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ABSTRACT

EFFECTS OF A 12-WEEK PLANT-BASED DIET PROGRAM
ON OBESE AND OVERWEIGHT ADULTS
IN RURAL MICHIGAN

by

Nadine Larcher

Chair: Carol Rossman, DNP, RN, FNP-BC, PNP-BC

ABSTRACT OF GRADUATE STUDENT PROJECT

Scholarly Project

Andrews University

College of Health & Human Services

TITLE: EFFECTS OF A 12-WEEK PLANT-BASED DIET PROGRAM ON OBESE AND OVERWEIGHT ADULTS IN RURAL MICHIGAN

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Date completed: February, 2023

Background

Overweight and obesity among adults are a rising epidemic in the U.S. Obesity is a risk factor for many chronic diseases and impacts morbidity and mortality. Despite our high-tech medical care system in the U.S., we are losing the war on obesity due to not addressing the underlying problems. These include unhealthy lifestyles and an unhealthy diet. A growing body of research studies has shown that adopting a low-fat whole food plant-based diet (WFPBD) regime consisting of whole grains, fruits, vegetables, legumes, and no animal-based products is an effective measure to counteract the rising pandemic of chronic diseases related to obesity.

Purpose

The purpose of this project was to examine the effects of a WFPBD on overweight and obese adults residing in northern Michigan. The project objectives were to examine if a 12-week online program on a plant-based diet would improve body mass index (BMI), waist circumference (WC), blood pressure (BP), fasting blood glucose (FBG), and serum lipid levels in this population and to determine if participants' self-efficacy and intake of plant foods would improve post-WFPBD.

Methods

This project used a quasi-experimental one-group pre-test post-test design. Forty-three individuals started the program, and 35 completed the requirements. The mean age for participants was 54.92 (SD=12.09) (range 34-75 years). For gender, 10 (23.3%) were male, and 32 (76.2%) were female. Biometric measurements, including weight, BMI, BP, WC, total cholesterol, LDL, HDL, triglycerides, and FBG, were taken before and after the program. Participants were also asked to complete a self-efficacy questionnaire before and after the program and a dietary questionnaire at baseline, week four, week eight, and post-intervention. The intervention was entitled The *Eat Well, Live Well* Program. Through a 12-week evidence-based online lifestyle educational intervention, participants were taught the principles of a WFPBD and how to apply these measures to lose weight, lower their risk factors for obesity-related diseases, and manage obesity-related problems.

Results

The results of the biometric measurements indicated significant reductions in BMI of 1.09 ($t(34) = 5.583, p < .001, d=0.944$), weight of 7.21 pounds ($t(34) = 6.370, p < .001$,

d=1.077), WC of 2.01 inches ($t(34) = 7.781, p < .001, d=1.315$), FBG of 4.94 mg/dL ($t(34) = 2.174, p = .018$), total cholesterol of 13.971 mg/dL ($t(34) = 2.248, p = .016, d=0.380$), LDL of 10.03 mg/dL ($t(31) = 1.784, p = .042, d=0.315$), and triglyceride levels of 14.77 mg/dL ($t(34) = 1.744, p = .045, d=0.295$). Results for HDL levels, systolic blood pressure (SBP), and diastolic blood pressure (DBP) were not statistically significant. There was a mean increase in self-efficacy scores of 3.810, which was not statistically significant ($p=.05$). Results of the Mediterranean food questionnaire showed a significant difference between baseline and week four ($p<0.01$), between baseline and week eight ($p<0.01$), and between baseline and post-intervention ($p<0.01$). There were no significant differences when comparing weeks four, eight, or post-intervention to other weeks aside from baseline.

Conclusion

This project demonstrated significant reductions in total cholesterol, LDL, triglycerides, FBG, BMI, weight, and WC. The results of this project indicate that any change in the direction of a WFPBD is a good change and may be associated with a decreased risk for obesity and chronic diseases.

Andrews University
College of Health & Human Services

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A Scholarly Project
Presented in Partial Fulfillment
of the Requirements for the Degree
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February 28, 2023

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LIST OF ABBREVIATIONS

ACC	American College of Cardiology
ACLM	American College of Lifestyle Medicine
AHA	American Heart Association
APN	Advanced Practice Nurse
BMI	Body Mass Index
BP	Blood Pressure
CHIP	Complete Health Improvement Program
CVD	Cardiovascular disease
DBP	Diastolic Blood Pressure
DNP	Doctor of Nursing Practice
EHC	Eating Habits Confidence
ID	Identification
FBG	Fasting Blood Glucose
HBM	Health Belief Model
HDL	High Density Lipoprotein
LDL	Low Density Lipoprotein
MEDAS	Mediterranean Diet Adherence Screener
PCP	Primary Care Provider
PCRM	Physicians Committee for Responsible Medicine

RCT	Randomized Control Trial
SD	Standard Deviation
SMART	Specific, Measurable, Attainable, Realistic, and Time-framed
SPSS	Statistical Package for Social Science
SBP	Systolic Blood Pressure
TOS	The Obesity Society
U.S.	United States
USPSTF	United States Preventive Services Task Force
WC	Waist Circumference
WFPBD	Wholefood Plant-based Diet
RDA	Recommended Daily Allowance

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CHAPTER 1

INTRODUCTION, BACKGROUND, AND SIGNIFICANCE

Introduction

Obesity is defined as a BMI of 30 or higher and is a multifaceted, chronic disease condition typified by excess subcutaneous and visceral fat (Papadakis et al., 2020). According to Blumenthal and Seervai (2018), obesity has been called a threat to public health. Being obese or overweight (BMI of 25-29.9) predisposes individuals to many comorbidities, such as high blood pressure, type 2 diabetes mellitus, cancer, and cardiovascular disease (CVD). In the United States (U.S.) alone, about 40,000 people die every year due to overweight and obesity-related cancers. Furthermore, obese individuals have a 1.5 to 2.5 times higher risk of death from heart disease compared to persons with a healthy BMI (Blumenthal & Seervai, 2018).

Obesity also has a dramatic toll on health care dollars. According C. Lopez et al. (2020), in 2014, the U.S spent \$0.976 trillion on obesity, whereas in 2018, the cost increased to \$1.39 trillion. Obesity is also expensive for the individual. Meldrum et al. (2017) suggest that an obese male will spend an average of \$1,152 yearly on medical costs, whereas obese females will spend about \$3,613 yearly. Obesity is a preventable condition, and medical providers should do much in their power to educate patients on reducing obesity and its complications (C. Lopez et al., 2020).

Background and Significance of the Problem

Overweight and obesity among adults are a rising epidemic in the U.S. In 1985, not one state had an obesity rate greater than 15%, whereas, in 2007-2008, 35% of adults were obese (Blumenthal & Seervai, 2018). Statistics from the Centers for Disease Control and Prevention (2021, June 7) show that the prevalence of obesity in the U.S. is 42.4%. Although obesity is prevalent in many states, Michigan is one state that is dramatically impacted, with an overall obesity rate of 36% (Centers for Disease Control and Prevention, 2021, March 31). One area in Michigan where adults are substantially affected by overweight and obesity is rural northern Michigan, more specifically, Crawford, Oscoda, and Roscommon counties. This project mainly included persons from these counties, but other nearby counties such as Kalkaska, Wexford, Grand Traverse, and Otsego counties were also included. A 2019 community health needs assessment showed that among Crawford, Oscoda, and Roscommon counties, the percentage of obese individuals was 32, 38, and 35 percent, respectively, whereas 49, 35, and 36 percent were overweight, respectively (Munson Healthcare, 2019). When we total these two numbers, we see that 71-81% of adults are either overweight or obese in these counties. With such high overweight and obesity rates, it is not surprising that cancer and CVD are the primary causes of death among residents of these counties. Mortality rates from CVD in Oscoda and Roscommon counties exceed the Michigan state rate, whereas mortality rates from cancer exceeded the Michigan rate in all three counties (Munson Healthcare, 2019).

It is well known that obesity greatly impacts morbidity and mortality. Obesity is a risk factor for many chronic diseases, including CVD, hypertension, cancer, diabetes

mellitus type 2, metabolic syndrome, and, more recently, COVID-19 (Najjar & Feresin, 2019; Sattar et al., 2020; Turner-McGrievy et al., 2017). Rahman (2019) states that despite our high-tech medical care system in the U.S, we are losing the war on obesity. We are not addressing the underlying problem with obesity, which is an unhealthy lifestyle and an unhealthy diet. On the other hand, a growing body of research studies has shown that adopting a WFPBD regime consisting of whole grains, fruits, vegetables, legumes, and no animal-based products is an effective measure to counteract the rising pandemic of chronic diseases related to obesity. Our health care system as a whole needs to begin to make changes in our methods to prevent and treat these common obesity-related chronic diseases (Rahman, 2019).

Obese or overweight persons are likely to be consuming the typical western diet, which is high in saturated fat, sodium, and sugar but is deficient in fruits and vegetables (Rahman, 2019). Many are unaware that animal products in the diet promote disease by contributing to oxidation, inflammation, and carcinogenesis (Hever & Cronise, 2017). Animal products, including meat (red and white meat), dairy, eggs, and fish, contain health-destroying products such as saturated fats, carnitine, and N-glycolylneuraminic acid (Neu5Gc) (Hever & Cronise, 2017). Moreover, dairy products are a significant source of saturated fats, and sugar, both of which contribute to obesity (Locke et al., 2018).

A WFPBD, consisting of plenty of legumes, whole grains, vegetables, and fruits, is rich in phytonutrients and fiber. These nutrients offer protection for the cardiovascular system, gastrointestinal system, and the immune system (Hever & Cronise, 2017; Rahman, 2019). A WFPBD diet also helps to reduce oxidation and inflammation in the

body, thus preventing the initiation and progression of disease (Hever & Cronise, 2017). This type of dietary pattern has been shown to be a healthy and sustainable method of weight loss while at the same time preventing or even reversing chronic diseases such as heart disease, diabetes, and hypertension (Wright et al., 2017).

Statement of the Problem

There is a high rate of overweight and obesity among residents of the rural Michigan counties of Crawford, Oscoda, and Roscommon, and this is contributing to high rates of cancer and heart disease. One in three adults are obese in these counties, and in order for us to tackle the primary causes of death, we must tackle the obesity epidemic (Munson Healthcare, 2019). Obesity is a very preventable risk factor for disease. It is evident from the rates of obesity in rural Michigan and elsewhere that many people are not following dietary guidelines for weight management (Locke et al., 2018). Moreover, no community programs were found in this area of rural Michigan where obese individuals are taught how to adopt a WFPBD. There is a great need to educate individuals in rural northern Michigan regarding the management of obesity and obesity-related complications with a predominantly plant-based diet.

Purpose/Specific Aim(s)/Objectives

The purpose of this project was to examine the effects of a WFPBD on overweight and obese adults residing in northern Michigan. The project objectives were:

- To examine if a 12-week online program of a plant-based diet will improve BMI, waist circumference, blood pressure, fasting blood glucose, and serum lipid levels with this population.

- To determine if participants self-efficacy and intake of plant foods will improve post-WFPBD.

Impact of Project on System or Population

This project had potential to impact obese and overweight individuals as well as the medical community. Because of the high rates of overweight and obesity and obesity-related diseases among residents of northern Michigan, it was vital for the residents of this community to become educated on the benefits and effectiveness of measures to decrease obesity, such as eating a WFPBD. This project sought to empower individuals with tools needed to lose weight, decrease BMI, WC, BP, and improve lipid and blood glucose levels.

There was also a great need for healthcare providers to become aware of the impact that a plant-based diet can have on the prevention, treatment, and management of obesity and obesity-related diseases and to educate their patients on adopting these measures. Many clinicians lack knowledge regarding these benefits, have never witnessed it with their patients, and therefore do not educate their patients on this matter (Lessem et al., 2019). This 12-week nurse-led lifestyle intervention used an evidenced-based approach guided by a nursing theory. The results of this project will hopefully be used to inform nursing practice and serve as an encouragement to health care providers to educate their patients regarding a WFPBD as an effective measure to combat overweight and obesity and their related complications.

Clinical Questions

1. Among overweight and obese adults in rural northern Michigan, will participation in a 12-week online plant-based diet program improve biometric measurements of

BMI, waist circumference, blood pressure, fasting blood sugars, and serum lipids levels?

2. Among overweight and obese adults in rural northern Michigan, will participation in a 12-week online plant-based diet program improve self-efficacy and increase the consumption of plant-based foods?

CHAPTER 2

LITERATURE REVIEW

Operational Definitions

The following concepts are found throughout this project and will help to improve comprehension:

Plant-Based Diet

Various terms are associated with a plant-based diet, including lacto-ovo-vegetarian, vegan, and a whole food plant-based diet. A lacto-ovo-vegetarian diet excludes meat but includes dairy and eggs (Kahleova et al., 2017). Vegan diets exclude all animal products entirely, including dairy and eggs, but may include many processed foods, as well foods high in sugar and fat (Campbell et al., 2019; Evans et al., 2017; Kahleova et al., 2017).

A WFPBD is a vegan diet but stricter (Karlsen et al., 2019). It places great emphasis on consuming vegetables, fruits, legumes, nuts, and whole grains, spices, and herbs in their natural state as much as possible (Hever & Cronise, 2017; Kahleova et al., 2017). A WFPBD also emphasizes greatly decreasing or omitting processed foods with added sugars, refined grains, refined oils, and fats (Karlsen et al., 2019). For the purpose of this project, we focused on a WFPBD as this diet has been shown to be beneficial in reducing the risk for chronic diseases and all-cause mortality (Kahleova et al., 2017). The terms plant-based diet and WFPBD is used interchangeably throughout this project. Intake of plant foods was assessed using a food intake questionnaire administered at

baseline and weeks 4, 8, and 12. For this project, adequate intake of plant foods is defined as the AHA's recommendation for at least six servings of grains per day and at least two servings of fruits, and at least two and a half servings of vegetables per day (American Heart Association, 2021a).

Biometric Measurements

BMI and Weight

Body mass index is the measurement that indicates if a person is underweight, normal, overweight, or obese. According to the Centers for Disease Control and Prevention (2021, March 3), a BMI below 18.5 is abnormal; a BMI of 18.5 to 24.9 is normal; a BMI of 25.0 to 29.9 is overweight, and a BMI of 30 or higher is considered obese. For this project, BMI was measured using the English system formula of $[\text{weight (lb.)} / \text{height (in)} / \text{height (in)}] \times 703$ (Buttaro et al., 2017). Success in this project was defined as a reduction in BMI of at least 2 units from baseline as is based on various plant-based studies such as Wright et al. (2017), Campbell et al. (2019), and Kahleova, Tura, et al. (2018). Successful weight loss in this project was defined as a weight loss of at least 5% of body weight compared to baseline as is recommended by the U.S. Preventive Services Task Force (2019).

Waist Circumference

The American Heart Association and the National Heart, Lung and Blood Institute define abdominal obesity in females as having a WC of greater than 35 inches (88cm) and greater than 40 inches (102cm) in men (Harvard T.H. Chan School of Public Health, 2021). For this project, success was defined by a decrease in waist circumference

of at least 2 inches from baseline, as is based on various plant-based studies, including Wright et al. (2017) and Viguiliouk et al. (2019).

Blood Pressure

Blood pressure measurements are categorized into five different levels.

According to the American Heart Association (2021b), normal BP is SBP below 120 and DBP below 80. Elevated BP is consistent SBP between 120-129 and DPB less than 80.

Hypertension (Stage 1) is consistent elevated SBP at 130-139 or DBP 80-89.

Hypertension (Stage 2) is consistent SBP 140 or higher or DBP of 90 or higher.

Hypertensive crisis is SBP 180 or higher and/or DBP at 120 or higher (American Heart Association, 2021b). Success in this project was defined as a decrease in SBP by least 10 mm Hg and a decrease in DBP by at least 5 mm Hg. These parameters are based on results from the Campbell et al. (2019) study and results of non-pharmacological interventions on BP from the American College of Cardiology (ACC), the American Heart Association (AHA), and The Obesity Society (TOS) (Arnett et al., 2019; Jensen et al., 2014).

Cholesterol

According to the U.S National Library of Medicine (2020, October 2), recommended cholesterol levels for both men and women age 20 and older are as follows: Total cholesterol: 125-200 mg/dL; Low-density lipoprotein (LDL): less than 100 mg/dL; High-density lipoprotein (HDL): For men over the age of 20, it is 40 mg/dL or greater, and for women over age 20, it is 50 mg/dL or greater; Triglyceride: Below 150 mg/dL. For this project, the lipids that were measured included total cholesterol, triglycerides, LDL, and HDL. Lipid levels were drawn after participants fasted for at

least 12 hours. Success in this project was defined as a decrease in total cholesterol by at least 30 mg/dL, triglycerides by at least 20 mg /dL, LDL by at least 30 mg/dL, and an increase in HDL by at least 2 mg/dL. These parameters were based on various plant-based studies, including Wright et al. (2017), Campbell et al. (2019), and Kahleova, Tura, et al. (2018), and guidelines from the AHA/ACC/TOS (Jensen et al., 2014).

Fasting Blood Glucose

According to Buttaro et al. (2017), FBG is used as a parameter to diagnose diabetes. A level of less than 100 mg/dL is normal; 100-125 mg/dL is prediabetes, and greater than or equal to 126 mg/dL is diagnostic of diabetes (Buttaro et al., 2017). Since FBG was taken at the same time as fasting lipids, a 12 hour fast was also required. For this study, success was defined as a reduction in blood sugar of at least 4 mg/dL among individuals who are in normal range or prediabetic range. This is based on results observed in several plant-based studies, including Kahleova, Tura, et al. (2018), Remy et al. (2017), and Drozek et al. (2019). For participants that who are diabetic, success is defined as a reduction in FBG of 10 mg/dL. This is based on a systematic review and meta-analysis involving studies of a mean length of 12 weeks by Vigiliouk et al. (2019).

Theoretical Framework

Making diet and lifestyle changes are sometimes the most challenging behavior changes to make. Often, individuals recognize that they need to change their health habits, but for many reasons do not. It is essential to realize that many factors will influence how and if a person makes behavior changes. Saghafi-Asl et al. (2020) suggest that weight loss programs could be more successful if psychological factors affecting

weight management were identified. On this premise, the theoretical framework for this project is the Health Belief Model (HBM).

According to Butts and Rich (2015), the HBM model was developed in the 1950s to devise an explanation for why only a few people participated in health promotion programs that aimed to prevent and detect illnesses. It was planned to discover what factors were encouraging or discouraging people from participating in their health programs and hypothesized that people's readiness to act depended on their beliefs of how susceptible they were to the disease and their benefits of avoiding the disease (Butts & Rich, 2015).

In later years, researchers expanded on the HBM and concluded that there were six main constructs that influenced a person's readiness to act (Butts & Rich, 2015). Butts and Rich (2015) and Saghafi-Asl et al. (2020) discuss that these constructs included perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cue to action, and self-efficacy. Perceived susceptibility refers to an individual's perception of how likely they are to contract a disease or illness. Perceived severity refers to the person's ideas about how serious their disease is and the potential consequences. Some researchers have summed up perceived susceptibility and perceived severity as perceived threats. Perceived benefits refer to the individual's ideas of whether taking action would reduce their likelihood of getting the disease or reduce the severity of the disease. Perceived barriers are the individual's assessment of whether the benefits outweigh the cost of taking action. Cue to action refers to the external or internal motivational factors that can prompt the individual to act. Self-efficacy refers to the individual's belief of

whether or not they are capable of performing the action (Butts & Rich, 2015; Saghafi-Asl et al., 2020).

Mckellar and Sillence (2020) discuss that the HBM can also be divided into three components: Individual perceptions, modifying factors, and likelihood of action. Individual perceptions include the person's perceived susceptibility to the illness and their perceived severity of the illness. Modifying factors include demographic variables such as sex, age, and race; sociopsychological variables such as personality and peer group, and finally, structural variables such as previous contact with the illness or knowledge of the disease. The last category of likelihood of action includes the perceived benefits minus the perceived barriers. These factors all combined contribute to the likelihood that the recommended behavior will occur. If a person perceives that they are susceptible to the disease and they take the consequences seriously, then they will see it as a threat to their health. When they receive cues to action, they will realize that the benefits of the recommended action far outweigh the barriers, and this results in the action being performed (Mckellar & Sillence, 2020).

The HBM has been used in many research models to explain factors that influence behavior changes. Saghafi-Asl et al. (2020) used the HBM to investigate factors that influenced behavior changes regarding weight management among college students. It was discovered that perceived benefits, perceived threats, and self-efficacy in dieting and exercise were significantly related to college student's intention to manage their weight. Larki et al. (2018) found an association between perceived susceptibility and adherence to non-smoking behavior and salt restriction among hypertensive patients. There was also a relationship between perceived severity and adherence to medication

regime (Larki et al., 2018). Similarly, McVay et al. (2018) found that there were three factors that influence obese adults' intention to lose weight. These factors included practical factors such as scheduling and cost, anticipated effectiveness of the intervention, and anticipated pleasantness of the intervention (McVay et al., 2018).

Application to Project

Saghafi-Asl et al. (2020) suggest that the HBM should be integrated into health promotion programs to ensure that participants adhere to recommendations. This project used the HBM to help improve dietary changes among participants. Recognizing that each component of the model is directly related to each other, all three components of the model were used: Individual perceptions, modifying factors, and likelihood of action (**Figure 1**). For modifying factors, we only focused on the structural variable of knowledge about the disease.

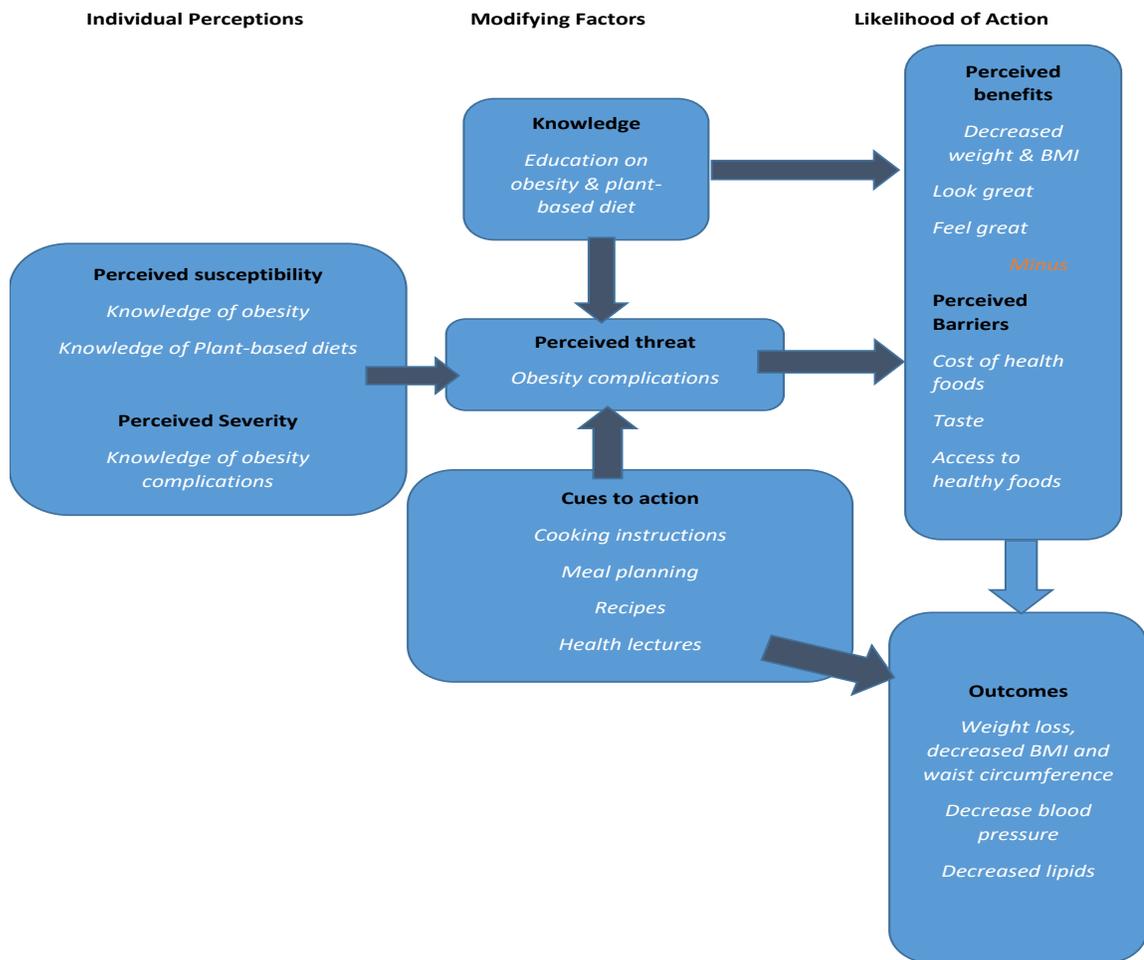


Figure 1. The Health Belief Model. Adapted from *The handbook of health behavior change*, by M.E Hilliard, K.A. Riekert, J.K. Ockene, & L. Pbert, L. (2018). Springer Publishing Company. <http://ebookcentral.proquest.com/lib/andrews-ebooks/detail.action?docID=5332147>

Perceived Susceptibility and Perceived Severity

Kaplan et al. (2018) discuss that despite increasing knowledge regarding obesity as a serious chronic disease that can have a significant negative impact on overall health and quality of life, it is still uncommon for obesity to be addressed and treated in the medical domain. A study of 3008 persons with obesity by Kaplan et al. (2018) revealed that only 55% of people with obesity reported that they were diagnosed with obesity.

