Project Proposal: Management of Hypertension

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Abstract

Hypertension (HTN) is a chronic health problem requiring nonpharmacological and pharmacological interventions. Patients lack adequate blood pressure (BP) control and evidence-based practice (EBP) techniques such as nutritional, physical activity, and self-management interventions can promote hypertension management. A clinical PICO question guides the systematic database search. “In adults (18-60 years old) with hypertension seen in the primary care setting, how does implementing evidence-based nonpharmacological interventions in addition to pharmacological interventions alone regulate blood pressure and reduce cardiovascular disease risk?” This paper aims to discover whether literature supports the integrations of a self-management BP program to improve hypertension control. Eight articles relevant to the PICO were synthesized and critically appraised determining best evidence. The research process led to the formation of several evidence-based recommendations for clinical practice focusing on diet, exercise, and lifestyle techniques to control BP. Following a setting assessment, data revealed that approximately 180 hypertensive patients were treated and evaluated that month, which is approximately 39% of the patient population. Self-management techniques are not a major part of the BP care plan; therefore, the team and patient interviews supported a need for a self-management BP program. Implementation strategies involve promoting a self-management program providing patients with a lifestyle protocol that utilizes BP self-monitoring and patient education. Measurement tools include providing patients with a questionnaire, a brochure, BP logs, and verbal education regarding brochure components. Outcome measures include a two- and six-month follow-up appointment determining project continuation and necessary adjustments. Evaluation strategies include assessing patient knowledge, comparing questionnaire scores, and analyzing BP log trends. By utilizing EBP

control recommendations, clinicians can integrate self-management programs into HTN patient care plans.

Keywords: Hypertension, control, self-management, evidence-based practice, program

Project Proposal: Management of Hypertension

Hypertension (HTN) is a chronic health problem requiring nonpharmacological and pharmacological interventions (Vamvakis, 2016). HTN is a significant public health challenge primarily neglected by the public health system and remains an unmet clinical issue (Parati et al., 2021). In the United States, approximately 30% of adults suffer uncontrolled hypertension, and 24% achieve optimal blood pressure control (Centers for Disease Control and Prevention, 2020). Unfortunately, patients lack adequate blood pressure (BP) control and negative factors such as poor dietary choices, sedentary behaviors, obesity, and noncompliance contribute to suboptimal BP control (Vamvakis et al., 2016). The Centers for Disease Control and Prevention (2020) estimated HTN costs at $131 billion from 2003 to 2014, carrying a significant financial healthcare burden. These findings underscore the importance of utilizing evidence-based HTN management approaches, thus decreasing poor health outcomes and public health spending.

According to Chowdhury et al. (2019), hypertensive management is an advanced practice concern requiring constant chronic care monitoring. Advanced practice nurses (APNs) rely on evidence-based practice research when managing chronic conditions ensuring patient care is relevant and reliable. Evidence-based practice (EBP) is a problem-solving approach integrating the best available experimental evidence producing high-quality healthcare (Pugh, 2018). EBP encourages APNs to question current policies and practices ensuring safe and effective nursing care (Pugh, 2018). Concerning uncontrolled hypertension, EBP formulates best-practice clinical guidelines and solutions, closing significant gaps in hypertension management. Practitioners should question nonpharmacological strategies as initial hypertension lowering treatment compared to medication therapy alone; therefore, utilizing EBP research the APN discovers best-practice patient care techniques.

Sustained high blood pressure damages the heart and increases cardiovascular patient disease risks (Pugh, 2018). Exploring techniques to reduce cardiovascular disease risks in hypertensive populations is essential in promoting overall patient health. Mahmood et al. (2019) suggests incorporating nonpharmacological interventions before medication therapy reducing medication use requirement. Therefore, hypertension control relies on self-management behaviors that promote adherence to prescribed medications and lifestyle changes. The purpose of this paper is to explore evidence-based nonpharmacological interventions in addition to pharmacological interventions alone when regulating blood pressure. Hypertension management requires intensive patient education and counseling in reducing the risk of stroke, heart attack, and death (Hargraves et al., 2018).

PICO Question and Components

Using the PICO (Population, Intervention, Comparison, Outcome) format, a clinical question was formed involving hypertension management. “In adults (18-60 years old) with hypertension seen in the primary care setting, how does implementing evidence-based nonpharmacological interventions in addition to pharmacological interventions alone regulate blood pressure and reduce cardiovascular disease risk?”

