advanced practice providers, with supporting documents at the IRB committee level, and it is a delight to inform you that you have approved your research request as expedited. This level of approval is for classroom usage only, meaning data collected cannot be used for anything other than a class project. We wish you the very best as you move forward with this study and look forward to reading your findings when your study is completed. As you move forward with your study, if there is a need to make minor changes to this research, before making those changes please notify us by completing and submitting a FORM B (Certification of Modification, Annual Review, Research Termination, or Research Completion). Please submit all applications to irb@southern.edu. If substantial changes are planned, you, as the principal investigator, should submit a new IRB FORM A application. Many blessing to you as you move forward. Please let us know if there is anything else we can do to assist you with this research study.

Always in His service, Robert Overstreet Robert Overstreet, Ph.D.

IRB Chair Southern Adventist University

423-236-2285

robertoverstreet@southern.edu

“I applied my mind to study and to explore by wisdom all that is done under the heavens…” - Ecclesiastes 2:13

“Research is to see what everyone else has seen and to think what nobody else has thought.” - Albert Szent-Gyorgyi

Appendix B: Informed Consent

Nutritional Medicine: Education for advanced practice providers.

PRINCIPAL INVESTIGATOR
Natalie Organ Southern Adventist University – Lifestyle Medicine
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435-340-8204
natalieorgan@southern.edu

PURPOSE OF STUDY

You are being asked to take part in a research study. Before you decide to participate in this study, you must understand why the research is being done and what it will involve. Please read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information. The purpose of this study is to improve advanced practice providers knowledge of nutrition as it relates to reducing risk of cancer, diabetes, cardiovascular disease, and obesity. The goals of the study are to provide an educational course that will provide evidence-based research for implementing nutrition education in practice, along with guidance for assessing nutritional deficiencies and ways to teach an individual about healthy food choices.

STUDY PROCEDURES

The study procedure is as follows:

1. Sign consent form
2. Take a pre-course survey. This is a Likert scale survey to evaluate understanding of nutrition. There are two demographic questions.
3. At the end of the survey, there is a link to begin taking the class. It will direct to a Canva link. The class is an approximately 35-minute lecture. This can be completed on personal devices. There is no video monitoring. The course will consist of how plant-based nutrition can help improve health and wellness in the following ways:

A. Prevent or reduce the risk of developing cancer, diabetes, cardiovascular disease, and obesity.
B. “How to” guides for assessing nutrition and how to teach individuals ways to modify their diet to increase nutrients.

4. Post-course Likert scale survey (the same survey as the pre-course)
5. The entire course, to include the pre/post-course surveys, is designed to be completed in 60 minutes.
6. Qualtrics will be utilized for the pre-and post-course surveys. A link to for the consent form, course, and surveys will be provided. No identifying information will be saved. The student investigator will not have access to email addresses or be able to attach survey results to individuals.

RISKS

You may terminate your involvement at any time if you choose. The statistical information obtained from study will be for student investigator results only. Demographic information will not be shared or stored on any type of device.

BENEFITS

Information obtained from this study will improve knowledge of nutrition and increase

confidence in discussion nutrition with patients and peers. It is hoped that the educational course will benefit each participant by promoting increased nutrition to help build healthier communities.

CONFIDENTIALITY
Your responses to this project will be anonymous. Please do not write any identifying information on your pre/post survey or demographic information.

CONTACT INFORMATION
If you have questions at any time about this study, or you experience adverse effects as the result of participating in this study, you may contact the researcher whose contact information is provided on the first page. If you have questions regarding your rights as a research participant, or if problems arise which you do not feel you can discuss with the Primary Investigator, please contact the Institutional Review Board at (865) 354-3000, ext. 4822.

VOLUNTARY PARTICIPATION Your participation in this study is voluntary. It is up to you to decide whether to take part in this study. If you decide to take part in this study, you will be asked to sign a consent form. After you sign the consent form, you are still free to withdraw at any time and without giving a reason. Withdrawing from this study will not affect the relationship you have, if any, with the researcher. If you withdraw from the study before data collection is completed, your data will be returned to you or destroyed.

CONSENT

I have read and understood the information provided and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily agree to take part in this study.