While these persons had self-reported their BMI as 30 or greater, only 50% of them perceived that they were obese or extremely obese. 48% reported that they were only overweight, and 2% reported that their weight was normal (Kaplan et al., 2018).

According to Visscher et al. (2017), many people are aware that they are obese but possibly downplay the risk that could occur from being obese. Obesity has not always been recognized as a risk factor for diseases. It was not until 1988 that obesity was recognized as a risk factor for diabetes and CVD. Also, it is only within the last ten years that obesity has been recognized as a risk factor for cancer. Many health organizations are now sounding the alarm about the impact of obesity on health status. Many people are aware and take action, and others do not, and there are other people that do not know about obesity as a disease. Some people have misconceptions about obesity and do not realize its association with disease (Visscher et al., 2017).

These studies clearly indicate that there is still room for education on obesity. It was hoped that this project would empower individuals with a proper knowledge of obesity. Through weekly health presentations, videos, and written information, participants were instructed on the impact of obesity on their health. We also instructed participants regarding the complications of obesity, including diabetes, heart disease, and hypertension.

Perceived Benefits and Perceived Barriers

It is essential to understand what the individual perceives as the benefits and barriers to participating in a new behavior modification program. The study by Kaplan et al. (2018) reported that some major barriers to starting a weight loss effort were the cost of healthy foods, preference for unhealthy foods, controlling hunger, lack of exercise, and

lack of motivation. López-Azpiazu et al. (1999). Much of the information presented throughout this health program was focused on encouraging and reinforcing to individuals that the changes they were making would have a positive impact on their entire life. This is evidenced by the many studies which show that adopting a whole food plant-based diet has a positive impact on BMI, BP, and cholesterol levels and is effective at preventing and reversing chronic diseases (Krause & Williams, 2019).

The participants for this project voiced that some of their barriers included food cost, transportation, and access to fruits and vegetables. This project educated individuals on the many positive benefits of changing their dietary choices to a more plant-based choice. These benefits include lower cholesterol levels, lower BP levels, losing weight, improving lipid levels, reversing CVD, and reducing mortality from chronic diseases (Kahleova et al., 2017; Krause & Williams, 2019; Rahman, 2019). The intervention in this project included weekly health presentations and discussions that sought to reinforce the benefits of making lifestyle changes and overcoming the barriers to change. We discussed how to shop for low-cost healthy foods, and conducted cooking classes (see **Appendix N**) that demonstrated healthy, tasty, cost-effective recipes. We also discussed overcoming food addictions and factors to help control the feelings of hunger, as this was a barrier to some people.

Cues to Action

During this project, the project manager provided many resources to the participants that enabled them to make an intelligent decision about eating a plant-based diet. Health videos and health lectures featured evidence-based information about the benefits of a plant-based diet, including how and what to eat. In many of the live Zoom

sessions, short YouTube videos were shown of individuals who lost weight on a plant-based diet and who experienced first-hand its results on their health issues. Participants were also given the link to documentaries featuring multiple testimonies from persons who switched to a plant-based diet to manage their health conditions. Participants also received a note book with weekly articles that enforced the concepts that were taught each week.

Self-efficacy

Wilson et al. (2016) suggest that persons with higher self-efficacy are more likely to persist until they reach their goals, whereas those with low self-efficacy are less likely to be persistent. This program endeavored to help individuals feel confident that they were able to follow a plant-based diet. Starting from the first week of the program, participants were encouraged to set goals for themselves. Burgess et al. (2017) discusses that goal setting is an important aspect of helping individuals to be successful at lifestyle interventions to lose weight. Goals should be SMART, which stands for “specific, measurable, attainable, realistic, and time-framed” (Burgess et al., 2017, p. 106). Self-efficacy was strengthened through sharing recipes, supplying meal planning ideas, and through live Zoom cooking classes. Since this project aimed to encourage individuals to adopt a plant-based diet, it was vital to show them how. Recipe sharing and cooking instructions were a key component of many plant-based studies including the CHIP program (Remy et al., 2017), the Wright et al. (2017) study, and the Kahleova, Dort, et al. (2018) study. It was hoped that these measures would also bring success to the participants of this program. Success of self-efficacy in this project was measured using the Eating Habits Confidence survey by Sallis (2021).

Literature Review

Being overweight or obese is a nutrition-related issue that puts individuals at risk for many chronic diseases and increases morbidity and mortality (Hever & Cronise, 2017). Many persons perceive this fact and try their best to lose weight. The weight loss industry is a multibillion-dollar industry in the U.S. and is indicative of how desperate many Americans are to lose weight (Blumenthal & Seervai, 2018). Popular dietary-based methods of losing weight include the Mediterranean diet, low-carbohydrate diets, the ketogenic diet, and gluten-free diets (Freire, 2020; Locke et al., 2018). According to Freire (2020), some of these dietary programs are well known and have proven to be effective at weight loss, but some may prove to have a negative effect on health in the long run. Moreover, diets that are low in fruits, vegetables, seeds and nuts, and high in trans-fat, processed meat, and sodium are a significant contributor to disability and early death in the United States (Hever & Cronise, 2017).

While some of these popular diets promote a healthier eating pattern than the standard American diet, some promote high intakes of unhealthy products that contribute to obesity and other chronic diseases. According to Freire (2020), individuals who adopt a Ketogenic diet, for example, may experience side effects such as halitosis, muscle cramps, headaches, constipation, and weakness. The Ketogenic diet may also worsen blood lipids and act in the development of hepatic steatosis. Low carb diets, such as the Atkins diet, have been linked to increased mortality if continued on a long-term basis (Freire, 2020). On the contrary, a plant-based diet has been shown to decrease the risk of chronic disease and its resulting mortality rates (Kahleova et al., 2017). The following literature review will discuss the effects of a plant-based diet on body weight, BMI, and

waist circumference. We will also examine the mechanisms of weight loss on a plant-based diet and discuss the effects of plant-based diets on CVD and blood pressure. Finally, we will discuss adequate consumption of plant foods and the importance of plant-based lifestyle management programs.

Effects of a Plant-based Diet on Weight and BMI

Plant-based diets are a very effective means of weight loss and possibly one of the healthiest ways to lose weight. Individuals who follow a plant-based diet, vegans more than vegetarians, tend to have a lower weight and BMI in comparison to non-vegetarians (Freire, 2020; Najjar & Feresin, 2019; Tran et al., 2020). This may be due to the fact that healthy plant-based diets are lower in caloric density, lower in fat (especially saturated fats), have higher fiber content, and overall reduced intake of calories (Tran et al., 2020). In randomized controlled trials (RCTs) and observational studies, those on a WFPBD tend to lose more weight than those in the control group. The BROAD study, an RCT by Wright et al. (2017), showed that the intervention group achieved a significant mean weight loss of 8.6 pounds at three months, 12.1 pounds at six months, and 11.5 pounds at 12 months, whereas the control group did not achieve significant weight loss. BMI significantly decreased by 3.1 units at three months, 4.4 units at six months, and 4.2 units at 12 months from baseline in the intervention group, but was not significant in the control group (Wright et al., 2017). Two 16-week RCTs by Kahleova, Dort, et al. (2018) and Kahleova, Fleeman, et al. (2018) showed a significant treatment effect in weight by -6.5 kilogram (kg) and BMI by -2.0 units among the intervention participants. Another 16-week RCT by Kahleova et al. (2020) study showed an average loss in body weight of 5.9 kg, and BMI dropped by an average of 1.9 units.

An observational study on the Complete Health Improvement Program (CHIP) by Remy et al. (2017) showed an average weight loss of 5.9 pounds and an average decrease in BMI by 1 unit over an 8-20 week period. Another eight-week observational study by Campbell et al. (2019) showed an average significant weight loss of 5.5 pounds and a significant drop in BMI by 2.0 units. This study, although it was only eight weeks in duration, demonstrated a mean reduction in body weight of 5.7%. This is significant as Turner-McGrievy et al. (2017) reports that even a modest weight loss of 5% of body weight can decrease the risk of chronic diseases.

In summary, these studies have consistently demonstrated that adopting a low-fat plant-based diet has powerful effects on decreasing weight and lowering BMI. The same principles of increased intake of fruits, vegetables, whole grains, and legumes and low intake of fatty foods were used in each study. This gives hope to anyone who is trying to lose weight and to keep it off in the long run.

Effects of Plant-based Diets and Waist Circumference

A plant-based diet not only helps to lower BMI and weight but it also helps to lower WC. Waist circumference is becoming an increasingly greater measure of adiposity than BMI. Cameron et al. (2020) discuss that although BMI is commonly used as a measure of obesity, it does not capture the distribution of body fat. Waist circumference measures the fat around the waist. Fat that is centered around the abdomen (abdominal obesity) appears to have a stronger relationship to mortality and morbidity than does BMI alone (Cameron et al., 2020). According to Harvard T.H. Chan School of Public Health (2021), having a larger WC is associated with a higher risk of death from CVD and increases the risk of type two diabetes, even after factoring in BMI.

Having more abdominal fat can also lead to higher blood glucose levels, triglycerides, LDL levels, and higher BP (Harvard T.H. Chan School of Public Health, 2021).

Wright et al. (2017) found that WC decreased by seven centimeters (cm) at three months, 10 cm at six months, and 9 cm at 12 months from baseline for those on a plant-based. Singh et al. (2019) compared WC between vegetarians and non-vegetarians Hispanic/Latino adults and found that vegetarians had a significantly lower WC of 34.8 inches versus 37.5 inches among non-vegetarians. A meta-analysis and systematic review by Vigiuliouk et al. (2019) found that diabetics who followed a vegetarian eating plan had a mean reduction in WC by -2.8 cm. Chen et al. (2019) conducted a cohort study of adiposity among middle-aged and elderly and found that those who adhered to a more plant-based diet over time had a lower WC of about 2.0 cm compared to those who did not. In summary, these studies demonstrate that those who follow a plant-based diet can reap the benefits of a trimmer waistline.

Mechanisms of Weight Loss on a Plant-based Diet

Low-fat WFPBDs are unique in the sense that individuals are told not to count calories but to eat to ad libitum or until they are satisfied (Campbell et al., 2019; Jensen et al., 2014; Wright et al., 2017). The general recommendations on weight loss from nutritionists and dietary guidelines are that individuals should restrict calories enough to lose about 0.5kg a week (Hwalla & Jaafar, 2021; Jensen et al., 2014). This is achieved through maintaining an energy deficit of about 500-750 calories less per day, restricting portion sizes, and at the same time increasing intakes of fruits and vegetables (Hwalla & Jaafar, 2021; Jensen et al., 2014). Usually, individuals who are on a 'diet' are very focused on counting calories to make sure that they do not go over their recommended

1200, 1500, or 1800 calories per day (Jensen et al., 2014). Remarkably, individuals on a low-fat WFPBD are still able to achieve wonderful results, even without counting calories. The mechanisms by which successful plant-based diet works are worthy to be noted; namely high fiber intake, low caloric density, and intake of healthy fats.

High Fiber

One reason that a plant-based diet works so well is because it is very high in fiber. Soluble and insoluble fiber are the two forms of fiber, and they are only found in plant foods, especially fruits, vegetables, legumes, whole grains, and nuts (Locke et al., 2018). Fiber works by absorbing and negating some of the calories from the meal by adding weight and bulk to the meal (Greger, 2019; Sarker, 2017). In the end, the extra calories get trapped by the fiber and are eliminated through the feces instead of being absorbed into the system (Greger, 2019).

A high intake of fiber tends to cause less hunger, increased satiety, and reduced energy intake, thus resulting in weight loss (Kahleova, Dort, et al., 2018; Tran et al., 2020). The Nurses' Health Study and other large cohort studies have all reported decreased weight gain among persons who consumed a high fiber diet (Kahleova, Dort, et al., 2018). On the contrary, a low intake of fiber has been associated with the rise of obesity (Sarker, 2017). The 2020 dietary guidelines for Americans recommend 14 grams of fiber per 1000 calories, which works out to be about 25-34 grams daily for men and women over the age of 18 (Quagliani & Felt-Gunderson, 2017; U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2020). The institute of Medicine recommends 19-38 grams per day (Quagliani & Felt-Gunderson, 2017). A vast majority of Americans are not reaching the daily recommended grams of fiber but are

averaging an intake of only about 16.2 grams per day (Quagliani & Felt-Gunderson, 2017). Adequate intake of fiber is a crucial element in controlling overweight and obesity (Greger, 2019).

Caloric Density

Another mechanism by which plant-based diets assist in weight loss is the principle of caloric density. According to Najjar and Feresin (2019), “caloric density refers to the number of kilocalories (kcal) per unit weight of food” (Najjar & Feresin, 2019, p. 2). Water makes up the weight of most whole plant foods, and therefore, tends to have less caloric density. Also, fiber contributes to the weight of plant foods but does not count towards calories. Looking along the spectrum of caloric density, we see that vegetables have the lowest caloric density, followed by fruits, then whole grains, then beans, then lean meats, then bread, then baked deserts, then nuts, and then free oils. Free oils have the highest caloric density; therefore, for someone trying to lose weight, a high intake of fats from oil would not be the best choice (Najjar & Feresin, 2019).

The strategy for losing weight with a whole food plant-based diet is to consume more foods within the lower caloric density margin rather than lessening portion sizes (Najjar & Feresin, 2019). This explains why in most studies on a low-fat vegan diet and weight loss, participants were told not to count calories but to eat until satiety was reached (Campbell et al., 2019; Wright et al., 2017). Due to the higher fiber intake and lower caloric density of plant foods, individuals tend to reach satiety much sooner than on a diet of refined products and meat. In fact, an unhealthful plant-based diet has the opposite effect of increased hunger and reduced satiety (Satija et al., 2019).

Healthy Fats

Another mechanism by which WFPBDs work in weight loss is that they are higher in monounsaturated fatty acids (MUFA) and polyunsaturated fatty acids (PUFA) and lower in saturated fats (Tran et al., 2020). Animal sources that are particularly high in saturated fats include butter, cheese, pork, and coffee cream (Najjar & Feresin, 2019). Plant sources high in saturated fats include coconut and palm oil (Freeman et al., 2017). Monounsaturated oils include olive, canola, and sunflower oils. Polyunsaturated oils include soybean, corn, and sunflower oils (Freeman et al., 2017). A cross-over study lasting four weeks among overweight and obese individuals showed that increased content of saturated fats led to a weight gain of 0.6 kg, whereas consumption of monounsaturated fats led to a weight loss of 1.6 kg (Najjar & Feresin, 2019).

Individuals should strive to keep their fat intake within the recommended daily allowance (RDA) of 25 to 35 percent of daily calories and saturated fats less than 10% of daily caloric intake (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2020). Most studies involving a WFPBD program instruct participants to eat a low-fat diet much below the RDA and to keep oils to a minimum or not use them at all (Campbell et al., 2019; Kahleova et al., 2019; Kahleova et al., 2020; Kahleova, Dort, et al., 2018; Wright et al., 2017). In summary, individuals who understand the mechanisms by which a plant-based diet work and put them into practice will likely experience great results and stick to it in the long run.

Effects of a Plant-based Diet on Cardiovascular Status

Perhaps one of the most studied effects of plant-based diets is on the cardiovascular system. Many years ago, renowned cardiologist, Caldwell Esselstyn,

stunned the medical community when he showed that heart disease could be reversed on a plant-based diet (Esselstyn, 2017). Since then, numerous studies have been conducted in this area and have added to the wealth of knowledge on this topic. Despite this knowledge, CVD is still the number one killer in the U.S., of which obesity is a major risk factor (Ahmad & Anderson, 2021). To appreciate the impact of a plant-based diet on CVD, we must first understand the role of BMI in the development of heart disease and the impact of the western diet on CVD. We will then discuss the impact of a plant-based diet on CVD risk as well as its effects on lipid levels.

BMI and CVD

Persons with higher BMI levels are at risk for dyslipidemia which sets the stage for the development of CVD (Arnett et al., 2019; Jensen et al., 2014). Csige et al. (2018) discusses that obesity is considered an inflammatory disease which can lead to atherosclerosis, which is the underlying factor in many cardiovascular diseases. Adipose tissue sets off an inflammatory process in the body, which gives rise to endothelial damage, insulin resistance, a hypercoagulable state, and in turn, fuels the atherosclerotic process. Persons with a high BMI tend to have more atherosclerotic lesions and are at a greater risk for coronary artery disease and myocardial infarction. The higher the BMI, the greater the risk of myocardial infarction (Csige et al., 2018).

The Western Dietary Pattern and CVD

Dietary intake is a major factor affecting cardiovascular status. A western dietary pattern that is high in saturated fats, cholesterol, refined carbohydrates, red meat, and processed meats and low in intake of plant foods is linked to both the development and progression of coronary artery disease (Oikonomou et al., 2018; Satija et al., 2017).

Diets high in saturated fats increase LDL and triglyceride levels, whereas diets low in saturated fats but higher in PUFAs and MUFAs lower LDL and triglyceride levels (Sacks et al., 2017). Moreover, animal-based products and processed meats are high in heme-iron, sodium, nitrites, and nitrates, which tend to increase cardiovascular risk and cause endothelial damage and insulin resistance (Satija & Hu, 2018). Animal-based products also contain L-carnitine, which gets broken down to trimethylamine N-oxide (TMAO), a substance that is linked to inflammation and the development of atherosclerosis (Najjar & Feresin, 2019; Satija & Hu, 2018). For these reasons, persons with CVD and those wanting to prevent CVD should stay clear of the western dietary pattern as much as possible.

Plant-based Diets and Risk of CVD

Many studies show that plant-based diets are effective at decreasing the risk of CVD. Freeman et al. (2017) noted that studies involving Seventh-day Adventists showed a lower risk of coronary heart disease and stroke among vegetarians compared to non-vegetarians. This study also noted that CVD is rarely seen in populations that predominantly eat a plant-based diet, including the Okinawans, the central Africans, and the New Guinea Papua Highlanders. A cohort study conducted by Kim et al. (2019) showed that middle-aged adults who followed a predominantly plant-based diet experienced a 16% lower risk of cardiovascular disease. They also experienced a 31-32% lower risk of mortality from CVD and an 18-25% lower risk of all-cause mortality.

A 12-year cohort study by Baden et al. (2019) found that every 10-point increase in healthy plant-based foods was associated with a 10% decrease in total mortality risk and a 9% decrease in death from CVD. On the contrary, with every 10-point increase in

unhealthy plant foods such as refined grains and sugar-sweetened beverages, there was a 9% increase in total mortality risk and an 8% increase in CVD mortality (Baden et al., 2019). Thus, the evidence is strong on the effectiveness of plant-based diets to decrease the risk of CVD and morbidity and mortality.

Plant-based Diets and Lipid Levels

When looking at lipid levels, plant-based diets offer a major advantage over omnivorous diets. Plant-based diets positively affect lipid levels, especially total cholesterol and LDL. A systematic review and meta-analysis by Yokoyama et al. (2017) showed that in observational studies, individuals on a vegetarian diet experienced a significant decrease of 29.2 mg/dL in total cholesterol (TC) levels and a decrease in LDL levels by 22.9 mg/dL. In clinical trials, vegetarians experienced a mean reduction in total cholesterol by 12.5 mg/dL, a decrease in LDL by 12.2 mg/dL (Yokoyama et al., 2017). In a study by Campbell et al. (2019), participants experienced a significant decrease of 25.2 points in total cholesterol and a mean decrease of 15.3 mg/dL in LDL levels over an eight-week period. In another study by Najjar et al. (2018), participants experienced a total cholesterol reduction of 33.8 mg/dL and a decrease in LDL by 24.6 mg/dL. Participants in the BROAD study experienced a drop in total cholesterol and LDL of 0.9 mmol/L each over a twelve-week period (Wright et al., 2017). This is equivalent to 34.8 mg/dL each. In a one-week study by Schwartz et al. (2020), participants experienced a decrease in total cholesterol by 20.40 mg/dL, an average decrease in LDL by 11.71 points. This study showed that even a short change in lifestyle intervention measures could have a dramatic impact on lipid levels.

One phenomenon that is observed in most plant-based diet studies is that HDL tends to decrease when it should be increasing. Higher HDL level (greater than 40 in men and greater than 50 in women) is protective against CVD, so it is baffling as to why HDL levels drop on a plant-based diet (Kent et al., 2018; J. S. Lee et al., 2017). According to guidelines from the AHA/ACC/TOS, HDL levels should increase by 2-3 mg/dL for weight losses of 5 kg to 8 kg (Jensen et al., 2014). However, in many of the studies previously cited, it is noted that as individuals move towards a more plant-based diet, they experience a drop in HDL levels even though they experience overall improvements in other biometric markers for CVD. In these studies, the decrease in HDL levels was in the range of 2.4-8.8 mg/dL depending on how high their baseline cholesterol levels were (Campbell et al., 2019; Najjar et al., 2018; Remy et al., 2017; Schwartz et al., 2020; Yokoyama et al., 2017). A systematic review and meta-analysis study from 2009 showed that interventions used to increase HDL levels did not result in decreased mortality or morbidity from CVD. A more recent double-blinded RCT study showed that the use of the drug Evacetrapib did well in increasing HDL levels by 133.2% but did not result in a lower risk of cardiovascular events among persons with a high-risk CVD status (Lincoff et al., 2017). These studies indicate that while having an appropriate HDL level is a good thing, it may not be the most important factor in mitigating cardiovascular risk. On the contrary, the ACC/AHA places greater emphasis on decreasing LDL levels among high-risk patients rather than increasing HDL levels (Arnett et al., 2019).

While consuming a plant-based diet, triglyceride levels may fall but not significantly (Yokoyama et al., 2017). Triglycerides were only reduced by an average of

10.2 mg/dL in the Campbell et al. (2019) study and 6.5 mg/dL in observational studies per Yokoyama et al. (2017). However, in the one-week study by Schwartz et al. (2020), triglycerides significantly decreased by an average of 31.7 mg/dL.

A high triglyceride level, which is defined as a level of over 150 mg/dL, is linked to a higher risk of cardiovascular disease (J. S. Lee et al., 2017). Factors that raise triglyceride levels include high intakes of saturated fats, fructose, refined carbohydrates, and alcohol (Scordo & Pickett, 2017). Kent et al. (2018) suggested that the reason that triglyceride decrease is not always significant on a plant-based diet may be due to individuals increasing their carbohydrate intake. These studies suggest that perhaps individuals would gain a greater advantage in their triglyceride levels if instructions given to them emphasized attention to eating more complex carbohydrates and lowering intakes of refined sugar and alcohol.

In summary, the studies demonstrate that a WFPBD has a positive effect on preventing CVD, decreasing mortality and morbidity from CVD, and overall causes significant changes in TC and LDL levels. A WFPBD is low in saturated fats and cholesterol and high in fiber and other nutrients that serve as protective factors for the cardiovascular system (Yokoyama et al., 2017).

Effects of a Plant-based Diet on Blood Pressure

Hypertension affects about 32-36% of the adult population in America and is primarily attributed to diet and lifestyle choices (Buttaro et al., 2017; Domino, 2022). According to Cohen (2017), hypertension is a significant risk factor for CVD. Excess adipose tissue causes endothelial damage and increases the number of inflammatory markers in the blood, including “C-reactive protein, erythrocyte sedimentation rate, and

plasminogen-activator inhibitor 1, as well as inflammatory cytokines such as tumor necrosis factor-alpha and interleukin-6” (Cohen, 2017, p. 2). This inflammatory condition sets the pace for the development of hypertension. In addition, excess adipose tissue affects the normal function of the renin-angiotensin system, thereby contributing to the development of hypertension (Cohen, 2017).

A plant-based diet has been shown to be very effective against hypertension, possibly by improving vasodilation, decreasing blood viscosity, and providing anti-inflammatory effects (Alexander et al., 2017). In the Schwartz et al. (2020) study, participants had an average decrease in SBP of 6.7 mmHg and DBP of 5.00 mmHg from baseline to one week. In the Najjar et al. (2018) study, patients observed a 16.6 mmHg drop in SBP and a 9.1 mmHg drop in DBP from baseline to 4 weeks. A systematic review with a trial sequential analysis and meta-analysis by K. W. Lee et al. (2020) found that vegetarian diets were associated with lower systolic and diastolic blood pressure compared to meat-based diets. On the contrary, a meta-analysis of RCTs by P. D. Lopez et al. (2019) found that a vegan diet was had no significant changes in SBP or DBP compared to diets that were less restrictive. However, in persons with a baseline SBP at or above 130, there was a mean decrease of 4 mmHg in both systolic and diastolic BP (P. D. Lopez et al., 2019).

A diet rich in fruits, vegetables, and whole grains and low in saturated fats plays a significant role in decreasing blood pressure. According to Arnett et al. (2019), individuals following this dietary pattern have the potential to decrease their SBP by 11 mmHg and DBP by 3 mmHg in the long run. However, for greater reductions in BP, individuals must pay attention to other vital precautions. Decreasing sodium intake to

less than 1500 mg is associated with a drop in SBP of 5-6 mmHg and DBP of 2-3 mmHg. A potassium-rich diet of 3500-5000mg/day can also result in a SBP reduction of 4-5 mmHg and a reduction of DBP of 2 mmHg. Other factors associated with lower BP include weight loss, increased physical activity, and low consumption of alcohol, defined as less than two drinks per day for men and less than one drink per day for women (Arnett et al., 2019).