The PICO components include the population of interest, the intervention, the control or comparison, and the outcomes. Using the PICO components, the population (P) of interest is adults with hypertension, while the setting of interest is based on primary care clinical concerns (Fineout-Overholt & Stillwell, 2019). The (P) component may seem easy to identify; however, a well-defined patient population is valuable while searching for relevant evidence (Fineout-Overholt & Stillwell, 2019). The intervention (I) is a specific reasonable alternative to current practice or an issue of interest (Fineout-Overholt & Stillwell, 2019). In the clinical question, the

(I) utilizes nonpharmacological interventions such as diet, exercise, and other means of blood pressure regulation. The comparison (C) component is what the researcher wants to compare the intervention or issue against (Fineout-Overholt & Stillwell, 2019). In the question, the (C) component involves pharmacological interventions alone in the management of high blood pressure. Lastly, the outcome (O) measured is blood pressure control and regulation while reducing cardiovascular disease risks.

Framework: The Johns Hopkins Nursing Evidence-Based Practice Model

Evidence-based practice sets the foundation for best practice treatment plans incorporating various theoretical frameworks. The Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) Model is an evidence-based approach composed of three interlinking components, including inquiry, practice, and learning (Poe et al., 2018). The model can be useful in exploring nonpharmacological and pharmacological blood pressure control means; therefore, providing potential evidence to answer the PICO question. The JHNEBP model provides realistic plans while enforcing lifestyle modification treatment plans, thus enhancing project development.

The Practice Question, Evidence, and Translation (PET) Process

According to Poe et al. (2018), the JHNEBP Model kickstarts the EBP process with the concept of inquiry questioning, examining, and collecting information about a problem or issue within a specific patient population. EBP relies on a spirit of inquiry driving clinicians to discover whether current practice is safe, effective, timely, accessible, costly, and high quality (Poe et al., 2018). The process consists of three phases: practice question, evidence, and translation (PET). Moving through the PET process guides the researcher in gaining new knowledge and improving collaboration skills while attaining future EBP insights (Poe et al.,

2018). The PET component of practice question pertains to the PICO question while contrasting lack of lifestyle management adherence and medication noncompliance in hypertensive populations. The next step is to gather evidence searching evidence-based sources and appraising evidence while developing recommendations for change. Finally, the last component involves translation where findings are disseminated and action plans are implemented.

Applying Hypertension to the John Hopkins Evidence-Based Practice Model

Utilizing nonpharmacological techniques can potentially aid in hypertension control, thus setting the foundation for patient goals and action plans while searching for relevant evidence (Dang et al., 2019). Vamvakis et al. (2017) suggested that daily lifestyle habits such as proper nutrition and exercise maintains a healthy body mass index and reduces blood pressure levels. Carey et al. (2018) discussed that only a small minority of hypertensive patients adhere to targeted lifestyle modification recommendations posing a challenge for change sustainability. The challenge enhances the importance of developing a solid plan supporting reliable evidence. Utilizing the model, the nurse and patient develops strong lifestyle modification goals enhancing life quality and positive disease outcomes.

The JHNEBP model is an ongoing dynamic process regarding practice change, such as hypertension management impacting the system, nurse, and patient outcomes (Poe et al., 2018). The Johns Hopkins Model is a useful tool in the development of evidence-based clinical practices among specific patient populations, such as patients experiencing hypertension. Controlling hypertension through targeted strategies increases awareness, treatment, and control by exploring modifiable lifestyle factors (Carey et al., 2018). Dang et al. (2019) highlighted how nurses assist patients in formulating a question or goal while searching for appropriate evidence and recommendations. Therefore, the nurse and patient can implement action plans based on

hypertension management support and resources. The JHNEBP model is an ongoing dynamic process regarding practice change, such as hypertension management impacting the system, nurse, and patient outcomes (Poe et al., 2018).

The JHNEBP model is a valuable tool aiding APRN's and patients in developing realistic goals while searching for best evidence providing patient-centered plans. The three components of inquiry, practice, and learning examines EBP clinical issue knowledge while integrating the PET process. Evidence-based nursing practice ensures nurses are constantly questioning current practices and searching relevant evidence to improve patient outcomes. Models incorporating clinical questions, evidence, and useful plan recommendations positively influence patients suffering uncontrolled hypertension. Utilizing the JHNEBP model, lifestyle modifications and strong patient goals promote optimal life quality.