Appendix C: Evidence Tables

Evidence Review Table 1

Test Statistics[a]

	Z	Asymp. Sig. (2-tailed)
Post: I try to follow a healthy diet - I try to follow a healthy diet	.000[b]	1.000
Post My overall health would be better if I followed a healthier diet - My overall health would be better if I followed a healthier diet	-1.414[c]	.157
Post: I am familiar with or have heard of a whole-food plant-based diet - I am familiar with or have heard of a whole-food plant-based diet	-1.732[c]	.083
Post I currently follow a whole-food plant-based diet, or variation (vegan, vegetarian, semivegetarian, etc.) - I currently follow a whole-food plant-based diet, or variation (vegan, vegetarian, semivegetarian, etc.)	.000[b]	1.000
Post: I have followed a whole-food plantbased diet or variation in the past (vegan, vegetarian, semivegetarian, etc.) - I have followed a whole-food plantbased diet or variation in the past (vegan, vegetarian, semivegetarian, etc.)	.000[b]	1.000

a. Wilcoxon Signed Ranks Test
b. The sum of negative ranks equals the sum of positive ranks.
c. Based on positive ranks.

Note. Comparison of attitudes towards a healthy diet.

Evidence Review Table 2

Test Statistics[a]

	Z	Asymp. Sig. (2-tailed)
Post:To lose weight - To lose weight	-2.530[b]	.011
Post:To lower blood pressure to normal levels - To lower blood pressure to normal levels	-2.549[b]	.011
Post:To manage or cure diabetes - To manage or cure diabetes	-2.121[c]	.034
Post:To manage or cure heart disease - To manage or cure heart disease	-2.585[b]	.010
Post:To slow down / prevent cancer - To slow down / prevent cancer	-2.251[b]	.024
Post:To lower cholesterol to normal levels - To lower cholesterol to normal levels	-2.558[b]	.011
Post:To lower saturated fat intake - To lower saturated fat intake	-2.565[b]	.010
Post:To go off of prescription medications - To go off of prescription medications	-2.271[b]	.023
Post:To prevent chronic diseases - To prevent chronic diseases	-1.633[c]	.102

a. Wilcoxon Signed Ranks Test
b. Based on positive ranks.
c. Based on negative ranks.

Note. Comparison of reasons an APP might recommend a WFPB diet.

Evidence Review Table 3

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.[a,b]	Decision
1	The median of differences between How likely would you be to recommend a whole-food plant-based diet for ANY of the above reasons? and Post:How likely would you be to recommend a whole-food plant-based diet for ANY of the above reasons? equals 0.	Related-Samples Wilcoxon Signed Rank Test	.025	Reject the null hypothesis.

a. The significance level is .050.

b. Asymptotic significance is displayed.

Note. Comparison of overall recommendations for a WFPB diet

Evidence Review Table 4

Test Statistics[a]

	Z	Asymp. Sig. (2-tailed)
Post:They do not like vegetables - They do not like vegetables	-2.913[b]	.004
Post:They will not want to change their diets/lifestyle - They will not want to change their diets/lifestyle	-1.492[b]	.136
Post:They will not want tto try new foods - They will not want to try new foods	-2.558[b]	.011
Post:They would not have enought willpower - They will not have enough willpower	-1.211[b]	.226
Post:They would not get enough to eat - They would not get enough to eat	-.711[b]	.477
Post:They would not get enough iron - They would not get enough iron	-1.140[b]	.254
Post:They would not get enough protein - They would not get enough protein	-1.318[b]	.187
Post: They would not get enough calcium - They would not get enough calcium	-1.890[b]	.059
Post:They would not know what to buy at the grocery store - They would not know what to buy at the grocery store	-2.460[b]	.014
Post:They would not know what to cook - They would not know what to cook	-1.633[b]	.102
Post:They would not know what to order at restaurants - They would not know what to order at restaurants	-2.333[b]	.020
Post:They would not have enough time - They would not have enough time	-2.236[b]	.025
Post:Their household would not eat plantbased foods - Their household would not eat plant-based foods	-1.414[b]	.157
Post: They do not have access to a grocery store with a variety of produce - They do not have access to a grocery store with a variety of produce	-2.121[b]	.034
Post: It would give them indigestion, gas, and/or stomach upset - It would give them indigestion, gas, and/or stomach upset	-2.565[b]	.010
Post: They would miss eating meat - They would miss eating meat	-1.890[b]	.059
Post:They would miss eating cheese/dairy - They would miss eating cheese/dairy	-1.947[b]	.052
Post:They would miss eating eggs - They would miss eating eggs	-.879[b]	.380
Post:They would miss going out to eat - They would miss going out to eat	-1.710[b]	.087
Post: It would be too expensive - It would be too expensive	-1.947[c]	.052

a. Wilcoxon Signed Ranks Test
b. Based on positive ranks.
c. Based on negative ranks.