Overall, studies show that persons who consume a plant-based diet do experience significant changes in their systolic and diastolic blood pressure. A plant-based diet that is rich in whole grains, fruits, vegetables, and legumes contributes to lower BP (Joshi et al., 2020). Individuals should be careful to follow additional precautions of lower sodium intake, potassium-rich foods, and less alcohol intake for a greater advantage in reduction of BP.

Adequate Consumption of Plant Foods

It is vital for individuals to ensure that they are getting enough nutrients from plant foods in order to reap the benefits of a plant-based diet. A healthy eating pattern includes an adequate number of fruits, vegetables, grains, and protein. The American Heart Association (2021a) recommends consuming at least six servings of grains per day, and at least half of those grains should be whole grains. The recommendations for protein are five and a half ounces per day, and for fruits and vegetables, it is two servings of fruits and two and a half servings of vegetables (American Heart Association, 2021a). The American Institute for Cancer Research, the American Heart Association, and the United States Department of Agriculture state that fruits and vegetables should take up

half of one's plate (Hever & Cronise, 2017). This ensures adequate consumption of potassium, magnesium, fiber, iron, folate, and vitamin C and A (Hever & Cronise, 2017).

Wang et al. (2021) compared fruit and vegetable intake among participants from two prospective cohort studies. The study found that persons who consumed about five daily servings of fruits and vegetables had a lower mortality risk. The current 2020-2025 dietary guidelines emphasize eating nutrient-dense food such as is found in a variety of fruits, vegetables, and legumes, and decreasing intake of sugars and saturated fats and sodium (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2020).

It is imperative that Americans begin to pay attention to their dietary patterns and reach up to a higher standard. This 12-week plant-based program instructed individuals on the adequate consumption of plant food. It was hoped that those who are not consuming the necessary amounts would increase their intake to improve their weight and overall health status.

Importance of Plant-based Lifestyle Management Programs

This 12-week plant-based, group-based program was guided by recommendations from the United States Preventive Services Task Force (USPSTF), the AHA, the ACC, and TOS, as well as plant-based studies that have been mentioned in this paper.

According to the U.S. Preventive Services Task Force (2018), when it comes to a method of achieving weight loss, there are no guidelines that say that a specific dietary program must be followed. Although there are many weight loss programs, everyone does not have to follow the same program, and the format and length of the program may vary with the organizations presenting it. The behavioral intervention programs considered by

the USPSTF were conducted in many formats, including individual, group, hybrid, and technology-based programs. In the group-based interventions, participants met for anywhere from eight sessions lasting 2.5 months to 23 sessions lasting one year. The group sessions met in classroom-style for one to two hours per week. Successful intensive behavioral should “help people make healthy eating choices, encourage increased physical activity and goal setting, and help people monitor their weight” (U.S. Preventive Services Task Force, 2018).

As noted, before, a plant-based diet is an effective means for losing weight. Many organizations have sought to promote a WFPBD through live-in programs and community education programs. Organizations such as the Pritikin Health Center and the Dr. McDougall Health Center have been very successful in hosting one week to 17-day lifestyle programs (Pritikin Longevity Center, 2021; Schwartz et al., 2020). Guests at these programs participate in daily health lectures, cooking classes, and exercise programs and have been successful in losing weight, lowering their cholesterol levels, reducing high blood pressure, and managing diabetes (Pritikin Longevity Center, 2021; Schwartz et al., 2020). The only drawback to live-in programs is that they are costly, and many people cannot afford them. However, community lifestyle education programs such as the CHIP program are much more affordable and are also very successful. It was hoped that this 12-week online community program would also be effective at reducing BMI, weight, WC, blood BP, and lipid levels.

CHAPTER 3

METHODOLOGY

Project Design

This project used a quasi-experimental one-group pre-test post-test design (See **Figure 2**). The intervention was entitled *The Eat Well, Live Well Program*. The purpose of this project was to exam the effects of a whole food plant-based diet on overweight and obese adults residing in rural northern Michigan. Through a 12-week evidence-based online lifestyle educational intervention, participants were taught the principles of a WFPBD and how to apply these measures to lose weight, lower their risk factors for obesity-related diseases, and manage obesity-related problems. The topics for the program were developed by this project manager using evidence-based guidelines and with assistance from the project chair and other members of the DNP committee. Institutional Review Board approval was granted from Andrews University and from a medical center in Northern Michigan.

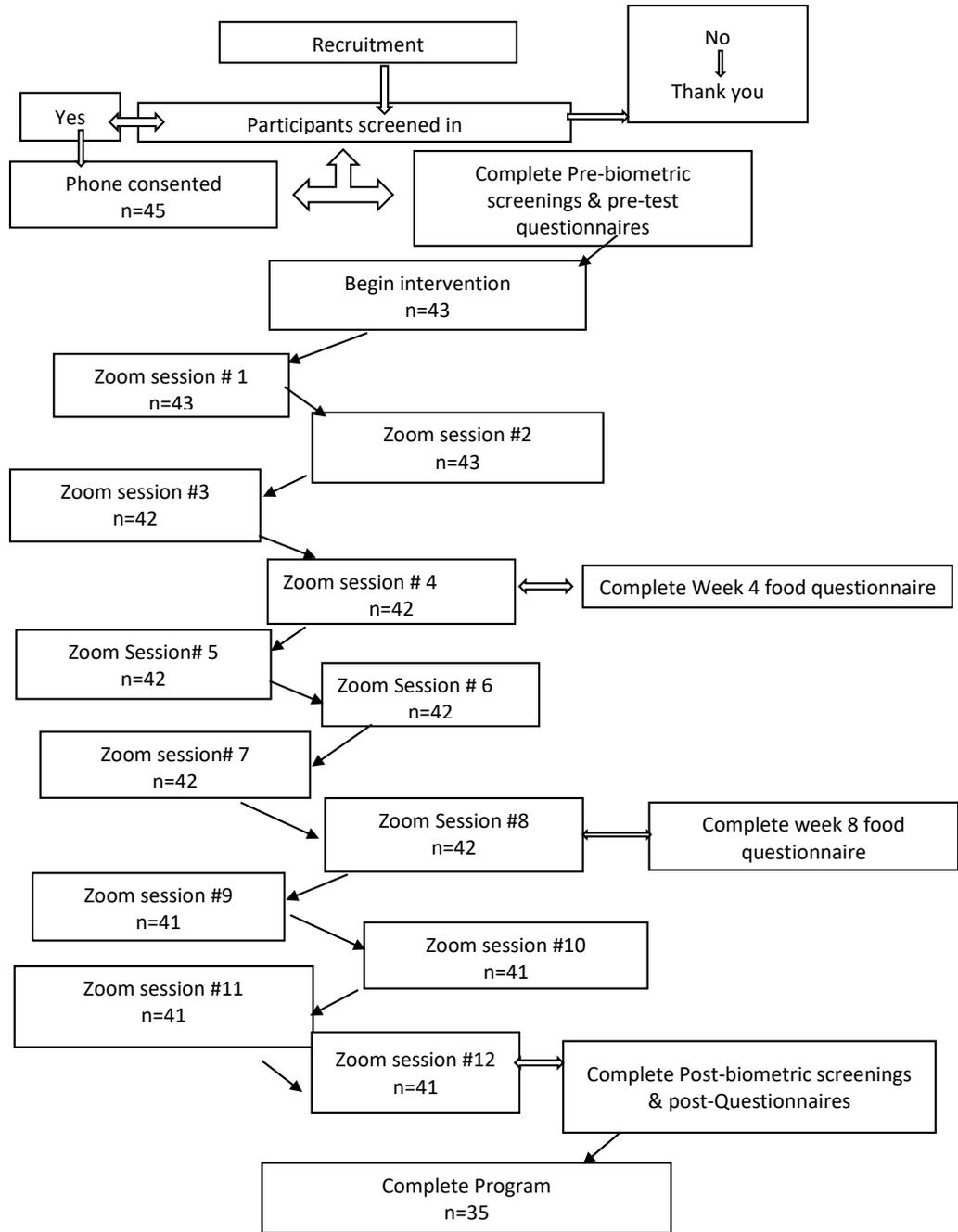


Figure 2. Project Protocol

Project Setting

This project intervention was implemented in an online setting using Zoom technology. Participants were recruited from a local clinic in Crawford County as well as from other sites in northern Michigan. Crawford County is home to a small rural hospital that services Crawford County, Oscoda County, and Roscommon County. According to Munson Healthcare (2019), the hospital provides inpatient, outpatient services, and emergency care services and operates five different clinics located in these counties. The combined population of Crawford, Oscoda, and Roscommon counties is 45,708 as of 2016 statistics. Of the 45,708 persons, 95% are Caucasian, 1.5% are Hispanic/Latino, and Native Americans make up 0.8% (Munson Healthcare, 2019). Initial face-to-face contact with the project manager and the participants to complete biometric measurements occurred at Camp Au Sable, a local Christian camp in Crawford County.

Dependent and Independent Variables

The Independent variable for this project was a 12-week WFPBD educational program. There were two categories of dependent variables that were measured in this project. The first category was biometric measurements. These include FBG, total cholesterol, LDL, HDL, triglycerides, SBP and DBP, weight, BMI, and WC. These measurements were taken before and after the intervention and were based on recommendations from the ACC)/AHA/TOS on the management of overweight and obesity in adults (Jensen et al., 2014).

The second category of measurements were pre- and post-intervention questionnaires. A dietary intake questionnaire was used to evaluate the overall increase in quality of diet over the 12-weeks. To evaluate intake of plant-based foods, the dietary

questionnaire was administered at baseline and at weeks four, eight, and twelve. A second questionnaire was the self-efficacy questionnaire that evaluated participants' confidence level in making healthier food choices.

Tools/Instruments

Weight/Height/BMI/Waist Circumference Measurements

Height and weight were measured using a professional Health-O-Meter mechanical balance beam scale with a height rod (Health-O-Meter by Continental scale corporation, Chicago, IL). Health-O-Meter scales have high accuracy, reliability and are built to last for years (Sales Galore, 2021). Participants were asked to remove their shoes and coats before measurements. Height was measured in inches to the nearest 1/4th inch. Weight was measured in pounds to the nearest 1/4 of a pound and with the scale calibrated to zero before use. There was a 350-pound limit capacity for the scale. BMI was calculated using the English system formula $[\text{weight (lb.)} / \text{height (in)} / \text{height (in)}] \times 703$ from (Buttaro et al., 2017). Waist circumference was measured at the level of the umbilicus using a flexible measuring tape (Michigan Medicine, 2021).

Blood Pressure

Blood pressure was taken manually using the PARAMED professional Aneroid Sphygmomanometer. The Paramed BP device is latex-free and uses a universal adult size (8.7-16.5 in {22-42 cm}) cuff. Aneroid sphygmomanometers have been clinically tested and proven to have a similar accuracy rate as the mercury sphygmomanometer in detecting hypertension (Ma et al., 2009; Shahbabu et al., 2016). Accuracy of the Paramed device was validated by testing it with another aneroid sphygmomanometer.

There was a difference in mean SBP of 2 mmHg and 4mmHg for DBP. For this project, the sphygmomanometer was calibrated to zero, and BP was measured with the arm supported at the level of the heart five minutes after the participant has been seated quietly (Thomas & Pohl, 2021). Participants also sat in a chair with good back support, legs uncrossed, and feet flat on the floor before measurements were taken (Thomas & Pohl, 2021).

Blood Samples

Blood samples for fasting total cholesterol, HDL, LDL, TG, and FBG were obtained using the CardioChek Plus Analyzer. According to Stat Technologies (2019), “the CardioChek Plus Analyzer is “CLIA waived” under the Clinical Laboratory Improvement Amendments of 1988 and CRMLN Certified. The system was simple to use, required minimal training, and is as reliable and accurate as tests offered in a laboratory (Bastianelli et al., 2017; Stat Technologies, 2019). It also meets National Cholesterol Education Program (NCEP) guidelines (Stat Technologies, 2019). To ensure that the CardioChek Plus analyzer was functioning properly, a test with the analyzer check strips was performed before each day of use (PTS Diagnostics, 2018). Quality control testing was also performed when the monitor was received and when new lot numbers was used for lipid and glucose test strips (PTS Diagnostics, 2018). Participants were instructed to fast for 8-12 hours prior to blood draws, as this is indicated for accurate measurements of blood lipids and FBG (MedlinePlus, 2021, March 3).

Questionnaires

Demographic Information. Demographic information collected was age, gender, race, education, income level, and comorbidities (hypertension, diabetes, pre-diabetes, high cholesterol, and heart disease) (**Appendix A**).

Dietary Intake Questionnaire. The 14-Item Mediterranean Diet Adherence Screener (MEDAS) questionnaire was used to measure dietary intake pre-intervention, then again at four weeks, eight weeks, and twelve weeks (**Appendix B**). The MEDAS survey has been used in a number of research studies and shows high internal validity. In the PREDIMED trial by Martínez-González et al. (2012), the score obtained from the MEDAS survey was compared to the score obtained from a standard full-length food frequency questionnaire. There was significant correlation between the two surveys (Pearson correlation coefficient (r) = 0.52; intraclass correlation coefficient = 0.51). A study by García-Conesa et al. (2020) established the validity of the survey across seven countries in Europe. In addition, validation of the MEDAS was also supported by its significant inverse correlation between triglycerides, total cholesterol ratio, fasting glucose, and the 10-year estimated coronary artery disease risk. Papadaki et al. (2018) evaluated the MEDAS survey across the United Kingdom and concluded that it had acceptable reliability and accuracy for assessing adherence to the Mediterranean diet among people at high risk for CVD. Schröder et al. (2011) used the MEDAS tool among Spanish women and men and found it to be a valid tool that can be used in clinical practice.

According to Hornby and Paterson (2013) and Papadaki et al. (2018), the Mediterranean dietary pattern is based mostly on the consumption of whole foods or

minimally processed foods from the categories of fruits, grains, vegetables, fish, legumes, and olive oil. The 14 questions on the MEDAS ask how many servings of items listed were consumed each day or each week. Items consumed include olive oil, fruits, vegetable, butter, sugar, wine, legumes, sweets/pastries, fish, nuts, meats, and pasta/rice. Items are scored by giving a one (1) for yes items and a zero (0) for no items, and scores range from 0-14. A higher number of yes items include a higher adherence to the Mediterranean diet. A score of less than or equal to seven indicated low adherence. Scores higher than seven indicated higher adherence (Marinez-Gonzales, 2012). A higher score on this survey is associated with a lower risk of all-cause mortality and cardiovascular disease (Hornby & Paterson, 2013; Papadaki et al., 2018). This survey was chosen for this project because, except for the meat and fish, the Mediterranean dietary pattern is closely related to the WFPBD eating pattern. For this project, each question was analyzed to assess improvement in overall dietary patterns. We compared pre- and post-mean scores on the MEDAS. Each individual question was also analyzed for frequency of yes and no items at baseline, four weeks, eight weeks, and 12 weeks.

Self-efficacy Questionnaire. The Eating Habits Confidence (EHC) survey was used for this project to assess self-efficacy (**Appendix C**). This EHC survey was developed by Sallis et al. (1988), who, prior to the EHC, developed the Self-efficacy for Eating Behaviors Scale (SEEBS), which was a longer version of the EHC questionnaire. The EHC has been used in many research projects (though in a modified format) to measure eating behaviors across a variety of populations. Nothwehr and Peterson (2005) used the EHC as a part of a study that assessed weight management strategies and attitudes among Midwestern adults. Resnicow et al. (2001) used the EHC among African

American adults to assess self-efficacy for eating more fruits and vegetables. A more recent study on the EHC by Decker and Dennis (2013) found the internal consistency of the EHC to have an alpha coefficient of 0.83. A doctoral study by Grizzle (2009) reported an internal consistency by Cronbach's alpha coefficient to be 0.94. A study by Bani-Issa et al. (2020) showed strong internal consistency with Cronbach's $\alpha = .83$.

According to Decker and Dennis (2013) and Sallis (2021), the EHC has a total of 20 questions that are divided into four subscales: sticking to it (items 1-5), reducing calories (items 6-10), reducing salt (items 11-15), and reducing fat (items 16-20). Each question is scored on a Likert scale of 1-5. For example, 1= I cannot, 3= maybe I can, and 5= I know I can. Any question that is left blank or marked as "does not apply" is coded as data that is missing. The survey should be scored by calculating the total score in each subscale which would give a total score between 1-100 (Decker & Dennis, 2013; Sallis, 2021). Higher mean scores indicate higher self-efficacy, and lower mean scores indicate lower self-efficacy. A comparison was made between pre- and post-scores.

Population and Sample

Convenience and snowball sampling method was used for this project. With a 20% attrition, the minimum sample size needed to detect any significant changes in the dependent variables following our intervention was estimated to be $27 / (1-0.2) = 34$ by using the G*Power software and assuming a probability of error (p-value) of 0.05, a power of 0.8 (80%), and a medium effect size. Although only 34 participants, were needed for the sample size, this project aimed to recruit up to 50 persons. The target population for this project were male and female adults over the age of 18 based on recommendations from the USPSTF (U.S. Preventive Services Task Force, 2019).

Inclusion criteria was BMI of 25 or over, willingness to try a plant-based diet, not currently on a 100% WFPBD, have a primary care provider (PCP), have internet access, and have a smartphone, mobile device, or a computer.

Exclusion criteria was weight over 350 pounds, breastfeeding, currently smoking, current alcohol abuse, or current illicit drugs. The 350-pound weight limitation was due to the incapacity limit of the scale to 350 pounds. Pregnancy and breastfeeding are two times in a woman's life when losing weight is not a goal (Buttaro et al., 2017). The focus is on gaining or maintaining adequate weight to nourish a growing fetus or child. Smoking, alcohol abuse, and drug abuse are addictive behaviors that require separate interventions that are beyond the scope of this project (Buttaro et al., 2017). Having a PCP was required because this project required biometric measurements and the results of these measurements may have necessitated the care of a medical practitioner. Also, it is not uncommon for individuals who begin a WFPBD to need their chronic medications lowered or stopped as they progress through the program, which may require the PCP to adjust (Campbell et al., 2019; Schwartz et al., 2020).

Recruitment

Recruitment began four weeks before the program was scheduled to start. Participants were recruited from the clinic in Crawford County as well as the surrounding communities in northern Michigan. Participants were encouraged to invite their friends and family members to join (snowball technique). Individuals from other areas in northern Michigan who wished to participate were allowed to do if they are able to meet the project manager to have biometric measurements taken.

The project manager developed an advertisement flyer that included information about the program, including dates, components of the program, inclusion and exclusion criteria, the deadline for registering, and contact information (**Appendix D**). The project manager emailed a letter (**Appendix E**) with a suggested script (**Appendix F**) to the PCPs in the clinic regarding the program and encouraged them to have their patients sign up. If they expressed interest in telling their patients about it, they were given information flyers to hand out to their patients and to speak to them about the program. If the patient was interested, the provider asked the patient to contact the project leader. The flyers were also placed in the clinic lobby and hospital advertisement boards so that anyone could take a copy. The program was also advertised by word of mouth and through local grocery stores, churches, gyms, and health food stores. Facebook advertising and radio advertising were also utilized (**Appendix G**).

When individuals contacted the project manager, they were given a detailed explanation about the program and given the opportunity to ask questions. If they expressed an interest in joining the program, the project manager recorded their names, email addresses, and phone numbers and assigned them an identification code. The consent form was also reviewed, and a verbal consent obtained. Arrangements were then made to meet the project manager at Camp Au Sable to sign the consent form (**Appendix H**) and to have their initial biometric measurements completed. During the meeting for biometric measurements, participants were invited to sign the consent form. They were also supplied with a binder that included a table of contents, a syllabus, and week to week articles that coincided with the subject presented for that week. After the initial meeting

they were emailed a link to Class Climate, where they were able complete the dietary and self-efficacy questionnaires before the program began.

Participants were instructed on the importance of working with their PCP during the program, especially if they were taking medications. Participants who were not recruited directly from the clinic had to voice to the project manager that they had a PCP. A letter to their PCP was included in their binder. They were instructed to give the letter to their PCP to make them aware that they were participating in a health program and that they may need to have their medications monitored while they were in the program (Appendix I).

Definition of Participation

The definition of participation in this project is summed up in **Table 1**. Each participant who completed the program was given a \$25 gift certificate to shop at Nature’s Nest Health Food Store at Camp Au Sable and was entered in a drawing to win an Instant pot.

Table 1

Criteria for Completion of the Eat Well, Live Well Program

Items	Criteria for Completion
1	Complete consent form
2	Complete pre-test questionnaires: Demographic Information, MEDAS, EHC
3	Complete pre-test biometric measurements
3	Attend at least 9 of 12 Zoom meetings or watch recorded Zoom presentations if unable to attend.
4	Complete 8 out of 12 quizzes.
5	Complete post-test questionnaires: MEDAS, EHC
6	Complete post-test biometric measurements

Intervention/Implementation

The intervention was a 12-week online educational program that was delivered through live Zoom presentations (See **Figure 1**). Participants met on Zoom with the project manager once per week for 12 weeks for 1-2 hours each time. Twelve topics were covered dealing with getting proper nutrients on a plant-based diet, exercise, sleep, eating out, and complications of obesity, along with prevention and management with a plant-based diet. The lectures were presented by various speakers, including the project manager, doctors, a registered dietitian, a nurse practitioner, and a nutritionist. Cooking demonstrations by a plant-based chef was also done at various times throughout the program. The Zoom meetings were recorded so that if a participant could not attend a meeting, they were able to still watch the recording. The video recording was sent through Panopto, an online platform that allowed the project manager to see if participants had watched the videos and how long they viewed the video. A lesson plan outline in **Appendix J** gives a complete description of the topics and content of the program from weeks 1-12.

The weekly Zoom meetings provided an opportunity for the project manager to assess how the participants were doing throughout the program. Each week, discussions were held regarding progress and setbacks experienced and encouragement was given to continue the path they had started. On various weeks, Zoom breakout sessions were held in which the participants were divided into small groups of 4-6 persons. This provided an opportunity for them to get to know and encourage each other. During some weeks, after the lecture was presented, short testimonial video clips were shown of individuals who were able to manage their disease conditions with a plant-based diet. Participants were

also encouraged to make weekly SMART goals, which according to Burgess et al. (2017), is an important aspect of helping individuals to be successful at lifestyle interventions to lose weight.

During some weeks, participants were invited to share pictures of dishes they had prepared during the week. They were also be invited to send the recipe to the project manager to be emailed to the rest of the group. The project manager also provided recipes to participants to assist them in meal planning and developing a plant-based recipe profile. Participants were encouraged to contact the project manager with any questions or concerns. The project manager also emailed participants on a weekly basis to encourage and to remind them about upcoming assignments for the week. A priority of the project manager was also to personally contact each participant on a weekly to biweekly basis (either by email, text message or telephone call) to discuss how they were doing, along with struggles and successes they were facing and to answer any questions they had.

The duration of this program and the number of sessions per week were based on guidelines from the USPSTF. The group-based interventions evaluated by the USPSTF in which persons attempted to lose at least 5% of their body weight lasted anywhere from 2.5 months to one year with anywhere from 8-23 sessions total (U.S. Preventive Services Task Force, 2019). Many groups also met weekly for 1-2 hours (U.S. Preventive Services Task Force, 2019). Due to the limited time frame for this project, the program was conducted over a 12-week period. Most of the studies involving community lifestyle programs vary in length from 8-20 weeks, and in all cases, participants

experienced positive outcomes (Campbell et al., 2019; Jakše et al., 2017; Kahleova et al., 2020; Kahleova, Fleeman, et al., 2018; Wright et al., 2017).

During the 12-week period, participants were taught how to transition to a plant-based diet. Participants learned the principles of the plant-based diet from week to week and were encouraged to make as many changes as they could towards healthier eating habits. The *PowerPlate* method and the *Whole-food Plant-based Plate* were used as visual guides to educate participants about a healthy plant-based diet. The *PowerPlate* method was developed by the Physicians Committee For Responsible Medicine (n.d.–b) and helps individuals to have a visible reminder of what to include on their plate. It is similar to *MyPlate*, which includes the food categories of fruits, vegetables, grains, protein foods, and dairy (U.S. Department of Agriculture, n.d). According to the Physicians Committee For Responsible Medicine (n.d–a), the *PowerPlate* omits all animal products and emphasizes the four food categories of fruits, grains, legumes, and vegetables. The *Whole-food Plant-based Plate* was developed by the American College of Lifestyle Medicine (ACLM) and is very similar to the *PowerPlate* Method.

Project Timeline and Evidence for Intervention Topics

One-Two Weeks Pre-Intervention

The project manager met with participants to have their biometric measurements taken and finalized the completion of consent forms and questionnaires. A mock Zoom meeting was held three days before the first scheduled Zoom meeting to make sure participants knew how to use Zoom. All participants were emailed the Zoom link.

Week One

This introductory meeting gave participants the opportunity to get to know each other and all the presenters during the program. The topic *Introduction to A Plant-based Diet* was chosen to help participants understand right away what a whole food plant-based diet is all about and that they can get adequate nutrients on a plant-based diet. The topics for this project are based on published guidelines and also modeled after other studies that have been published using a WFPBD as an intervention (Arnett et al., 2019; Kahleova et al., 2020; Wright et al., 2017).

During this week, participants were asked to watch the documentary *Fork over Knives*. If they were unable to watch it that week, they were still encouraged to watch in the following week. *Fork Over Knives* is a video documentary that discusses in-depth the benefits of a plant-based diet. In the video, Dr. Esselstyn tells of his experience treating his heart patients with a plant-based diet, and Dr. Campbell recalls his research involving plant foods and their effects on different populations. The video also features individuals who tell of their experience managing their chronic diseases with a plant-based diet (Forks Over Knives, 2021).