Literature Review

A literature search was conducted using Auburn University Library database website. First, databases by the subject of interest were selected. After nursing was selected, databases that correspond with the topic of interest were listed. The CINAHL (Cumulative Index to Nursing and Allied Health Literature) database was selected, and other databases were searched, including Health Source: Nursing/Academic Edition and MEDLINE (Medical Literature On-Line). CINAHL was chosen due to the resources available on allied health and nursing, providing access to over two thousand journals and publications. Health Source: Nursing/Academic Edition was also selected due to numerous scholarly full-text journals focusing on various medical topics. MEDLINE was also selected based on its direct access to scholarly biomedical literature.

Search Terms and Results

While searching, keywords connected with Boolean operators were used, including "hypertension" OR "high blood pressure" OR "elevated blood pressure" OR "HTN" AND "non-pharmacological interventions" OR "therapies" OR "treatments." Ensuring current evidence-based literature was populated criteria limits, and search strategies were used. The limitations included a time frame of five years, articles in the English language, and peer-reviewed literature resulting in 80,900 articles. As a search strategy, the search term "nursing" was applied, generating 2,295 articles. To further narrow down results, limits on major subject headings were applied to correspond with the PICO question, which included: "hypertension," OR "high blood pressure," AND "non-pharmacological interventions" OR "therapies" AND "nursing management." This search revealed a total of 44 articles.

The MEDLINE database resulted in 30 articles, the CINAHL resulted in 11 articles, and the Health Source: Nursing/Academic Edition resulted in 3 articles. Next, the "page option" was selected, and the result format was changed to "detailed," allowing the abstracts to be examined. After reviewing the titles and abstracts, approximately 18 articles were chosen that corresponded with the PICO components and were deemed relevant in answering the clinical question. Articles were thoroughly reviewed ensuring reliable evidence articles were chosen for the project. After reviewing articles approximately twelve were chosen for the project, and eight were chosen based on higher levels of quality evidence. The articles selected included randomized controlled trials, population-based retrospective cohort studies, meta-analysis of randomized controlled trials, quasi-experimental studies, and well-developed narrative reviews and quality improvement projects.

Nutritional and Physical Activity Interventions

Nutritional Interventions

A cohort study by Lelong et al. (2015) utilized convenience sampling evaluating the association of recommended lifestyle factors, such as nutritional interventions and the effect on BP level. According to Lelong et al. (2015), HTN stems from various genetic and behavioral factors and numerous lifestyle components have been associated with disease prevalence. Therefore, five nonpharmacological guideline measures are recommended including maintaining or attaining a normal weight or body mass index (BMI) of <25 kg/m2, increasing physical activity, limiting alcohol consumption, controlling dietary salt intake, and utilizing dietary approaches such as the Dietary Approaches to Hypertension (DASH) diet while reducing saturated and total fat intake. A meta-analysis of RCTs by Caligiuri and Pierce (2017) evaluated 30 various antihypertensive therapies analyzing various lifestyle therapies and conventional hypertensive medications. Caligiuri and Pierce (2017) revealed that the DASH diet alone resulted in reduced systolic/diastolic blood pressure of 5.9/2.9 mmHg. Therefore, the DASH diet is the nutritional choice for hypertension prevention and treatment, and includes increasing intake of fruits, vegetables, whole grains, low fat dairy products, and limiting red meat and sugar intake.

Lelong et al. (2015) emphasized that increasing the intake of fruits, vegetables, potassium, and fiber also promotes reductions in weight-associated blood pressure causes, such as suboptimal BMI ratios. Therefore, cohort study findings revealed, aside from age, BMI had the strongest association with BP levels, and the main contributory modifiable factor in systolic BP reduction. Strong associations between obesity and BP level were shown in a large-scale cross-sectional survey excluding potential conflicting factors, revealing that 60% of hypertension may be due to obesity. According to Lelong at al. (2015), the recommended lifestyle factors such as limiting salt and alcohol and increasing consumption of fruits and vegetables, as well as

increasing physical activity targets counteraction of suboptimal BMI levels and uncontrolled hypertension.

A well-founded narrative review by Mahmood et al. (2019) discussed a 15-year follow up study involving a “Control Diet Group” (standard diet), and a “DASH Diet Group.” Comparing both groups, Mahmood et al. (2019) revealed that incorporating DASH diet components such as reducing sodium intake resulted in systolic blood pressure reduction of 11.5 mmHg in hypertensive individuals; therefore, the reduction is equivalent to the BP lowering effect of a single drug therapy. Mahmood et al. (2019) and Lelong et al. (2015) highlighted the importance of adopting nutritional plans such as the DASH diet, while Mahmood et al. (2019) also suggests the “Traditional Mediterranean Diet” for hypertension prevention and management.

