The Implementation of an Exercise Program to Improve Blood Pressure and Weight Control in African American Patients with Hypertension in the Primary Care Setting

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Abstract

Purpose: In recent years, hypertension, known as a "silent killer," has increased in the African American population. Approximately 45% of individuals diagnosed with hypertension receive adequate blood pressure control (Centers for Disease Control and Prevention [CDC], 2020). If left untreated or inadequately treated, hypertension can significantly increase the risk of mortality associated with cardiovascular, neurovascular, and renal diseases. Though several modalities have been studied and employed in the fight against hypertension, a vast array of evidence has brought to the forefront the role of exercise as a first-line treatment for hypertension. The purpose of this study was to investigate the impact of exercise on high blood pressure and weight control in the African Americans with hypertension in the primary care setting.

Method: The exercise program entailed performing an aerobic exercise such as walking or moving more for at least 150 minutes weekly for eight weeks. The exercise intervention also included education about lifestyle modification strategies such as diet and health promotion behaviors based on Nola Pender's Health Promotion Model. The goal of participants in this exercise program was to exercise (walk) or move more to help improve their blood pressure and weight and identify any facilitating factors or barriers. The DNP project took place at an outpatient primary care office in East Orange, New Jersey.

Results: The exercise program was completed with a convenience sample of five participants, although ten participants were recruited. The outcomes measured utilizing SPSS statistical data technology indicated that there was a statistically significant reduction in systolic blood pressure pre-intervention ($M=159, SD=12.86$) and post-intervention ($M=142.6, SD=7.20$), $t(4)=3.69, p=0.02$. The reduction in the diastolic blood pressure was not statistically significant;
Improving Blood Pressure Through Exercise

Discussion: Several limitations to this exercise program intervention significantly impacted the results; however, a program such as this one which indicated statistically significant results should be replicated with a larger sample, especially with the emergence of the COVID-19 pandemic. The COVID-19 pandemic has demonstrated the magnitude of the impact of hypertension in African Americans since they were more severely affected with COVID-19 than other races. Bearing this knowledge in mind, it has become increasingly important to deploy life-saving strategies such as regular exercise for African Americans in the battle against this "silent killer."

Implications: Primary care practices should be required by healthcare governing bodies to have an exercise program in place as part of their management and treatment plan for hypertension. Continuous education about exercise and its impact especially those tailored to small groups at a time should be ongoing. Electronic blood pressure machines to improve home self-monitoring should be covered by all private and public health insurance companies. An exercise program will reduce the financial burden on society and have long-term benefits such as minimizing the morbidity and mortality associated with hypertension.

Keywords: high blood pressure, weight, hypertension, lifestyle modification, Pender's Health Promotion Model, COVID

Introduction

Through decades, the severity of hypertension and its management in African Americans have been poorly understood. However, with steady increases in the prevalence of hypertension in the African American population in the United States, 40.8% in men and 41.5% in females,
significant changes should be made in its management (Diaz et al., 2017). Furthermore, African Americans are more adversely affected by hypertension as compared to other populations. Bolin et al. (2018) reiterated this point by stating that African Americans "suffer more comorbidities and renal complications related to hypertension than other races" (para 1). Although most patients are aware of the importance and significance of the impact of exercise or physical activity on blood pressures and weight management, minorities such as African Americans who are already burdened with poorly controlled blood pressures do not take advantage or optimize this knowledge. (Bokhour et al., 2016).

To obtain optimal health outcomes in African Americans with hypertension, a comprehensive approach with pharmacological therapy and non-pharmacological therapy such as lifestyle modifications to include diet and exercise is highly recommended (Bolin et al., 2018). Evidence has suggested that any form of exercise program, from aerobics to stepping in place, will improve blood pressure control and weight management in African American patients with hypertension (Sabahhi et al., 2016). Besides, an exercise program will allow African American patients to look at exercise or physical activity as a drug-free approach to lowering their blood pressures (Mayo Clinic, 2019). Promotion of self-efficacy in African Americans with hypertension is another goal of an exercise program. Studies have shown that engaging patients in the self-management of their chronic conditions are a significant ingredient for improved health outcomes (Zabler et al., 2018). Health care workers need to learn effective communication, especially in educating African Americans with hypertension about lifestyle modifications such as exercise (Appendix K). Providing a platform with an exercise program will not only accomplish this goal at this care site, but it can be exemplified at other sites.
Background and Significance

East Orange is a small municipality located within Essex County, New Jersey, and has approximately 64,457 people, with 88.51% (56,887) representing African Americans. The median household income is $44,809, with 19.1% of persons living in poverty. Furthermore, 13.9% of persons have no health insurance (United States Census Bureau, 2020). The primary care site, which is in East Orange, New Jersey, has a large volume of African American patients diagnosed with or at risk for developing hypertension making an exercise program appropriate. In 2017, approximately 38.9% of African Americans in Essex County had hypertension. However, according to current data, 31.1% percent had the disease in East Orange in 2011 (New Jersey State Health Assessment Data, 2019).

Hypertension, referred to as the "silent killer" since it goes undiagnosed or unnoticed until severe disease occurs, is responsible for more than 7 million deaths annually and is the leading cause of cardiovascular diseases such as strokes and myocardial infarctions and chronic kidney failure in the United States (De Souza et al., 2016). Hypertension, according to the World Health Organization (WHO, 2020), "known as high or raised blood pressure, is a condition in which the blood vessels have persistently raised pressure, putting them under increased stress" (para. 1). Hypertension is described as having a systolic blood pressure (SBP) greater than 130 mm Hg and diastolic blood pressure (DBP) greater than 80 mm Hg. In contrast, normal blood pressure is SBP less than 120 mm Hg and DBP less than 80 mm Hg (Centers for Disease Control and Prevention, 2020). Hypertension can be further categorized as stage 1 when blood pressure is above 130/80 mm Hg and stage 2 when blood pressure is above 140/90 mm Hg (Centers for Disease Control and Prevention [CDC], 2020).
Some significant risk factors for developing hypertension are age, race, family history, obesity, lack of physical activity, diabetes, alcohol overuse, smoking, hyperlipidemia, stress, sleep apnea, and an unhealthy diet, especially ones with high sodium (American Heart Association, 2020). These risk factors can either be modifiable or non-modifiable. For example, in an exercise program that incorporates healthy dietary options, obesity which is a modifiable risk factor for hypertension in African Americans, can be reduced considerably. On the opposite end of the spectrum is race, a non-modifiable risk factor in African Americans, responsible for the disproportionate incidence of hypertension compared to other populations. Furthermore, a wide margin exists in the mortality rate of hypertension, approximately 50% between African Americans and Whites (Musemwa & Gadegbeku, 2017).

Social determinants of health in African Americans, such as race, lead to significant disparities in managing chronic conditions such as hypertension. Other social determinants of health that increase the risk for poor blood pressure control and weight management in African Americans include socioeconomic status, education level, health access, social support, and culture (Abbott & Williams, 2015). Abbot and Williams (2015) further explained that "social determinants of health contribute to health disparities by influencing the life experiences of diverse groups, including African Americans" (para. 2). These social determinants of health can undoubtedly act as barriers in introducing an exercise program for African Americans and will require further examination. Acquiring a knowledge base about why African American individuals have high blood pressure would be the first step in its management and could include the utilization of exercise.

In making a thorough assessment of the reasons for patients' blood pressure being high upon arrival to the office, health professionals and clinicians should rule out whitecoat high
blood pressure. Whitecoat high blood pressure is a phenomenon in which blood pressure is elevated in the office. Still, there is no permanent increase in blood pressure as indicated in the patient's ambulatory or at-home blood pressures (Pierre-Yves et al., 2016). Ensuring that patients document their blood pressures, whether taken at home or other outpatient facilities such as pharmacies, would be an essential factor for comparison and trending purposes. Research has indicated that keeping accurate records, whether with old fashion pen and paper or mobile applications in monitoring home blood pressures, is one of the most effective components in blood pressure self-management (Beng et al., 2019). Individualized patient interviews while maintaining current social distancing guidelines and questionnaires further provided additional information about their physical activity levels and dietary habits. Investigation into the medical charts revealed participants' demographics, blood pressure and weight trends, treatment modalities, and other vital information necessary to implement the exercise program. In a world that is severely afflicted with the burden and casualties of chronic conditions such as cardiovascular disease, the significance of implementing an exercise program is a priority in curbing the high prevalence of hypertension in African Americans.

**Significance.** African Americans, both male and female, ages 30 to 55, were regularly seen at the office with stage 1 and stage 2 hypertension and body mass indexes (BMIs) greater than 25. These patients are at increased risk for stroke, heart disease, and kidney failure—bearing this in mind, steps should be taken to change the management of these high blood pressure and elevated BMIs in African Americans. Several studies have brought the strong association between excess in body weight and blood pressure control (Vamvakis et al., 2017).

A chronic condition such as hypertension poses a significant social, economic, and health burden on society, costing the United States approximately $55.9 billion annually (CDC, 2020).
The healthcare system in the United States, which generally aims at more preventative measures rather than curative, has already mediated some significant steps in its' goal for reducing the burden of hypertension. For example, in 2017, two powerful forces; the American College of Cardiology, in partnership with the American Heart Association, developed new guidelines for the prevention, detection, evaluation, and management of hypertension in adults (American College of Cardiology & American Heart Association [ACC/AHA], 2018). These guidelines delineate hypertension in its entirety and provided standardized literature on its classification, measurement, screening, and treatment modalities. These recommended guidelines were taken into consideration while introducing the exercise program and proved fundamental.

Education is an essential factor in any program aimed at making changes in behavior or practices. For example, in signifying the importance of education in social justice and human rights issues, Gebremedhin and Joshi (2016) brought Nelson Mandela's famous quote, "education is the most powerful weapon which you can use to change the world" (para. 1), to the forefront. Bearing this quote in mind, one should understand that to elicit a change in any context, whether, in human rights or patients' blood pressure and weight, one should ensure that education takes center stage. The United States spends millions of dollars on the management and education of chronic diseases annually. However, rates of hypertension, especially in African Americans, continue to rise (CDC, 2020).

**Needs Assessment**

The primary care site in which the exercise program was implemented specializes mainly in managing kidney disease and hypertension, and other primary care conditions. With one primary care physician, an office manager, and two medical assistants, on any given day, the office is hectic and sees an average of 20 to 25 patients daily. However, an advanced practice
nurse manages the outpatient dialysis patients. Patients are seen, and their needs are assessed; referrals for consults are made; tests and procedures are ordered; medications are prescribed and reconciled; follow-up appointments are made, and all these are done quickly and efficiently. Although all patients are educated about chronic disease management, a gap still exists in the amount of time spent on comprehensive education. Devising a method to close this gap should be beneficial in controlling the hypertension crisis that exists in African Americans.

In the initiation part of the needs assessment, the reasons responsible for the high blood pressure of many African American patients seen in the office were identified. Many research studies have indicated several reasons for non-adherence to lifestyle modifications especially exercise or physical activity in African Americans (Sabbahi et al., 2016). These reasons include differing causes of hypertension, depression, lack of knowledge, socioeconomic status, and culture (Petty et al., 2016). African Americans make up most of the population in East Orange, NJ, and many live below the poverty level (United States Census Bureau, 2020). Of the people in East Orange, NJ, 85.6% have health coverage (Datausa, 2020). However, of this percentage, one-third is covered by Medicaid and employer plans while the others either have personal plans or no insurance. In 2017, approximately 47.5% of the population with hypertension in Essex county was obese, and 56.5% did not participate in any form of physical activity or exercise (New Jersey State Health Assessment Data, 2020). This statistical data further reinforced the need to implement an exercise program amongst African American patients with hypertension.

Although several primary care offices offer similar health care services in the East Orange area, this office has the greatest need to improve its educational capabilities, especially about lifestyle modification practices in managing hypertension in African Americans. The current patient education process, which typically involves individual teaching and distribution of handouts on
hypertension management and other chronic conditions, needs improvement. The time spent educating African American patients and their families about the content of these handouts; due to time constraints placed by them is inadequate. Furthermore, most patients fail to read these handouts or abide by the instructions noted in them. Whether on a local, state, national or global level, hypertension rates have been steadily rising. Approximately 1.13 billion people suffer from hypertension worldwide, with almost two-thirds from low and middle-income countries, and it is responsible for most premature deaths (WHO, 2020). In deciding on whether to implement this exercise program, a SWOT analysis was instrumental.

**SWOT.** The SWOT analysis ensured that the exercise program was the correct fit or match for the organization. An essential strength of this organization was the trusting relationship between African American patients, physicians, and other clinicians. This relationship provided a platform to introduce new programs as well as new treatment modalities. A fundamental shortcoming in this organization was the time constraints placed by physicians and other clinicians on patients. The physician and other clinicians are usually rushing from one appointment to the next, making it impossible to provide adequate education about hypertension management.

Organizational opportunities such as bringing in new patients and obtaining further growth were of top priority. Introducing an exercise program for African American patients was another organizational opportunity. African American patients can share the program's benefits with family and friends, providing an avenue for new patient consults and referrals. A potential threat to this organization was competition from other primary care offices in the area. To minimize the impact of competition from other primary care providers, patients' satisfaction should be enhanced. One way patient satisfaction can be improved is by providing unique
services such as an exercise program. The needs assessment was an essential step in determining the organization's needs and developing a problem statement.