Weeks Two

The topic for this week was *The Role of Fiber in Weight Control*. The rationale for this topic is that getting adequate fiber is one of the key mechanisms of how a plant-based diet works. As stated in the literature review section, one reason that the plant-based diet works so well with weight loss is that it is very high in fiber. A high intake of fiber tends to cause less hunger, increased satiety, and reduced energy intake, thus resulting in weight loss (Kahleova, Dort, et al., 2018; Tran et al., 2020). This topic is also

in line with recommendations for the AHA/ACA for increased intake of insoluble and soluble vegetable fiber as it plays a part in decreasing all-cause mortality (Arnett et al., 2019).

Week Three

The topic for his week was *The Grocery Store Tour: Shopping for Healthy Foods*. Jung et al. (2019) found that grocery store tours helped to increase participants' attitudes, perceived behavioral control, and intention to eat different types of fruits and vegetables. The grocery store or supermarket is an ideal location to shop for many Americans, and it is, therefore, an ideal place to offer nutrition education (Jung et al., 2019). During this presentation, we discussed and showed pictures of how to stock the pantry with wholesome foods and how to find healthy foods in different sections of the supermarket.

Week Four

The topic of this week was *Replacing Meat & Dairy*. Oikonomou et al. (2018) noted that the current standard American diet consists primarily of high intakes of refined carbohydrates, red meat, and saturated fats, and low consumption of fruits and green leafy vegetables. This topic was essential to help participants know their options if they choose not to have meat or dairy. Educating on meat and dairy replacements is also in line with the AHA/ACC recommendations that all Americans should eat a diet rich in fruits, vegetables, whole grains, nuts, and lean vegetable protein (Arnett et al., 2019).

Week Five

The topic for this week was *Management of Obesity on A Plant-Based Diet*. Participants learned essential strategies in managing obesity with a plant-based diet, especially the concept of caloric density. As obesity is a central theme of this project, it was essential that participants be educated on the definition of obesity and the complications that may arise from it. Recommendations from the AHA/ACC/TOS state that obese and overweight adults should be taught that the greater their BMI and waist circumference, the greater their risk for type 2 diabetes, CVD, and all-cause mortality (Jensen et al., 2014).

Week Six

The topic for this week was *Complications of Obesity: Type 2 Diabetes*. According to the Centers for Disease Control and Prevention (2020, November 3), greater than 34 million people in the United States have diabetes, and more than 88 million people are prediabetic. Of the 88 million prediabetics, 90% of them do not know they are prediabetic. Being overweight or obese are risk factors for prediabetes and diabetes (Centers for Disease Control and Prevention, 2020, November 3). The ACC/AHA recommends that individuals with type 2 diabetes should try to lose weight and achieve better glycemic control (Arnett et al., 2019). A vegetarian/vegan diet has been recognized by the ACC/AHA as a way to achieve these goals, as it emphasizes the intake of whole grains that are rich in fiber and discourages intake of refined carbohydrates (Arnett et al., 2019). This topic on diabetes is essential and is included in most lifestyle education programs, including CHIP (Lifestyle Medicine Options, 2019), the Wright et al. (2017) study, and the Kahleova et al. (2020) study.

Week Seven

The topic for this week was *Complications of Obesity: High Blood Pressure*. According to Cohen (2017), hypertension is a significant risk factor for cardiovascular disease, and overweight and obese individuals are more at risk for developing hypertension. A plant-based diet has been shown to be effective at decreasing blood pressure and is a topic presented in the CHIP program (K. W. Lee et al., 2020; Lifestyle Medicine Options, 2019; Schwartz et al., 2020). The ACC/AHA recommends that adults with elevated blood pressure, diagnosed hypertension, and those requiring medications, non-pharmacological interventions should be practiced such as weight loss, sodium restrictions, increase in dietary potassium, following a healthy heart diet, limiting alcohol, and increasing physical activity (Arnett et al., 2019). These measures were taught during this week.

Week Eight

The topic for this week was *Complications of Obesity: Heart Disease*. CVD is the number one killer in the U.S. According to Csige et al. (2018), persons with a high BMI tend to have more atherosclerotic lesions and are at a greater risk for coronary artery disease and myocardial infarction. The higher the BMI, the greater the risk for a myocardial infarction (Csige et al., 2018). A plant-based diet has been shown to decrease the risk of heart disease as well as decrease mortality and morbidity from heart disease (Freeman et al., 2017; Kim et al., 2019). This topic was essential in order to educate individuals on how to prevent and manage heart disease.

Week Nine

The topic for this week was *Exercising for Health*. While this project emphasizes diet as the main management of obesity and does not measure exercise, it is important to note that exercise is a major component of any weight loss program and is not to be neglected. The USPSF recommends increased physical activity as a strategy to reduce BMI (U.S. Preventive Services Task Force, 2019). Since this project was focused on the effects of a plant-based diet, participants were asked not to change their exercise routines as yet. Nevertheless, they were taught exercise recommendations and encouraged to adopt an exercise routine as a next step beyond this program.

Week Ten

The topic for this week was *Managing Stress*. According to van der Valk et al. (2018), stress may be a critical factor in the development and sustenance of obesity in certain persons. An increased amount of stress has been directly linked to increased consumption of sugar, fat, high-calorie foods, decreased sleep, and decreased physical activity (Tomiyama, 2019). It was therefore essential that participants be educated on some stress management techniques in this program.

Week Eleven

The topic for this week was *Dining out and Eating with Family*. Since dining out at restaurants, parties, and workplaces may be a challenge to sticking to a healthy diet, it was vital that participants receive some education on how to better manage these situations. Since participants may have spouses and other family members living in the same household who do not eat a plant-based diet, it was also vital that we discuss how to include family members in their health journey.

Week Twelve

The event for this week was *Graduation*. Participants were provided with information regarding various plant-based resources such as books, cookbooks, websites, podcasts, movies and lifestyle programs. Participants were acknowledged for their accomplishments throughout the program and were given an opportunity to share with the group their experience during the program. A graduation ceremony was integrated into the Wright et al. (2017) study, and it seemed appropriate also to have one for this program. At the end of this program, participants were reminded to set up appointments for their post-biometric measurements if they had not already done so. A general email was also sent out with the link to complete the post-questionnaires.

Confidentiality

Participants' confidentiality was maintained throughout this project. When the participant contacted the project manager and stated that they would like to join the program, they were assigned an identification (ID) code prior to collecting any data. The only identifying information collected was their name, phone number, and email address. Email addresses were used only to communicate with participants, and send weekly educational handouts, and recipes. Telephone numbers were used to communicate with participants as needed. A separate participant spreadsheet file that matches the ID code with the participant's name, phone number, and email addresses was kept on a password-protected computer that only the project manager could access. A separate spreadsheet was also created, which had the participant's ID code and kept a record of their attendance at the zoom sessions, quizzes completed, videos watched, biometric screening completed, and the questionnaires filled out. This record aided the project manager to

know which participants met the criteria for completion of the program and eligibility for the gift certificate and drawing to win an Instant Pot.

Questionnaires were sent through Class Climate, a survey platform utilized by Andrews University. Participants were asked to enter their ID code instead of their name on the questionnaire. For biometric screenings, all data was entered onto a spreadsheet using the participant's ID number. The spreadsheet was used for data analysis. All participant personal identification data and recorded videos will be destroyed at the completion of the project. Consents were uploaded to a file on a secure password-protected computer that only the project manager could access. Consents will be destroyed after three years.

Zoom was used as the platform to meet with participants weekly. According to Zoom Video Communications (n.d.), there are several ways to secure Zoom meetings and these were utilized during the sessions. First, a meeting password was used to prevent unwanted guests from joining. Participants were required to enter this password before entering the meeting. Secondly, a waiting room was enabled to control who joins the meeting and when. Participants were not able to join the meeting before the host. Lastly, during the meeting, screen sharing was disabled to everyone except the presenter (Zoom Video Communications, n.d.).

Internal Validity

This project has sought to ensure internal validity by careful consideration of the inclusion and exclusion criteria, such as not including individuals who smoke or who are already on a 100% plant-based diet, as these can skew the results of the project. The instruments and techniques used to measure the dependent variables were also chosen

carefully to ensure precise measurements each time. Also, the accuracy of the data analysis was enhanced using a trusted and reliable data analysis program and a very experienced statistician. We sought to avoid bias by a broad inclusion criterion and by recruiting from the general population.

Data Analysis

The Statistical Package for Social Science (SPSS) version 27 was used for data analysis for this project. Descriptive statistics, including means for continuous demographic variables and frequencies for categorical variables, were computed. The paired sample t-test was used to measure pre-and post-intervention group differences in the dependent variables. It was planned that a one-way analysis of variance (ANOVA) would be used to compare post-intervention means between demographics with three or more categories, but we found that the paired sample t-test was sufficient for comparisons. Pearson's Chi-square was also used to compare pre and post-intervention frequencies on the MEDAS.

CHAPTER IV

RESULTS

The purpose of this project was to exam the effects of a WFPBD diet on overweight and obese adults residing in rural northern Michigan. The recruitment process began after IRB approvals were obtained (see **Appendix O**). Consents were signed, data was collected, participants completed the 12-week program, and then data analysis was completed. Forty-five people met the qualifications to begin the program, but two did not show up for pre-biometric measurements. Of the 43 participants that started the program, 35 met the completion requirements (see **Figure 2**). Of the eight people who dropped out after the program began, three persons dropped out due to personal or family issues, and the remaining five were not able to attend the required number of Zoom meetings or complete the required quizzes or show up for the post-biometric measurements. This chapter provides results for demographics, pre and post weight, BMI, WC, BP, FBG, total cholesterol, LDL, HDL, triglycerides, self-efficacy questionnaire, and the food questionnaire.

Demographics

Demographics collected were age, gender, race, education, income, and health condition. A summary of demographics is in Table 2. A total of 43 persons started the program. The mean age for participants was 54.92 (SD=12.09) (range 34-75 years). For gender, 10 (23.3%) were male, and 32 (76.2%) were female. One participant did not disclose this information. In the Race category, most participants were Caucasians

(90.5%), and 7.1% were Native American or American Indian. One participant (2.4%) identified as other, and one participant did not disclose. In the education category, 4.7% had less than a high school education, 9.3% had only a high school education, 34.9% had some college education, 23.3% had an undergraduate degree, and 27.9% had a graduate degree. One participant did not disclose their education. The largest income representation was \$50,000 to \$74,999 per year (35.7%), followed by \$35,000-49,000 per year (21.4%). In the health conditions category, 23.3% were pre-diabetic, 26.7% had diabetes, 23.3% had high blood pressure, and 26.7% had high cholesterol levels. Thirteen persons (30.2%) did not disclose their health information.

Table 2*Demographics of Project Participants (n=43)*

Characteristics	<i>n</i>	(%)	<i>M (SD)</i>
Gender			
Male	10	(23.3)	
Female	32	(76.2)	
Race			
Caucasian	38	(90.5)	
Native American or American Indian	3	(7.1)	
Other	1	(2.4)	
Education			
Less than high school	2	(4.7)	
High School	4	(9.3)	
Some College	15	(34.9)	
Undergraduate Degree	10	(23.3)	
Graduate Degree	12	(27.9)	
Income			
Less than \$20,000	7	(16.7)	
\$20,000-\$34,999	5	(11.9)	
\$35,000-\$49,999	9	(21.4)	
\$50,000-\$74,999	15	(35.7)	
\$75,000-\$99,999	4	(9.5)	
Over \$100,000	2	(4.8)	
Health Condition			
Pre-diabetes	7	(23.3)	
Type 2 Diabetes	8	(26.7)	
High blood pressure	7	(23.3)	
High cholesterol	8	(26.7)	
Age	41		54.92 (12.09)

Biometric Measurements

Table 3 summarizes the biometric measurements of the 35 persons who completed the 12-week program, except for LDL levels which were only reported on 32 persons. Tables 4 and 5 summarize the comparison of overweight and obese individuals in the areas of BMI and WC.

Table 3*Biometric Measurements and Self-Efficacy, Pre- and Post-Intervention*

Variables	Pre-test		Post-test		t-test	p	d
	M	SD	M	SD			
Fasting Blood Glucose	104.4	15.967	99.46	14.952	t(34) = 2.174	.018*	0.387
Total Cholesterol	182.49	49.955	168.51	52.947	t(34) = 2.248	.016*	0.380
Low-Density Lipoprotein	103.94	41.292	93.91	41.465	t(31) = 1.784	.042*	0.315
High-Density Lipoprotein	49.11	13.907	48.51	15.157	t(34) = 0.515	.305	
Triglyceride	142.40	87.096	127.63	69.423	t(34) = 1.744	.045*	0.295
Body Mass Index	33.73	6.523	32.64	6.657	t(34) = 5.583	<.001*	0.944
Weight	202.40	39.809	195.19	40.278	t(34) = 6.370	<.001*	1.077
Waist Circumference	41.94	5.289	39.94	5.600	t(34) = 7.781	<.001*	1.315
Systolic BP	128.63	23.308	129.14	19.344	t(34) = -0.269	.395	
Diastolic BP	79.66	10.819	77.43	9.865	t(34) = 1.449	.078	
Self-Efficacy	74.84	11.964	78.65	15.768	t(36) = 1.693	.050	

Asterisk (*) indicates significant difference <.05

d indicates effect size

Body Mass Index

Of the 35 persons who completed the program, the mean pre-intervention BMI was 33.73 (SD=6.523), and the mean post-BMI was 32.64. The mean BMI reduction was 1.09 (SD=1.15). The paired sample t-test showed that the difference between pre and post-intervention means was statistically significant ($t(34) = 5.583$, $p < .001$, $d=0.944$).

We then compared the BMI between those who were in the overweight category (BMI 25-29.9, n=12)) and those who were in the obese category (BMI ≥ 30 , n=20). For those in the overweight category, the mean pre-BMI was 28.408 (SD=1.80), and the mean post-BMI was 27.225 (SD=1.43). The paired sample t-test showed that the mean difference of 1.183 was significant ($t(11)=5.757$, $p<0.001$, $d=1.662$). For those in the

obese category, the mean pre-BMI was 38.035 (SD=5.2850), and the mean post-BMI was 37.090 (SD=5.3587). The paired sample t-test showed the mean reduction of .9450 was statistically significant ($t(19)=3.106$, $p=.003$, $d=.695$).

Weight

The mean pre-intervention weight was 202.40 pounds (SD=39.809), and the mean post-intervention weight was 195.18 pounds (SD=40.278). The mean weight reduction was 7.21 pounds (SD=6.70). Paired sample t-test showed that the difference between pre and post-intervention means is statistically significant ($t(34) = 6.370$, $p < .001$, $d=1.077$).

Waist Circumference

The mean pre-intervention WC was 41.94 (SD=5.389), and the mean post-intervention WC was 39.94 (SD=5.600). The mean WC reduction was 2.01 (SD=1.526). The paired sample t-test showed that the difference between pre and post-intervention WC means was statistically significant ($t(34) = 7.781$, $p < .001$, $d=1.315$). We then compared the WC between those who were in the overweight category (BMI 25-29.9, $n=12$) and those who were in the obese category (BMI ≥ 30 , $n=20$). For those in the overweight category, the mean pre-WC was 36.75 (SD=2.069), and the mean post-WC was 34.98. Paired sample t-test showed that the mean difference of 1.770 was statistically significant ($t(11)=5.200$, $p<.001$, $d=1.662$). For those in the obese category, the mean pre-WC was 45.94 (SD=2.87), and the mean post-WC was 43.98 (SD=3.64). Paired sample t-test showed that the mean difference of 1.96 was statistically significant ($t(19)=5.210$, $p<.001$, $d=1.165$).

Table 4*BMI & WC Comparison of Overweight Individuals (BMI 25-29.9) Pre and Post-**Intervention*

Variable	N	Mean	SD	t-test	p	Effect size (d)
Pre-BMI	12	28.408	1.8028	t(11)=5.757	<.001*	1.662
Post-BMI	12	27.225	1.4290			
Pre-WC	12	36.7500	2.06980	t(11)=5.200	<.001*	1.501
Post-WC	12	34.9792	1.89934			

Asterisk (*) indicates significant difference < .05

Table 5*BMI & WC Comparison of Obese Individuals (BMI ≥30) Pre and Post-Intervention*

Variable	N	Mean	SD	t-test	p	Effect size (d)
Pre-BMI	20	38.035	5.2850	t(19)=3.106	<.003*	.695
Post-BMI	20	37.090	5.3587			
Pre-WC	20	45.9375	2.86870	t(19)=5.210	<.001*	1.165
Post-WC	20	43.9750	3.64177			

Asterisk (*) indicates significant difference < .05

Blood Pressure

The mean pre-intervention SBP was 128.63 mmHg (SD=23.308). The mean post-intervention SBP was 129.14 mmHg (SD=19.344). There was a mean increase in SBP of 0.51 mmHg (SD=11.317). The paired sample t-test showed that the difference between the pre and post-intervention SBP was not statistically significant ($t(34) = -0.269$, $p = .395$).

The mean pre-intervention DBP was 79.66 (SD=10.819), and the mean post-intervention DBP was 77.43 (SD=9.865). The mean reduction in DBP was 2.23 mmHg

(SD=9.098). The paired sample t-test revealed that the difference in the pre and post-intervention mean DBP was also not statistically significant ($t(34) = 1.449$, $p = .078$).

Fasting Blood Glucose

The mean pre-intervention FBG was 104.4 (SD=15.967), and the mean post-intervention FBG was 99.46 (SD=14.952). The mean reduction in FBG was 4.94 (SD=13.453). The paired sample t-test showed that the difference in pre and post-intervention mean FBG was statistically significant ($t(34) = 2.174$, $p = .018$).

We then compared FBG between diabetics ($n=13$) and non-diabetics ($n=6$) (See table 6). The mean FBG among non-diabetics was 101.85 (SD=13), and the mean post-FBG was 99.46. Paired sample t-test showed that the mean reduction of 2.385 was not statistically significant ($p=.230$). Among non-diabetics, the mean pre-FBG was 123.33, and the mean post-FBG was 116.50. The paired sample t-test shows that the mean reduction of 6.833 was not statistically significant ($p=.227$).

Table 6*Comparison of FBG between Diabetics and Non-Diabetics*

Variable	N	Mean	SD	t-test	<i>p</i>
Non-Diabetics					
Pre-FBG	13	101.85	9.677	t(12)=.762	.230
Post-FBG	13	99.46	12.313		
Diabetics					
Pre-FBG	6	123.33	19.906	t(5)=.810	.227
Post-FBG	6	116.50	14.856		

Total Cholesterol

The mean pre-intervention total cholesterol was 182.49 (SD=49.955), and the mean post-intervention total cholesterol was 168.51 (SD=52.947). The mean reduction in total cholesterol was 13.971 (SD=36.776). The paired sample t-test showed that the difference in the pre and post-intervention total cholesterol was statistically significant ($t(34) = 2.248, p = .016, d=0.380$).

Low-Density Lipoprotein

The CardioChek Plus Analyzer cholesterol machine could not calculate LDL levels on three participants due to one or more of the cholesterol levels that were out of range either on the pre or post-intervention readings. Therefore LDL levels were only reported on 32 participants who completed the program. The mean pre-intervention LDL was 103.94 (SD=41.292), and the mean post-intervention LDL was 93.91 (SD 41.465). The mean reduction in LDL was 10.03 (SD=31.808). The paired sample t-test revealed that the difference in the pre and post-intervention LDL was statistically significant ($t(31) = 1.784, p = .042, d=0.315$).

High-Density Lipoprotein

The mean pre-intervention HDL level was 49.11 (SD=13.907), and the mean post-intervention HDL level was 48.51 (SD=15.157). There was a mean reduction in HDL levels of 0.600 (SD=6.895). The paired sample t-test showed that the difference in the pre and post-intervention mean HDL level was not statistically significant ($t(34) = 0.515, p = .305$).

Triglycerides

The mean pre-intervention triglyceride level was 142.40 (SD=87.096), and the mean post-intervention triglyceride level was 127.63 (SD=69.423). There was a mean reduction in triglyceride levels of 14.771 (SD=50.101). The paired sample t-test showed that the difference in the pre and post-intervention mean triglyceride levels was statistically significant ($t(34) = 1.744, p = .045, d=0.295$).

Self-Efficacy

Self-efficacy scores were reported on 37 participants. This is because two participants who were planning to complete the program went ahead and completed the post-intervention self-efficacy questionnaire. The mean pre-intervention self-efficacy score was 74.84 (SD=11.964), and the mean post-intervention self-efficacy score was 78.65 (SD=15.768). There was a mean increase in self-efficacy scores of 3.810 (SD=13.688). The paired sample t-test showed that the difference in the pre and post-intervention scores was not statistically significant ($p=.05$); however, it was borderline.

Dietary Intake

Dietary adherence was measured using the 14-point Mediterranean Dietary Adherence Screener (MEDAS). Scores were reported on 36 participants and were measured at baseline and then again at weeks four, eight, and post-intervention. The mean pre-intervention score was 6.889 (SD=1.953). At week four, the mean score was 8.4722 (SD=2.021). At week eight, the mean score was 8.694 (SD 1.84), and the post-intervention score was 9.138 (SD=2.058). The paired sample t-test was used to compare scores between baseline and the stated weeks. The paired sample t-test showed that there were at least two significant differences between the means stated above { $F(3)=12.776$, $p<.001$, $d=0.267$ }. A pairwise comparison of the stated weeks measured showed that there was a significant difference between baseline and week four ($p<0.01$), between baseline and week eight ($P<0.01$), and between baseline and post-intervention ($p<0.01$). There were no significant differences when comparing weeks four, eight, or post-intervention to other weeks aside from baseline (See Table 7).

Table 7*Pairwise Comparisons of Various Weeks of the MEDAS*

Variables	Week Comparisons	Mean Difference	Significance	95% CI for Difference	
				LB	UB
Baseline	Week 4	1.583*	0.000	-2.352	0.814
	Week 8	1.806*	0.000	-2.542	-1.069
	Post-intervention	2.250*	0.000	-3.156	-1.344
Week 4	Baseline	1.583*	0.000	0.814	2.352
	Week 8	0.222	0.565	-0.998	0.554
	Post-intervention	-0.667	0.106	-1.484	0.150
Week 8	Baseline	1.806*	0.000	1.069	2.542
	Week 4	0.222	0.565	-0.554	0.998
	Post-intervention	-0.444	0.207	-1.147	0.258
Post-intervention	Baseline	2.250*	0.000	1.344	3.156
	Week 4	0.667	0.106	-0.150	1.484
	Week 8	0.444	0.207	-0.258	1.147

Asterisk (*) indicates significant mean difference $<.05$

LB indicates lower bounds

UB indicates upper bounds

Aside from evaluating pre and post-intervention scores on the MEDAS, each question on the MEDAS was analyzed to assess the percentages of yes and no answers pre and post-intervention (See table 8). Of particular interest to this project were questions 3, 4, 5, 9, and 12, which inquire about vegetable, fruit, meat, legumes, and nut intake.

Question three asked, “Do you eat 4 servings of vegetables each day? (1 serving is ½ cup raw or cooked or 1 c raw salad greens).” Pre-intervention, 37.8% of participants

responded yes, and 62.2% responded no. Post-intervention, 78.4% answered yes, and 21.6% said no. Pearson Chi-Square analysis showed that there was a difference between the pre and post-intervention percentages, but unfortunately, Fisher's Exact test showed that the differences were not significant ($\chi^2=2.786$, $p=0.102$).

Question four asked, "Do you have 3 whole fruits or 1.5 c fruit each day?" Pre-intervention, 35.1% of participants responded yes, and 64.9% answered no. Post-intervention, 81.1% responded yes, and 18.9% responded no. Pearson Chi-square analysis showed that there was a difference between the pre and post-intervention frequencies, and Fisher's Exact Test showed that the differences were significant ($\chi^2=4.676$, $p=0.034$).

Question five asked, "Do you eat less than 1 serving of red meat, hamburger, sausage, or processed meats daily?" Pre-intervention, 77.8% of participants responded yes to this question, and 22.2% answered no. Post-intervention, 94.4% of participants responded yes, and 5.6% responded no. Pearson Chi-square analysis showed that there was a difference between the pre and post-intervention frequencies, but unfortunately, Fishers Exact test showed that the difference was not significant ($\chi^2=.945$, $p=0.400$).

Question 9 asked, "Do you have 3 servings or more of legumes (peas, beans, or lentils) each week? (1 serving is $\frac{1}{2}$ - $\frac{2}{3}$ c)?" Pre-intervention, 59.5% of participants responded yes, and 40.5% answered no. Post-intervention, 89.2% responded yes, and 10.8% responded no. Pearson Chi-square analysis showed that there was a difference between the pre and post-intervention frequencies, but Fisher's Exact test showed that the difference was not significant ($\chi^2=2.209$, $p=0.172$).

Question 12 asked, “Do you eat nuts 3 or more times per week? 1 serving is 30g or 1oz.” Pre-intervention, 67.6% of participants responded yes, and 32.4% answered no. Post-intervention, 78.4% responded yes, and 21.62% responded no. Pearson Chi-square analysis showed that there was a difference between the pre and post-intervention frequencies, and Fisher’s Exact test showed that the differences were significant ($\chi^2=8.440$, $p=0.008$).