The Mediterranean diet focuses on increasing intake of fruits and vegetables, high consumption of monounsaturated fatty acids and polyunsaturated fatty acids, less red meat consumption, and reduced alcohol consumption. A meta-analysis of RCTs by Caligiuri and Pierce (2017) concluded that the Mediterranean diet has been associated with cardio-protection. The metanalysis by Caligiuri and Pierce (2017) revealed that hypertensive participants responded better than normotensive subject in terms of cardio-protection. Therefore, nutritional interventions such as the DASH or Mediterranean diet are essential in hypertension prevention and management.

Physical Activity Interventions

A strong thorough narrative review by Mahmood et al. (2019) evaluated various studies on lifestyle interventions including the importance of physical activity on BP levels. Mahmood et al. (2019) stated that compared to dietary interventions, exercise and weight loss are the second major modifiable lifestyle interventions for blood pressure control. The review stated that a

meta-analysis of 54 RCTs involving 2,419 participants revealed that at least 150 minutes of exercise per week results in both systolic and diastolic blood pressure reduction (Whelton et al., 2002). Similarly, a separate meta-analysis utilized physical activity as the only modifiable intervention resulting in both systolic and diastolic BP level reduction (Kelley & Kelley, 2000). Increasing physical activity also promotes a healthy BMI index; therefore, Caligiuri and Pierce (2017) and Lelong et al. (2015) agreed that optimal BMI levels are a significant control strategy and the main modifiable blood pressure control factor.

Drug Therapy in Addition to Lifestyle Interventions

According to Mahmood et al. (2019), proper hypertension management requires both pharmacological and nonpharmacological interventions. Moreover, nonpharmacological interventions may reduce the demanded doses of hypertension medications and promote delays in hypertension progression stages. A quasi-experimental study by Jang et al. (2021) utilized difference-in-difference sampling method evaluating 2,428 hypertension patients in a medication management program. Jang et al. (2021) highlighted that most chronic diseases such as hypertension requires strict medication management in addition to lifestyle changes such as smoking cessation, physical exercise, and dietary control, thus promoting overall disease management. Jang et al. (2021) described a program for medication management that includes providing patients with medication pamphlets on proper administration and following up with patients via technological means. Jang et al. (2021) concluded that overall adherence increased after the medication adherence program compared to the control group with adults under the age of 60 benefiting the most. Therefore, active engagement with patients and ensuring education is reiterated increases overall medication adherence. Although medication adherence is essential,

Caligiuri & Pierce (2017) emphasized that drug treatment may not be the only answer; thus, utilizing lifestyle and dietary strategies are strongly recommended.

Self-Management Interventions

Hypertension management requires medication therapy in addition to various lifestyle changes. According to Lelong at al. (2015), lifestyle modifications are difficult to implement and maintain in daily life. Therefore, self-management increases lifestyle change adherence and improves blood pressure control. Adopting healthy lifestyle and medication adherence requires behavioral change modifications relying on appropriate self-efficacy and social support (Gerage et al., 2017; Truong et al., 2021). A randomized controlled trial by Gerage et al. (2017) discussed a behavioral change program identifying whether the possible changes in physical activity and eating habits are mediated by self-efficacy and social support at preintervention and postintervention stages.

The study by Gerage et al. (2017) is referred as the "Vida Ativa Melhorando a Saude (VAMOS) Program" that aimed at motivating changes in physical activity and nutrition behavior for 12 weeks. The control group participated in an educative lecture lasting 90 minutes about lifestyle changes, whereas the VAMOS group participated in a behavioral change program for 12 weeks. After the 12-week program, all the participants were reevaluated (postintervention) in all the aspects measured at preintervention. Changes in eating habits, physical activity, quality of life, and changes in self-efficacy and social support were measured among the control group and VAMOS group. The VAMOS group improved the general healthy eating habit score and quality of life (44% CG versus 92%) proving the effectiveness of a VAMOS behavioral change program. The RCT concluded that educated patients increased medication adherence no matter how the educative material was presented.