**Problem/Purpose Statement**

Keeping the needs assessment data in mind, one can see that African American patients require better and more effective teaching methods about exercise and weight control. Furthermore, due to time constraints placed on clinicians, it can be challenging to find adequate time to teach patients, thus eliciting a behavior change effectively. Behavior modification is critical in managing chronic conditions such as hypertension (Musemwa & Gadegbeku, 2017). This problem can be rectified by implementing an exercise program that will consider both patients' individual needs and the organization's needs. Although evidence has indicated that only 15% of adults in the United States can meet exercise recommendations leading to poor blood pressure control, an exercise program to meet the needs of African American patients should be implemented (Sabbahi et al., 2016).

Another critical factor in managing hypertension in the African American population is their attitudes and beliefs about the disease. A patient's health beliefs can lead to certain adverse health behaviors (Buckley et al., 2016). Most African American patients usually approach disease management differently from other races. African American's beliefs about hypertension management may also differ from those of their health care providers, increasing the communication gap between them. Reconciling differences in the gap between African American patients with hypertension and healthcare providers' beliefs about expectations for disease management may lead to better adherence and increased acceptance of medical treatments (Buckley et al., 2016). In implementing an exercise program to improve blood
pressure and weight, both patients and healthcare providers should be educated about existing beliefs about hypertension.

Ensuring that African American patients with hypertension are appropriately educated about hypertension and its management takes priority. Along with exercise, these patients were introduced to approved diet options indicated by the American College of Cardiology/American Heart Association 2017 Hypertension Guidelines such as the DASH and low salt diet to assist in obtaining the outlined outcomes of this program (ACC/AHA, 2018). In this present clinical environment in which evidence-based solutions are required to solve even the most straightforward clinical problems, a clinical question should be developed.

**Clinical Question**

For decades, clinicians have been utilizing evidence to base their practice, leading to clinical questions. Evidence-based practice plays a significant role in promoting patient safety and healthcare excellence. Forming a clinical question by utilizing PICOT provides the opportunity to develop a well-structured question (Melnyk & Fineout-Overholt, 2015). PICOT further assists the clinicians in finding the proper evidence to answer those questions and decrease the margin of uncertainty.

**The clinical question:** Will implementing an exercise program improve blood pressure and weight control in African Americans with hypertension in the primary care setting? This clinical question covers all the facets of the PICOT system of formulating a clinical question. The PICOT elements compose of (P)-African Americans with hypertension, (I)-implementing an exercise program, (C)-elevated blood pressures and high body mass indexes, (O)-improved blood pressure and weight, and (T)-a reasonable time frame (at least eight weeks). These
elements all work together to obtain the best source of evidence to the clinical question, thus leading to improved quality of care.

Utilizing the PICOT elements makes it easier to research the problem and find articles related to what others have already done about it. Using keywords from the clinical question should help do a literature search (Melnyk & Fineout-Overholt, 2015). Keywords create a clearer picture of all the data essential to the PICOT question but require more specialized searching skills to be successful. With a well-formulated clinical question, implementing an exercise program will have a firm foundation as all data obtained will be evidence-based.

**Aims/Objectives**

The aims and objectives of the exercise program are relatively straightforward. African American patients with hypertension in this inner-city neighborhood will be allowed to take responsibility for their blood pressure self-management and increase morale, leading to optimal health outcomes. Self-efficacy questionnaires will be administered to the program participants in person while maintaining current social distancing guidelines and through email, text messaging, or the mail before and after implementation to measure whether there was an improvement. These outcome measures will include improved glucose metabolism, weight, cholesterol, and hgbA1c levels, lower blood pressures, improved health-promoting behaviors, and a better quality of life (Rosen et al., 2015). These patients will better manage their blood pressures and weight through practical and appropriate exercises and dietary habits. Blood pressure and weight will be documented before and post-implementation of the exercise program to check for improvement.

The exercise program will provide an atmosphere in which African American patients will be comfortable discussing their beliefs about managing hypertension with their health care
providers, leading to improved communication between them. With better control of blood pressure and weight, African American patients' risk for developing other chronic conditions and further complications will be reduced. A primary objective of the exercise program is to ensure that it is provided in a logical manner that is easy to understand by African American patients. With low health literacy levels in African Americans, the education methods must be tailored to their levels of education and comprehension.

This exercise program provides clinicians such as physicians and nurse practitioners an opportunity to be active participants in developing optimal educational tools presented to African Americans with hypertension. Furthermore, the outcomes gained from it can be further studied, and a platform can be created for replication to be utilized throughout the health care industry.

**Review of the Literature**

The goal of this literature review was to find well-designed studies which may have utilized an exercise program for African Americans who are overweight and have hypertension, as well as any new recommendations for treatment and management. Databases such as EBSCOhost, PubMed, CINAHL, and OVID were searched to gain a better insight into the underpinnings of hypertension and what it entails. Terms utilized in this search included exercise, uncontrolled hypertension, weight management, aerobic exercises, African Americans and hypertension, dietary options for hypertension, and self-efficacy in hypertension. For this present literature review, peer-reviewed articles from 2009 to 2020 were sought about African Americans, exercise, and hypertension. Approximately 8,200 pieces were retrieved; however, many were duplicates. Over 250 abstracts were reviewed and sorted according to their relevance (Appendix B).
The literature review brought to the forefront several critical contributing factors related to poorly controlled hypertension in African Americans, such as adherence barriers to lifestyle modifications such as diet and exercise (Pettey et al., 2016). It further recommended specific activities such as aerobic and approved dietary guidelines, which may reduce blood pressure and weight in African Americans (Carlson et al., 2016; Vamvakis et al., 2017). Along with the recommended exercises and dietary guidelines, strategies that provide culturally appropriate education and promote self-efficacy have been proven to improve blood pressure control in African Americans (Meinema et al., 2015). Also, healthcare providers should maintain consistency in their decision-making capabilities when referencing recommended hypertension treatment guidelines (Sessoms et al., 2015).

It was hypothesized that an exercise program designed with aerobic exercise such as walking and approved hypertension dietary options would reduce blood pressure and promote weight control in African Americans with hypertension. This literature review explained and supported this hypothesis. Evidence supporting aerobic exercises and dietary guidelines for hypertension are discussed below.

**Aerobic Exercises**

Aerobic exercises such as walking for at least 10 to 15 minutes a day have long been recognized and appreciated as a valuable tool in reducing blood pressure in patients with hypertension (Sabbahi et al., 2016). White et al. (2015), in the CARDIA study, further acknowledged that even shorter spurts of physical activity (less than 10 minutes) such as aerobic exercises reduce the risk of hypertension. Aerobic exercises are described as continuously utilizing the body's large muscles rhythmically (Bakker et al., 2018). Furthermore, it is one of the
most common forms of physical activity found in the general population, and apart from walking, it includes running, jogging, cycling, and swimming (Bakker et al., 2018).

A large meta-analysis RCT study by Cornelissen and Smart (2013) showed a reduction in systolic blood pressure (SBP) and diastolic blood pressure (DBP) of 3.5 mmHg and 2.5 mmHg, respectively, by individuals who undertake aerobic exercises. In an earlier study by Whelton et al. (2002), the importance of aerobic exercises was further reported when similar blood pressure reductions, as in the Cornelissen and Smart (2013) study, were obtained in persons who perform these exercises. Both studies further concluded that aerobic exercises significantly impacted blood pressure in persons with hypertension than those without average SBP/DBP 5-8/4-5 mmHg (Whelton et al., 2002; Cornelissen & Smart, 2013). Although these blood pressure reductions are small, their overall impact on reducing morbidity and mortality rates from stroke, cardiovascular, and kidney disease is unprecedented. An exercise program designed with aerobic exercises such as walking for African Americans will reduce blood pressure and maintain weight control. Still, it will also promote self-efficacy in the management of hypertension. Aerobic activities such as walking have been overly emphasized in hypertension and other chronic diseases; however, approved dietary guidelines for African Americans with hypertension should also be examined.

**Dietary Guidelines for Hypertension**

Most African Americans with a body mass index (BMI) greater than 25 kg/m2 are considered obese, making hypertension management difficult. Evidence has shown that a strong correlation exists between excess body weight and hypertension as it is linked with sodium retention, increases in vascular resistance, and high cardiac outputs (Vamvakis et al., 2016). Hypertension is more prevalent amongst obese persons with a BMI > 30 kg m2 (42.5%) than in
those with poor body masses (15.3%) (CDC, 2020). Approved dietary guidelines should be adopted to reduce these high body mass indexes and achieve optimal blood pressure control. In patients with hypertension who are either overweight or obese, it is recommended that they eat a heart-healthy diet low in sodium but with potassium supplementation (American College of Cardiology [ACC] & American Heart Association [AHA], 2017).

The Dietary Approaches to Stop Hypertension (DASH) was developed specifically for patients with hypertension and constitutes a diet low in dairy products and high in fruits, vegetables, and fiber (Vamvakis et al., 2016). Research has shown that the DASH diet coupled with a low sodium intake of at least 100 mmol daily reduced blood pressure by 7.1 mm Hg in patients with hypertension and was even more profound in normotensive patients; 11.5 mm Hg (Vamvakis et al., 2016). The Exercise and Nutrition Interventions for Cardiovascular Health (ENCORE) (2013) followed Individuals who were overweight and had hypertension for eight months post being on the DASH diet for 18 weeks. The researchers later concluded that the DASH diet significantly impacted blood pressure, exercise, and weight (Hinderliter et al., 2014). Several studies have looked at the beneficial effects of nutritional supplements with potassium and magnesium in patients with hypertension. Most have indicated reductions in both SBP and DBP by 4.5 mm and 3.5 mm Hg, respectively, in hypertensive and normotensive patients who were off antihypertensives but took potassium supplements (Binia et al., 2015).

Magnesium use is also instrumental in reducing blood pressure in patients with hypertension. However, the mechanism of action of both potassium and magnesium in lowering blood pressure is still unknown. Including approved dietary guidelines in an exercise program designed with aerobic exercises such as walking is fundamental in achieving optimal blood pressure and weight control outcomes. Along with nutritional guidelines for African American
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patients with hypertension, a theoretical framework was considered in developing this exercise program.

**Theoretical Framework**

In the process of eliciting a change in behavior required to make recommended lifestyle modifications such as diet and exercise to achieve optimal blood pressure control and weight reduction, Pender's Health Promotion Model was integrated into this project (Appendix A). Nola Pender's Health Promotion Model, described as a midrange theory, takes a closer look at the factors associated with a patient's health-promoting behaviors (Pender et al., 2011). The development of the Model was facilitated by utilizing the expectancy-value and social cognitive theories that address both the patient's values and social needs. This Model delves deeper into a patient's psychosocial, biological, and sociocultural needs and any prior related behaviors essential in promoting their health.

In explaining the Health Promotion Model, Pender described the interpersonal and situational influences on behavior, emphasizing those behaviors and benefits that are perceived and self-efficacy (Pender et al., 2011). This Model looks closely at an individual commitment to a plan, for example, regular exercise, along with any competing demands that may impede adherence. It can be utilized in explaining, predicting, and altering African American patients' health-promoting behaviors, especially in the implementation of an exercise program (Appendix A).

Researchers' adoption of Pender's Health Promotion Model to predict adherence to health-promoting behaviors in patients with hypertension has long been utilized. Kamran et al. (2015), in their cross-sectional study about the relationship between systolic blood pressure and concepts of the Pender Health Promotion Model in patients with hypertension in a rural area of Iran, demonstrated its significance. The study method included questionnaires about
demographics and their attitudes about nutrition to 671 patients. These questionnaires were designed based on Pender's Health Promotion Model constructs (Kamran et al., 2015). The researchers concluded that diets perceived by these patients were predictive of systolic blood pressure. Also, perceived benefits and self-efficacy were inversely related to systolic blood pressure.

A study by Wood (2008) examining Pender's Health Promotion Model in the provision of exercise motivation in breast cancer risk reduction for high-risk women found a high correlation between physical activity and optimal well-being. The study further suggested that regardless of the type of exercise program, the benefits to be reaped are endless (Wood, 2008). An exercise program based on Pender's Health Promotion Model for African Americans with hypertension will ensure that their perceptions and beliefs about hypertension management take center stage.

**Explanation of Pender’s Health Promoting Model to an Exercise Program.** Hypertension is a chronic disease that cannot be cured but can be effectively managed. In applying Pender's Health Promotion Model to this exercise program, African American patients with hypertension will form a plan of action based on their characteristics or problems (Appendix A). The perceived benefits of activity will be the benefits of the exercise program, such as blood pressure and weight reduction, recognition of the risk factors and benefits of an exercise program, exercising for life, and adopting the DASH and low sodium diet. The patients' commitment to action is the exercise program in which they are willing to make appropriate lifestyle changes to improve their blood pressure. This commitment can be rather challenging to create and maintain. The small red arrow indicates the difficulty that is involved in committing along with revisiting prior behaviors before they can achieve desired outcomes. The behavioral outcome is the goals to be gained from the exercise program. The large red arrow represents patients being constantly
aware of their blood pressure and weight, that lifestyle modification is required, and their commitment to an exercise program is necessary to achieve optimal health outcomes.