Table 8*Individual Frequencies for Yes and No Pre and Post-Intervention MEDAS Questionnaire*

Question	N	Pre-Yes %	Pre-No %	Post-yes %	Post-No %	Chi-Square	p-value
1. Is olive oil the main source of fat for cooking?	37	51.4%	48.6%	83.8%	16.2%	3.449	0.078
2. Do you have 4 tablespoons (60ml) of olive oil each day?	37	8.1%	91.9%	18.9%	81.1%	4.852	0.086
3. Do you eat 4 servings of vegetables each day? (1 serving is ½ cup raw or cooked or 1 c raw salad greens).	37	37.8%	62.2%	78.4%	21.6%	2.786	0.102
4. Do you have 3 whole fruits or 1.5 c fruit each day?	37	35.1%	64.9%	81.1%	18.9%	4.676	0.034*
5. Do you eat less than 1 serving of red meat, hamburger, sausage or processed meats daily?	36	77.8%	22.2%	94.4%	5.6%	.945	0.400
6. Do you eat 1 tablespoon (15ml) or less of butter, margarine, or cream each day?	37	62.2%	37.8%	91.9%	8.1%	1.154	0.316
7. Do you have <1 can (355 ml or 12 oz) of sugar-sweetened beverages each day?	37	86.5%	13.5%	91.9%	8.1%	1.097	0.362
8. Do you drink 3 glasses or more of wine per week? (1 serving is 150ml or 5 oz).	37	8.1%	91.9%	8.1%	91.9%	15.025	0.013*
9. Do you have 3 servings or more of legumes (peas, beans, or lentils) each week? (1 serving is ½-2/3 c).	37	59.5%	40.5%	89.2%	10.8%	2.209	0.172
10. Do you have 3 servings or more of fish or seafood each week? Fish serving is 3.5-5 oz or 100-150 g, seafood serving 4-5 pieces)	37	10.8%	89.2%	10.8%	89.2%	.544	0.620
11. Do you eat commercial baked goods such as cookies, doughnuts, or cake less than 2 times per week?	37	64.9%	35.1%	64.9%	35.1%	1.279	0.223
12. Do You eat nuts 3 or more times per week? 1 serving is 30g or 1 Oz.	37	67.6%	32.4%	78.4%	21.6%	8.440	0.008*
13. Do you choose chicken or turkey more often than beef, pork, hamburger, or sausage?	37	75.7%	24.3%	73.0%	27.0%	9.475	0.005*
14. Do you consume vegetables, pasta, or rice dishes with a homemade sauce of sauteed garlic, onions, olive oil, and tomatoes 2 or more times a week?	37	43.2%	56.8%	56.8%	43.2%	.524	0.469

Asterisk (*) indicates significant difference <.05

CHAPTER 5

DISCUSSION

A WFPBD is a style of eating that emphasizes minimally processed and nutrient-dense plant foods as the primary food source on one's plate (American College of Lifestyle Medicine, 2021, September 16). These plant foods include fruits, nuts, seeds, vegetables, whole grains, legumes, and beans. A WFPBD has been shown in numerous studies to be an effective means of combating chronic diseases and stemming the tide of obesity (Campbell et al., 2019; Kahleova et al., 2019; Schwartz et al., 2020). Obesity is a rising pandemic in the United States as an overall 42.4% of the population is considered obese (Centers for Disease Control and Prevention, 2021, June 7). Consumption of a whole food plant-based dietary pattern is even more critical now than ever, as obesity is considered the progenitor of many chronic diseases, including hypertension, diabetes, cancer, and cardiovascular disease (Najjar & Feresin, 2019).

This project involved two main objectives. The first objective was to examine if a 12-week online program on a plant-based diet would improve BMI, waist circumference, blood pressure, fasting blood glucose, and serum lipid levels of adults residing in northern Michigan. The second objective was to determine if participants' self-efficacy and intake of plant foods would improve post-WFPBD. This chapter will discuss the findings of this project, the relationship of the results to theory, project insight and the current knowledge gap, and the impact of this project on the community, on practice, on

nursing education, and on nursing research. We will also discuss the strength and limitations of the project, recommendations, plans for dissemination, deliverables, and project evaluation. It will also include a discussion of how the DNP essentials were used in this project and, finally, the spiritual insight gained.

Demographic Findings

In our study, the mean age of participants was 54.92. The majority of participants were female (76.2%), Caucasian (90.5%), and had some college education (34.9%). A large percentage (27.9%) had a graduate degree. Moreover, most participants were in the income bracket of \$50,000-\$74,999. Many participants also reported being pre-diabetic (26.7%) or diabetic (23.3%), having high blood pressure (23.3%), and high cholesterol (26.7%). Our demographic data is comparable to data from other plant-based studies, which show a higher percentage of Caucasians, middle age individuals, and females who participated in a lifestyle program (Campbell et al., 2019; Kahleova et al., 2020; Schwartz et al., 2020). Recent data shows that although obesity is higher among African Americans, Hispanics, and women, there are high rates of obesity among all men and women of all races between the ages of 40-59 (C. Lopez et al., 2020). Regardless of age, race, or socioeconomic status, chronic disease and obesity is a result of an unhealthy lifestyle and an unhealthy eating pattern consisting of foods high in saturated fats, sugar, and sodium, and deficient in fruits and vegetables (Najjar & Feresin, 2019; Rahman, 2019). The *Eat Well Live Well* 12-week program showed that adopting a plant-based diet was beneficial to many participants.

Biometric Findings

The *Eat Well Live Well* program started March 27 and ended on June 12, 2022. Participants were taught how to gradually transition to a plant-based diet using weekly lectures, presentations, group discussions, cooking classes, videos, and weekly to biweekly follow-ups with the project manager. They were encouraged from week to week that any change made towards a WFPB dietary pattern is a positive change (American College of Lifestyle Medicine, 2021, September 16). They were taught the dietary spectrum in which the typical American diet consisting of fried foods, refined grains, meat, dairy, poultry, eggs, sweets, and high sodium foods is associated with an increased risk of type two diabetes, heart disease, obesity, and higher mortality rates. On the other hand, a shift towards a WFPB lifestyle is associated with a decreased risk for type two diabetes, obesity, and heart disease, and moreover, is the backbone of chronic disease treatment (American College of Lifestyle Medicine, 2021, September 16).

The answer to the first objective (to examine if a 12-week online program on a plant-based diet will improve BMI, WC, BP, FBG, and serum lipid levels of adults residing in northern Michigan) is yes for most items. This project demonstrated that transitioning to a plant-based diet is associated with statistically significant reductions in total cholesterol, LDL, triglycerides, FBG, BMI, weight, and waist circumference. Changes in HDL and systolic and diastolic blood pressure were not significant.

Effects on Cholesterol Levels

This project found that the mean reduction in total cholesterol was 13.971 mg/dL (SD=36.776), the mean reduction in LDL was 10.03 mg/dl (SD=31.808), and the mean reduction in triglycerides was 14.771 (SD=50.101). These results are most comparable

to results obtained by participants of CHIP. In a retrospective CHIP study involving 620 participants from 26 different CHIP classes, participants experienced a mean reduction in total cholesterol of 19.37, in HDL of 3.69, LDL of 14.98, and TG of 7.36 (Drozek et al., 2019). Participants of CHIP engage in 16-18 in-person lifestyle class sessions over a period of 4-12 weeks, and similar to our program, participants are taught the principles of a WFPBD, but they are self-monitored, and there is no specific monitoring of their adherence (Drozek et al., 2019).

The results of this project also broadly differ from other plant-based programs. The expectations of this project were that there would be a reduction in total cholesterol by 30 mg/dL, triglycerides by at least 20 mg/dL, LDL by at least 30 mg/dL, and an increase in HDL by at least 2 mg/dL. The expectation for greater reductions was based on previous studies from other lifestyle programs. In a study on an eight-week lifestyle program by Campbell et al. (2019), participants were asked to follow an ad libitum WFPBD and to avoid all animal products, oils, and refined grains. Participants experienced a reduction in total cholesterol of 25.2 mg/dL, LDL by 15.2 mg/dL, and triglycerides by 10.2 mg/dL. These results are notable, considering that the program was only eight weeks. Their program met in person twice weekly, and they asked their participants to adhere to their prescribed diet. This project was presented over Zoom once per week, and there was no push for participants to change their diet right away. It was acknowledged that each person was in a different stage of change, and they were encouraged to go at their own pace and to make changes as they were able to.

In another study by Najjar et al. (2018), participants experienced a total cholesterol reduction of 33.8 mg/dL and a decrease in LDL by 24.6 mg/dL. This study

was done in an outpatient clinical setting, and patients were strictly monitored. They were also given instructions to adhere to a specific diet. Again, the *Eat Well Live Well* program did not instruct participants that they had to follow the WFPBD strictly. They were given the option to make as few or as many changes as they wished, with the encouragement that the more changes they made, the more results they would see.

Participants in the BROAD study by Wright et al. (2017) experienced a drop in total cholesterol and LDL of 0.9 mmol/L each over a twelve-week period (Wright et al., 2017). This is equivalent to 34.8 mg/dL each. The BROAD study was a randomized controlled trial in which participants had to follow a strict protocol. The *Eat Well Live Well* Program was not an RCT and therefore did not strictly monitor dietary intake.

This project did not demonstrate significant reductions in HDL. It was hoped that we would have an increase of at least 2 mg/dL per guidelines set forth by the ACC/AHA/TOS (Jensen et al., 2014). HDL is the only cholesterol level in which higher levels are healthier, and lower levels are associated with increased cardiovascular risk (Arnett et al., 2019). It is recommended that men have an HDL of 40 or above and females have a level of 50 or above (U.S National Library of Medicine, 2020, October 2). However, in this project, there was a mean reduction of 0.600 (SD=6.895). Similar results were found in other plant-based studies. Many plant-based studies showed that when individuals move towards a more plant-based diet, HDL levels tend to decrease even though subjects experience overall improvements in other biometric markers for CVD (Campbell et al., 2019; Najjar et al., 2018; Schwartz et al., 2020). According to Drozek et al. (2019, p. 3), this drop in HDL is not harmful but is a “compensatory response to lower LDL levels.”

Effects on Fasting Blood Glucose

This project did show that the overall mean reductions in FBG were significant. Other plant-based studies have also demonstrated significant results in FBG, including Drozek et al. (2019) and Viguiliouk et al. (2019). In these studies, individuals obtained reductions of 5.75 mg/dL and 10.09 mg/dL, respectively. This project showed an overall mean reduction of 4.94 mg/dL (SD=13.453), which was significant. Based on these studies, the initial expectation was that participants would experience a reduction of at least 4 mg/dL among individuals with normal or prediabetic status and at least 10 mg/dL for individuals with diabetes. When the mean FBG reduction among non-diabetics (n=13) alone were analyzed, we saw a mean reduction of 2.385 mg/dL, which was not significant. The mean FBG among diabetics (n=6) alone was 6.833 but was also not significant. Considering the low sample size, it is not surprising that the mean FBG results of both diabetics and non-diabetics were not significant. Perhaps a larger sample size would have been more beneficial for this type of analysis. It is commendable, however, that this program did achieve significant results overall. These results showed that a plant-based diet may be an effective option for preventing and treating diabetes.

Effects on WC, BMI, and Weight

This project resulted in significant reductions in weight, BMI, and WC. The mean reduction in WC was 2.01 inches (SD=1.526). There was also a large effect size of 1.315. For WC, the expected outcome was achieved of at least 2 inches from the baseline. Significant results were also achieved when we independently compared the mean WC reductions among overweight individuals and among obese individuals. Wright et al. (2017) also found similar results in that participants lost 7 cm (2.76 inches) after three

months of following a plant-based diet. A meta-analysis and systematic review by Vigiuliouk et al. (2019) found that diabetics who followed a vegetarian eating plan had a mean reduction in waist circumference by 2.8 cm.

The mean reduction in BMI was 1.09 (SD=1.15), and the mean reduction in weight was 7.21 pounds which was a 3.56% reduction. Both these results were statistically significant. Statistical significance was noted when individual comparison of the mean reductions in BMI among overweight individuals and among obese individuals were conducted. There was an expectation that BMI would decrease at least two units from baseline and that there would be at least a 5% decrease in body weight. In our literature review, we noted that in BROAD study, an RCT by Wright et al. (2017), the intervention group achieved a significant mean weight loss of 8.6 pounds at three months, 12.1 pounds at six months, and 11.5 pounds at 12 months, whereas the control group did not achieve significant weight loss. BMI significantly decreased by 3.1 units at three months, 4.4 units at six months, and 4.2 units at 12 months from baseline in the intervention group, but was not significant in the control group (Wright et al., 2017). The mean reduction of 7.21 pounds was very close to the 8.6 pounds lost in this RCT study and was significant even though the participants were not followed for strict dietary adherence. Also, despite the fact this project did not achieve the 5% that we hoped, a 3% weight loss is still very admirable. A weight loss of at least 5-10% is a gold standard to meet as set forth by the U.S. Preventive Services Task Force (2019) and the ACC/AHA Arnett et al. (2019). However, a 3-5% weight loss can result in “meaningful improvement in obesity-related comorbidities” (Wharton et al., 2020, E879).

Effects on Systolic and Diastolic Blood Pressure

Systolic and diastolic blood pressure levels did not show significant reductions. The expectation was that SBP would decrease by at least 10 mmHg and DBP would decrease by at least 5 mmHg. However, there was observed a mean increase in SBP of 0.51 mmHg (SD=11.317) and a mean decrease in DBP of 2.23 mmHg (SD=9.098). In the Schwartz et al. (2020) study, participants had an average reduction in systolic blood pressure of 6.7 mmHg and diastolic blood pressure of 5.00 mmHg from baseline to one week. In the Najjar et al. (2018) study, patients observed a 16.6 mmHg drop in SBP and a 9.1 mmHg drop in DBP from baseline to 4 weeks. It is unclear why this project did not achieve significant results similar to other plant-based studies. There is evidence that a plant-based diet that is rich in whole grains, fruits, vegetables, and legumes contributes to lower blood pressure (Joshi et al., 2020). It is interesting, though, that a meta-analysis of RCTs by P. D. Lopez et al. (2019) found that a vegan diet showed no significant changes in SBP or DBP compared to diets that were less restrictive. However, in persons with a baseline SBP at or above 130, there was a mean decrease of 4 mmHg in both systolic and diastolic BP (P. D. Lopez et al., 2019). The mean SBP at baseline was 128.63 (SD=23.308), so perhaps this explains why this project did not achieve the results that were hoped for. It also important to note that there are other factors that play into achieving optimal blood pressure levels. These include stress, sodium intake, physical activity, and alcohol intake (Arnett et al., 2019; Iob & Steptoe, 2019). This project mainly dealt with obesity, and moreover, there was no monitoring of physical activity, sodium intake, or other factors that contribute to optimal blood pressure readings.

In summary, perhaps the *Eat Well Live Well* program would have demonstrated more significant reductions in biometric measurements if it were an in-person program where participants were monitored more closely and if participants were told that they had to follow a WFPBD entirely. Although the original expectations did not meet the actual results, this project still demonstrated significant reductions in total cholesterol, LDL, triglycerides, FBG, BMI, weight, and waist circumference. The results of this project show that even little changes are beneficial and can have significant results.

Self-Efficacy

Self-efficacy scores were available for 36 participants. There was a mean increase in self-efficacy scores from baseline of 3.81081 (SD=13.688), which was borderline but not significant. This project sought to help participants feel confident that they were able to follow a plant-based diet. Self-efficacy was strengthened through goal setting, recipe sharing, cooking classes, and breakout discussion sessions during the Zoom presentations. It is unclear as to why this project did not achieve significant results. This may be attributed to a low sample size. It can also be speculated that since the questionnaire used a Likert-based scoring system (in which 1=I know I cannot and 5=I know I can), some individuals may have accidentally clicked the wrong number. Lack of significance may also be attributed to some individuals not answering all the questions. Another possible reason has to do with the type of questions that were asked on the questionnaire. Question 17 asked, “How sure are you that you can...substitute low or non-fat milk for whole milk at dinner” and question 19 asked, “How sure are you that you can...eat poultry and fish instead of red meat at dinner.” This program emphasized eating a WFPBD, which did not include meat or dairy, so these questions may have

posed a problem for a number of participants who were trying to avoid these foods. These participants were also made up of vegetarians and non-vegetarians, and some of the non-vegetarians may have decided to give up meat and dairy by the end of the program.

Despite not having achieved significant self-efficacy scores, it cannot be refuted that this project did achieve significant outcomes with cholesterol levels, BMI, weight, and WC. The fact that these scores were significant may mean that individuals did feel confident enough to make the changes they needed to and stick to it for three months.

Dietary Intake

This project achieved significant results on the MEDAS when comparing pre-intervention scores to weeks four, eight, and post-intervention. The mean pre-intervention score was 6.889 (SD=1.953). At week four, the mean score was 8.4722 (SD=2.021). At week eight, the mean score was 8.694 (SD 1.84), and the post-intervention score was 9.138 (SD=2.058). However, there were no significant results when comparing scores from weeks four, eight, or post-intervention to each other. It is noted that individuals did make improvements in dietary intake as they progressed from week to week in the program.

Individual question on the MEDAS were analyzed to determine the frequencies of yes and no answers. Special attention was given to questions 3, 4, 5, 9, and 12 which inquired about intake of vegetables, fruit, meat, legumes, and nuts. These questions specifically related to the objective of increasing plant foods by the end of our 12-week program. It is noted that the intake of vegetables increased from 37.8% pre-intervention to 78.4% post-intervention. This is a difference of 40.6%. Even though Chi-square

analysis showed that this was not significant, it is still impressive that there was a large increase in vegetable intake from pre-to post-intervention. This shows the intervention may have had an effect on individuals increasing vegetable intake. It was also noted that fruit intake increased from 35.1% pre-intervention to 81.1% post-intervention. This is a difference of 46%. Legume intake also increased from 59.5% pre-intervention to 89.2% post-intervention. This is a 29.7% increase. Nut intake increased from 67.6% pre-intervention to 21.6% post-intervention, which is a 46% increase. The intake of red meat decreased post-intervention by a difference of 16.6%. Pre-intervention, 77.8% of participants stated that they ate less than one serving of red meat, hamburger, sausage, or processed meats daily, and post-intervention, 94.4% said they ate less than one serving per day.

The Mediterranean dietary pattern is based mostly on the consumption of whole foods or minimally processed foods from the categories of fruits, grains, vegetables, fish, legumes, and olive oil (Hornby & Paterson, 2013; Papadaki et al., 2018). A score of less than or equal to 7 indicated low adherence. Scores higher than 7 indicated higher adherence (Martínez-González et al., 2012). A higher score on this survey is associated with a lower risk of all-cause mortality and cardiovascular disease (Hornby & Paterson, 2013; Papadaki et al., 2018). It is noted that the pre-intervention score of 6.889 (SD=1.953) showed low adherence, and the post-intervention score of 9.138 (SD=2.058) showed high adherence. Moreover, individuals did improve on their intake of plant foods over the course of the 12 weeks. Even though the Mediterranean diet is not strictly a WFPBD diet, it does closely resemble that pattern of eating. It is emphasized here again the dietary spectrum in any change in the direction of a WFPBD is a good change and is

associated with a decreased risk for type two diabetes, obesity, and heart disease and is the backbone of chronic disease treatment (American College of Lifestyle Medicine, 2021, September 16).

Relationship of Results to Theoretical Framework

The HBM was the theoretical framework used to guide this project, and the project results indicated that this model was a superb fit. The HBM hypothesizes that people's readiness to act depends on their beliefs of how susceptible they are to the disease and the benefits of avoiding the disease (Butts & Rich, 2015). All components of the model were used to guide participants in making dietary changes. These components included perceived susceptibility, perceived severity, perceived threat, cues to action, and perceived benefits and barriers which determine the outcome.

The concept of adopting a WFPBD was a difficult task for many of the participants, as noted in weekly discussions. However, weekly health presentations, videos, discussions, cooking classes, and written information provided ample education on obesity and how a WFPBD can help to prevent, manage and possibly reverse obesity and its complications. Each week participants discussed their goals as well as their victories and challenges in reaching their goals. Many participants voiced throughout the weekly discussions that they were facing challenges such as stress, addictions to sweets, and difficulty cooking for their spouses and children. Many also expressed that the changes they were making were not as difficult as they initially thought. Mckellar and Sillence (2020) noted that when individuals realize that the benefits of the recommended action far outweigh the barriers, this results in the action being performed. In this project, it was observed that as individuals began to grasp the materials presented, they started to

make changes that manifested in significant reductions in weight, BMI, WC, cholesterol levels, and FBG. Many of the participants voiced at the end of the program that they were very encouraged and wanted to continue on the path they had learned.

Project Insight and Current Knowledge Gap

This project provided valuable insight into the knowledge that already exists regarding the impact of a WFPBD on the treatment and management of chronic diseases. The research indicates that as individuals begin to adopt a WFPBD, they move up on the dietary spectrum and experience a decreased risk for obesity, type two diabetes, heart disease, and certain cancers (American College of Lifestyle Medicine, 2021, September 16). Those who already have these conditions learn that the adoption of a WFPBD is effective at treating, managing, and even reversing some chronic diseases (American College of Lifestyle Medicine, 2021, September 16). The literature review indicated that there is a plethora of studies on the benefits of a WFPBD. There is a continual growth of research that suggests that consumption of a WFPBD is an effective measure to counteract the rising pandemic of chronic disease related to obesity. However, there is a gap between research and practice as these research studies are not known to many practicing clinicians (Rahman, 2019). Clinicians often voice that they do not have time to talk to their patients about nutrition or that nutrition has “little to no impact on health and chronic disease” (Ha, 2019, p. 61). Hever and Cronise (2017) also noted procedures and pharmacological interventions are more commonly prescribed than dietary interventions. This project attempted to fill this gap by recruiting participants from a clinic setting and from hospital staff as well as the general community. Clinicians were informed about the program and were encouraged to speak to their patients about the

program. It was very rewarding to see research come to life as participants in the study experienced significant reductions in their weight, BMI, WC, FBG, and cholesterol levels, as the literature indicated they would. The results of this project indicated that educating individuals about a WFPBD lifestyle is an effective means to treat and manage obesity and chronic diseases. It is hoped that this research project as well as many others, will become known to clinicians so that they can pass it along to their patients.

Impact of Project Results on Practice

Results of this project may have an impact on patient outcomes, clinical practice, healthcare systems, and healthcare costs. This project has impacted patient outcomes by empowering individuals to take charge of their health. Porter-O'Grady and Malloch (2015) suggest that healthcare is changing dramatically, and the locus of control is shifting from the provider to the patient. Already we are seeing this shift in healthcare, and patients are assuming more responsibilities to take care of their own health. The focus of healthcare is also shifting to a more preventive model rather than a reliance on the treatment of disease with surgery and medications alone (Evans et al., 2017). Lifestyle-related diseases account for 80% of chronic diseases and could be remedied by adopting a healthy lifestyle (Bodai et al., 2018). Obesity is a lifestyle-related chronic disease that increases the risk of morbidity from type 2 diabetes, dyslipidemia, hypertension, and heart disease (Jensen et al., 2014). However, a plant-based diet has the potential to prevent, stop, or even reverse heart disease, obesity, hypertension, and type 2 diabetes (Ha, 2019). Every individual has the right to know how to manage their health, and as they come to this knowledge, they will reap the benefits.

This project mainly focused on Crawford County, Roscommon County, and Oscoda Counties in northern Michigan. The overweight and obesity rates in these counties range from 71-80% (Munson Healthcare, 2019). Prior to this program, there were no active programs in these communities that taught individuals how to adopt a plant-based diet. During the recruitment phase, it became very clear that there are many people that want to know how to change their lifestyles but do not know how (Bodai et al., 2018). This project aimed to significantly impact this population by educating them in this manner and was therefore warranted in these communities.

This project also has implications for nursing and medical practice. A number of organizations, including the American Academy of Family Physicians (Locke et al., 2018), The American Association of Clinical Endocrinologists and the American College of Endocrinology (Garber et al., 2020), and the American Diabetes Association (2019), endorse a plant-based diet as a way to manage and decrease the risk associated with chronic disease. The ACC/AHA recommends a diet that emphasizes such elements as fruits, vegetables, legumes, and whole grains to decrease the risk factors for atherosclerotic CVD (Arnett et al., 2019). These recommendations exist, yet many clinicians do not educate their patients in this manner. Rahman (2019) suggests that many physicians are unaware of the multiple research studies showing the impact of a plant-based diet on diabetes and cardiovascular disease. It is hoped that the results of this project will bring awareness to clinicians in this geographical area of northern Michigan. Patients who are educated and receive food guidance from their clinicians are very capable of making significant changes (Rahman, 2019).

This project also has the potential to impact healthcare systems at large. Several large healthcare systems have implemented a lifestyle medicine approach in some of their practices, and instruction on a whole food plant-based diet is the backbone of the management of chronic diseases among many of their patients. Some of these institutions include Kaiser Permanente in Southern California (Ha, 2019), Spectrum Health in Grand Rapids, Michigan Spectrum Health (2019), and St. Joseph's Mercy Health System in Ann Arbor (Saint Joseph Mercy Health System, 2021). This small healthcare community in northern Michigan, which is part of a more extensive healthcare system, also has the potential to offer lifestyle medicine as an option to patients to empower them to change their lifestyles. Knowledge of the biometrical outcomes of this project may empower this healthcare system to begin to move in the direction of a more lifestyle medicine approach.