Note. Comparison of concerns over recommending a WFPB diet

Evidence Review Table 5

Test Statistics[a]

	Z	Asymp. Sig. (2-tailed)
Post: Incorporating more whole-food/plant-based nutrition into current APP education - Incorporating more whole-food plant-based nutrition into current APP education	-1.000[b]	.317
Post: More focus on whole-food/plant-based nutrition on national board examinations - More focus on whole-food plantbased nutrition on national board examinations	-.577[b]	.564
Post: Attending a whole-food plant-based cooking class as an elective in APP education - Attending a whole-food plantbased cooking class as an elective in APP education	-1.667[b]	.096
Post: Adding whole-food plant-based nutrition competencies to family practice certification requirements - Adding whole-food plant-based nutrition competencies to family practice certification requirements	-1.841[b]	.066
Post: Adding a whole-food/plant-based nutrition competencies to cardiology training - Adding whole-food plant-based nutrition competencies to cardiology training	-2.000[b]	.046
Post: Doing my own research on whole-food/plant-based nutrition - Doing my own research on wholefood plant-based nutrition	-1.134[b]	.257
Post:: Seeing that a whole-food/plant-based diet works for others in clinical practicie - Seeing that a whole-food plantbased diet works for others in clinical practice	-1.633[b]	.102
Post: Seeing a nutrionally-complete and detailed meal plan - Seeing a nutritionally-complete and detailed meal plan	-2.449[b]	.014
Post: Getting more information or evidence in general - Getting more information or evidence in general	-2.449[b]	.014

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Note. Comparison WFPB nutrition education option

Appendix D: Starting The Conversation: Diet

Starting The Conversation: Diet

(Scale developed by: the Center for Health Promotion and Disease Prevention, University of North Carolina at Chapel Hill, and North Carolina Prevention Partners)

Over the past few months:

1.	How many times a week did you eat fast food meals or snacks?	Less than 1 time ☐ 0	1–3 times ☐ 1	4 or more times ☐ 2
2.	How many servings of fruit did you eat each day?	5 or more ☐ 0	3–4 ☐ 1	2 or less ☐ 2
3.	How many servings of vegetables did you eat each day?	5 or more ☐ 0	3–4 ☐ 1	2 or less ☐ 2
4.	How many regular sodas or glasses of sweet tea did you drink each day?	Less than 1 ☐ 0	1–2 ☐ 1	3 or more ☐ 2
5.	How many times a week did you eat beans (like pinto or black beans), chicken, or fish?	3 or more times ☐ 0	1–2 times ☐ 1	Less than 1 time ☐ 2
6.	How many times a week did you eat regular snack chips or crackers (not low-fat)?	1 time or less ☐ 0	2–3 times ☐ 1	4 or more times ☐ 2
7.	How many times a week did you eat desserts and other sweets (not the low-fat kind)?	1 time or less ☐ 0	2–3 times ☐ 1	4 or more times ☐ 2
8.	How much margarine, butter, or meat fat do you use to season vegetables or put on potatoes, bread, or corn?	Very little ☐ 0	Some ☐ 1	A lot ☐ 2

SUMMARY SCORE (sum of all items): _____

Appendix E: Student Pre/Post Intervention Survey

The following is a survey to assess advanced practice providers perceptions and opinions about healthy eating. Please read all directions and answer to the best of your abilities.

DEMOGRAPHICS/HEALTH INFORMATION

Please bubble in the answer that best describes you, filling in the blank when necessary.

Are you an:

- ○ **Nurse practitioner (NP)**
- ○ **Physician assistant (PA)**

BIOLOGICAL SEX

- ○ **Male**
- ○ **Female**
- ○ **Prefer not to answer**

DIET

PLEASE READ THE FOLLOWING DIRECTIONS

For the purposes of this survey, a **WHOLE-FOOD PLANT-BASED DIET is one that:**

INCLUDES or EMPHASIZES whole plant foods

- **Whole grains –** whole grain bread & pasta, brown rice
- **Fruits –** fresh, frozen, or canned
- **Vegetables –** fresh, frozen, or canned
- **Beans/legumes –** dried, or canned
- **Nuts/natural nut butters**
- **Seeds**
- **Plant milk –** soy, almond, cashew, etc.
- **Soy products –** tofu, tempeh, etc.