**PICOT Question:** Will the Implementation of an Exercise Program Improve Blood Pressure and Weight Control in African Americans with Hypertension in the Primary Care Setting?

**Methodology**

This section describes the methods and procedures used to examine the relationship between exercise, hypertension, and weight in the primary care setting. The study design, the study setting where the project was conducted, population, and sample are described in their entirety. Additionally, this section also outlined the instrument utilized to collect the data and the methods created to maintain the validity and reliability of the instrument. Physical readiness and demographic and health history questionnaires were used to collect quantitative and qualitative data (Appendix G). With the ongoing COVID-19 pandemic, the concept of social distancing was considered related to the planning and implementation of this project.

**Study Design**

The project utilized a quasi-experimental approach with written questionnaires administered to participants pre-intervention of the exercise program through in-person, emails, and text messages. This design investigated the impact of the exercise program on hypertension and weight. Data points included blood pressure readings and weight pre- and post-intervention of the exercise program to determine whether there was an effect.

**Study Setting**

The project utilized a quasi-experimental approach with written questionnaires administered to participants pre-intervention of the exercise program through in-person, emails, and text messages. This design investigated the impact of the exercise program on hypertension
and weight. Data points included blood pressure readings and weight pre-and post-intervention of the exercise program to determine whether there was an effect.

**Study Population and Sample**

The study population consisted of adult patients diagnosed with hypertension with systolic and diastolic blood pressure readings greater than 130 mmHg and 80 mmHg. The study population also utilized the practice to treat and manage their hypertension for the past six months. Non-probability convenient sampling was employed to recruit participants. The sample size was estimated through the G-Power statistical analysis for a priori power analysis. A sample size of 16 patients was estimated to have sufficient statistical power to detect differences. The statistical analysis included an effect size of 1.000, an error probability of 0.05, and a power of 0.95.

**Criteria for Sampling Selection:**

**Inclusion Criteria:**

- African American patients diagnosed with hypertension
- Patients with the last recorded blood pressure reading that was above 130 mmHg systolic and 80 mmHg diastolic, respectively, and have been prescribed antihypertensive medications Patients who have been seen at the practice in the last six months
- Patients age 30-55 years
- Patients who can speak, write and read English
- Patients who owned an electronic oscillometric blood pressure machine (or one was provided to them free of charge)

**Exclusion Criteria:**
• Patients with functional limitations (Functional limitations will be assessed by asking the participants if they can walk approximately 10 minutes at a rate of 2.5 miles per hour without experiencing limiting symptoms such as shortness of breath)
• Patients who were pregnant, have preeclampsia, or have a history of preeclampsia
• Patients with concerning symptoms such as chest pain, dizziness, shortness of breath, palpitations at rest, and activity
• Patients with a history of injuries, back problems, and arthritis

Subject Recruitment

Flyers with information about the exercise program were displayed in the practice's common areas and consultation rooms (Appendix F). They were also distributed to patients via text messaging and emails. In lieu of the COVID-19 pandemic, participants were recruited either in person with social distancing measures or telehealth utilization for office visits after patients’ scheduled appointments with the physician. All study participants were recruited by the co-investigator (Co-I). Office staff also distributed information cards to all African American patients who presented and diagnosed hypertension. Sixteen participants were targeted for enrollment into the exercise program. Project participants received a short synopsis in handouts via electronic means such as email and text messaging, which explained the project's aim and what it entails. Besides, these materials included the contact information of the Co-I (emails and telephone numbers) for any questions or concerns. All potential participants were reassured that their participation in the project was strictly voluntary. Furthermore, the decision to participate did not affect the usual standards of care provided at this practice. All copies of the recruitment material for this project are found in Appendix F.
Consent Procedure

Consent aligned with Rutgers State University's requirements and was only achieved after explaining the aims and objectives of the project. It was voluntary, and there was no coercion. If social distancing measures were in place, the investigator could reach out to the participants via telephone or telehealth. A copy of the consent form for participation in this project can be found in Appendix F and included the following components:

- Person/Persons conducting/involved in study/project (and contact information)
- Brief introduction of the study
- Purpose of the study
- What are participants being asked to do/how long the study will take
- Statement letting participants know that they can end involvement in the research at any time without issue or penalty
- Statement outlining that participation does not impact their treatment at this practice
- Benefits/risks of participation in this study
- Anonymity/confidentiality and how this process will be maintained
- Duration of any data held
- Contact information for the IRB(s)

Risks and Harms

Participation in this project posed minimal risks. Participant’s name along with personal health information necessary for this project were collected, de-identified by way of an assigned number. In addition, the Co-I ‘s computer was encrypted with special software for this purpose. These steps ensured that all personal information collected was safe and there was no direct association while data was being reviewed. The possibility existed for participants to experience
mild discomfort from using certain muscle groups and joints involved in an aerobic exercise such as walking. These discomforts were temporary and resolved within a few days.

**Subject Costs and Compensation**

There were no costs incurred to participate in this project. Participants received no compensation for their participation in this project. However, any exercise tools and accessories utilized in the study were kept by participants after the conclusion of the project. An automatic oscillometric blood pressure machine was presented to all participants at no cost as an incentive to participate in the study and a tool for their home self-monitoring of their blood pressure.

**Study Interventions**

The project was conducted at a primary care practice in East Orange, New Jersey. After obtaining formal permission from the practice's owner and Rutgers State University Institutional Review Board, the project began. Flyers containing details of the project were displayed in common areas and distributed to patients through emails and text messaging to enhance recruitment. A sample size of 10 patients was selected using convenience sampling and met the inclusion criteria for participation in the project. Informed consent to participate was completed. The first step of implementing the exercise program was the data collection form which includes measurement of blood pressure and weight assessment. Social distancing standards included maintaining at least 6 feet of distance between other patients, especially in the waiting rooms. Furthermore, everyone, including the researchers, wore appropriate personal protective equipment (PPE) such as masks and gloves. Handwashing with soap and water and the use of hand sanitizers were utilized throughout the project. All equipment such as automatic oscillometric blood pressure machines and scales were cleaned and sanitized appropriately before and after each use.
The second step of the project was an in-person education conference with participants discussing the exercise program and its recruitment process. Information about healthy diets was provided at this first meeting. The exercise program involved mostly walking for at least 150 minutes weekly, and participants were encouraged to keep moving more throughout the day rather than sitting (American Heart Association, 2018).

Throughout the exercise program, participants were reminded via text messaging weekly about exercise routines and dietary habits. The text messages included content illustrating simple and easy-to-do walking exercises and recommended foods from the dietary approach to stop hypertension (DASH) diet. The study team was available by telephone to answer any questions and provided encouragement and support. The third and final step of the implementation process was for participants to return to the practice to reassess post-intervention blood pressure and weight. These data were measured and analyzed for their impact on hypertension and weight control. The exercise program was conducted for eight weeks and was led by the Co-I.

**Outcomes to be Measured**

**Instruments.** A demographic and health history questionnaire was distributed to patients before the exercise program intervention while maintaining current social distancing standards. The demographic and health history questionnaire were used to collect vital information about participants such as age, gender, education, and occupation. It also included pertinent data about participants' medical history such as diabetes, hypertension, medication compliance, smoking status, family history of hypertension, and history of physical activity.

An oscillometer was used to measure participants' blood pressure pre-and post-implementation of the study. Two blood pressure readings were taken within 5-minute intervals at each measurement, and the average was taken as the final measurement. Participants' weight
was assessed using a professional scale pre-and post-implementation of the exercise program. These measurements were evaluated for changes in blood pressure and weight, therefore, examining whether the exercise program impacted African American patients with hypertension.

In COVID-19 social distancing recommendations, patients will use self-report of their blood pressure and weight.

**Data Collection Procedure.** Questionnaire data were collected using paper and pen. The questionnaire was completed in the office or, if needed, sent to homes for being returned with a self-stamped envelope to ensure their return. Data were entered into SPSS for data analysis (Appendix E).

**Variables.** The independent variable was the exercise program which included aerobic exercise (walking) and healthy diet options. Dependent variables were the blood pressure and weights of African American participants with hypertension.

**Project Timeline**

This project began once IRB approval was given. Recruitment took three weeks, and the period of the exercise intervention was eight weeks. Each step of the study included the proposal development, presentation, IRB submissions, implementation process, data collection, data analysis, final write-up, presentation of the final project, and dissemination was expected to be completed within 12 months. With the ongoing COVID-19 pandemic, this may prove a challenge; however, the goal was to ensure that the project completion timeline was maintained.

A chart depicting a more precise illustration of the study timeline is found in Appendix C.

**Resources Needed**
All costs incurred for this project were the sole responsibility of the Co-I. Costs included exercise accessories and tools such as educational handouts, brochures, and flyers, recruitment material, and other miscellaneous expenses. A copy of the budget can be found in Appendix D.

**Evaluation Plan**

The following section describes the evaluation plan for implementing this exercise program and its impact on hypertension and weight control in African Americans. The primary investigator oversaw all data collection to ensure that the project aims, and objectives were met. Feedback was received on whether these goals and benchmarks were met and what could have been done differently. The evaluation plan included both formative (process) and summative (impact) performance measures. The formative evaluation method looked at the effectiveness of the project procedures and practices in implementing the project and whether its goals were met while keeping the set timeline. Key questions that were asked during the formative evaluation process were:

a) Were the project activities related to the project goals and objectives?
b) Has the data collected been used effectively throughout the project?
c) Has the project met its targets for implementation and conformed to the project timeline?
d) Do the measurement tools utilized effectively and provided the anticipated outcomes outlined in the project proposal?
e) Does the feedback and data evaluation mechanisms support ongoing review and improvement?

According to the Centers for Disease and Prevention (CDC, n.d.), the formation method of evaluation "ensures that a program or program activity is feasible, appropriate, and acceptable before it is fully implemented. It is usually conducted when a new program or activity is being
developed or when an existing one is being adapted or modified" (2020, para. 2). The summative method of evaluation examined the impact of the exercise program. Summative evaluation includes questionnaires, tests, interviews, and other assessments from which information can be derived to investigate the outcome of a project. Questions asked during the summative method of evaluation were:

a) What was the exercise program's impact on African Americans with hypertension?
b) Was the exercise program achieving targeted milestones?
c) Were the methods used for dissemination and sustainability effective?
d) Were there any unforeseen barriers or limitations which impacted the anticipated outcomes?
e) What could have been done differently?

**Data Analysis Plan**

Collected data were tabulated and analyzed by using both descriptive and inferential statistics utilizing SPSS statistical analysis technology. Descriptive statistics such as frequency (percentage) were used to describe demographic and health variables. Besides, it was used in examining the impact of the exercise program on hypertension and weight in African Americans. Inferential statistics such as mean and standard deviation and paired t-test were also used to analyze the data collected. The mean and standard deviation assessed the pre-and post-blood pressure and weight measurements among the participants. Paired t-test examined the effectiveness of the exercise program on blood pressure and weight. These data analysis methods were chosen because of their efficacy in quasi-experimental studies and demonstrated whether a change was elicited.

**Maintenance and Security**
The primary investigator assigned participants random identification numbers to use personal health information data collection and the project evaluation. The Co-I administered the project evaluations. The main list which links the participant names to the random identification numbers was kept separately from all questionnaires. Questionnaires and other project materials were kept in a locked cabinet at the project site. Data collected were de-identified upon completion, and only this de-identified data was used for analysis.

According to Rutgers State University guidelines, all data was destroyed upon completing the project, closure of the IRB, and final writing of the manuscript. Hard copies of consent forms and other project information were kept on a flash drive maintained to store only study materials and data and kept secured in a locked draw in the Co-I’s home office. Due to COVID-19 restrictions, it was impossible to hold study materials at the primary investigator's office as planned.

**Results**

A total of ten participants (N=10) were recruited for this pilot project. Data collection pre-intervention of the project was successful. All participants' blood pressure and weight were measured before the exercise program (Appendix E). However, it was difficult to get participants back in the outpatient primary care office for vital post-intervention measurements such as blood pressure and weight. Participants stated their fear of returning to the site, a primary care office, due to the COVID-19 pandemic, especially since there was an increase in infection rates. Other options to meet for post-intervention blood pressure and weight measurements, such as meeting at a local park or different outdoor location, were offered to all participants; however, most of the participants were unwilling to take these options. The intervention was completed with a convenience sample of 5 participants (N=5). Post-intervention blood pressure and weight were
collected on only five participants who were willing to meet at the primary care site only because of pre-scheduled appointments during this time and after several attempts (Appendix E). The participants who completed the study were 41 to 55 years old, with a mean age of 52.8 years and a median age of 53 years. The sample of participants who completed the study consisted of four females and one male.