Impact of Project Results on Nursing Education

This project has great implications for nursing education both at the graduate and undergraduate levels and in clinical settings as well. As an experienced student of nursing education, this DNP student is aware that nursing schools, including nurse practitioner schools, focus on teaching nurses the major sciences as well as how to take care of various patient populations, including adults, pediatrics, psychiatric, and women and infants. Although there is much emphasis on disease prevention in nursing education, like physician education, nursing education does not place much emphasis on nutrition as a key to the management of chronic diseases (Rahman, 2019).

A curriculum on plant-based nutrition and the lifestyle management of disease would be a great addition to the nursing curriculum. A study by Evans et al. (2017)

involving 19 nurses who went through a 21-day plant-based education program showed that a robust experimental plant-based nutrition program could be very beneficial for nurses, both at the personal and professional level. The study concluded that as nurses participate in experimental plant-based programs and begin to see the impact on their lives, they will be more empowered to teach their patients. A study by Lessem et al. (2019), also involving experimental plant-based education among healthcare providers, showed that healthcare providers, including nurse practitioners, are more likely to continue with a WFBPD themselves and teach it to their patients if they themselves went through a program.

Impact of Project Results on Nursing Research

The results of this project showed that making even little changes towards a more WFBPD is beneficial and can result in significant outcomes on a person's health. More research is needed among nurses and healthcare professionals. In researching the literature for this project, it was quickly noted that there were not many plant-based studies specifically done among nurses. There is much room for this. As pointed out in the Evans et al. (2017) and Lessem et al. (2019) study, more nurses need to understand the power of a plant-based diet so that they can teach their patients. There is also a need for more plant-based research among patients in the clinical setting such as clinics and hospitals. As the primary modes of treatment are pharmaceuticals and procedural interventions (Hever & Cronise, 2017), perhaps it would be beneficial to compare these two methods of treatment to lifestyle treatments in the context of chronic diseases among patients. Also, it was noted in this project as well as other plant-based studies that that Caucasians are the primary participants. Due to geographical limitations, this project was

done in a rural setting in which Caucasians were the dominant population. More research also needs to be done among African Americans, Hispanics, and other ethnicities. These populations also need to know the benefit of adopting a WFPBD, as obesity highly affects the African American and Hispanic groups. Nurse practitioners who value lifestyle medicine and who live among these people groups are in a prime position to conduct research among these people groups.

Project Strengths

One strength of this project is the utilization of Zoom technology to conduct the weekly meetings. Zoom was an added advantage because participants could easily join the sessions in the comfort of their own homes as long as they had internet access. This fact may have been a motivating factor in recruiting participants to join the program. Another advantage of Zoom was that the project started in March when there was still snow in northern Michigan, so participants did not have to worry about driving in hazardous weather. Conducting this project on Zoom also proved to be economical in that it saved the participants gas money for having to drive out once per week. It also was very economical for the project manager because if this project had been done in person, the cost of food would have been much more expensive as we would have had to prepare extra food samples to feed the participants during the cooking classes. There also might have been an added cost of renting a room to hold the weekly presentations.

Another project strength was that although the project was done online, the project manager was able to meet the participants in person for their biometric screenings before and after the program. It gave the project manager a chance to meet the participants on a one-to-one basis and discuss with them personally about their goals and

the results of their biometric measurements. This may have been an encouragement to the participants to make the changes they did.

Another strength of this project is that it was well planned out. The project manager compiled a binder for each participant, which included a syllabus of the program and weekly reading materials (**Appendix M**). It was also strategically planned out who the speaker would be from week to week. Although some changes were needed at times due to speaker availability, the program still ran smoothly. Many participants voiced their appreciation and commented that the program was very structured and professionally done.

Another project strength was the utilization of a theoretical framework, namely, the HBM. Turner-McGrievy et al. (2017) noted that many plant-based diet studies were lacking in the use of a theoretical framework. Using a behavioral or social health theory in public health intervention studies is considered to be more productive than not using one at all (Turner-McGrievy et al., 2017). The HBM was a very useful tool in guiding the design of this project and may have contributed to its success.

Project Limitations

This project had many limitations. Although Zoom technology was beneficial in many ways, it also had some disadvantages. Many lifestyle programs are done in person because it helps participants to bond with each other, and participants can also be monitored more closely to see how they are doing with the program. If this project were done in person, there would have been more opportunities to do weigh-ins and possibly add an exercise component. Also, possibly the most difficult part of using Zoom technology was that participants could not sample the dishes that were prepared by the

plant-based chef. There was also some difficulty with getting the camera to zoom in close enough to see the dishes prepared. If participants were able to be in a live cooking class and see, touch and taste the food, they might have received greater knowledge and experience with plant-based cuisine, and it might have offered greater encouragement for some to add more plant-based meals to their diet and continue with it. Also, perhaps if the project were held in person, there may have been more significant reductions in biometric measurements, and perhaps self-efficacy scores would have been higher among participants.

Another limitation of this project was the questionnaires. The project manager had great difficulty in finding evidence-based questionnaires that were geared towards plant-based studies. As previously noted, the self-efficacy questionnaire had some questions pertaining to meat and dairy, which was not feasible for this project. Also, the MEDAS did not perfectly fulfill the purpose of this project. Although many of the questions dealt with plant foods, some of the questions encouraged fish, seafood, and wine consumption. There is a great need for the development of evidence-based food questionnaires that fit plant-based studies.

Finally, a low sample size may have also been a limitation of this project. A higher sample size may have resulted in more significant reductions in biometric levels. There may have also been the opportunity to make better comparisons within groups such as diabetics versus non-diabetics and possibly achieve significance. A higher sample size may have also allowed us to reach significance in self-efficacy.

Evaluation of the Project

Recommendations

Several recommendations arise from this project:

1. It would be beneficial for healthcare organizations to implement an ongoing lifestyle program in northern Michigan that would help individuals transition to a more plant-based diet and maintain it. The rates of obesity will continue to grow if individuals continue to follow a diet that lacks the power of fruits, nuts, grains, legumes, and vegetables. The implementation of these lifestyle recommendations has the potential to improve and save many lives (Bodai et al., 2018).

2. Clinicians should be educated on the benefits of a plant-based diet and teach it to their patients. It would also be beneficial for clinicians to participate in an experimental lifestyle program themselves so that they can experience the benefits to their own health.

3. Nursing education should incorporate lifestyle medicine into their curriculum both at the graduate and undergraduate levels. It would also be beneficial for students to participate in an experimental lifestyle program so that they will know how to teach their patients.

4. More plant-based research needs to be done among patients in the clinical setting, such as clinics and hospitals, and among minorities such as African Americans, Hispanics, and other ethnicities.

Project Stakeholder Evaluation Plan

The project manager originally planned to present the results of this project to clinicians in the clinic in which the project was carried out. However, due to relocating,

the project manager is no longer within the vicinity of northern Michigan. A Zoom PowerPoint presentation will be emailed to the clinicians in the clinic who assisted in recruiting patients for the project. The presentation will include an introduction, a background of the problem, the literature review, the methodology, and the results of the program.

Deliverable Product of Project

The project manager will develop a brochure that will include short statements on the benefits of a plant-based diet, how to transition to a plant-based diet, and useful evidence-based web sources for ongoing learning. This brochure will be emailed to the clinicians at the clinic who assisted in recruiting patients for this project. They can also make it available to other clinicians to hand out to their patients.

Project Evaluation

The *Eat Well Live Well* program was evaluated through weekly quizzes. The twelve quizzes coordinated with the topic for the week, with the last quiz being an actual open-ended quiz to assess the effectiveness of the program based on participants' impressions. Quizzes were mostly based on the reading information located in the participant's handbooks. Some quizzes also included information from the PowerPoint presentations. PowerPoint presentations were emailed to participants if they were a part of the quiz. Participants were asked to read and review the information ahead of time and then to take the quiz. The average score on most quizzes was above 96%, which shows that participants had a good understanding of the subjects presented. Table 9 shows the percentages of the average scores on quizzes 1-11 along with the topics.

Table 9*Average Scores for Quiz 1-11*

Quiz Number	Topic	Average Score	Number of Responses	Number of Duplicate ID #'s
1	Introduction to a WFPBD	96.67%	45	2
2	Fiber and Water	96.28%	43	3
3	Shopping for Healthy Foods	93.85%	39	1
4	Replacing Meat & Dairy	96.9%	42	4
5	Managing Obesity on a Plant-based Diet	96.25%	40	2
6	Type 2 Diabetes	98.65%	37	1
7	High Blood Pressure	96.22%	37	2
8	Heart Disease	97.89%	38	3
9	Exercise	98.61%	36	1
10	Stress	99.09%	33	0
11	Dining Out	95.59%	34	1

Explanation of Duplicate ID#'s:

Many questions were answered by the indicated number of persons possessing the same ID #. It is unclear if some persons put the wrong ID # or if it was filled out more than once by the same person.

Quiz twelve was not graded because it was all open-ended questions. Table 10 shows a summary of questions 1-8, which rated the effectiveness of the program in

various areas. The results of questions 1-8 indicate that most people felt that the program was very beneficial to them and was very effective in helping them to add more plant foods to their diet.

Table 10:

Responses for Quiz 12: question 1-8

Questions	Results*
1. The Eat Well Live Well Program was effective at teaching me how to improve my weight, blood pressure, blood sugar levels, and cholesterol levels.	7.9% rated a 4 92.1% rated a 5
2. The Eat Well Live Well Program was effective at teaching me how to gradually transition to a plant-based diet.	10.5% rated a 4 89.5% rated a 5
3. The Eat Well Live Well Program was effective at helping me to increase my fruit and vegetable intake.	2.6% Rated a 3 13.2% rated a 4 84.2% Rated a 5
4. The Eat Well Live Well Program was effective at helping me to increase my intake of legumes.	7.9% rated a 3 10.5% rated a 4 81.6% rated a 5
5. The Eat Well Live Well Program was effective at helping me to increase my intake of whole grains.	7.9% rated a 3 7.9% rated a 4 81.6% rated a 5
6. The reading materials helped me to better understand the topics presented.	2.6% rated a 3 2.6% rated a 4 94.7% rated a 5
7. The speakers were well-prepared and presented the materials in a way that was easy for me to understand.	2.6% rated a 4 97.4% rated a 5
8. How helpful were the documentaries (Forks Over Knives and Plantwise) in helping me to move towards a more plant-based diet? **	5.3% rated a 3 13.2% rated a 4 81.6% rated a 5

*1=strongly disagree and 5=Strongly agree

**1=Not at all helpful and 5=extremely helpful

Question 9 on Quiz 12 asked, “ What aspect of the program did you enjoy the most? (example: Group discussions, lectures, cooking classes, documentaries).” There were multiple responses to this question, with the most popular answer being cooking classes, lectures, and group discussions. Some other responses are documented in table 11.

Question 10 of quiz 12 asked, “How did the Eat Well Live Well Program impact your intake of meat and dairy?” Many persons responded by saying that they have reduced their intake of meat and dairy or have eliminated it. Some of the exact responses are documented in table 11.

The final question on quiz 12 asked, “If this program were conducted again in the future, what recommendations would you give for improvement?” Many persons expressed their appreciation for the program. Some of the exact responses of documented in table 12.

Table 11

Responses for Quiz 12: Questions 9 & 10

Question	Exact Responses
9. What aspect of the program did you enjoy the most? (example: Group discussions, lectures, cooking classes, documentaries)	<p>“Lectures from qualified Doctors, Nurses, & Staff that spoke. It helped me to connect by their knowledge. All aspects of the program was incredible and I learned so much. No other diet or program compares to this Eat Well Live Well Program.”</p> <p>“I enjoyed all the research and data that supports a plant based diet.”</p> <p>“I enjoyed all of the aspects of this program especially the information provided in the lectures, cooling classes & inspirational documentaries.”</p> <p>“sharing of recipes was helpful, discussions were helpful, learning about alternative products also good.”</p> <p>“hearing this again is good for me and I appreciated the accountability of the weekly meetings.”</p>
10. How did the Eat Well Live Well Program impact your intake of meat and dairy?”	<p>“I eat none now.”</p> <p>“Eating a lot less.”</p> <p>“Substantially! I am most likely over eating meat - dairy is a bit if a struggle.”</p> <p>“Significantly. Lowered my intake of meat, dairy& eggs by 90%”</p> <p>“Dairy and meat is down to maybe once a week.”</p> <p>“Decreased it to zero.”</p> <p>“I haven’t eaten meat since I started the program and don’t miss it! I eat dairy very rarely now.”</p> <p>“Very impactful. The evidence of my having my before and after numbers have motivated me to continue.”</p> <p>“I now rarely eat meat and I have eliminated dairy especially after learning the benefits of eating a whole food plant-based diet.”</p> <p>“Cut in half or more intake. Plan to reduce more.”</p> <p>“It was life changing. I am meat and mostly dairy free now.”</p> <p>“Don't eat meat, but it did help me cut my dairy!!!”</p>

Table 12

Responses for Quiz 12: Question 11

Question	Exact responses
11. If this program were conducted again in the future, what recommendations would you give for improvement?	<p>"More cooking classes."</p> <p>"To be able to meet together."</p> <p>"I didn't enjoy the group discussions, I would rather have not done those in order to have much shorter Zoom call commitments."</p> <p>"Mid way have a get together ... (potluck)."</p> <p>"I would like in person classes with cooking on hands."</p> <p>"I would like to see and exercise or yoga portion. Other than that it was a great program and I am happy I decided to join. Thank you."</p> <p>"Great program, would only suggest optional group contact throughout week (ie private facebook.)"</p> <p>"If there was a hands on cooking session."</p> <p>"Maybe keep it going for a 6 month program."</p> <p>"Another face to face check in with Nadine in the middle of the program for one on one counsel."</p> <p>"I think it was very effective as it was presented. I can't think of any ways to improve it. It was well organized, informative, personal and supportive. Nadine did an excellent job!"</p> <p>"Great program loved all of it."</p> <p>"This has been the most effective plan I have ever tried. I do not have any recommendations at this time."</p> <p>"Nadine did an outstanding job ! I was SO impressed !!!!! She exceeded my expectations!"</p> <p>"No recommendations. It was informative, well organized, and professional."</p> <p>"More sessions and separate cooking sessions."</p> <p>"Great learning opportunity, Nadine did a great job providing evidence based information, great discussions with participants, and collaborating awesome speakers. Thank you so much Nadine for this opportunity. Great Job!!!"</p>

Mastery of DNP Essentials

This project utilized DNP Essentials I, II, III, IV, VI, VII, and VIII.

Essential I: Scientific Underpinning for Practice

The doctor of nursing practice (DNP) advanced practice nurse (APN) is prepared to integrate knowledge from all the sciences in order to be more effective in their practice. According to Zaccagnini and White (2017), these sciences include biophysical, analytical, ethical, psychosocial, and organizational sciences. The blending of all the sciences is what differentiates nursing from the profession of medicine. Medicine seeks to diagnose and treat disease, while nursing seeks to treat the human being as a whole and not just the disease (Zaccagnini & White, 2017). The DNP APN sees the individual as a complex person with physical, spiritual, and psychological dimensions (O'Brien, 2018). As such, nursing theory, which is essential to the practice of nursing, should be incorporated into the practice of all DNP nurses. The use of theory to guide practice enables the DNP nurse to achieve a higher level of care while, at the same time, elevating the profession of nursing (Zaccagnini & White, 2017).

This project utilized the scientific underpinning for practice by incorporating the science of anatomy and physiology to teach individuals how an unhealthy diet and lifestyle can affect the various functions of their body and cause the development of disease. As we discussed the complications of obesity and obesity-related illnesses, we also dived into the realm of psychology and discussed stress and emotional eating as an environmental cause of disease and how to manage it effectually. We also addressed family dynamics and how to include the family in their quest to make lifestyle changes.

The scientific underpinning was also utilized through the use of the HBM as the theoretical framework to guide the project. The HBM helped to balance the sciences by focusing on the factors that helped or hindered the individual's readiness for change. These factors include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cue to action, and self-efficacy (Butts & Rich, 2015). As we met from week to week, we were able to work through these factors to influence the participants to enable them to effectually make the changes that they desired and gain significant results.

Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking

Zaccagnini and White (2017) discusses that the Affordable Care Act of 2010 has enabled APNs to fill positions that before were not as available to them. APNs are now at the forefront leading out in practices that provide quality, safe, and affordable care for a variety of patient populations. APNs are called to be leaders in primary care and in prevention and wellness programs. APNs are becoming change agents that operate at the organizational and systems level. They can quickly identify problems in an organization and implement projects or programs that will target that problem (Zaccagnini & White, 2017).

This project manager functioned as a leader and change agent by undertaking this project. Obesity is a rising epidemic in the U.S. and affects all organizations and systems. With 42.4% of the U.S. population that is now obese, there is need for a change within the healthcare system, with business organizations, and with individuals (Centers for Disease Control and Prevention, 2021, June 7). Not only are we plagued with obesity, but we are also plagued with obesity-related complications, including diabetes,

heart disease, hypertension, and certain types of cancer. This project sought to apply principles that will affect change in individuals that belong to systems and organizations. The project manager functioned as the leader of this project and was able to teach individuals principles that will help to stem the tide of obesity and obesity-related complications. They, in turn, can teach these principles to their family, friends, and co-workers.

Essential III: Clinical Scholarship and Analytic Methods for Evidence-Based Practice

According to Chism (2019), the DNP APN should be well versed in evaluating, integrating, translating, and applying evidence-based practices to their everyday job. They should be able to search the existing literature and critically evaluate it so that they can come up with the best method of practice (Chism, 2019). This project has functioned as a training ground for this DNP student in that it was a requirement to scrutinize the literature and to critically evaluate studies regarding a WFPBD as one of the best evidence-based practices for managing obesity. It took many hours, days, weeks, and months to analyze the principles of a WFPBD and to develop a twelve-week program that was evidence-based.

The six steps in the evidence-based research process were carefully followed in this project. These steps include cultivating an inquiring spirit, asking a burning clinical question, searching for and collecting the most relevant and best evidence from the research, critically appraising the research evidence, integrating the research evidence into practice to make changes, evaluating the outcomes of the practice change, and disseminating the outcomes of the evidence-based change (Melnyk & Fineout-Overholt,

2015). This project has indeed been a learning experience and has prepared the grounds for future practice as an APN in the clinical realm as well as in the research realm.

Essential IV: Information Systems-Technology and Patient-Care Technology for the Improvement and Transformation of Healthcare

Healthcare has quickly transformed from paper-based charting and documenting to everything computer-based. DNP APNs are well prepared to use many technology-based methods in the delivery of care, including telemedicine, electronic health records, and internet-based communications (Chism, 2019; McGonigle & Mastrian, 2018). This project has been instrumental in preparing this DNP student to use technology to communicate effectively with patients. The project utilized Zoom technology as the platform to communicate with participants from week to week. Zoom meetings had to be carefully planned and constructed so that every participant would know exactly when to meet and how to access the sessions.

The project manager also had to utilize various methods of communicating with each participant, including emails, texting, and phone calls. The use of technology was also utilized in choosing the CardioCheck Plus Analyzer to measure cholesterol and blood sugar levels. The project manager had to undergo online training and certification to be able to use the machine to get the most accurate results. This project would not have been successful without the use of technology. This project manager is well prepared to use medical technology in future practice as an APN.

Essential VI: Interprofessional Collaboration for Improving Patient and Population Outcomes

The DNP-prepared APRN practices at the “highest level of clinical expertise” and must be able to collaborate with all healthcare disciplines in order to provide safe and effective patient care to improve outcomes (Zaccagnini & White, 2017, p. 235). This project would not have been possible without the help of other disciplines of the healthcare team. The project manager was mentored by a registered dietician who shared her expertise on the use of evidence-based nutrition recommendations. The project manager was also mentored by an APRN who shared her expertise on the clinical aspects of patient care. She was instrumental in many other ways, including reading and editing the proposal documents and helping the project manager decide how to structure the program to meet the busy patient population. Other disciplines who were utilized in the project included a statistician to assist in analyzing the data and a chair who guided the project manager in putting the entire project together. There was also collaboration with medical doctors who assisted in presenting some of the lectures. This project manager has greatly benefited from the collaboration of all these members of the healthcare team.

Essential VII: Clinical Prevention and Population Health for Improving the Nation’s Health

According to Chism (2019), the DNP APRN is expected to use clinical prevention and health promotion in their practice. Clinical prevention focuses on activities that promote health and reduces and/or prevent disease. Population health focuses on the many areas that affect health, including the community, the environment, the culture, and the socioeconomic aspects. DNPs must be able to analyze and interpret data from

epidemiological, occupational, biostatistical, and environmental sources in order to develop, implement and evaluate programs to improve the health of individuals and populations (Chism, 2019).

This project was deeply grounded in these concepts. The project manager utilized epidemiological, biostatistical, and environmental data to frame the background and the need for this project. These sciences were also used to develop and implement the entire 12-week program. The prevention, management, and treatment of obesity and obesity-related complications was the theme of the project. Individuals benefitted from gaining a greater knowledge of obesity and by first-hand experiencing the effects of living and eating a healthier diet.

Essential VIII: Advanced Nursing Practice

DNP APRNs are prepared to practice in one of the various advanced practice specialties. This DNP student has gained the training needed to practice in the area of family practice. Participating in this project has been a part of the preparation to act as a DNP-prepared APRN. This project has enabled this project manager to develop skills in communicating with individuals of the same ethnicity yet very culturally diverse due to their various developmental backgrounds. This project has allowed the project manager to further develop the competencies needed for an entry-level DNP APRN. These skills include independent practice, which includes assessing, diagnosing, treating, and managing various illnesses (Chism, 2019). The DNP student had to personally meet with each participant and discuss their illnesses and how to use the principles in this program to their benefit. Other competencies include using a scientific foundation for practice, providing leadership, providing quality care, a spirit of inquiry to improve outcomes, and

using technology to improve decision-making (Chism, 2019). These competencies have all been developed as a result of this project. This project has given this DNP student practice and insight into the day-to-day world of the APRN and has provided preparation for future practice.

Spiritual Encouragement

God's design for all humankind is that we "should prosper and be in good health" (3 John 1:2, King James Version). It was never God's design that human beings should be plagued with illness and disease. Sin has marred God's perfect plan, yet, He has provided a way for us to stay in good health and keep the body functioning at a level that we can live prosperous and happy lives. Genesis 1:29 (King James Version) says, "I have given you every herb that yields seed which is on the face of all the earth, and every tree whose fruit yields seed; to you it shall be for food." As we partake of the delicious fruits, nuts, grains and vegetables that God has provided for our health and our pleasure, we will reap the benefits.

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APPENDIX A

DEMOGRAPHIC QUESTIONNAIRE

Please enter your participant identification (ID) number _____

1. What is your gender?
 - a. Male
 - b. Female
2. What is your age? _____
3. What is your race?
 - a. White
 - b. Hispanic or Latino
 - c. Black or African American
 - d. Native American or American Indian
 - e. Asian / Pacific Islander
 - f. Other
4. What is the highest level of education you have completed?
 - a. Less than high school
 - b. Completed high school
 - c. Some college
 - d. Undergraduate degree
 - e. Graduate degree

5. Please state your income range?
 - a. Less than \$20,000
 - b. \$20,000 to \$34,999
 - c. \$35,000 to \$49,999
 - d. \$50,000 to \$74,999
 - e. \$75,000 to \$99,999
 - f. Over \$100,000

6. Do you have any of the following health conditions?
 - a. Prediabetes
 - b. Type 2 diabetes
 - c. High blood pressure
 - d. High cholesterol
 - e. Heart disease

APPENDIX B

MEDITERRANEAN DIET ADHERENCE SCREENER (MEDAS) QUESTIONNAIRE

Question	Yes	No	Nutrition Issue to Discuss in Response
1 Is olive oil the main source of fat for cooking?			Choose Healthy Fats Olive oil is high in monounsaturated fat and a healthy choice for cooking and preparing foods.
2 Do you have 4 tablespoons (60 ml) or more of olive oil each day?			Add olive oil to your meals.
3 Do you eat 4 servings of vegetables each day? (1 serving is ½ c raw or cooked or 1 c of raw salad greens)			Eat plenty of fruits and vegetables Eating a wide variety of fruits and vegetables every day provides vitamins, minerals, phytochemicals and fibre and offers protection for heart disease and cancer.
4 Do you have 3 whole fruits or 1.5 c fruit each day?			
5 Do you eat less than 1 serving of red meat, hamburger, sausage or processed meats daily?			Choose lean meats and consider cooking methods Processed meats are often high in saturated fat and salt and are best replaced with white meat, fish or vegetarian sources of protein.
6 Do you eat 1 tablespoon (15 ml) or less of butter, margarine or cream each day?			Choose plant-based alternatives.
7 Do you have < 1 can (355 ml or 12 oz) of sugar sweetened beverages each day?			Excess sweet drinks can effect blood sugars and heart disease risk. Limit sweet drinks.
8 Do you drink 3 glasses or more of wine per week? (1 serving is 150 ml or 5 oz)			Drinking alcohol comes with risks. Discuss with your health care provider.
9 Do you have 3 servings or more of legumes (peas, beans, or lentils) each week? (1 serving is ½-2/3 c)			Include soluble fibre Legumes are high in soluble fibre, protein and other important nutrients and a budget-friendly way to get more protein.
10 Do you have 3 servings or more of fish or seafood each week? Fish serving is 3.5-5 oz or 100-150 g, seafood serving 4-5 pieces			Eat more oily and white fish Fish is an excellent source of protein and vitamin D. Choose fish high in omega-3 fats like salmon, trout, sardines, anchovies and herring.
11 Do you eat commercial baked goods such as cookies, doughnuts or cake less than 2 times per week?			Eat less processed food Baked goods are often high in saturated fat, salt and sugar. Choose fruit or unsalted nuts or seeds for a healthy snack.
12 Do you eat nuts 3 or more times per week? 1 serving is 30 g or 1 oz			Snack on unsalted nuts Nuts are rich in unsaturated fat, phytosterols, fibre, vitamin E and iron, e.g. walnuts, almonds, hazelnuts.
13 Do you choose chicken or turkey more often than beef, pork, hamburger or sausage?			Choose lean proteins with little or no visible fat or skin.
14 Do you consume vegetables, pasta or rice dishes with a homemade sauce of sauted garlic, onions, olive oil and tomatoes 2 or more times a week?			Homemade sauces of garlic, onions, olive oil, and tomato are consumed often in the Mediterranean style of eating.
TOTAL SCORE (total number of 'yes' answers)			

Adapted from: Alison Hornby and Katherine Paterson and www.Predimed.es, Int J Epidemiol 2012 Apr;41(2):377-385, J Nutr Jun;41(6):1140-5, and N Engl J Med 2019; 3278:e34 DOI: 10.1056/NEJMoa1800389

From: Dieticians of Canada. (2018, November). Mediterranean diets score tool +adherence screener. <https://www.eefht.ca/wp-content/uploads/2020/03/DC-Mediterranean-Diet-Score-Tool.pdf>

APPENDIX C

THE EATING HABITS CONFIDENCE SURVEY (EC)

EATING HABITS CONFIDENCE SURVEY

Below is a list of things people might do while trying to change their eating habits. We are mainly interested in salt and fat intake, rather than weight reduction.