A systematic review and meta-analysis by Truong et al. (2021) evaluated 12 RCTs including 2,714 hypertensive older adults evaluating the effects of self-management on medication adherence and BMI ratios. Truong et al. (2021) defined self-management as the presence of prerequisites including the attitudes, perceived ability, and knowledge required to successfully self-manage. Therefore, five self-management interventions may increase blood pressure control, including cognitive-behavioral, self-efficacy, self-regulation, education, and self-care interventions. Truong et al. (2021) highlighted how utilizing self-management interventions encourages patients to be active healthcare management members while adopting medication adherence, higher physical activity, healthy diet compliance, and body weight control. The study concluded that the effects of self-management was statically significant on self-efficacy (effect size of 0.93) and medication adherence (Hedges' g value of 1.72). Furthermore, APNs should provide patient-tailored treatment plans while stressing the importance of self-efficacy and social support.

Strategies and Potential Gaps to Improving Primary Care Blood Pressure Control

Hypertension control relies on primary care clinics searching for and providing best evidence protocols avoiding major cardiovascular events and mortality. A quality improvement project by Sadeghi et al. (2020) utilized the "Plan-Do-Study-Act method" identifying barriers, such as physician medication knowledge gaps and patient nonadherence to pharmacological and nonpharmacological BP control means. The project identified patient nonadherence to medications and appointments as the most common patient related barrier; therefore, specific interventions were used (Sadeghi et al., 2020). The interventions encouraged patient education and shared decision-making processes for medication optimization. Sadeghi et al. (2020) highlighted how education was based on the American Heart Association (AHA) guidelines and

data analysis was performed using monthly statistical process control charts. Furthermore, patients appreciated the time and effort the nursing staff and physicians created to reiterate hypertension control recommendations. The project also emphasized that patients were accurately filling and taking prescribed medications, and transitional care such as home health nursing services were recommended if needed (Sadeghi et al., 2020). The project achieved 62.6% for BP control within the initial 12 months and sustained at a rate of 72.64% for BP during the 10-month post-project period (Sadeghi et al., 2020). The project by Sadeghi et al. (2020) highlighted the importance of patient education regarding accurate BP measurement techniques, DASH diet, exercise, smoking cessation, and medication adherence.

A quasi-experimental study by Egan et al. (2018) evaluated the Measure accurately, Act rapidly, and Partner with patients (MAP) protocol in 16 family medicine clinics measuring whether the protocol improved hypertension control at six and twelve months. According to Egan et al. (2018), "Measure accurately" ensured that staff was instructed on proper BP measurement and reassessment. However, before MAP was implemented many clinics reported that only a single BP measurement was taken with no further actions. "Act rapidly" emphasized that action was made after initial BP was higher or equal to 140/90 mmHg in the clinic (Egan et al., 2018). "Partner with patients" encouraged patient engagement including office visits or follow-up appointments, shared management decisions, prescribing affordable and single-pill medications, and BP self-monitoring (Egan et al., 2018). The study included adults aged 18 to 85 years with a diagnosis of hypertension with at least one visit with recorded BP during the MAP protocol. BP readings from the last visit during the baseline and first and second six-month MAP period were used to determine control. The study confirmed a 64.4% to 74.3% increase in BP control in 16,787 hypertensive adults in only six months after MAP was implemented; moreover,

at the 12-month mark BP control improved in three out of every four patients (Egan et al., 2018). The quality improvement protocol showed strong evidence for BP improvement providing support for the ongoing project proposal mentioned above.

Summary

A research review provided various supporting resources to the PICO question. Hypertension remains a chronic health issue requiring both pharmacological and nonpharmacological interventions relying on various nutritional, physical activity, drug therapy, and self-management interventions. Adopting nutritional plans such as the DASH diet and the Mediterranean diet is essential for hypertension prevention and management (Caligiuri & Pierce, 2017; Lelong et al., 2015; Mahmood et al., 2019). Additionally, increasing physical activity is an essential control strategy that directly influences a healthy BMI index. Jang et al. (2021) agreed that lifestyle factors are crucial in hypertension management; however, medication therapy is also required for optimal disease management. Medication adherence and lifestyle modifications depend on self-management techniques emphasizing patient treatment plan involvement (Gerage et al., 2017; Truong et al., 2021). Hypertension control is improved utilizing quality improvement projects while searching for and implementing best evidence BP control recommendations (Egan et al., 2017; Sadeghi et al., 2020).