All participants were required to perform an aerobic exercise such as walking for at least 150 minutes weekly or just move more rather than sitting for eight weeks (American Heart Association, 2020). During the recruitment process, all participants were provided with a free automatic oscillometric blood pressure machine and educated on using these machines with return demonstrations. Also, participants were educated about their diet especially reading food labels accurately and paying close attention to salt and calorie intake (Appendix L). Participants were instructed to keep track of the time spent walking using exercise applications found on their phones or by just writing times down.

Data Analysis

Systolic Blood Pressure and Diastolic Blood Pressure. This exercise program investigated the impact of exercise such as walking or moving more on African American patients with hypertension at an outpatient primary care site. Activities involved measuring blood pressure before and after the exercise intervention. Physical activity such as walking for periods of at least 15 minutes at a time throughout the day has long proven to be an effective tool in controlling high blood pressure in individuals diagnosed with hypertension (Lopez, 2020). Pre- and post-intervention systolic blood pressure (SBP) and diastolic blood pressure (DBP) for the five participants were entered into SPSS statistical (IBM 27) analysis program, and means were calculated (Appendix E). A paired samples test was conducted to analyze whether there was a
reduction in mean SBP and DBP pre- and post-intervention of the exercise program. A two-tailed sampled $t$-test revealed that there was a statistically significant reduction between the SBP pre-intervention ($M=159, SD=12.86$) and SBP post-intervention of the exercise program ($M=142.6, SD=7.20$), $t(4)=3.69, p=0.02$.

A paired samples test was also utilized for analysis of DBP pre- and post-intervention of the exercise program. The results of the two-tailed sampled $t$-test revealed that although there was a reduction between the pre-intervention DBP ($M=78.8, SD=15.78$) and post-intervention DBP of the exercise program ($M=73.6, SD=8.65$), $t(4)=1.42, p=0.23$, it was not statistically significant. This data analysis indicates that physical activity such as walking or just moving more has a statistically significant impact on the systolic blood pressure of African Americans with hypertension in the primary care setting. Weight was another vital variable assessed in this exercise program.

**Weight.** The weight of all participants was measured before the exercise program. However, the weight of only five participants was collected post-intervention. These five participants were the same participants from which pre-implementation blood pressures were collected. The results were entered into the SPSS statistical analysis program for analysis (Appendix E). There was a slight difference between the numerical means of the pre-intervention and post-intervention weight measured (Appendix E).

Furthermore, a two-tailed sample $t$-test indicated that there was a statistically significant reduction in the weight of the five individuals who completed the exercise program between the pre-intervention ($M=171.4, SD=55.05$) and post-intervention weight ($M=166.2, SD=54.32$), $t(4)=6.50, p=0.003$. Taking a closer look at numerical changes in the participants' weight before and post the exercise program intervention, the participants lost an average of 5.2 pounds.
Although this weight loss may not seem significant to many, for African American patients diagnosed with hypertension, it substantially impacts their blood pressure, as seen with the decrease in SBP.

**Discussion.**

The results from this exercise program were consistent with what evidence has long indicated that there will be a reduction in SBP when exercise such as walking, whether performed for long or short bouts at a time, is undertaken. Lopez (2020) reiterated this point by stating that a "reduction in BP observed after a single session of exercise, that is post-exercise hypotension, showed a strong positive correlation with the chronic reduction in BP observed after eight weeks of exercise training; suggesting that the acute decrease in BP may be linked to long-term adaptations to exercise." Although there was no statistically significant reduction in DBP, the statistically significant decrease in SBP can contribute to optimal health outcomes for African Americans with hypertension. Pre-intervention DBP means were within normal. Furthermore, evidence have further confirmed that the effect of exercise on DBP is generally minimal as compared to SBP. Any reduction in SBP will help reduce the recent uptake in the rates of the significant comorbidities associated with hypertension in African Americans, such as cardiovascular disease (stroke, myocardial infarction) and renal complications. Alpsoy (2020) brought aerobic exercises such as walking to the forefront by stating that they have "beneficial effects in the long-term management of BP of hypertensive patients". The program also looked at the impact of exercise on weight.

Evidence has been consistent in demonstrating that a strong association exists between excess body weight and high blood pressure. It is often responsible for sodium retention and increases in vascular resistance in overweight patients diagnosed with hypertension (Vamvakis et
al., 2016). Reductions in body weight require long-term discipline in lifestyle modifications, especially with diet. The exercise program led to a statistically significant decrease in weight. The main objective of this exercise program was to investigate whether exercise had an impact on the blood pressure and weight of African Americans in the primary care setting. A large meta-analysis of randomized controlled trials (RCTs) concluded that regular aerobic exercises such as walking might reduce SBP and DBP by five mmHg and three mmHg, respectively (Alpsoy, 2020). The exercise program impacted the SBP of African Americans. However, it was a small sample of participants and cannot be generalized. Further studies will be required to determine the extent of this study and duplicate the results with a more extensive selection. Evaluating the exercise program is one of the most critical steps in assessing whether it was successful or not.

The formative evaluation plan was utilized continuously during the implementation of the exercise program. Some critical questions asked during this evaluation process were: were the activities of the program related to its goals and objectives, and was the data collected used effectively throughout the program? The program's actions were related to its goals and objectives. With exercise being its focal point and the data collected (blood pressure and weight before and after implementing the program), the main variables were effectively utilized throughout the program. During the formative evaluation plan, another question was, has the project met its target for implementation and conformed to the projected timeline? Due to the COVID-19 pandemic, it was challenging to stick to the project timeline; however, it was relatively easy to adjust with a project like this, which may have significantly impacted the results. While the formative evaluation plan was done continuously throughout the program, the summative evaluation plan was done at the end of the program.
Questions concerning the results, such as the impact of exercise on African Americans with hypertension and whether targeted milestones were met, were examined? The exercise program positively impacted African American patients with hypertension as results indicated a statistically significant reduction in SBP. Weight reduction, on the other hand, was not statistically significant to warrant an impact. Some targeted milestones were met, such as participant recruitment. The exercise program would not have materialized if it were not for some key facilitators. The physician and owner and the staff of the primary care site were very accommodating during the entire implementation of the exercise program. The chair and team member of the program provided an immense amount of support and were always available to answer questions; give advice and encouragement. These two main facilitating ingredients together made the barriers encountered insignificant.

The COVID-19 pandemic was a significant barrier impacting the exercise program. Recruiting participants took much more time than expected, although this milestone was met by the targeted time. Some participants were resistant to joining the program from the beginning. Participants also indicated during reminder calls their reluctance to get out of the house to walk. Still, several stated that they were moving about inside their home and utilizing whatever exercise equipment they had available. The pandemic proved difficult in post-implementation data collection. An unintended consequence that negatively impacted the exercise program was the inability to collect the data from all ten participants recruited due to the pandemic. A positive unintended consequence was the immense support received from the physician and owner of the practice in encouraging and persuading participants to return for post-intervention data collection. Another unintended positive consequence was the participants' ability to confidently take their blood pressure and report it for trending.
Overall, this exercise program was a significant stepping-stone in the fight against hypertension in African American patients in the primary care setting. An exercise program should be the foundation of any blood pressure management. A treatment plan inclusive of an exercise program should be the goal of all healthcare providers fighting the battle against hypertension in African Americans. Replication of this exercise program would not only make a significant contribution to African American community but to other races, as well as to society.

Implications

Clinical Practice. This exercise program will be most beneficial to clinical practice as it was based on evidence that has proven that exercise significantly impacts blood pressure and weight in African Americans (AAs). Although it was a small sample of AA participants in the program, the results were statistically significant, indicating a reduction in the mean blood pressure. These results can be replicated in all primary care settings with a larger sample throughout the country and amongst all races with hypertension. An exercise program such as this one should be the cornerstone of the management and treatment of hypertension.

For decades, the focus of hypertension management and treatment in the clinical care setting has been placed on pharmacological modalities. However, a large body of evidence exists about the effects of exercise on blood pressure. Bearing the results of this exercise program in mind, physicians and other healthcare practitioners should include exercise as part of their prescription for and as a first-line treatment for lowering high blood pressure. Several meta-analyses of randomized controlled trials (RCTs) concluded that continuous exercise such as walking reduces blood pressure by 5-7 mmHg (Pescatello et al., 2015). Another important implication of this exercise program to clinical practice is encouraging patients to take their blood pressure at home.
efficiently. Integrating self-measuring of blood pressure in an exercise program such as this one would promote better compliance and improved outcomes.

Since most patients spend indefinite amounts of time in the outpatient setting, a continuous exercise program would promote self-efficacy. Patients would take greater responsibility for their blood pressure management, leading to decreased morbidity and mortality rates associated with hypertension. Exercise has been shown to reduce the risk of cardiovascular diseases such as stroke and myocardial infarctions and leads to overall patient well-being.

**Healthcare Policy.** Health care policies have long been developed to ensure quality standards, improve safety and promote optimum health outcomes for all patients. However, the outside community may have little or no influence on these policies. An exercise program that significantly impacted high blood pressure is warranted a closer look for further policy development. A policy requiring that all private and public insurance companies cover the cost of electronic blood pressure machines should be fundamental in managing hypertension. Hypertension poses a substantial burden on society considering the high price of its management and treatment and morbidity and mortality rates. The provision of electronic blood pressure machines by insurance companies would further assist patients, especially AAs, with their self-measuring goals and enable physicians and other practitioners to grasp better, manage, and treat hypertension (CDC, 2020).

Specific guidelines and recommendations delineating exercise therapy related to hypertension should be considered and developed by policymakers. Utilizing evidence-based data such as this exercise program, an exercise therapy care plan should be designed with explicit information about the type, indication, duration, individual patient characteristics,
contraindications, benefits derived, and other pertinent information required for successful outcomes.

Exercise workshops for managing and treating high blood pressure based on a replica of this program should be established, especially in low-income neighborhoods where the need is more required. These exercise workshops should include exercise, and dietary guidelines, and other modalities that proved effective and evidence-based in the battle against hypertension. Bringing these innovative workshops into the community will encourage and motivate patients to make appropriate changes, leading to improved blood pressure and weight control, and overall quality of life.

Quality and Safety. The objective of any healthcare industry is to provide quality and safe services for all its customers, which include both patients and their families. An exercise program such as this, which incorporates low-intensity activity such as walking, is a safe and effective tool in helping win the fight against hypertension. To maintain quality and safety, any exercise program should be part of a multidisciplinary team approach involving physicians, nurse practitioners, nurses, dieticians, physical and occupational therapists, and other health care members. According to Dennison Hemmelfarb et al. (2016), "team-based hypertension care has been reported to increase the proportion of individuals remaining in care with controlled BP and reduced SBP and DBP."

On many occasions in both the outpatient and inpatient settings, a patient diagnosed with hypertension is usually placed on antihypertensive medications, which are associated with several adverse side effects. Making an exercise program, the first line of treatment for any diagnosis of hypertension would lead to a reduction in the side effects related to antihypertensive medications. Some side-effects of antihypertensives include low blood pressure, dry mouth,
headache, fatigue, weakness, dizziness, diarrhea, joint pain, etc. These side-effects can be debilitating for patients and lead to further disability impeding quality and safe care. Exercise such as walking has other benefits besides reducing blood pressure. Since health care considers patients' overall well-being, regular exercise may lead to weight loss, a strong heart and lungs, increased energy, better sleeping habits, strong bones, and an improved outlook on life (Department of Health and Human Services [DHHS], 2018).

**Education.** Education plays a significant role in health care and should be continuous. An exercise program will incorporate topics about suitable exercise and dietary guidelines for patients with hypertension. Physicians and other practitioners alike should receive ongoing education about appropriate and effective teaching techniques to motivate patients to exercise. Furthermore, they should be able to present educational topics on exercise in logical and patient-centered methods. Teaching patients about self-measuring their blood pressure at home should take centerstage. Practitioners will require training sessions about blood pressure self-measuring techniques as are necessary for implementation.

Educational brochures and flyers about exercise and its impact on high blood pressure should be readily available to patients. Information in these flyers and brochures should be evidence-based, transparent, and written in language that is clearly understood. For example, organizations such as the American Heart Association and the National Institute of Neurological Disorders and Stroke have already developed several guidelines and fact sheets about hypertension found on their respective websites. An exercise program that encompasses all the facets of educating patients about blood pressure and weight control should be ongoing and prioritized in managing hypertension. According to these famous words of Annan (1998),
"Knowledge is power. Information is liberating. Education is the premise of progress, in every society, in every family".

**Economic.** Through the years, hypertension has placed a significant economic burden on society. Billions of dollars are spent annually on the treatment and management of hypertension (CDC, 2020). An exercise program will help reduce the financial burden on society and have long-term benefits such as minimizing the morbidity and mortality associated with hypertension. Practitioners can utilize exercise therapy more often than medications, thereby reducing the costs of these medications to patients. Although there are many different antihypertensive medications to treat hypertension, they can be expensive and not always covered by insurance companies. Insurance companies should take up the mantle to include exercise therapy as part of the treatment for hypertension. Exercise therapy can be described as a cheap, safe, and effective method to prevent, treat and manage hypertension.