Whether you are trying to change your eating habits or not, please rate how confident you are that you could *really motivate* yourself to do things like these consistently, *for at least six months*.

Please circle *one* number for each item:

How sure are you that you can do these things?

		I know I cannot		Maybe I can		I know I can		Does not apply	
1.	Stick to your low fat, low salt foods when you feel depressed, bored, or tense.	1	2	3	4	5		(8)	
2.	Stick to your low fat, low salt foods when there is high fat, high salt food readily available at a party.	1	2	3	4	5		(8)	
3.	Stick to your low fat, low salt foods when dining with friends or co-workers.	1	2	3	4	5		(8)	
4.	Stick to your low fat, low salt foods when the only snack close by is available from a vending machine	1	2	3	4	5		(8)	
5.	Stick to your low fat, low salt foods when you are alone, and there is no one to watch you.	1	2	3	4	5		(8)	
6.	Eat smaller portions at dinner.	1	2	3	4	5		(8)	
7.	Cook smaller portions so there are no leftovers.	1	2	3	4	5		(8)	
8.	Eat lunch as your main meal of the day, rather than dinner.	1	2	3	4	5		(8)	
9.	Eat smaller portions of food at a party.	1	2	3	4	5		(8)	
10.	Eat salads for lunch.	1	2	3	4	5		(8)	
11.	Add less salt than the recipe calls for.	1	2	3	4	5		(8)	
12.	Eat unsalted peanuts, chips, crackers, and pretzels.	1	2	3	4	5		(8)	
13.	Avoid adding salt at the table.	1	2	3	4	5		(8)	
14.	Eat unsalted, unbuttered popcorn.	1	2	3	4	5		(8)	
15.	Keep the salt shaker off the kitchen table.	1	2	3	4	5		(8)	
16.	Eat meatless (vegetarian) entrees for dinner.	1	2	3	4	5		(8)	
17.	Substitute low or non-fat milk for whole milk at dinner.	1	2	3	4	5		(8)	
18.	Cut down on gravies and cream sauce.	1	2	3	4	5		(8)	

- | | | | | | | | |
|-----|---|---|---|---|---|---|-----|
| 19. | Eat poultry and fish instead of red meat at dinner. | 1 | 2 | 3 | 4 | 5 | (8) |
| 20. | Avoid ordering red meat (beef, pork, ham, lamb) at restaurants. | 1 | 2 | 3 | 4 | 5 | (8) |

From: Sallis, J. F. (2021). Self-efficacy for diet and exercise.
https://drjimsallis.org/measure_selfefficacy.html

APPENDIX D
INFORMATION FLYER



**EAT WELL, LIVE WELL:
A FREE 12-WEEK PLANT-
BASED DIET PROGRAM FOR
HEALTH & WEIGHT LOSS**

YOU CAN PARTICIPATE IF:

- AGE 18 OR OLDER
- WANT TO LOSE WEIGHT
- HAVE A PRIMARY CARE PROVIDER
- HAVE ACCESS TO ZOOM MEETINGS
- INTEREST IN EATING PLANT-BASED

DATES:

REGISTRATION DEADLINE:

WHAT IS INCLUDED?

- COOKING WITH CHEF
- HEALTH TALKS
- CHOLESTEROL TEST
- ONLINE GROUP MEETINGS

WHAT WILL I LEARN?

HOW TO LOWER RISK FROM:

- HEART DISEASE
- HIGH BLOOD PRESSURE
- DIABETES
- OBESITY
- HIGH CHOLESTEROL

WHAT DO I GET?

- \$25 HEALTH FOOD STORE GIFT CERTIFICATE
- CHANCE TO WIN AN INSTANT POT

INTERESTED?

CALL, TEXT, OR EMAIL

**Nadine Larcher, BSN,
RN, DNP student
316-558-1158
larcher@andrews.edu**

Andrews University
School of Nursing

APPENDIX E

LETTER TO HEALTH CARE PROVIDERS

Dear Dr.....

As you may already know, I am in the last year of my DNP program at Andrews University. As a requirement to complete my studies, I am recruiting participants for my project entitled “**Effects of a 12-week Plant-based Program on Obese and Overweight Adults in Rural Michigan.**” I decided to do this project because I have a passion for healthy eating and helping individuals make lifestyle changes. There is a wealth of evidence that a plant-based diet is effective at preventing, treating, and even reversing many chronic diseases. This is backed by recommendations from many organizations, including the American Association of Clinical Endocrinologists, the American College of Endocrinology, the American Heart Association, and the American College of Cardiology. Many people are not aware of these benefits. **This project is an effort to educate and encourage interested individuals to move towards a more plant-based diet to improve their health.**

The program is a **12-week online program with weekly via Zoom meetings.** Through discussions, health lectures, reading handouts, and cooking demonstrations, participants will learn how to gradually transition to a plant-based diet. **I will measure pre and post biometric measurements of BMI, waist circumference, blood pressure, blood glucose, and lipid levels.** I will also measure self-efficacy and dietary intake using a questionnaire which they will securely complete online using a secure survey tool. The program begins _____ and is totally voluntary and free to all participants.

I am seeking your help to recruit participants for the project. Inclusion criteria are BMI of 25 or over; willingness to try a plant-based diet; not currently on a 100% WFPBD, have a primary care provider (PCP); have internet access, and have a smartphone, mobile device, or a computer. **Exclusion criteria** include weight more than 350 pounds, pregnant, breastfeeding, currently smoking, current alcohol abuse, or illicit drugs. If you have any patients that could benefit from this project or if you know anyone that would like to participate, please have them **call or text at 316-558-1158 or email larcher@andrews.edu**. I will also provide you with flyers. I will appreciate your **assistance in giving these flyers to your patients** and other interested parties. I will be happy to answer your questions regarding the project.

Thank you,

Nadine Larcher, Project Manger, BSN, RN
316-558-1158
larcher@andrews.edu

APPENDIX F

SUGGESTED SCRIPT FOR HEALTH CARE PROVIDERS

Have you considered trying a plant-based diet to help you lose weight, lower your cholesterol level, or decrease your blood pressure? Then consider joining this free 12-week plant-based project. You will meet in a group once per week for 12 weeks via Zoom technology. Through discussions, health lectures, reading handouts, and cooking demonstrations, you will learn how to gradually transition to a plant-based diet. You will also receive free cholesterol and blood sugar testing. Here is a flyer. Think about it and if you are interested, please email or call Nadine Larcher for more information. Her contact information is on this flyer.

APPENDIX G:

SCRIPTS FOR RADIO AND FACEBOOK ADVERTISING

Radio

Are you interested in learning how to transition to a plant-based diet, lose weight, decrease your blood pressure, and/or decrease your cholesterol levels? You are invited to participate in a free project involving a 12-week plant-based diet program to decrease weight and improve health. The program will be conducted one day per week for 12 weeks through Zoom technology. You will participate in discussions, health lectures, cooking demonstrations, and handouts to reinforce information received. During this period, you will learn how to gradually transition to a plant-based diet. You will also receive free cholesterol and blood sugar testing. To be eligible, you must be 18 or older, be interested in adopting a plant-based diet, have a need to lose weight, have a primary care provider, have access to zoom technology, and live in northern Michigan. A \$25 gift certificate will be given to anyone who completes the program. If interested, please email Nadine Larcher for more information at larcher@andrews.edu or call 316-558-1158.

Facebook

Are you interested in learning how to transition to a plant-based diet, lose weight, decrease your blood pressure and/or cholesterol levels? Then, take a look at this opportunity to be involved in a free 12-week plant-based project! See attached flyer.

APPENDIX H

PARTICIPANTS CONSENT LETTER

Andrews University

Title of Project: Effects of a 12-week Plant-based Diet Program on Obese and Overweight Adults in Rural Michigan

Please read this consent document carefully before you decide to participate in the project.

Principal Investigator: Nadine Larcher, Project Manager, BSN, RN

Project Advisor: Dr. Jochebed Ade-Oshifogun

Statement of Scholarly Project:

This project is done by a doctoral student and professor from Andrews University, Berrien Springs, Michigan. Your participation in this project is greatly appreciated.

Purpose: The purpose of this project is to examine the effects of a whole food plant-based diet on overweight and obese adults residing in rural northern Michigan.

Procedures

You will be asked to provide your email address and phone number to be used for the purpose of communicating information to you.

During this program, you will meet once per week for 12 weeks of online Zoom meetings with other participants for 45-75 minutes in length. During these meetings, you will have group discussions, view cooking demonstrations, and listen to various health presentations about managing overweight and obesity with a plant-based diet. The meetings will be recorded on zoom for the benefit of participants who may miss a few meetings and to reiterate information given at the meetings. The recorded meetings will be deleted after the program completion.

Before and at the end of the program, you will be asked to meet with the doctoral student to measure your weight, height, waist circumference, and blood pressure. You will also have your cholesterol levels, and blood sugar checked using a fingerstick blood sample.

You will complete a demographic questionnaire about your age, gender, race, education level, income level, and medical diagnoses. You will also complete two questionnaires before and after the program to learn about your eating habits and confidence. You will complete the food questionnaires two more times during the project. You will receive handouts to reiterate the information you receive from the meetings and complete a short quiz after each weekly program. The total completion time for both surveys is less than 10 minutes and 5 minutes for the quizzes.

To successfully complete the 12-week program, you need to complete all surveys, body measurements, blood tests, attend at least 9 out of 12 zoom meetings, and complete 8 out of 12 quizzes. If unable to attend the Zoom meetings, you will receive a recording of the meeting by email. You will receive credit for the zoom meeting missed if you watch the video.

Possible Risk/Discomfort

There are some minor risks involved with getting a fingerstick to measure your cholesterol and blood sugar levels. You may experience some discomfort or have a bruise to your finger after the fingerpick. There is also a small risk of infection to your finger. To decrease these risks, your finger will be cleaned with an alcohol swab before and after the fingerpick, and you will be given a clean gauze to hold pressure to it and a band-aide if needed.

Another risk with participating in this program is that you may need changes to your blood pressure or diabetes medications. If your blood pressure gets low, you may experience dizziness, lightheadedness, nausea, or tiredness. If your blood sugar drops too low, you may have dizziness, sweating, shaking, confusion, or anxiety. To lessen your chances of low blood pressure or low blood sugar, you are asked to please notify your primary care provider that you are participating in this program and that you may need your medications adjusted. A nurse practitioner will be available for you to ask any medical questions you may have during this project, but this does not replace getting care from your doctor, nurse practitioner, or physician assistant.

In the unlikely event of injury resulting from this project, Andrews University is not able to offer financial compensation nor to absorb the costs of medical treatment. However, assistance will be provided to participants in obtaining emergency treatment and professional services that are available to the community generally at nearby facilities.

Possible Benefits

By participating in this project, you will have a greater knowledge about a plant-based diet and how it can help you prevent or manage diseases like diabetes, high cholesterol, and obesity. Potential benefits to participating in this project are that you may lower your blood pressure, cholesterol, and blood sugar levels, lose weight, lower your body mass index (BMI), and decrease your waistline.

Voluntary Participation

Participation in this project is entirely voluntary. Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may discontinue participation at any time without penalty or loss of benefits to which you may otherwise be entitled. However, you need to complete the minimum requirements specified above to receive the compensation.

Privacy/Confidentiality/Data Security

All information that we collect from this project will be kept confidential. Any identifying information (name, email address, phone number) will be stored safely in a password-protected computer file, and no one but the project manager and faculty advisor will have access to it. You will be assigned an identification code which you will be asked to enter on your survey questionnaires instead of your name. This code will also be used to enter the results of your measurements and blood tests onto a spreadsheet for analysis.

Your email address and phone number will be used for communication between you and the project manager during the 12-week program.

We anticipate that your participation in the questionnaires presents no greater risk than everyday use of the internet.

Confidentiality:

The results of this project may be published in a journal and may be presented in a conference or in a meeting with other health care providers. There will be no identifiers linking you to the project dissemination.

Incentives

If you successfully complete the criteria for participation in this project, you will be given a \$25 gift card to the Nature's Nest Health Food Store, and your name will be entered in a drawing to win an instant pot.

Contact Information for Questions

If you have questions or concerns, please contact Nadine Larcher at 316-558-1158, or email her at larcher@andrews.edu

You may also use the following contacts if you have questions or concerns:

- Dr. Ade-Oshifogun, Ph.D., RN, Endowed Chair of Andrews University Department of Nursing at (269) 471-3363 or jochebed@andrews.edu
- The Andrews University Institutional review board at 269-471-6361 or irb@andrews.edu.
- The Institutional Review Board for Munson Healthcare at 231-935-5049.

Voluntary Participation

I have been informed about the duration and procedures involved in this project. I certify that I am at least 18 years old. I understand my risk and benefits. I understand that I will

be participating in a 12-week plant-based diet program. I agree to have the Zoom meetings recorded for those who cannot attend. I have been given the opportunity to ask questions and have had my questions answered. I freely give my consent to be a part of this project.

You may print/keep a copy of this consent form.

Participant's name (Please Print)

Date

Participant's signature

Project Manager's signature

Date

Assigned ID# _____

APPENDIX I
PARTICIPANT LETTER TO PCP

Dear Primary Care Provider:

This letter is to inform you that I will be participating in a virtual project entitled “Effects of a 12-week plant-based diet program on obese and overweight adults in rural Michigan.” I am interested in losing weight and improving my health and hope that participating in this program will help me to reach some of my health goals. Throughout this program, I will gain a better understanding of a plant-based diet and how it can help with weight management and prevent or manage diabetes, prediabetes, high blood pressure, and cholesterol levels. I will also have my cholesterol and blood sugar tested before and at the end of the program.

I am letting you know about my plans to participate in this program because I know that as I make these lifestyle changes, there is a chance that my medication dosages may need to be adjusted. I will be in contact with you if I feel I need to make any changes. If you have any questions about this program, please contact Nadine Larcher, DNP Student, BSN, RN, at 316-558-1158 or email her at larcher@andrews.edu. You may also use the following contacts if you have questions or concerns about this program:

- Dr. Ade-Oshifogun, Ph.D., RN, Endowed Chair of
Andrews University Department of Nursing at (269) 471-3363 or
jochebed@andrews.edu
- The Andrews University Institutional Review Board at 269-471-6361 or
irb@andrews.edu.
- The Institutional Review Board for Munson Healthcare at 231-935-5049.

Thank you

APPENDIX J

LESSON PLANS: WEEK 1-12

Lesson Topic 1	Class Introduction/ Introduction to A Whole Food Plant-based Diet
Purpose	Enable participants to connect with others in the class and equip them with knowledge about a whole food plant-based diet.
Lesson Goal	<ul style="list-style-type: none"> • Participants will be knowledgeable about a whole food plant-based diet eating plan. • Participants will name at least one person in their group.
Lesson Objectives	<p>Following this Zoom meeting, participants will be able to do the following with at least 70% accuracy:</p> <ul style="list-style-type: none"> • Define a whole-food plant-based diet. • Identify the four categories of plant-based foods. • Identify recommended intakes of vegetables, fruits, whole grains, and legumes. • Define how much of each plant-based category should occupy their plate. • Identify if a plant-based diet provides adequate intakes of protein, iron, B12, and calcium. • Name at least one other person in the group.
Content Outline	<ul style="list-style-type: none"> • Welcome and Presenter Introductions (20-25 minutes)-Nadine Larcher. • Review the 12-program week by week (10-15 minutes)- Nadine Larcher • PowerPoint Presentation by Nadine Larcher (15-20 minutes) to cover: <ul style="list-style-type: none"> ▪ Definition of a whole-food plant-based diet ▪ The categories of a plant-based food ▪ The <i>WFPB Plate</i> & the <i>PowerPlate</i> method ▪ The recommended intakes of vegetables, fruits, grains, and legumes

	<ul style="list-style-type: none"> ▪ Getting adequate protein, calcium, iron, B12, and omega 3 fatty acids on a plant-based diet. • Discuss personal SMART Goals (5 minutes) • Question and Answers (Q&A)/Review Assignments for the week (5-10 minutes)
Assessment Plan	Quiz
Method of Instruction	Zoom, PowerPoint, Group discussion (Breakout rooms)
Time Allotted	55-75 minutes
Technology/Resources	Zoom, computer, educational handout, PowerPoint
Homework Assignment	<ul style="list-style-type: none"> • Read Handout-<i>The PowerPlate</i> (by PCRM), <i>The Nutrition Rainbow</i>, and <i>Food as Medicine Jumpstart</i> • Watch <i>Fork over Knives</i> Documentary • Work on personal goals • Complete Quiz

Lesson Topic 2 The Role of Fiber in Weight Control	
Purpose	Provide participants with education on fiber
Lesson Goal	Patients will be knowledgeable about the importance of fiber.
Lesson Objectives	<p>Following this Zoom meeting on fiber, participants will be able to do the following with 70% accuracy:</p> <ul style="list-style-type: none"> • Define fiber • Identify three sources of fiber • State one negative effect of starting a high fiber diet • State three benefits of a high fiber diet • State two types of healthy carbohydrates • State two benefits of drinking water
Content Outline	<ul style="list-style-type: none"> • Welcome Participants and discuss SMART goals (15 minutes). • PowerPoint presentation by Nadine Larcher, RN (20 minutes) to cover: <ul style="list-style-type: none"> ▪ The definition of fiber; ▪ Types and sources of fiber ▪ Advantages and disadvantages of starting a high fiber diet ▪ Tips on starting a high fiber diet ▪ How fiber helps weight loss

	<ul style="list-style-type: none"> ▪ Healthy carbohydrates versus unhealthy carbohydrates ▪ Benefits of drinking water • Cooking demonstration by chef Miguel Larcher (40 minutes) • Q&A and discuss assignments for the week (5-10 minutes)
Assessment Plan	Quiz
Method of Instruction	Zoom, PowerPoint presentation, cooking demonstration
Time Allotted	80-85 minutes
Technology/Resources	Zoom, computer, educational handouts
Homework Assignment	<ul style="list-style-type: none"> • Read <i>Power-plate-Fill up on Fiber</i> (PCRM handout) and <i>Nutrition Myths</i>. • Work on personal SMART goals • Complete quiz

Lesson Topic 3	Grocery Store Tour: Shopping for Healthy Foods
Purpose	Equip participants with knowledge of healthy items to purchase at the grocery store
Lesson Goal	Participants will be knowledgeable of healthy items to stock in their pantry
Lesson Objectives	<p>Following this presentation participants will be able to do the following with 70% accuracy:</p> <ul style="list-style-type: none"> • Identify 4 healthy foods to stock up on • Identify two items to purchase from the produce section • Identify the healthiest type of pasta to purchase • Name three added ingredients in foods that are not healthy in large quantities • Name two healthy ingredients to purchase in the freezer section • Identify two items to evaluate on food labels
Content Outline	<ul style="list-style-type: none"> • Welcome participants and discuss SMART goals and make suggestions on cookbooks (10-15 minutes) • PowerPoint presentation by Cyndi Leffler, RD (20-25 minutes) to cover the following: <ul style="list-style-type: none"> • Navigating through the ingredients list • Healthy foods to purchase in different sections of the supermarket. • Unhealthy items to avoid in the grocery store.

	<ul style="list-style-type: none"> • How to interpret food labels. • Breakout rooms (20-35mins) • Q&A and discuss assignments for the week (5-10 minutes).
Assessment Plan	Quiz
Method of Instruction	Zoom, PowerPoint, educational reading, Group discussions (Zoom breakout rooms)
Time Allotted	55-85 min
Technology/Resources	Zoom, computer, PowerPoint, educational handouts
Homework Assignment	<ul style="list-style-type: none"> • Complete quiz • Work on SMART goals • Continue reading <i>Food as Medicine Jumpstart</i> and <i>How to Read Food Labels</i>

Lesson Topic 4	Replacing Meat & Dairy
Purpose	Provide participants with knowledge of how to replace meat and dairy in the diet
Lesson Goal	Participants will be knowledgeable about how to replace meat and dairy in their diet
Lesson Objectives	<p>Following this session on meat and dairy, participants will be able to do the following with at least 70% accuracy:</p> <ul style="list-style-type: none"> • Identify 2 negative effects of eating meat • Identify two negative effects of eating dairy • Identify two food items that can replace meat in the diet • Identify two food items that can substitute for dairy in the die
Content Outline	<ul style="list-style-type: none"> • Welcome Participants and discuss SMART goals (5 minutes). • PowerPoint presentation by Cyndi Leffler, RD (20-25 minutes) to cover: <ul style="list-style-type: none"> ▪ Common protein myths ▪ Benefits of plant versus animal protein ▪ The health effects of eating animal protein ▪ The benefits of eating plant foods ▪ Healthy meal replacements for meat and dairy • Breakout rooms (15 minutes) • Cooking demonstration by chef Miguel Larcher (30-40 minutes) • Q& A and discuss assignments for the week (5 minutes)
Assessment Plan	Quiz

Method of Instruction	Zoom, PowerPoint, group discussion, cooking demonstration
Time Allotted	75-90 minutes
Technology/Resources	Zoom, PowerPoint presentation, educational document
Homework Assignment	<ul style="list-style-type: none"> • Read <i>ingredient's substitution chart</i> (PCRM handout) • Read <i>red and processed meat products-No safe amount</i> (PCRM handout). • Read <i>health concerns with Eggs</i> (PCRM handout) • Read <i>health concerns about fish</i> (PCRM handout) • Read <i>health concerns about dairy</i> (PCRM handout) • Complete quiz • Work on SMART goals • Complete dietary intake questionnaire

Lesson Topic 5	Management of Obesity on A Plant-Based Diet
Purpose	Equip participants with knowledge of how to manage weight on a plant-based diet
Lesson Goal	Participants will be knowledgeable of how to manage weight on a plant-based diet
Lesson Objectives	<p>Following this session on obesity, participants will be able to do the following with at least 70% accuracy:</p> <ul style="list-style-type: none"> • Define BMI parameters for obesity • Explain two causes of obesity • Identify two complications of obesity • Define caloric density • Identify four food categories that will help with weight loss • Name two additional tips for weight loss
Content Outline	<ul style="list-style-type: none"> • Welcome Participants and discuss SMART goals (5 minutes). • PowerPoint presentation by Nadine Larcher, RN (20-25 minutes) to cover: <ul style="list-style-type: none"> ▪ BMI definition ▪ Causes of obesity ▪ Complications of obesity ▪ Caloric density ▪ Managing weight with a plant-based diet ▪ Additional tips for weight loss • Breakout rooms (15 minutes) • View video (the Adam Sudd Story) -(10 minutes)

	<ul style="list-style-type: none"> • Q& A and discuss assignments for the week (15 minutes)
Assessment Plan	Quiz
Method of Instruction	Zoom, PowerPoint, Discussion, Role modeling with interview
Time Allotted	60-65 minutes
Technology/Resources	Zoom, PowerPoint presentation, educational document
Homework Assignment	<ul style="list-style-type: none"> • Read <i>healthy weight loss with a plant-based diet</i> (PCRM handout) • Read <i>Caloric Density</i> • Complete quiz • Work on SMART goals

Lesson Topic 6	Complications of Obesity: Type 2 Diabetes
Purpose	Provide patients education on type 2 diabetes disease process, etiology, and management with a plant-based diet
Lesson Goal	Participants will be knowledgeable about the etiology, signs and symptoms, risk factors, and management of type 2 diabetes with a plant-based diet.
Lesson Objectives	<p>Following this Zoom session, participants will be able to do the following with 70% accuracy:</p> <ul style="list-style-type: none"> • Define type 2 diabetes • Explain one cause of type 2 diabetes • Identify three risk factors for type 2 diabetes • Explain three lifestyle modification measures
Content Outline	<ul style="list-style-type: none"> • Introduction and Welcome (5 minutes). • PowerPoint presentation by Eddie Ramirez, MD (25-30 minutes) to cover: <ul style="list-style-type: none"> • The definition, causes, signs and symptoms, and risk factors for type 2 diabetes. • Discuss prevention and management of type two diabetes with a plant-based diet. • Discuss other lifestyle factors for the prevention and management of type 2 diabetes. • Cooking demonstration by chef Miguel Larcher (30-40 minutes) • Q & A and discuss assignments for the week (5-10 minutes)

Assessment Plan	Quiz
Method of Instruction	Zoom, PowerPoint, group discussion, cooking demonstration
Time Allotted	65-85 minutes
Technology/Resources	Zoom, PowerPoint presentation, educational document, computer.
Homework Assignment	<ul style="list-style-type: none"> • Read <i>Diet and Diabetes: Recipes for Success</i> (from PCRM) • Complete quiz • Work on SMART goals

Lesson Topic 7	Complications of Obesity: High Blood Pressure
Purpose	Provide patients education on the disease process, etiology, and management of high blood pressure.
Lesson Goal	Patients will be knowledgeable about the etiology, signs and symptoms, risk factors, and prevention and management of high blood pressure on a plant-based diet.
Lesson Objectives	<p>Following a 20-minute PowerPoint presentation on high blood pressure, participants will be able to do the following with 70% accuracy:</p> <ul style="list-style-type: none"> • Define hypertension • Explain one cause of hypertension • Identify three risk factors for hypertension • Identify two food categories that help to fight hypertension
Content Outline	<ul style="list-style-type: none"> • Introduction & Welcome (5 minutes). • PowerPoint presentation by David DeRose, MD (25-30 minutes) <ul style="list-style-type: none"> • Discuss the definition of hypertension • Discuss causes and risk factors of hypertension. • Discuss the signs and symptoms of hypertension • Discuss the prevention and management of hypertension with a plant-based diet • Discuss other lifestyle prevention and management strategies for hypertension • Breakout room (15 minutes) • Cooking demonstration by chef Miguel Larcher (30 minutes)

	<ul style="list-style-type: none"> • Q & A and discuss assignments for the week (5 minutes)
Assessment Plan	Quiz
Method of Instruction	Zoom, PowerPoint, group discussion
Time Allotted	80-85 minutes
Technology/Resources	Zoom, PowerPoint presentation, educational document, computer.
Homework Assignment	<ul style="list-style-type: none"> • Educational reading-<i>Diet and High Blood Pressure</i> (by PCRM) • Complete quiz • Work on SMART goals • Watch <i>PlantWise</i> documentary

Lesson Topic 8	Complications of Obesity: Heart Disease
Purpose	Provide patients education on the disease process, etiology, and management of heart disease with a plant-based diet.
Lesson Goal	Patients will be knowledgeable about etiology, signs and symptoms, risk factors and management of heart disease with a plant-based diet.
Lesson Objectives	<p>Following today's meeting on heart disease, participants will be able to do the following with 70% accuracy:</p> <ul style="list-style-type: none"> • Define heart disease • Explain one cause of heart disease • Identify three risk factors for heart disease • Identify three signs and symptoms of heart disease <p>Identify two foods categories that help to prevent and manage heart disease</p>
Content Outline	<ul style="list-style-type: none"> • Welcome participants and show pictures of dishes made by participants (15 minutes). • PowerPoint presentation by Nadine Larcher, RN (25 minutes) to cover: <ul style="list-style-type: none"> • Definition of heart disease, and explain some contributing causes. • Risk factors for heart disease. • The signs and symptoms of heart disease.