Critical Appraisal of Evidence

The evidence-based literature obtained for hypertension management provided information regarding nutritional interventions, physical activity interventions, drug therapy in addition to lifestyle interventions, as well as self-management interventions. Therefore, making evidenced-based recommendations for intervention implementation, a critical appraisal must be conducted evaluating the quantity, quality, and consistency of the results. Numerous peer-

reviewed articles were analyzed for the project including a level-one meta-analysis of randomized controlled trials, a level-one systematic review and meta-analysis, a level-two randomized controlled trail, a level-three quasi-experimental, a level-four cohort study, a level-six narrative review, a level-three quasi-experimental, and a level-six quality improvement project. The multiple levels of evidence, experimental methods used, range of sample size, and study lengths included in the articles will be beneficial while comparing project results. Appendix A includes a detailed research evidence grid supplementing the critical appraisal.

Nutritional and Physical Activity Interventions

A level-one meta-analysis of randomized controlled trials (Caligiuri and Pierce, 2017), a level-four cohort study (Lelong et al. 2015), and a level-six narrative review (Mahmood et al. 2019), provided evidence regarding nutritional and physical activity interventions promoting hypertension management. The level-one article by Caligiuri and Pierce (2017) included 30 antihypertensive therapies from meta-analysis and RCTs. The various meta-analysis or RCTs topics related to nutritional interventions included DASH diet, dietary sodium restriction, fiber, Mediterranean diet, weight loss, and stress reduction while managing high blood pressure and decreasing cardiovascular risks. The studies presented were assessed for quality and appropriately graded according to Cochrane Collaboration fundamentals. Inclusion criteria minimized ambiguity and reduced bias, supporting evidence consistency. Each article is relevant to the hypertensive patient population. Limitations and potential bias employed for the review may include skewed bias towards reporting more effective therapies than noneffective therapies.

The level-four cohort study performed by Lelong et al. (2015) utilized convenience sampling following 8,670 volunteers from the NutriNet-Santé Study, an ongoing French web-based cohort study. Men= 2,075 (24%) and women= 6,595 (67%). The population included

internet-using adult volunteers over the age of 18 years. The study provided quality and completeness of dietary investigation closely investigating the relationship between nutritional factors and BP. The large sample size and consistent findings supported strong evidence to incorporate in the project proposal. Several limitations were observed including volunteers must be internet-using participates; therefore, selection was biased. Another limitation of the design was that participants could have already modified their lifestyle; thus, results may be deemed inaccurate.

Although the article by Mahmood et al. (2019) was a narrative review, the article reviewed various studies excluding unreliable findings. Mahmood et. (2019) performed a thorough review measuring intervention success including dietary modification, body weight and exercise, and reduced physiological stress. The review demonstrates the importance of nutrition, exercise, and body weight interventions promoting hypertension management. The review included consistent findings utilizing scholarly databases. Limitations included a small sample size and unclear dietary guidelines requiring further research to support the PICO question. However, both studies provided consistent and reliable evidence supporting nutritional and physical activity interventions enhancing hypertension control.

Drug Therapy in Addition to Lifestyle Interventions

A level-one meta-analysis of randomized controlled trials (Caligiuri and Pierce, 2017), a level-three quasi-experimental (Jang et al. 2021), and a level-six narrative review (Mahmood et al. 2019), provided evidence regarding drug therapy in addition to lifestyle interventions promoting hypertension management. The level-one article by Caligiuri and Pierce (2017) was also utilized proving reliable evidence regarding medication therapy importance. A level-three quasi-experimental study by Jang et al. (2021) utilized difference-in-differences sampling

method providing evidence for the implementation of lifestyle changes in addition to medication therapy. The study involved 2,428 hypertensive patients in the intervention group and 2,140 hypertensive patients in the control group. The study addressed medication management program importance and medication adherence impact. Although quasi-experimental studies have concerns regarding internal validity, the article by Jang et al. (2021) utilized valid and reliable collection methods, while clearly stating inclusion and exclusion criteria. Participants may have rejected due to low self-confidence concerning medication adherence; therefore, results may not accurately describe patients that are unable to adhere.

The thorough narrative review by Mahmood et al. (2019) demonstrates the importance of medication therapy in addition to nutrition, exercise, and body weight interventions promoting hypertension management. The articles included provides consistent findings and strong research elements such as quantity and quality of evidence provided. The above sources strongly emphasize medication therapy while incorporating lifestyle changes, while managing uncontrolled BP. Caligiuri and Pierce, 2017, Jang et al. 2021, and Mahmood et al. 2019 provided reliable and consistent findings concerning hypertension drug therapy importance.