A preventative approach should also be taken with hypertension. An exercise program such as this one can be utilized in preventive care for patients at risk for the disease. Patients who have not yet been diagnosed with hypertension but have increased risk factors can participate in continuous physical activity such as walking or other exercises, which may prevent its development. It is more cost-effective to prevent the emergence of hypertension than to manage and treat it in economic terms. Besides, hypertension has been associated with several deadly cardiovascular and renal diseases making preventative care such as an exercise program an opportunity to save millions of dollars. These resources can be better invested in other much-needed health care services. An exercise program such as this one speaks volumes of its economic implications by delving deeper into its costs versus benefits for both patients and society.
Sustainability

Sustaining an exercise program such as this one may take substantial effort by key stakeholders. Healthcare practitioners should continually emphasize the importance of exercise, making it a prescription for the prevention, management, and treatment of hypertension. Primary care and other care practices found in the community can replicate the results of this exercise program and use it as a fundamental tool in their care plans. With their permission, the exercise program results can be portrayed on the websites of many practice sites that manage patients with hypertension. Furthermore, professional organizations should play a significant role in exercise promotion and sustainability. Patients should be made to realize the value and benefits of exercise in the short-term and long term. Policymakers, practitioners, and patients will need to make a concerted effort to continue to build on this exercise program, making it viable for the next generation.

Professional Reporting

Any evidence-based program, especially this exercise program that had statistically significant results, should be reported to professional organizations such as the American Heart Association and American Stroke Association. With a targeted audience of all patients with hypertension, these two organizations are vital in setting standards and guidelines for managing hypertension. Further studies may be warranted, especially with larger sample sizes. However, both organizations will have the resources required to replicate this study on a larger scale. These results will be a stepping-stone in acknowledging the importance of exercise such as walking on high blood pressure. Reporting these critical results to these professional bodies will help promote the spread of information from the exercise program intervention leading to enhanced application and optimal outcomes.
Conclusion

When peeling away at the many layers of hypertension; risk factors, causes, prevention, management, and treatment, it is essential to understand the significance of exercise and its impact on the disease. Many studies have concluded that exercise does reduce blood pressure over time. To find common ground in which physical activity remains at the forefront of hypertension management, healthcare practitioners and patients alike should continue to educate themselves and be willing to participate in programs with proven results such as this exercise program. In summary, with hypertension being one of the predominant risk factors for cardiac and other chronic diseases, health-promoting behaviors such as exercise and diet will prove beneficial in its treatment and management. An exercise program will provide a fundamental tool for African American patients with hypertension to continue to fight the war against hypertension.
References

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https://doi.org/10.1016/j.cct.2018.06.011
Appendix A

Figure 1

Health Promotion Model

Figure 2

*Application of Pender’s Health Promotion Model to an Exercise Program for African Americans with Hypertension*

**Individual Characteristics and Experiences**
- African American Patients with Hypertension and BMIs >25
- African American patients on antihypertensives

**Perceived Benefits of Action**
- Blood pressure and BMI reduction
- Recognizing hypertension risk factors and benefits of exercise
- Exercise for life
- Dash and low sodium diet

**Commitment to a Plan of Action**

**Behavioral outcomes**
- Following health promoting behaviors
- Continuing with the exercises and dietary habits learned from the exercise program
- Improved Self-efficacy
Appendix B

Table 1.0

Evidence Table

<table>
<thead>
<tr>
<th>Article #</th>
<th>Author &amp; Date</th>
<th>Evidence Type</th>
<th>Sample, Sample Size &amp; Setting</th>
<th>Study Findings that Help Answer the EBP Question</th>
<th>Limitations</th>
<th>Evidence Level /Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>White et al. (2015)</td>
<td>An observational prospective cohort study</td>
<td>Data collected from the Coronary Artery Risk Development in Young Adults (CARDIA) CARDIA participants who attended year 20 (2005-2006) and year 25 (2010-2011) Year 20 and year 25; 3549 and 3498 participants respectively Age range: 37-55 years (at baseline 18-35 years from 1985 to 1986) The proportion of race (white/black), education level, sex, age was equal Study setting included</td>
<td>More time spent in short spurts of moderate to vigorous amounts of physical activity significantly reduces the risk for hypertension but not on obesity in middle age adult patients</td>
<td>From a cost perspective, the study was impractical</td>
<td>IV, V/A</td>
</tr>
<tr>
<td>2</td>
<td>Cornelissen and Smart (2013)</td>
<td>A meta-analysis of RCT study</td>
<td>Randomized controlled trials (RCT), lasting greater than four weeks</td>
<td>Endurance, dynamic resistance, and isometric resistance training lowered both systolic and diastolic blood pressure</td>
<td>Participants knew of group allocation (exercise vs. control)</td>
<td></td>
</tr>
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<td></td>
</tr>
<tr>
<td><strong>Purpose:</strong></td>
<td>examining the effects of different forms of exercise such as endurance, dynamic resistance, and isometric resistance training on blood pressure</td>
<td>Healthy adults from 18 years or older</td>
<td><strong>Results</strong></td>
<td>Combined training with endurance, dynamic resistance, and isometric resistance training lowered diastolic blood pressure</td>
<td>Critical scientific criteria were not always observed such as regular follow up, compliance, lifestyle changes, and lack of blinded measures</td>
<td></td>
</tr>
<tr>
<td><strong>Randomized controlled trials (RCT) study</strong></td>
<td></td>
<td></td>
<td><strong>Results</strong></td>
<td>Combined training with endurance, dynamic resistance, and isometric resistance training lowered diastolic blood pressure</td>
<td>Critical scientific criteria were not always observed such as regular follow up, compliance, lifestyle changes, and lack of blinded measures</td>
<td></td>
</tr>
<tr>
<td><strong>Results published in peer-reviewed journals up to February 2012</strong></td>
<td></td>
<td></td>
<td><strong>Results</strong></td>
<td>Combined training with endurance, dynamic resistance, and isometric resistance training lowered diastolic blood pressure</td>
<td>Critical scientific criteria were not always observed such as regular follow up, compliance, lifestyle changes, and lack of blinded measures</td>
<td></td>
</tr>
<tr>
<td><strong>93 trials involved (105 endurance, 29 dynamic resistance, 14 combined, 5 isometrics)</strong></td>
<td></td>
<td></td>
<td><strong>Results</strong></td>
<td>Combined training with endurance, dynamic resistance, and isometric resistance training lowered diastolic blood pressure</td>
<td>Critical scientific criteria were not always observed such as regular follow up, compliance, lifestyle changes, and lack of blinded measures</td>
<td></td>
</tr>
<tr>
<td><strong>5223 participants (3401 exercise/1822 control)</strong></td>
<td></td>
<td></td>
<td><strong>Results</strong></td>
<td>Combined training with endurance, dynamic resistance, and isometric resistance training lowered diastolic blood pressure</td>
<td>Critical scientific criteria were not always observed such as regular follow up, compliance, lifestyle changes, and lack of blinded measures</td>
<td></td>
</tr>
<tr>
<td><strong>Meta-analysis utilizing the Comprehensive Meta-analysis V2 software</strong></td>
<td></td>
<td></td>
<td><strong>Results</strong></td>
<td>Combined training with endurance, dynamic resistance, and isometric resistance training lowered diastolic blood pressure</td>
<td>Critical scientific criteria were not always observed such as regular follow up, compliance, lifestyle changes, and lack of blinded measures</td>
<td></td>
</tr>
<tr>
<td><strong>Primary outcome:</strong></td>
<td></td>
<td></td>
<td><strong>Results</strong></td>
<td>Combined training with endurance, dynamic resistance, and isometric resistance training lowered diastolic blood pressure</td>
<td>Critical scientific criteria were not always observed such as regular follow up, compliance, lifestyle changes, and lack of blinded measures</td>
<td></td>
</tr>
</tbody>
</table>

**There was a risk for potential bias in publication**

**The large number of statistical tests performed may lead to significant findings to be obtained by chance**
<table>
<thead>
<tr>
<th></th>
<th>Author(s) (Year)</th>
<th>Methodology</th>
<th>Study Details</th>
<th>Results</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Whelton et al. (2002)</td>
<td>Meta-analysis of RCTs</td>
<td>The Articles examined were published before September 2001. 54 RCTs; 2419 participants. The study included both an intervention group (aerobic exercise) and control group (without aerobic exercise).</td>
<td>A reduction of blood pressure in both hypertensive and normotensive individuals occurred with aerobic exercises. Aerobic exercise is associated with reductions in both SBP and DBP.</td>
<td>Multivariate data analysis could not be conducted as there was no data on ethnicity and hypertensive status. Potential for publication bias was identified. The underlying mechanisms responsible for the reduction in blood pressure were unclear.</td>
</tr>
<tr>
<td>4</td>
<td>Hinderliter et al. (2014)</td>
<td>Systematic Review</td>
<td>Follow-up post the Exercise and Nutrition Interventions for Cardiovascular for Health) ENCORE study. 144 participants including both overweight men and women any who were not on antihypertensives. Study inclusions were age greater than 35, BMI 25-39.9 kg/m², sedentary lifestyle and BP.</td>
<td>A meaningful reduction in blood pressure after eight months of completion of lifestyle modifications especially with the DASH diet was achieved.</td>
<td>One-year data for 20 of the 144 participants were missing. There was a short follow up duration. Diet patterns based on a 4-day food diary as assessed but is likely to have some bias. Difficulty in measuring physical activity with an individual’s self-report.</td>
</tr>
</tbody>
</table>
130-160/80-99 mm Hg

Exclusion criteria included participants with cardiovascular disease, diabetes, and chronic kidney disease.

Participants were randomized to three different groups; Dietary Approaches to Stop Hypertension (DASH) alone diet, DASH diet with a behavior weight intervention or usual care.

Follow-up assessment was conducted eight months after completion after the 16-week intervention.

---

5 Binia et al. (2015)

Purpose: To evaluate the efficacy of taking daily potassium on Meta-analysis of RCTs

Randomized controlled trials with potassium supplementation with blood pressure reduction as the primary outcome in non-medicated patients

Potassium supplementation is associated with blood pressure reduction in patients who are not taking any antihypertensive medications

The statistical test did not exclude the presence for small study bias.

The study only emphasized patients who were not on I/A
decreasing blood pressure in non-medicated normotensive and hypertensive patients

15 RCTs selected; 917 participants

Study settings:
- United Kingdom
- United States
- Australia
- China
- South Africa
- New Zealand
- Italy
- India
- Chile
- Kenya

Patients with elevated blood pressure can benefit from increase potassium intake along with decreased or controlled sodium intake

Significant heterogeneity existed

The study was only based on 4-weeks trial of potassium supplementation which decreases generalizability

Factors other than potassium may have played a role in blood pressure reduction

Kamran et al. (2015)

Cross-sectional study

Purpose:
To investigate the predictive power of the health promotion model on SBP due to self-care practices in a rural hypertensive

671 participants under the coverage of Ardebil City in 2013

Questionnaires were utilized for data collection

Statistical analysis with Pearson correlation, multivariate linear regression, ANOVA, and independent t-test

There was a significant negative correlation between the constructs of the health promotion model and SBP

Challenging to examine a causal relationship

Behavioral theories are recommended for investigations to increase predictability

Sessoms et al. (2015)

A descriptive, pre-

Data were obtained from

There was moderate adherence to

Patient barriers such as non-adherence to
Purpose: to evaluate provider adherence to national guidelines for the treatment of hypertension in African Americans

Experimental, quantitative study

Electronic medical records

62 charts were reviewed

Clinical data collected were blood pressure measurements, prescribed medications, laboratory studies, lifestyle modification, referral to hypertension specialist, and follow-up care

Blood pressure and provider adherence had no relationship, although there was moderate provider adherence

National guidelines for the treatment of hypertension by providers

Medications and lifestyle recommendations, and lack of follow-up limiting correlation between the variables

The study setting was a multi-physician practice located in a rural community

A population of 45,273 patients are seen by the practice of which 63.8% are African Americans

8 Bakker, et al. (2018) A systemic review of both observational studies and RCTs

Purpose: to examine the effects of a broad

Performance of Aerobic exercises increases cardiorespiratory fitness leading to reductions in blood pressure

Studies which are generally focused on minimal and optimal amount of physical activity are limited

I/A
spectrum of physical activity and exercise on BP and the incidence of hypertension

Further studies are recommended to investigate the association which exists between resistance exercise and muscle strength and their impact on the incidence of hypertension

Individuals who participate in physical activity studies usually have prior healthy lifestyles which may lead to bias.

Self-reported physical activity measurement is usually overestimated.