EXCLUDES animal products

- **Meats** – beef, pork, lamb, etc.
- **Poultry –** chicken, turkey, duck, etc.
- **Seafood/shellfish –** fish, shrimp, etc.
- **Dairy –** cow's milk, butter, yogurt, cream
- **Eggs**

GREATLY REDUCES

- **Processed or refined foods** – packaged foods and snacks, frozen meals, etc.
- **Sugars & artificial sweeteners**
- **Fats & oils**
- **Salt**

Mark "yes" or "no" for the following questions:

	YES	NO
I am familiar with or have heard of a whole-foods plant-based diet	O	O
I am familiar with the health benefits of a whole-foods plant-based diet	O	O
I currently follow a whole-foods plant-based diet, or variation (vegan, vegetarian, semi-vegetarian)	O	O
I have followed a whole-foods plant-based diet in the past, or variation (vegan, vegetarian, semi-vegetarian, etc.)	O	O

	Strongly Disagree	**Disagree**	**Neither Agree nor Disagree**	**Agree**	**Strongly Agree**
I try to follow a healthy diet	O	O	O	O	O

My doctor or Dietitian/Nutritionist has told me to follow a healthier diet	O	O	O	O	O
My overall health would be better if I followed a healthier diet	O	O	O	O	O

Mark whether you strongly disagree, disagree, agree, strongly agree, or are neutral regarding the following statements.

RECOMMENDATION

Given that each of the statements below is supported with scientific evidence with regards to a whole-food plant-based diet**, how likely would you be to RECOMMEND a whole-food plant-based diet TO YOUR PATIENTS for at least 3 weeks** for each of the statements given?

	Definitely will NOT recommend it for this reason	**I might suggest to CERTAIN patients for this reason**	**I would probably recommend this to MOST patients for this reason**	**Definitely WOULD recommend it for this reason**	**I am ALREADY recommending or planning to recommend to patients for this reason.**
To lose weight	O	O	O	O	O
To lower blood pressure to normal levels	O	O	O	O	O
To manage or cure diabetes	O	O	O	O	O
To manage or cure heart disease	O	O	O	O	O

To slow down/prevent cancer	O	O	O	O	O
To lower cholesterol to normal levels	O	O	O	O	O
To lower saturated fat intake	O	O	O	O	O
To go off of prescription medications	O	O	O	O	O
To prevent chronic diseases	O	O	O	O	O

	Extremely unlikely	Moderately unlikely	Neither likely nor unlikely	Moderately likely	Extremely Likely
How likely would you recommend a whole-foods plant-based diet for ANY of the above reasons?	O	O	O	O	O

BARRIERS

When considering RECOMMENDING a whole-food plant-based diet TO YOUR PATIENTS for at least three weeks, which factors would prevent this or get in your way? In other words, **why might you NOT recommend a whole-food plant-based diet to your patients?**

	Strongly Disagree	**Disagree**	**Not Sure or Not Applicable**	**Agree**	**Strongly Agree**

They do not like vegetables.	O	O	O	O	O
They will not want to change their diets/lifestyle	O	O	O	O	O
They will not want to try new foods	O	O	O	O	O
They will need more willpower.	O	O	O	O	O
They would not get enough to eat	O	O	O	O	O
They would not get enough iron.	O	O	O	O	O
They would not get enough protein.	O	O	O	O	O
They would not get enough calcium.	O	O	O	O	O
They would not know what to buy at the grocery store	O	O	O	O	O
They would not know what to cook	O	O	O	O	O
They would not know what to order at restaurants	O	O	O	O	O
They would need more time.	O	O	O	O	O
Their household would not eat plant-based foods	O	O	O	O	O
They do not have access to a grocery store with a variety of produce	O	O	O	O	O

It would give them indigestion, gas, and stomach upset	O	O	O	O	O
They would miss eating meat.	O	O	O	O	O
They would miss eating cheese/dairy.	O	O	O	O	O
They would miss eating eggs.	O	O	O	O	O
They would miss going out to eat	O	O	O	O	O
It would be too expensive.	O	O	O	O	O

CURRICULUM

If you are NOT WILLING TO RECOMMEND a whole-food plant-based diet to your patients for at least three weeks for ANY reason, **which of the following factors might help change your mind?**

	Strongly Disagree	**Disagree**	**Not Sure**	**Agree**	**Strongly Agree**
Attending a whole-food, plant-based nutrition elective in medical school	O	O	O	O	O
Incorporating more whole-food plant-based nutrition into current medical school classes	O	O	O	O	O
If more focus were put on whole-food plant-based nutrition on national boards or shelf examinations	O	O	O	O	O

Attending a whole-food plant-based cooking class as an elective in medical school	O	O	O	O	O
Adding whole-food plant-based nutrition competencies to internal medicine residency requirements	O	O	O	O	O
Adding whole-food plant-based nutrition competencies to cardiology licensure requirements	O	O	O	O	O
Doing my research on whole-food, plant-based nutrition	O	O	O	O	O
Seeing that a whole-food plant-based diet works for others in clinical practice	O	O	O	O	O
Seeing a nutritionally complete and detailed meal plan	O	O	O	O	O
Getting more information or evidence in general	O	O	O	O	O

Appendix F: Scholarly Project EOP SLO Synthesis

Knowledge for Nursing Practice (KNP): The DNP project's main goal was to improve advanced practice provider (APP) knowledge of nutritional medicine. This will directly increase the ability of nursing practice by teaching the APP how obesity, diabetes, cardiovascular disease, and cancer can be managed through an improved, predominantly plant-based diet. The DNP project also discussed ways to overcome financial, social, and cultural barriers to foods that individuals may experience.