Self-management Interventions

A level-one systematic review and meta-analysis (Truong et al, 2021), a level-two randomized controlled trail (Gerage et al. 2017), and a level-four cohort study (Lelong et al. 2015), provided evidence for the use of self-management interventions promoting hypertension management. Truong et al. (2021) was composed of 12 randomized controlled trails studying 2,714 older adult patients who have received a diagnosis of hypertensive or other chronic conditions. The meta-analysis related to the effects of self-management programs on blood pressure control. Consistent findings were presented, and extensive searches were performed

including reliable RCTs and the use of meta-regression to control differences between studies. Multiple appropriate databases were searched for reliable articles. The study bias included a 91.7% concern; therefore, limitations exist.

A level-two randomized controlled trail performed by Gerage et al. (2017) utilized convenience sampling method involving 90 hypertensive patients randomly assigned to a control group and a VAMOS group. The original study provided evidence for the use of self-management interventions to promote hypertension management utilizing quality evidence. Valuable and reliable tools and tests were used ensuring accurate results. Additionally, qualitative results minimize recall bias and yields information on day-to-day variability. Environmental conditions and factors were not controlled in the study; therefore, results may be altered to participants that already practice physical activity and other lifestyle changes.

The level-four cohort study performed by Lelong et al. (2015) utilized convenience sampling following 8,670 volunteers from the NutriNet-Santé Study, an ongoing French web-based cohort study. Lelong at al. (2015) evaluated the association between an individual's behaviors, nutrition, and blood pressure effects. The results of the cohort study demonstrated the importance of behavioral alterations, thus complying with recommended self-management interventions promoting hypertension management. The study portrayed consistent findings and strong evidence quality. The studies utilized provided consistent and sufficient research evidence, while stating that changes in diet, exercise, and overall disease compliance strongly rely on appropriate self-management behaviors.

Strategies and Potential Gaps to Improving Primary Care Blood Pressure Control

A level-three quasi-experimental study by Egan et al. (2018), and a level-six quality improvement project by Sadeghi et al. (2020) provided potential gaps and strategies to improve

primary care blood pressure control. Although quasi-experimental studies have concerns regarding internal validity, the article utilized valid and reliable collection methods while clearly stating inclusion and exclusion criteria. Egan et al. (2018) evaluated 16,787 hypertensive adults from 16 diverse, community-based family medicine clinics determining whether the Measure accurately, Act rapidly, and Partner with patients (MAP) protocol improved hypertension control at six and twelve months. The study was approved by the local instructional review board, granting informed consent of each participant. Additionally, the quality improvement (QI) program utilized evidence-based and American Heart Association (AHA) guidelines. Cost and complexity of the program was a significant weakness; however, the pilot study reported that MAP is effective for rapidly improving hypertension. Furthermore, MAP is shown to be effective and possibly implemented into most clinical settings.

A level-six quality improvement project by Sadeghi et al. (2020) utilized the Plan-Do-Act-Study method while identifying multidisciplinary QI team barriers. The study utilized the AHA blood pressure guidelines aiming to improve BP control from the baseline rates of 40-60% between ages of 18-75 years old, within 12 months. Outcome measures included percentage of patients with BP <140/90 mmHg, as well as physician and nurse educational attendance rates, medication reconciliation completion rates, and care guide order rates. QI is a systematic approach to data collection for the purpose of achieving specific healthcare setting outcomes, ensuring generalizability. Although there was no significant cost for the project, sustainability in any QI remains a significant challenge. Sadeghi et al. (2020) displayed improvements in BP and other factors, such as enhancing patient adherence to appointments and medications through a high functioning multidisciplinary team approach. The studies highlighted that while

incorporating various hypertension methods and protocols, primary care clinics are enhancing patient education regarding BP management techniques.

Recommendations

1. Incorporate nutritional plans such as the DASH or Mediterranean diet, which includes increasing consumption of fruits, vegetables, and limiting consumption of red meats into hypertension management treatment plans. (Grade A) Evidence Level I (Caligiuri & Pierce, 2017). Evidence Level IV (Lelong et al., 2015). Evidence Level VI (Mahmood et al., 2019).
2. While adopting nutritional plans, physical activity guidelines should be strongly recommended in hypertension treatment plans; therefore, promoting weight and BMI control, thus decreasing blood pressure and cardiovascular disease risks. (Grade A) Evidence Level I (Caligiuri & Pierce, 2017). Evidence Level IV (Lelong et al., 2015). Evidence Level VI (Mahmood et al., 2019).
3. While actively engaging with the patient, clinicians should encourage lifestyle interventions in addition to medication therapy for adequate blood pressure control utilizing effective management programs (Grade A) Evidence Level I (Caligiuri & Pierce, 2017). Evidence Level III (Jang et al., 2021).
4. Clinicians should integrate patient-tailored treatment plans incorporating self-management programs; furthermore, partnering with patients to accurately measure and manage hypertension while sharing decision making, BP self-monitoring, and affordable medications (Grade A). Evidence Level I (Truing et al., 2021). Evidence Level II (Gerage et al., 2017). Evidence Level III (Egan et al., 2018). Evidence Level VI (Sadeghi et al., 2020).