Further cohort studies which follow individuals over time should be considered to investigate which exercise therapy is optimal in reducing risk of hypertension.
Appendix C

Figure 3

Exercise Program Project Timeline
Appendix D

Table 2.0

*Budget for an Exercise Program for African Americans with Hypertension*

<table>
<thead>
<tr>
<th>Expenses</th>
<th>Costs</th>
<th>Total Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational Handouts</td>
<td>$75</td>
<td>$75</td>
</tr>
<tr>
<td>Recruitment Flyers</td>
<td>20 x $3</td>
<td>65</td>
</tr>
<tr>
<td>Blood Pressure (oscillometric)</td>
<td>10 x $15</td>
<td>150</td>
</tr>
<tr>
<td>Machines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recruitment Brochures</td>
<td>50 (Fed-Ex)</td>
<td>95</td>
</tr>
<tr>
<td>Dissemination Posters</td>
<td>5 x $5</td>
<td>25</td>
</tr>
<tr>
<td>Total Budget</td>
<td></td>
<td>$430</td>
</tr>
</tbody>
</table>
Appendix E

Results/SPSS Analysis Data

Table 3.0

*Pre-Intervention Systolic Blood Pressure for Ten Participants*

<table>
<thead>
<tr>
<th>Pre-Intervention Systolic Blood Pressure (mmHg)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>101520-001</td>
<td>176</td>
</tr>
<tr>
<td>101520-002</td>
<td>152</td>
</tr>
<tr>
<td>101520-003</td>
<td>171</td>
</tr>
<tr>
<td>101520-004</td>
<td>153</td>
</tr>
<tr>
<td>101520-005</td>
<td>144</td>
</tr>
<tr>
<td>101520-006</td>
<td>141</td>
</tr>
<tr>
<td>101520-007</td>
<td>145</td>
</tr>
<tr>
<td>102120-008</td>
<td>140</td>
</tr>
<tr>
<td>102120-009</td>
<td>160</td>
</tr>
<tr>
<td>102120-010</td>
<td>171</td>
</tr>
</tbody>
</table>

Mean 155.3

Table 4.0

*Pre-Intervention Diastolic Blood Pressure for Ten Participants*

<table>
<thead>
<tr>
<th>Pre-Intervention Diastolic Blood Pressure (mm Hg)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>101520-001</td>
<td>105</td>
</tr>
<tr>
<td>101520-002</td>
<td>80</td>
</tr>
<tr>
<td>101520-003</td>
<td>90</td>
</tr>
<tr>
<td>101520-004</td>
<td>100</td>
</tr>
<tr>
<td>101520-005</td>
<td>96</td>
</tr>
<tr>
<td>101520-006</td>
<td>62</td>
</tr>
<tr>
<td>101520-007</td>
<td>72</td>
</tr>
<tr>
<td>102120-008</td>
<td>74</td>
</tr>
<tr>
<td>102120-009</td>
<td>64</td>
</tr>
<tr>
<td>102120-010</td>
<td>98</td>
</tr>
</tbody>
</table>

Mean 84.1

Table 5.0
**Pre-Intervention Systolic Blood Pressure for Five Participants who Completed the Program**

<table>
<thead>
<tr>
<th>Pre-Intervention Systolic Blood Pressure (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>101520-001</td>
</tr>
<tr>
<td>101520-002</td>
</tr>
<tr>
<td>101520-003</td>
</tr>
<tr>
<td>101520-004</td>
</tr>
<tr>
<td>101520-005</td>
</tr>
<tr>
<td>101520-006</td>
</tr>
<tr>
<td>101520-007</td>
</tr>
<tr>
<td>102120-008</td>
</tr>
<tr>
<td>102120-009</td>
</tr>
<tr>
<td>102120-010</td>
</tr>
</tbody>
</table>

Mean 159

**Table 6.0**

**Pre-Intervention Diastolic Blood Pressure for Five Participants who Completed the Exercise Program**

<table>
<thead>
<tr>
<th>Pre-Intervention Diastolic Blood Pressure (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>101520-001</td>
</tr>
<tr>
<td>101520-002</td>
</tr>
<tr>
<td>101520-003</td>
</tr>
<tr>
<td>101520-004</td>
</tr>
<tr>
<td>101520-005</td>
</tr>
<tr>
<td>101520-006</td>
</tr>
<tr>
<td>101520-007</td>
</tr>
<tr>
<td>102120-008</td>
</tr>
<tr>
<td>102120-009</td>
</tr>
<tr>
<td>102120-010</td>
</tr>
</tbody>
</table>

Mean 78.8
Table 7.0

*Post Intervention Systolic Blood Pressure of Five Participants who Completed the Exercise Program*

<table>
<thead>
<tr>
<th>Post Intervention Systolic Blood Pressure (mmHg)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>101520-001</td>
<td>136</td>
</tr>
<tr>
<td>101520-002</td>
<td>140</td>
</tr>
<tr>
<td>101520-003</td>
<td></td>
</tr>
<tr>
<td>101520-004</td>
<td></td>
</tr>
<tr>
<td>101520-005</td>
<td></td>
</tr>
<tr>
<td>101520-006</td>
<td>138</td>
</tr>
<tr>
<td>101520-007</td>
<td></td>
</tr>
<tr>
<td>102120-008</td>
<td></td>
</tr>
<tr>
<td>102120-009</td>
<td>145</td>
</tr>
<tr>
<td>102120-010</td>
<td>154</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td><strong>142.6</strong></td>
</tr>
</tbody>
</table>

Table 8.0

*Post Intervention Diastolic Blood Pressure for Five Participants*

<table>
<thead>
<tr>
<th>Post Intervention Diastolic Blood Pressure (mmHg)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>101520-001</td>
<td>74</td>
</tr>
<tr>
<td>101520-002</td>
<td></td>
</tr>
<tr>
<td>101520-003</td>
<td>84</td>
</tr>
<tr>
<td>101520-004</td>
<td></td>
</tr>
<tr>
<td>101520-005</td>
<td></td>
</tr>
<tr>
<td>101520-006</td>
<td>64</td>
</tr>
<tr>
<td>101520-007</td>
<td></td>
</tr>
<tr>
<td>102120-008</td>
<td></td>
</tr>
<tr>
<td>102120-009</td>
<td>66</td>
</tr>
<tr>
<td>102120-010</td>
<td>80</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td><strong>73.6</strong></td>
</tr>
</tbody>
</table>
Table 9.0

*Blood Pressure Control for Five Participants who Completed the Program*

<table>
<thead>
<tr>
<th>BP Control</th>
<th>Pre-intervention</th>
<th>Post-intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Systolic BP (mm Hg)</td>
<td>159</td>
<td>142.6</td>
</tr>
<tr>
<td>Mean Diastolic BP (mm Hg)</td>
<td>78.8</td>
<td>73.6</td>
</tr>
</tbody>
</table>

Figure 4

*Blood Pressure Control*
SPSS Analysis for SBP and DBP Post the Exercise Program Intervention

Table 10.0

*Paired Samples Statistics*

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1</td>
<td>SBP</td>
<td>159.0000</td>
<td>5</td>
<td>12.86468</td>
</tr>
<tr>
<td></td>
<td>(mmHg) pre-intervention</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SBP</td>
<td>142.6000</td>
<td>5</td>
<td>7.19722</td>
</tr>
<tr>
<td></td>
<td>(mmHg) post-intervention</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 11.0

*Paired Samples Correlations*

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Correlation</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1</td>
<td>SBP (mmHg) pre-intervention &amp; SBP (mmHg) post-intervention</td>
<td>5</td>
<td>0.640</td>
</tr>
</tbody>
</table>
Table 12.0

**Paired Samples Test**

<table>
<thead>
<tr>
<th>Pair</th>
<th>SBP (mmHg)</th>
<th>Paired Differences</th>
<th>95% Confidence Interval of the Difference</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-intervention - SBP Post-intervention</td>
<td>Mean</td>
<td>Std. Deviation</td>
<td>Std. Error Mean</td>
<td>Lower</td>
</tr>
<tr>
<td>1</td>
<td>16.40000</td>
<td>9.93982</td>
<td>4.44522</td>
<td>4.05808</td>
</tr>
</tbody>
</table>

Table 13.0

**Paired Samples Effect Sizes**

<table>
<thead>
<tr>
<th>Pair</th>
<th>SBP (mmHg)</th>
<th>Standardizer</th>
<th>Point Estimate</th>
<th>95% Confidence Interval</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-intervention - SBP Post-intervention</td>
<td></td>
<td>Cohen's d</td>
<td>9.93982</td>
<td>1.650</td>
<td>0.213</td>
<td>3.025</td>
</tr>
<tr>
<td>1</td>
<td>11.01117</td>
<td>Hedges' correction</td>
<td>1.489</td>
<td>0.192</td>
<td>2.730</td>
<td></td>
</tr>
</tbody>
</table>

a. The denominator used in estimating the effect sizes.
Cohen's d uses the sample standard deviation of the mean difference.
Hedges' correction uses the sample standard deviation of the mean difference, plus a correction factor.
### Table 14.0

**Paired Samples Statistics**

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1 DBP (mmHg) pre-intervention</td>
<td>78.8000</td>
<td>5</td>
<td>15.78607</td>
<td>7.05975</td>
</tr>
<tr>
<td>DBP (mmHg) post-intervention</td>
<td>73.6000</td>
<td>5</td>
<td>8.64870</td>
<td>3.86782</td>
</tr>
</tbody>
</table>

### Table 15.0

**Paired Samples Correlations**

<table>
<thead>
<tr>
<th>Pair 1 DBP (mmHg) pre-intervention &amp; DBP (mmHg) post-intervention</th>
<th>N</th>
<th>Correlation</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.940</td>
<td>0.017</td>
<td></td>
</tr>
</tbody>
</table>
Table 16.0

**Paired Samples Test**

<table>
<thead>
<tr>
<th>Paired Differences</th>
<th>Paired Differences</th>
<th>Paired Differences</th>
<th>Paired Differences</th>
<th>Paired Differences</th>
<th>Paired Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>Std. Deviation</td>
<td>Std. Error Mean</td>
<td>95% Confidence Interval of the Difference</td>
<td>Lower</td>
<td>Upper</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------</td>
<td>-------------------</td>
<td>-------------------</td>
<td>-------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Pair 1 DBP (mmHg)</td>
<td>5.20000</td>
<td>8.19756</td>
<td>3.66606</td>
<td>4.97862</td>
<td>15.37862</td>
</tr>
</tbody>
</table>

Paired intervention
- DBP (mmHg)
post-intervention

Table 17.0

**Paired Samples Effect Sizes**

<table>
<thead>
<tr>
<th>Paired Samples Effect Sizes</th>
<th>Paired Samples Effect Sizes</th>
<th>Paired Samples Effect Sizes</th>
<th>Paired Samples Effect Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>Std. Deviation</td>
<td>Std. Error Mean</td>
<td>95% Confidence Interval</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------</td>
<td>-------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Pair 1 DBP (mmHg) pre-intervention</td>
<td>Cohen's d</td>
<td>8.19756</td>
<td>0.634</td>
</tr>
<tr>
<td>Hedges' correction</td>
<td>9.08112</td>
<td>0.573</td>
<td>-0.334</td>
</tr>
</tbody>
</table>

a. The denominator used in estimating the effect sizes.
Cohen's d uses the sample standard deviation of the mean difference.
Hedges' correction uses the sample standard deviation of the mean difference, plus a correction factor.
Table 18.0

*Pre-Intervention Weight*

<table>
<thead>
<tr>
<th>Weight Pre-Intervention (pounds) for the Five out of the Ten Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>101520-001</td>
</tr>
<tr>
<td>101520-002</td>
</tr>
<tr>
<td>101520-003</td>
</tr>
<tr>
<td>101520-004</td>
</tr>
<tr>
<td>101520-005</td>
</tr>
<tr>
<td>101520-006</td>
</tr>
<tr>
<td>102120-007</td>
</tr>
<tr>
<td>102120-008</td>
</tr>
<tr>
<td>102120-009</td>
</tr>
<tr>
<td>102120-010</td>
</tr>
<tr>
<td>Mean</td>
</tr>
</tbody>
</table>

Table 19.0

*Post-Intervention Weight*

<table>
<thead>
<tr>
<th>Weight Post-Intervention (pounds) for the Five out of the Ten Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>101520-001</td>
</tr>
<tr>
<td>101520-002</td>
</tr>
<tr>
<td>101520-003</td>
</tr>
<tr>
<td>101520-004</td>
</tr>
<tr>
<td>101520-005</td>
</tr>
<tr>
<td>101520-006</td>
</tr>
<tr>
<td>102120-007</td>
</tr>
<tr>
<td>102120-008</td>
</tr>
<tr>
<td>102120-009</td>
</tr>
<tr>
<td>102120-010</td>
</tr>
<tr>
<td>Mean</td>
</tr>
</tbody>
</table>
Table 18.0

*Weight Control for Five Participants who Completed the Program*

<table>
<thead>
<tr>
<th>Weight Control</th>
<th>Pre-intervention</th>
<th>Post-intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Weight (pounds)</td>
<td>171.4</td>
<td>166.2</td>
</tr>
</tbody>
</table>

Figure 5

*Weight Control*
SPSS Analysis for Weight Pre and Post Intervention of the Exercise Program

Table 20.0

*Paired Samples Statistics*

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1 Weight pre-intervention</td>
<td>171.4000</td>
<td>5</td>
<td>55.04816</td>
<td>24.61829</td>
</tr>
<tr>
<td>Weight post-intervention</td>
<td>166.2000</td>
<td>5</td>
<td>54.32035</td>
<td>24.29280</td>
</tr>
</tbody>
</table>