	<ul style="list-style-type: none"> • The prevention and management of heart disease with a plant-based diet • Other lifestyle interventions to prevent and manage heart disease • Breakout rooms (15-20 minutes) • Q &A and discuss assignments for the week (5 minutes)
Assessment Plan	Quiz
Method of Instruction	Zoom, PowerPoint, group discussion
Time Allotted	60-65 minutes
Technology/Resources/Materials	Zoom, PowerPoint presentation, educational document, computer, Group discussion
Homework Assignment	<ul style="list-style-type: none"> • Read <i>Cholesterol and Heart Disease</i> (by PCRM) • Read <i>Health Concerns about Coconut and Palm Oil</i> (PCRM) • Complete quiz • Work on SMART goals • Complete dietary questionnaire

Lesson Topic 9	Exercising for Health
Purpose	Equip participants with education on the benefits of exercise
Lesson Goal	Participants will be knowledgeable about the benefits of exercise
Lesson Objectives	<p>Following this meeting on exercise, participants will be able to do the following with 70% accuracy:</p> <ul style="list-style-type: none"> • Give one example of moderate-intensity of exercise • Give one example of high-intensity exercise • Identify three benefits of exercise • Identify how many minutes of exercise is recommended per week • Explain one way exercise helps with weight loss
Content Outline	<ul style="list-style-type: none"> • Introduction & Welcome (5 minutes). • PowerPoint presentation by Della Lambert, NP (20-25 minutes) to cover: <ul style="list-style-type: none"> • Exercise guidelines from the American Heart Association • Health benefits of exercise • How exercise helps with weight loss

	<ul style="list-style-type: none"> • Group class discussion (10-15 minutes) • Cooking Class by chef Miguel Larcher (30 minutes) • Q & A and discuss assignments for the week (5 minutes)
Assessment Plan	Quiz
Method of Instruction	PowerPoint, discussion
Time Allotted	70-80 minutes
Technology/Resources	Zoom, PowerPoint presentation, educational document, computer, group discussion
Homework Assignment	<ul style="list-style-type: none"> • Read <i>How Much Physical Activity Do You Need</i> (AHA) • Read <i>Lifestyle Activity</i> (ACLM) • Complete quiz • Work on SMART goals

Lesson Topic 10	Managing Stress
Purpose	Provide participants with knowledge of stress management
Lesson Goal	Participants will be knowledgeable about strategies to manage stress
Lesson Objectives	<p>Following this meeting on stress management, participants will be able to do the following with 70% accuracy:</p> <ul style="list-style-type: none"> • Identify one way too much stress can lead to weight gain • Identify one stress management strategy • State how much sleep per night is recommended.
Content Outline	<ul style="list-style-type: none"> • Introduction & Welcome (5 minutes) • PowerPoint presentation by Nadine Larcher, RN (20-25 minutes) to cover: <ul style="list-style-type: none"> • Discuss acute and chronic stress response • The connection between stress and weight gain • Discuss emotional eating and how to combat it • Importance of sleep on the management of stress and weight gain • Breakout rooms (10-15 minutes) • Q & A and discuss assignments for the week (5 minutes)
Assessment Plan	Quiz

Method of Instruction	Zoom, PowerPoint, group discussion,
Time Allotted	40-50 minutes
Technology/Resources	Zoom, PowerPoint, computer
Homework Assignment	<ul style="list-style-type: none"> • <i>Read Lifestyle Stress Reduction (ACLM)</i> • <i>Read Lifestyle Sleep Health (ACLM)</i> • Complete Quiz • Make appointments for biometric measurements

Lesson Topic 11	Dining Out and Eating with Family
Purpose	Equip participants with knowledge of how to choose healthy foods when dining out
Lesson Goal	<p>Participants will be knowledgeable about healthy food choices when dining out</p> <p>Participants will be knowledgeable about how to include their family into healthy eating</p>
Lesson Objectives	<p>Following this meeting on dining out, participants will be able to do the following with 70% accuracy:</p> <ul style="list-style-type: none"> • Identify a plant-based option at one type of restaurant • Identify two tips for eating healthy away from home • Identify one app that can be used to find restaurants serving plant-based foods
Content Outline	<ul style="list-style-type: none"> • Introduction and Welcome (5 minutes) • PowerPoint presentation by Evelyn Kissinger (20-25 minutes) to cover: <ul style="list-style-type: none"> • How to choose plant-based meals when dining out at various types of restaurants, including Italian, Pizza, Chinese, Mexican, Indian, Steak houses. • How to choose plant-based options at fast food locations. • Helpful apps that can be used to find restaurants offering plant-based options. • Tips for eating healthy when away from home. • Tips on including family members in healthy eating plan • Entire class group discussion (20 minutes) • Q & A and discuss plans for the week (5-10 minutes)
Assessment Plan	Quiz

Method of Instruction	Zoom, PowerPoint, group discussion
Time Allotted	50-60 minutes
Technology/Resources	Zoom, PowerPoint, computer
Homework Assignment	<ul style="list-style-type: none"> • Read <i>Dining at Restaurants and Fast Food Chains</i> (by Plant Pure Communities) • Complete quiz 11 • Work on SMART goals • Make appointment for biometric measurements

Lesson Topic 12	Graduation
Purpose	To honor participants for their completion of the program and accomplishments throughout the program
Lesson Goal	Participants will be aware of their accomplishments and be equipped with resources to continue their plant-based journey
Lesson Objectives	<p>Following completion of this graduation program, participants will:</p> <ul style="list-style-type: none"> • Be aware of their accomplishments throughout the program. • Be knowledgeable about other resources to use to continue on their plant-based journey
Content Outline	<ul style="list-style-type: none"> • Introduction and welcome (5 minutes) • Power point presentation by Nadine Larcher, RN (15-20 minutes) to cover: <ul style="list-style-type: none"> ○ Benefits of moving towards a more plant-based diet • Hallmarks of successful weight maintenance • Resources to continue living a healthy lifestyle • Allow participants to give testimony of their experience through the program (20-30 minutes) • Closing remarks (5 minutes)
Assessment Plan	Program evaluation quiz
Method of Instruction	Discussion, Personal testimonies
Time Allotted	45-60 minutes
Technology/Resources	Zoom, PowerPoint, computer
Homework Assignment	<ul style="list-style-type: none"> • Fill out post questionnaires (Dietary Intake and Self-Efficacy) • Complete quiz 12

APPENDIX K

DNP PROJECT BUDGET

Items	Cost
Blood pressure Cuff	\$24.33
Measuring Tape	\$5.93
CardioChek Plus Analyzer	\$909
Lancets for CardioChek Plus	\$29
Extra lipid/glucose strips	\$198
Printing Flyers	0.53/color copy x 200 copies=\$106
Food Items for cooking classes	Estimated-\$200
Zoom Premium Cost	\$14.99/month X 4 months=\$59.96
Gift Cards	\$25 x 35=875.00
Total Cost	\$2042.22

APPENDIX L

PROJECT TIMELINE

Date	Event
Jan 26, 2022 & Feb 3, 2022	IRB Approval
February 25-March 27, 2022	Recruitment/Consents/Pre-test Questionnaires and Biometric measurements
March 27, 2022	Zoom #1: Introduction to a Whole Food Plant-based Diet
April 3, 2022	Zoom #2: The Role of Fiber in Weight Control
April 10, 2022	Zoom #3: The Grocery Store Tour
April 17, 2022	Zoom #4: Replacing Meat & Dairy
April 24, 2022	Zoom #5: Management of Obesity on a Plant-Based Diet
May 1, 2022	Zoom #6: Complications of Obesity: Type 2 Diabetes
May 8, 2022	Zoom #7: Complications of Obesity: High Blood Pressure
May 15, 2022	Zoom #8: Complications of Obesity: Heart Disease
May 22, 2022	Zoom #9: Exercising for Health
May 29, 2022	Zoom #10: Managing Stress
June 5, 2022	Zoom #11: Dining Out Participants to complete post-biometric measurmets
June 12, 2022	Zoom #12: Graduation
June 13-July 6, 2022	Post-test Questionnaires/Post-biometrics/Gift Certificates
Augus, 2022	Data analysis
February-March, 20203	Final Paper/DNP Defense

APPENDIX M

PROJECT SYLLABUS

The Eat Well Live Well Program Syllabus

March 27, 2022-June 12,2022

Instructor Information

Nadine Larcher, DNP
Student, BSN, RN

larcher@andrews.edu

316-558-1158

Description

This 12-week program is designed to educate individuals on the benefits of a whole food plant-based diet (WFPBD) and to help them to transition towards a healthier lifestyle.

Expectations and Goals

- Focus on making changes toward a WFPBD. You decide how far you want to go. You can decide to make only one meal a day plant-based, then two then all three. If you prefer, you can decide to start out with one day a week eating plant-based, then 2, then 3, 4, 5, 6, and then every day. You may be ready to go cold turkey and go all the way. You set your goals and try your best to reach them. Remember that any change that you make towards a WFPBD is a positive change.
- Set SMART goals each week. S(specific). M(Measurable). A(Attainable). R(Realistic). T (Time-connected). Use My Personal Action Plan to make your goals. A copy is included under the first week's tab. Please use this as a template to make weekly goals.
- The focus of this program is on your diet, and not exercise. If you have been physically active, please continue with that. If you are not as active yet, don't feel like you have to jump and start an exercise program right away. Exercise is very important but try to mainly focus on making dietary changes for the remainder of this program, and then after the program, you can focus on exercise as your next goal.
- Please notify your doctor that you are starting a health program. Your doctor may need to adjust your medications as you go through the program.

- Participants who complete the program will be given a \$25 gift certificate to the Natures Nest health food store at Camp Au Sable and will have their names entered in a drawing to win an instant pot. If unable to attend the Zoom meetings, you will be sent a recording of the meeting by email. Credit will be given for attendance if you watch the recorded video.

The criteria for completion for this program are listed as followed:

- Complete consent form.
- Complete pre-test questionnaires: Demographic Information, dietary, and self-efficacy.
- Complete pre-test biometric measurements.
- Attend at least 9 of 12 Zoom meetings or watch recorded zoom presentations if unable to attend.
- Complete weeks 4 and 8 dietary questionnaires.
- Complete at least 8 out of 11 quizzes.
- Complete post-test questionnaires-Dietary, and self-efficacy.
- Complete post-test biometric measurements.

Please don't hesitate to call or email the instructor with any questions or concerns.

Course Materials

Required Materials

All reading materials are contained in the binder given to you.

Any additional readings and recipes will be emailed to you.

Course Schedule

Week	Topic	Reading	Exercises
Week 1	Introduction to a WFBPD	The <i>PowerPlate</i> (Physicians Committee for Responsible Medicine [PCRM]).	Think of some of your favorite meals that you could make plant-based.
Sunday March 27, 2022 5:30 pm-7:00 pm EST		<i>The Nutrition Rainbow</i> (American College of Lifestyle Medicine [ACLM]).	Complete SMART goals Watch <i>Fork Over Knives</i> Documentary (1 ½ hrs.).
		<i>Food as Medicine Jumpstart</i> (ACLM) Read pgs. 3-8)	Complete Quiz
		(ACLM)	
Week 2	The Role of Fiber in Weight Control	<i>Power-Plate Fill Up on Fiber</i> (PCRM).	Decide on what meals you want to make plant-based and start.
Sunday April 3, 2022 5:30 pm-6:45 pm EST	Cooking Demonstration- (Introduction to plant-based cooking & herbs and spices)	<i>Nutrition Myths</i> (ACLM).	Work on SMART goals (As desired or related to Fiber).
			Complete quiz
Week 3	The Grocery Store Tour: Shopping for Healthy Foods	<i>Read Food as Medicine Jumpstart</i> (pgs. 10-12) <i>How to Read Food Labels</i> (PCRM).	Work on SMART Goals (As desired or related to shopping).
Sunday April 10, 2022 5:30pm-6:45pm EST	Success Story (Short video clip)		Complete Quiz

Week	Topic	Reading	Exercises
Week 4 Sunday April 17, 2022 5:30 pm-6:45pm EST	Replacing Meat & Dairy Cooking Demonstration- (Plant-based Entrees)	<i>Ingredients Substitution Chart</i> (PCRM) <i>Red and Processed Meat Products-No Safe Amount</i> (PCRM). <i>Health Concerns with Eggs</i> (PCRM). <i>Health Concerns about Fish</i> (PCRM). <i>Health Concerns about Dairy</i> (PCRM).	Complete SMART goals (As desired or related to meat, dairy, or fish). Complete dietary intake Questionnaire. Complete Quiz
Week 5 Sunday April 24, 2022 5:30 pm-6:45pm EST	Management of Obesity on a Plant-Based Diet. Live Interview.	<i>Healthy Weight Loss with a plant-based diet</i> (PCRM). Caloric density (ACLM).	Complete Quiz Work on SMART Goal (As desired or related to calorie density)
Week 6 Sunday May 1, 2022 5:30 pm-6:45 pm EST	Complications of Obesity: Type 2 Diabetes Cooking Demonstration- (Healthy Breakfast Dishes)	<i>Diet and Diabetes: Recipe for Success</i> (PCRM)	Complete Quiz Work on SMART goals (As desired or related to diabetes).
Week 7 Sunday May 8, 2022	Complications of Obesity: High Blood Pressure	<i>Diet and High Blood Pressure</i> (PCRM)	Complete SMART goals (As desired or related to High blood pressure).

Week	Topic	Reading	Exercises
<hr/>			
			Complete Quiz
			Complete dietary questionnaire (Link will be emailed).
<hr/>			
Week 8	Complications of Obesity: Heart Disease	<i>Cholesterol and Heart Disease</i> (PCRM)	Work on SMART goals (As desired or related to heart disease).
Sunday May 15, 2022 5:30 pm-6:45 pm EST	Cooking Demonstration- (Soups, salads, and dressings).	<i>Health Concerns about Coconut and Palm Oil</i> (PCRM)	Complete Quiz
			Complete dietary intake Questionnaire.
			Watch <i>PlantWise</i> movie (ACLM)-47:55 minutes (Link will be emailed).
<hr/>			
Week 9	Exercising for Health	<i>How much physical activity do you need?</i> (American Heart Association).	Work on SMART goals (As desired or related to exercise).
Sunday May 22, 2022 5:30 pm-6:45 pm EST	Success Story (Short video clip).	<i>Lifestyle Activity</i> (ACLM).	Complete Quiz
<hr/>			

Week	Topic	Reading	Exercises
Week 10	Managing Stress	<i>Lifestyle Stress Reduction</i> (ACLM).	Make SMART goals (As desired or related to stress)
Sunday May 29, 2022 5:30 pm-6:45 pm EST	Cooking Demonstration- (Desserts)	<i>Lifestyle Sleep Health</i> (ACLM).	Complete Quiz
Week 11	Dining Out and Eating with Family.	<i>Dining at Restaurants and Fast Food Chains</i> (PPC).	Make SMART goals (As desired or related to Dining out).
Sunday June 5, 2022 5:30 pm-6:45 pm EST	Live interview		Complete Quiz
			Make appointment with Nadine to get Biometric Measurements taken after next week's program.
Week 12	Graduation	Additional Resources to be emailed.	Complete dietary and self-efficacy questionnaires.
Sunday June 12, 2022 5:30 pm-7:00 pm EST			Get Biometric measurements taken

APPENDIX N

THE EAT WELL LIVE WELL PROGRAM COOKING CLASS ITINERARY

Cooking Class Itinerary

Week 2: Introduction to plant-based cooking & herbs and spices

- Discuss how to choose a quality chef knife and how to care for it.
- Demonstrate knife skills.
- Meal prep ideas-Chopping and storing vegetables ahead of time (onions, celery, peppers, red cabbage, garlic blended with olive oil).
- Discuss the importance of cooking with fresh herbs and give ideas on how to use them (rosemary, basil, oregano, thyme, cilantro).
- Show a variety of dry herbs and spices, nutritional yeast flakes, Braggs amino, and chicken-style seasoning).
- Discuss meal prep ideas-How to make four meals last for two weeks
- Examples of meal preps-
 - Tofu cottage cheese
 - Stuffed shells or manicotti
 - How to season beans and lentils
 - Discuss how to make Italian chicken bundles with cottage cheese

Week 4: Plant-based entrees (to Replace Meat & Dairy).

- Discuss different types of tofu (Silken, soft, firm, extra firm)
- Discuss ways of prepping and seasoning tofu
- Demonstrate sweet and sour sauce recipe for tofu
- Demonstrate Lasagna
- Discuss cottage cheese can also be used to make stuffed shells and manicotti

Week 6: Healthy Breakfast Dishes

- Discuss the importance of breakfast
- Show a variety of whole grains: Oatmeal, Quinoa, millet
- Demonstrate Breakfast Oatmeal
- Demonstrate scrambled tofu.
- Demonstrated Vegan pancakes and waffles
- Demonstrate breakfast quinoa and black bean dish.
- Demonstrate breakfast millet

Week 7: Soups, Salads, and dressings

- Discuss why the chef enjoys making soups
- Demonstrate Butternut-squash soup
- Demonstrate Potato leeks soup
- Discuss the versatility of garbanzo beans
- Demonstrate hummus dressing
- Demonstrate cashew ranch dressing
- Discuss and demonstrate how to make a power salad bowl

Week 9: Healthy Desserts

- Discuss healthier substitutes for when making desserts (date sugar)-(applesauce, bananas, flaxseed, egg replacer).
- Demonstrate banana smoothie
- Demonstrate Fruit ice cream
- Demonstrate cherry clafouti
- Demonstrate tapioca pudding

APPENDIX O
IRB APPROVALS



January 26, 2022

Nadine Larcher
Tel. 316-558-1158
Email: larcher@andrews.edu

RE: APPLICATION FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECTS
IRB Protocol #: 21-156 Application Type: Original Dept.: Doctor of Nursing Practice
Review Category: Exempt Action Taken: Approved Advisor: Jochebed Bea Ade-Oshifogun
Title: Effects of a 12-week plant -based diet program on obese and overweight adults in rural Michigan.

Your IRB application for approval of research involving human subjects entitled: *“Effects of a 12-week plant -based diet program on obese and overweight adults in rural Michigan”* IRB protocol # 21-156 has been evaluated and determined Exempt from IRB review under regulation CFR 46.104 (1): Research, conducted in established or commonly accepted educational settings, that specifically involves normal educational practices that are not likely to adversely impact students' opportunity to learn required educational content or the assessment of who provide instruction. You may now proceed with your research.

Please note that any future changes made to the study design and or the informed consent form require prior approval from the IRB before such changes can be implemented. In case you need to make changes please use the attached report form.

While there appears to be no more than minimum risks with your study, should an incidence occur that results in a research-related adverse reaction and or physical injury, this must be reported immediately in writing to the IRB. Any research-related physical injury must also be reported immediately to the University Physician, Dr. Katherine, by calling (269) 473-2222.

We ask that you reference the protocol number in any future correspondence regarding this study for easy retrieval of information.

Best wishes in your research.

Sincerely,

Mordekai Ongo, PhD.
Research Integrity and Compliance Officer

Institutional Review Board – 8488 E Campus Circle Dr Room 234 - Berrien Springs, MI 49104-0355
Tel: (269) 471-6361 E-mail: irb@andrews.edu



Munson Healthcare Institutional Review Board

1150 Medical Campus Drive, Traverse City, MI, 49684 (231) 935-5049 MHC-IRB@mhc.net

MHC IRB FWA #00002923
MHC IRB Registration #00002661

Letter of Determination: Study Exempt of IRB Review

DATE: February 3, 2022

TO: Nadine Larcher, BSN

FROM: Munson Healthcare Institutional Review Board

PROJECT TITLE: Effects of a 12-week Plant-based Diet Program on Obese and Overweight Adults in Rural Michigan

IRBNet ID #: 1861062-1

MHC IRB #: 21.031

Sponsor: Self-funded

Decision Date: February 03, 2022

Determination: EXEMPT of IRB Review

Regulation/ Category: Exemption category # 46.104 (b)(1)

Not FDA regulated: No Defined Expiration Date

Project Risk Level: Minimal risk

RE: EXEMPT of IRB Review

Thank you for your submission of the above-referenced project and associated materials. Munson Healthcare IRB concurs with the determination of Andrew. In accordance to federal regulations 45 CFR 46.104(b)(1), MHC IRB has determined this above referenced project is EXEMPT FROM IRB REVIEW. This study will not adversely affect or place unreasonable risks upon those involved. MHC IRB oversight is not necessary.

A "limited IRB review" has been conducted by MHC IRB to ensure that adequate privacy safeguards are in place to protect the identifiable private information and identifiable biospecimens in this proposed research [46.111(a)(7)].

Since the IRB is no longer involved in review of this project, it is you, the Principal Investigator, who assumes the responsibility for the protection of human subjects in this project. You are to ensure that the project is performed with integrity and within accepted ethical standards, particularly as outlined in the Belmont Report. See <https://www.hhs.gov/ohrp/regulations-and-policy/belmont-report/index.html>.

If revisions or amendments are made to this project that may change the exempt status of this study you *must* re-submit the project to the MHC IRB for an updated determination *prior* to implementation of the changes. If problems arise during the conduct of the research, such as unanticipated problems, adverse events, or any problem that would increase the risk to the human subjects and change the category of review, notify the MHC IRB office promptly. Any complaints from participants regarding the risk and benefits of the project must be reported to the IRB.

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Generated on IRBNet

Exempt projects do not require annual review, however if your project is completed, please submit a PI Study Site Close-out Report, available in IRBNet forms. If your exempt project is not reported to be closed after 3 years, the IRB office will contact you to clarify the status of your project and to verify that no changes have occurred that may affect exempt status.

If you have any questions or concerns regarding this submission please contact MHC IRB office Monday through Friday by phone at (231) 935-5049 or by email at MHC-IRB@mhc.net. Please include your project title, IRBNet ID and MHC IRB reference numbers in all correspondence with this committee.

The office observes all federal holidays, and does not process applications during federal or national holidays. This letter is in accordance with MHC IRB policies and all applicable federal regulations. A copy of this letter is retained within Munson Healthcare IRB records.