Person-Centered Care (PCC): The DNP project aimed to improve patient care by educating the APP about nutritional medicine and providing resources in the clinical setting. Patient-centered care is a fundamental approach to healthcare that puts the patient at the forefront of decision-making and treatment planning. It revolves around recognizing and respecting patient needs. The DNP project completed this by educating APPs about the barriers and challenges to implementing healthier eating patterns that many patients face and the burden of food preparation. The collaboration between provider and patient helps to ensure patient compliance. Patient-centered care goes beyond addressing a single complaint in a single patient encounter. It revolves around recognizing and respecting an individual's unique needs, preferences, and values. Patient-centered care creates personalized and empathetic healthcare by having the provider engage with patients to understand their concerns over their well-being.

Population health: Promoting population health through a whole/plant-based diet is a strategy to enhance overall well-being and reduce the burden of chronic disease. Educating patients about the impact of fruits, vegetables, whole grains, legumes, and nuts on their health positively impacts population health. Diets low in saturated fats and cholesterol and high in fiber, vitamins,

minerals, and antioxidants will directly improve obesity and subsequent chronic conditions. Whole-food/plant-based diets can also contribute to the sustainability of food sources by reducing the burden of raising animals for meat consumption.

Evidence-informed practice is a direct outcome of the DNP project, which used evidence-based practices to improve APP knowledge regarding nutritional medicine with the work it will implement in practice. High-quality, peer-reviewed studies and clinical data were used to guide and create content for the DNP project. This approach ensured that healthcare professionals have access to accurate information regarding the benefits and potential risks of recommending and adopting a whole-food/plant-based diet to their patient population. By prioritizing evidence-informed practice in dietary recommendations, the APP can encourage the widespread adoption and debunk myths surrounding whole-food/plant-based diets.

Quality and safety: The DNP project focused on the quality and safety of the content provided. The dietary approach of a whole-food/plant-based diet is aligned with well-established nutritional principles and minimal risk of adverse health effects. This dietary style emphasizes consuming unprocessed foods, limiting exposure to preservatives, chemical additives, and cholesterol, and is lower in sodium, sugar, and fat. Eliminating processed foods and increasing whole foods decreases the risk of many chronic conditions, as outlined in the DNP project.

Interprofessional collaboration was achieved through discussion with content experts, such as dieticians, for information and resources regarding a whole-food/plant-based diet and educators to help develop engaging and meaningful content for the APP participant.

Systems-based practice involves recognizing the interaction between individual dietary choices and the broader healthcare systems. Utilizing a whole-food/plant-based diet aligns with system-based thinking by addressing the personal health of an individual but also the impact it has on healthcare resources, food production, and environmental sustainability. Adopting a whole-food/plant-based diet will decrease the disease burden on healthcare systems.

Healthcare information and technology have the potential to amplify the positive impact that a whole-food/plant-based diet has on public health. Digital resources that educate about nutrition can be beneficial. This helps APPs from across the United States access nutritional medicine courses taught by content experts regardless of geographical location. Data-driven approaches and artificial intelligence can analyze datasets to understand better the impact of implementing a whole-food/plant-based diet on health benefits and outcomes associated with a healthier, nutrient-rich diet.

The APP maintains professionalism when adopting a whole-food/plant-based diet. Healthcare professionals need to maintain optimal physical and mental well-being to ensure they are equipped to meet the demands of their careers. This dietary eating pattern can serve as a role model for colleagues and patients, demonstrating a commitment to a healthy lifestyle and inspiring others to make choices. The DNP project pointed out that providers who are interested in nutrition tend to educate their patients more frequently about the benefits of good food.

Personal and professional development was achieved by creating and implementing an educational course for APPs about a whole-food/plant-based diet and how to implement it into practice. Creating a virtual academic system for peers deepened clinical expertise and commitment to lifelong learning and advancement in the healthcare field. The comprehensive

research project increased clinical knowledge and improved critical thinking skills. It also positions the APP as a healthcare leader, offering insights and solutions for promoting health and well-being through dietary interventions.

As outlined above, all student learning outcomes were achieved by developing, creating, and implementing a nutritional medicine course for advanced practice providers.