Table 21.0

*Paired Samples Correlations*

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Correlation</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1 Weight pre-intervention &amp; Weight post-intervention</td>
<td>5</td>
<td>1.000</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
Table 22.0

**Paired Samples Test**

<table>
<thead>
<tr>
<th>Pair</th>
<th>Weight pre-intervention - Weight post-intervention</th>
<th>Paired Differences</th>
<th>95% Confidence Interval of the Difference</th>
<th>Std. Error Mean</th>
<th>Std. Deviation</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.20000 - 1.78885</td>
<td>Mean</td>
<td>0.80000</td>
<td>2.97884</td>
<td>7.42116</td>
<td>6.500</td>
<td>4</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Table 23.0

**Paired Samples Effect Sizes**

<table>
<thead>
<tr>
<th>Pair</th>
<th>Weight pre-intervention - Weight post-intervention</th>
<th>Standardizer</th>
<th>Point Estimate</th>
<th>95% Confidence Interval</th>
<th>Std. Error Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.20000 - 1.78885</td>
<td>Cohen's d</td>
<td>1.78885</td>
<td>2.907</td>
<td>0.779</td>
<td>5.015</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hedges' correction</td>
<td>1.98166</td>
<td>2.624</td>
<td>0.703</td>
<td>4.527</td>
</tr>
</tbody>
</table>

a. The denominator used in estimating the effect sizes.  
Cohen’s d uses the sample standard deviation of the mean difference.  
Hedges’ correction uses the sample standard deviation of the mean difference, plus a correction factor.
Appendix F

Recruitment Statement

Hello, I am___________, a nurse practitioner student from the School of Nursing at Rutgers’ State University. We are conducting a research study on the impact of exercise such as walking on high blood pressure and weight control in African Americans with hypertension. This program will involve a low impact exercise such as walking or just moving more for a total of 150 minutes a week for a period of 8 weeks. During this time, we will also need to watch the foods you eat. Before we begin the exercise program, there is a simple questionnaire about your background and medical history that will need to be filled. In addition, we will take your blood pressure and weight before and after the exercise program. This will help us gather information about the impact of exercise on your blood pressure and weight. Your participation in this research study is completely voluntary. If you choose to participate, you will need to give us your permission to take part in the study. This study should not cause you any harm. If you need further details or have any questions, please feel free to contact us. Our contact information is found on the flyers, and information cards found here at the practice. Thank you for your time.
EXERCISE PROGRAM

Principal Investigator: Dr. Gerti Hieder

The purpose of this research study is to examine the impact of walking and moving more on high blood pressure and weight in African Americans with high blood pressure.

To participate in this research study, you must:
- Be 30-55 years old
- Speak, write and read English
- Have a diagnosis of Hypertension
- On blood pressure medications

Participation in this study involves:
- Filling a demographic and health history questionnaire
- Walking or moving for at least 150 minutes weekly for a period of 8 weeks
- Taking your blood pressure and weight prior to and after the exercise program
- Paying close attention to your diet

Benefits of the Exercise Program:
- Reduction in blood pressure and weight
- Improved self-management of high blood pressure
- Overall improvement in well-being
- Improved dietary habits

CONTACT INFORMATION

To find out more about this study, please contact:

- Dr. Gerti Heider, PhD, MSN, APRN, GNP-BC, ANP
  - Email: [redacted]
- Grethel John, RN, BSN, DNP Student-Co-Investigator
  - Tel #: [redacted]
  - Email: [redacted]
CONSENT TO TAKE PART IN A RESEARCH STUDY

Title of Study: The Implementation of an Exercise Program to Improve Blood Pressure and Weight Control in African Americans with Hypertension in the Primary Care Setting

Principal Investigator: Dr. Gerti Heider, PhD, MSN, APRN, GNP-BC, ANP

STUDY SUMMARY: This consent form is part of an informed consent process for a research study and it will provide information that will help you decide whether you want to take part in this study. It is your choice to take part or not.

The purpose of the research is to: examine the impact of an exercise program on high blood pressure and weight control in African Americans with Hypertension. If you take part in the research, you will be asked to walk or move more for at least a total of 150 minutes weekly. Your blood pressure and weight will be taken before and after you start the exercise program. You will need to pay close attention to the foods you eat during the exercise program. You will be asked to eat low salt foods, as well as, more fruits, vegetables, and fish. You will also be asked to fill a questionnaire before the start of the program. The questionnaire will ask some basic information and some health promoting behaviors about yourself. The exercise program will include exercise instructions that you can view on your phone, computer, or other electronic device. There will be question and answer opportunities via the telephone. Your time in the study will take approximately 8 weeks from the beginning to the end and will include walking exercises, 30 minutes for blood pressure and weight for both the before and after measurement periods of the program, 20 minutes to complete the questionnaire prior to the implementation of the program.

Possible harms or burdens: there is no possible harms or burdens if you take part in this study.

An alternative to taking part in the research study Your alternative to taking part in the research study is not to take part in it.

The information in this consent form will provide more details about the research study and what will be asked of you if you choose to take part in it. If you have any questions now or during the study, if you choose to take part, you should feel free to ask them and should expect to be given answers you completely understand. After your questions have been answered and you wish to
take part in the research study, you will be asked to sign this consent form. You are not giving up any of your legal rights by agreeing to take part in this research or by signing this consent form.

**Who is conducting this study?**
Dr. Gerti Heider, PhD, MSN, APRN, GNP-BC, ANP is the Principal Investigator of this research study. A Principal Investigator has the overall responsibility for the conduct of the research. However, there are often other individuals who are part of the research team.

Grethel John, RN, BSN, DNP student is the co-investigation and may be reached at telephone number and at email address.

The Principal investigator or another member of the study team will also be asked to sign this informed consent. You will be given a copy of the signed consent form to keep for your records.

**Why is this study being done?**
This research study is being done to examine the impact of an aerobic exercise such as walking on blood pressure and weight control. Many African American patients have high blood pressure with the top number usually over 130 mmHg and the bottom number above 80 mmHg, as well as, being overweight with body mass indexes above 25. High blood pressure can lead to other chronic conditions such as stroke, heart, and renal disease.

**Who may take part in this study and who may not?**
Patients who may take part in this research study are those who are of black/non-Hispanic/African American race; ages 30 to 55 years old; able to speak, write and read English; diagnosed with high blood pressure (hypertension) and have been seen at this office in the last six months; those patients with their last recorded blood pressure reading above 130 mmHg systolic (top number) and 80 mmHg diastolic (bottom number) respectively, and are on medications to help reduce their blood pressure. In addition, they should own an electronic blood pressure machine (or one will be provided for them free of charge).

Patients who may not take part in this research study are those with functional limitations (functional limitations will be assessed by asking you if you are able to walk approximately 10 minutes at rate 2.5 miles per hour without experiencing any limiting symptoms such as shortness of breath, difficulty breathing, pain etc.); those who are pregnant, have preeclampsia or have a history of preeclampsia; those with concerning symptoms such as chest pain, dizziness, shortness of breath, palpitations at rest and with activity; and those with a history of injuries, back problems, and arthritis.

**Why have I been asked to take part in this study?**
You have been asked to take part in the study because you have high blood pressure. This research study will help improve the way you manage your high blood pressure through a simple exercise such as walking and by watching the foods you eat. Furthermore, this research study will help you better manage your weight which may lead to better blood pressure control. High blood pressure puts you at risk for other chronic conditions such as heart disease, stroke, and renal disease.
How long will the study take and how many subjects will take part?
Approximately 16 patients will take part in this research study and you are expected to take part in it for 8 weeks. The overall study from the start to the finish will last for a period of 12 months.

What will I be asked to do if I take part in this study?
In this research study, you will be asked to simple walk several times during the week. You need to walk or just keep moving throughout the week. You will be required to move more rather than sitting for long periods. You will be required to walk or move for a total of at least a total of 150 minutes a week, as well as, watch the foods you eat more closely. Your blood pressure and weight will be taken before and after the research study. You will also be required to fill up a questionnaire with simple questions about you, your health and other lifestyle behaviors. It is not necessary to record or take images of you during this research study.

What are the risks of harm or discomforts I might experience if I take part in this study?
There is less than minimal risk or harm to you if you take part in this research study. Walking is a form of low impact exercise. Potential discomfort you may experience from walking is slight muscle aches which is temporary and will resolve quickly. There is no evidence that walking causes any psychological, social, financial, and reproductive immediate and/or long-term risks of harm or discomforts to you, rather, walking will boosts your overall quality of life.

Reproductive Risks of Harm
There are no reproductive risks of harm to you.

Are there any benefits to me if I choose to take part in this study?
Some benefits of taking part in this study may be a reduction in your blood pressure and weight; you may feel better and more confident about managing your own blood pressure and weight; your heart and lungs may become stronger; your energy level may increase allowing you to get more done; you may get better sleep; and your muscles may become stronger and firmer. However, it is possible that you may not receive any direct benefit from taking part in this study.

What are my alternatives if I do not want to take part in this study?
There are no alternative treatments available if you choose not to take part in this research study. Your alternative is not to take part in this study.

How will I know if new information is learned that may affect whether I am willing to stay in the study?
During the study, you will be updated about any new information that may affect whether you are willing to continue taking part in the study. If new information is learned that may affect you after the study or your follow-up is completed, you will be contacted immediately.

Will I receive the results of the research?
In general, we will not give you any individual results from the study. If we find something of urgent medical importance to you, we will inform you, although we expect that this will be an exceedingly rare occurrence. Furthermore, if the exercise program had a significant impact on
your blood pressure and weight, the research team will notify you by first class mail after analysis of research data are concluded, which may take up to six months. The research team’s intention for doing this, is to motivate you to continue engaging in physical activity such as walking and moving more with the goal of controlling your blood pressure and weight for your overall health improvement.

**Will there be any cost to me to take Part in this study?** You will have absolutely no costs from participating in this research study.

**Will I be paid to take part in this study?** You will not be paid to take part in this research study. If you participate in this research study, it is strictly voluntary.

**Who might benefit financially from this research?** N/A

**How will information about me be kept private or confidential?**
All efforts will be made to keep your personal information in your research record confidential, but total confidentiality cannot be guaranteed. You will be assigned a random identification number by the primary investigator to be used on personal health information data collection and the project evaluation. The project evaluations will be administered by the Co-I. The main list which links your name to the random identification number will be kept separately from all questionnaires. Questionnaires and other project materials will be kept in a locked cabinet at the project site. Information collected about you will be de-identified upon completion and only this de-identified information will be used for analysis. All information about you will be destroyed according to Rutgers State University guidelines upon completion of the research project, closure of the IRB and final writing of the manuscript. Hard copies of consent forms and other project information will be kept at the primary investigator’s office; Dr. Gerti Heider at SSB 1135, Newark Health Sciences, Rutgers State University, 65 Bergen Street, New Jersey, 07107. Data (information) encryption software as approved by Rutgers State University will be used for all information about you held on the research team’s personal computers. There are no foreseeable issues that may increase the risk of breach in keeping your information confidential.

**What will happen to my information or biospecimens collected for this research after the study is over?**
All information about you will be destroyed according to Rutgers State University guidelines upon completion of the research project, closure of the IRB and final writing of the manuscript.

**What will happen if I do not wish to take part in the study or if I later decide not to stay in the study?**
It is your choice whether to take part in the research. You may choose to take part, not to take part or you may change your mind and withdraw from the study at any time.

If you do not want to enter the study or decide to stop taking part, your relationship with the study staff will not change, and you may do so without penalty and without loss of benefits to which you are otherwise entitled.
You may also withdraw your consent for the use of data already collected about you, but you must do this in writing to Dr. Gerti Heider, PhD, MSN, APRN, GNP-BC, ANP, Newark Health Sciences, SSB 1135, 65 Bergen Street, Newark, NJ 07107

If you decide to withdraw from the study for any reason, you may be asked to return for at least one additional visit for safety reasons.

**Who can I contact if I have questions?**
If you have questions about taking part in this study or if you feel you may have suffered a research related injury, you can contact the Principal Investigator: Dr. Gerti Heider, PhD, MSN, APRN, GNP-BC, ANP, Division of Advanced Nursing Practice, Newark Health Sciences, tel #: (973) 972-9603.

If you have questions about your rights as a research subject, you can contact the Rutgers IRB Director at: Newark Health Science IRB, 65 Bergen St., SSB 511, Newark, NJ 07107, (973)-972-3608]; or the Rutgers Human Subjects Protection Program at (973) 972-1149, email us at humansubjects@ored.rutgers.edu., or write us at 65 Bergen St., Suite 507, Newark, NJ 07107.

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**PERMISSION (AUTHORIZATION) TO USE OR SHARE HEALTH INFORMATION THAT IDENTIFIES YOU FOR A RESEARCH STUDY**

The next few paragraphs tell you about how investigators want to use and share identifiable health information from your medical record in this research. Your information will only be used as described here or as allowed or required by law. If you sign this consent form, you agree to let the investigators use your identifiable health information in the research and share it with others as described below. Ask questions if there is something you do not understand.

**What Is The Purpose Of The Research And How Will My Information Be Used?**
You are being invited to take part in this research study which is described at the beginning of this form. The purpose of collecting and using your health information for this study is to help investigators answer the questions that are being asked in the research.

**What Information About Me Will Be Used?**
- Medical history and physical
- Medication regimens
- Treatment plans
- Office visit/consultation notes
- Other (vital signs: blood pressure and body mass indexes for the last six months)

**Who May Use, Share or Receive My Information?**
The research team may use or share your information collected or created for this study with the following people and institutions:
- Rutgers University Investigators Involved In The Study
• The Rutgers University Institutional Review Board and Compliance Boards
• The Office for Human Research Protections in the U.S. Dept. of Health and Human Services
• Hospital Personnel as Necessary For Clinical Care: N/A
• Non-Rutgers Investigators on the Study Team: N/A
• The Food and Drug Administration: N/A
• List every other class of persons or organizations not affiliated with Rutgers University N/A

Those persons or organizations that receive your information may not be required by Federal privacy laws to protect it and may share your information with others without your permission, if permitted by the laws governing them.

**Will I Be Able To Review My Research Record While The Research Is Ongoing?**
No. We are not able to share information in the research records with you until the study is over. To ask for this information, please contact the Principal Investigator, the person in charge of this research study.

**Do I Have To Give My Permission?**
No. You do not have to permit use of your information. But, if you do not give permission, you cannot take part in this study. (Saying no does not stop you from getting medical care or other benefits you are eligible for outside of this study.)

**If I Say Yes Now, Can I Change My Mind And Take Away My Permission Later?**
Yes. You may change your mind and not allow the continued use of your information (and to stop taking part in the study) at any time. If you take away permission, your information will no longer be used or shared in the study, but we will not be able to take back information that has already been used or shared with others. If you say yes now but change your mind later for use of your information in the research, you must write to the researcher and tell him or her of your decision: Dr. Gerti Heider, PhD, MSN, APRN, GNP-BC, ANP, Division of Advanced Nursing Practice, Newark Health Sciences, tel #: (973) 972-9603

**How Long Will My Permission Last?**
Your permission for the use and sharing of your health information will last until end of the research study.
AGREEMENT TO PARTICIPATE

Subject Consent:

I have read this entire consent form, or it has been read to me, and I believe that I understand what has been discussed. All my questions about this form and this study have been answered. I agree to take part in this study.

Subject Name (Print):__________________________________________________________

Subject Signature:_________________________________________ Date:___________

Signature of Investigator/Individual Obtaining Consent:

To the best of my ability, I have explained and discussed all the important details about the
Appendix G

**Physical Activity Readiness Questionnaire (PAR Q)**

**Short version**

Regular physical activity or exercise such as walking is especially important in the management of chronic diseases such as hypertension and weight management. It can also be fun and rewarding to take part in regular physical activity. Although, regular physical activity or exercise such as walking is usually safe for most people and poses minimal risk of injury, it is important to check with your doctor before becoming physically active.

The Physical Activity Readiness Questionnaire (PAR.Q) will help determine your readiness to participate in this exercise program, and whether you will need to check with your doctor prior to starting this program. Please read the following questions carefully and answer them as honestly as possible.

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ 1. Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?</td>
<td></td>
</tr>
<tr>
<td>□ 2. Do you feel pain in your chest when you do physical activity?</td>
<td></td>
</tr>
<tr>
<td>□ 3. In the past month, have you had chest pain when you were not doing physical activity?</td>
<td></td>
</tr>
<tr>
<td>□ 4. Do you lose your balance because of dizziness or do you ever lose consciousness?</td>
<td></td>
</tr>
<tr>
<td>□ 5. Do you have a bone or joint problem that could be made worse by a change in your physical activity?</td>
<td></td>
</tr>
<tr>
<td>□ 6. Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?</td>
<td></td>
</tr>
<tr>
<td>□ 7. Do you know of any other reason why you should not do physical activity?</td>
<td></td>
</tr>
</tbody>
</table>

If you answered:

**YES to one or more questions**

Talk to your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want – if you start slowly and build up gradually. Or you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

**Delay becoming much more active:**

- If you are not feeling well because of a temporary illness such as a cold or a fever – wait until you feel better; or
- If you are or may be pregnant – talk to your doctor before you start becoming more active.

Please note: If your health changes so that you then answer YES to any of the above questions, please let us know immediately. Ask whether you should change your physical activity plan.

**NO to all questions**

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- Start becoming much more physically active – begin slowly and build up gradually. This is the safest and easiest way to go.
- Take part in a fitness appraisal – this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively.
Demographic and Health History Questionnaire

1. Gender
   o Male
   o Female

2. Age
   o 30-40
   o 41-50
   o 51-60
   o 61-70

3. Marital Status
   o Yes
   o No
   o Single, never married
   o Married, domestic partnership
   o Divorced
   o Separated
   o Widowed

4. Education Level
   o No schooling completed
   o Nursery school to 8th grade
   o Some high school, no diploma
   o High school graduate, diploma, or the equivalent (for example: GED)
   o Some college credit, no degree
   o Trade/technical/vocational training
   o Associate degree
   o Bachelor’s degree
   o Master’s degree
   o Professional degree
   o Doctorate degree

5. Employment Status
   o Employed
   o Unemployed

6. When was your hypertension diagnosis made?

_______________________________________________________________________

7. Do you have a family history of hypertension?
   o Yes
   o No
   o Mother
   o Father
8. Have you been diagnosed with diabetes? If yes, when was this diagnosis made?
   - Yes
   - No

9. What is your favorite type of exercise?
   - stationary bike
   - treadmill
   - elliptical
   - water rower
   - stress balls
   - recumbent bike
   - walking outside
   - biking outside
   - I do not exercise

10. Where do you exercise?
    - Home
    - Gym
    - Park
    - I do not exercise

11. How often do you eat fried foods?
    - 1-2 days a week
    - 3-4 days a week
    - 5 or more days a week
    - Never

12. How often do you eat vegetables?
    - 1-2 days a week
    - 3-4 days a week
    - 5 or more days a week
    - Never

13. How often do you eat fast foods?
    - 1-2 days a week
    - 3-4 days a week
    - 5 or more days a week
    - Never

14. Tobacco history:
    - Currently smoke (check all that apply)
    - cigarettes
o smokeless tobacco
o cigars
o pipe
o other____________
o Quit smoking
o Month and Year__________________
o Have never smoked

15. Are you currently prescribed medications by your healthcare provider(s)?
o Yes
o No

16. What medications are you currently taking for you high blood pressure?
_________________________________________________________________________________

17. How often do you miss medication doses?
o Daily
o Weekly
o Monthly

18. How often do you follow up with your primary care physician for blood pressure management?
o Once a year
o Every 6 months
o Never

19. Do you own a blood pressure machine?
o Yes
o No

20. How often do you check your blood pressure?
o Once a day
o Once a week
o Twice a week
o Greater than twice a week
o Never

21. Have you ever participated in an exercise program like this one before? If yes, please explain below.
o Yes
o No
Appendix H

Table 24.0
*Demographic and Health History of Participants*

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Subcategories</th>
<th>Frequency-% (Total N=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age Group</td>
<td>30-40 years</td>
<td>1 (10%)</td>
</tr>
<tr>
<td></td>
<td>41-50 years</td>
<td>3 (30%)</td>
</tr>
<tr>
<td></td>
<td>51-60 years</td>
<td>6 (60%)</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>4 (40%)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>6 (60%)</td>
</tr>
<tr>
<td>Duration of HTN</td>
<td>1 year</td>
<td>1 (10%)</td>
</tr>
<tr>
<td></td>
<td>5-10 years</td>
<td>6 (60%)</td>
</tr>
<tr>
<td></td>
<td>&gt;10 years</td>
<td>3 (30%)</td>
</tr>
<tr>
<td>Physical Activity Readiness of</td>
<td>Yes</td>
<td>10 (100%)</td>
</tr>
<tr>
<td>Participants to Exercise</td>
<td>No</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>HTN Providers</td>
<td>Primary Care Provider</td>
<td>8 (80%)</td>
</tr>
<tr>
<td></td>
<td>Specialists (Cardiologist/Neurologist)</td>
<td>2 (20%)</td>
</tr>
<tr>
<td># of Antihypertensive Medications</td>
<td>1</td>
<td>2 (20%)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4 (40%)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>4 (40%)</td>
</tr>
<tr>
<td>Own a BP Machine</td>
<td>Yes</td>
<td>7 (70%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>3 (30%)</td>
</tr>
</tbody>
</table>
## Appendix I

### Participant Medical Data Abstraction Form

<table>
<thead>
<tr>
<th>Patient ID</th>
<th>Medical History</th>
<th>Medications</th>
<th>Blood Pressure (Last six months)</th>
<th>Weight (Last six months)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>March</td>
<td>April</td>
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<td></td>
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<td></td>
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</tr>
</tbody>
</table>

*Figure 4. Participant Medical Abstraction Form*
Appendix J

Figure 6

Exercise Program Brochure Page 1
**Exercise Program Brochure Page 2**

**Your Walking Guide:**
- Walk or keep moving for only 8 weeks and it will become part of your lifestyle.

**Step 1:** Find a suitable route to walk
- Ensure that the area you choose to walk in is nice and safe.
- Choose at least a 1-mile walking route.
- If you are unable to walk outside, you can try stepping in place inside your home.

**Step 2:** Choose a suitable time to walk
- You can walk either before breakfast, dinner, or both.

**Step 3:** Get ready to walk
- Make sure you have good fitting shoes.
- Keep track of your walking.
  - Get a calendar.
  - Mark the days and distance you walked.

Reference: American Heart Association

---

**“Walk For Your Health”**

**Before You Step Out**

**DO:**
- Wear light color clothes: reflective ones after dark.
- Walk preferably in a park with others.
- Change your route from day to day.
- Cross only at corners and look out for speeding drivers.
- Carry ID and a cell phone.

**DON'TS:**
- Do not wear headphones.
- Do not walk near deserted, overgrown, or dark places.
- Do not walk on icy, smooth, or wet surfaces.
- Stay away from strangers.
- Do not assume all drivers will obey traffic rules.
**LIFESTYLE CHANGES that Lower Blood Pressure**

- **Move More**
  Get regular physical activity

- **Focus on Nutrition**
  Follow the DASH diet and eat potassium-rich vegetables

- **Cut Salt**
  Aim for 1,500 mg of sodium or less per day

- **Limit Alcohol**
  For men, not more than 2 drinks per day; for women, 1

- **Lose Weight**
  Losing just a few pounds can make a big difference

- **Don’t Smoke**
  If you smoke, stop

- **De-stress**
  Meditation and rest help lower blood pressure
### How to Read a Label

1. **Start Here**
   - *Serving Size: Compare this to the portion size you are eating.*

2. **Check Calories**

3. **%DV Guide**
   - 5% or less is LOW
   - 20% or more is HIGH

4. **Limit These Nutrients**

5. **Get Enough of These Nutrients**

### Nutrition Facts

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Amount</th>
<th>% Daily Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Calories</strong></td>
<td>85</td>
<td></td>
</tr>
<tr>
<td><strong>Fat</strong></td>
<td>1 g</td>
<td>2%</td>
</tr>
<tr>
<td>Saturated</td>
<td>0.5 g</td>
<td>3%</td>
</tr>
<tr>
<td>+ Trans</td>
<td>0 g</td>
<td></td>
</tr>
<tr>
<td><strong>Cholesterol</strong></td>
<td>0 mg</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Sodium</strong></td>
<td>150 mg</td>
<td>6%</td>
</tr>
<tr>
<td><strong>Carbohydrate</strong></td>
<td>15 g</td>
<td>5%</td>
</tr>
<tr>
<td>Fibre</td>
<td>3 g</td>
<td>13%</td>
</tr>
<tr>
<td>Sugars</td>
<td>2 g</td>
<td></td>
</tr>
<tr>
<td><strong>Protein</strong></td>
<td>3 g</td>
<td></td>
</tr>
<tr>
<td><strong>Vitamin A</strong></td>
<td></td>
<td>0%</td>
</tr>
<tr>
<td><strong>Vitamin C</strong></td>
<td></td>
<td>0%</td>
</tr>
<tr>
<td><strong>Calcium</strong></td>
<td></td>
<td>6%</td>
</tr>
<tr>
<td><strong>Iron</strong></td>
<td></td>
<td>15%</td>
</tr>
</tbody>
</table>
Appendix M

Thank You Letter/Post-Intervention Script

Now that you have completed the last week of the exercise program, I invite you to complete the last part of the study. The last part of the study involves you coming back to the office to have your blood pressure and weight measured. This will only take approximately 10-15 minutes of your time. The office staff and I will take every precaution to ensure your safety by following the most updated CDC COVID-19 guidelines. These measurements will give me the opportunity to assess and evaluate the effectiveness of exercise on your blood pressure and weight. This information will assist other researchers in future studies and encourage others to adopt exercise as part of their lifestyle in the management of hypertension. I will be contacting you again in the next several weeks via telephone or text message to ensure that you continue to exercise and maintain a healthy diet. Thank you so much for your time and participation in this study. It was deeply appreciated.

Best regards to you and your family, and please stay safe.