Clinical Setting Assessment: Hypertension Management

Andalusia Family Healthcare (AFHC) is owned and operated by Andalusia Medical Group in rural Alabama. After presenting the project proposal, the staff agreed that a substantial percentage of patients suffer uncontrolled blood pressure; therefore, a setting assessment of the practice was permitted. The practice consists of five healthcare team members: one Medical Doctor (MD), two Nurse Practitioners (NP), and two Medical Assistants (MA). The practice is joined by the Andalusia Walk-in Clinic, consisting of a separate healthcare team; however, patients are commonly referred to the family practice when needed. Additionally, the team consists of four office staff for the walk-in clinic and the family practice.

The practice provides acute and chronic disease management and cares for ages 16 to 70; however, the NP sees an average age group of 30 to 50 years old. Patient visits are predominately established patients seeking primary care or referred by the walk-in clinic for acute or chronic disease management. Established patients can be seen for urgent or sick visits; however, non-established patients must utilize the walk-in clinic for sick visits. Each NP sees an average of 14 patient visits per day Monday through Friday, and the MD strictly sees patients who are on controlled substances on Wednesdays and Thursdays. Medical assistant only visits are available for COVID-19 tests, blood pressure checks, laboratory draws, and scheduled vaccine appointments.

The NP roles and responsibilities include, but are not limited to, recording a patient's medical history, updating medical records, ordering laboratory or diagnostic procedures, performing patient-specific examinations, prescribing medications, and coordinating care between other medical professionals and specialists when necessary. Additionally, the NP provides acute and chronic patient disease counseling while determining whether treatment is

successful or change is needed. The MAs assist each NP in gathering chief complaints and medical history, assessing vital signs, performing ordered scans or laboratory tests, and administering prescribed intramuscular injections. The front office personnel communicates with patients concerning appointments, referrals, and study results. Additionally, office staff collect sensitive patient information and communicate directly with healthcare staff to ensure patient needs are met.

Primary Patient Population and Existing Patient Data

The clinic utilizes eClinicalsWorks Electronic Health Record (EHR) System. The receptionist was able to generate a report concerning patient volume seen at the clinic. In 2021, AFHC saw an average of 4,789 patients, including sick visits, primary care or follow-up appointments, and MA-only visits; however, one of the practicing NPs was out of the office for maternity leave during that appointment count. In that year, the MD saw an average of 265 patients for scheduled appointments concerning controlled substances. Approximately 464 patients were seen in January 2022, including hypertensive patients and patients with other medical conditions. Of those patients, approximately 180 hypertensive patients were treated and evaluated that month, which is approximately 39% of the patient population. The report indicated that 70% of patients diagnosed at the clinic had at least two BP readings greater than 120/89 mmHg. The EHR could not determine any further detail other than what is reported above.

Current Hypertension Measures

Currently, the practice follows a standard set of guidelines when diagnosing and treating primary and secondary hypertension. The practice manages hypertension based on four stages: stage one: >120/89, stage two: >140/89, stage three: >160/100, and stage four: >180/110.

Concerning pharmacological therapy, the guidelines state that in stage one without comorbidities, a thiazide diuretic (Hydrochlorothiazide 12.5-25 mg PO) is administered daily, an ACE inhibitor/ARB (Lisinopril10 mg PO or Losartan 25-50 mg PO daily), or a calcium channel blocker (Amlodipine 2.5 mg PO or Diltiazem 120-180 mg PO daily) is prescribed by the primary care provider. In stage one with coronary artery disease (CAD) without congestive heart failure (CHF), a beta-blocker is the drug of choice. In stage two without comorbidities, combination therapy is recommended; however, for those with CAD without CHF, a beta-blocker plus a thiazide diuretic, ACE/ARB, or CCB is prescribed.

The provider may perform a series of laboratory or diagnostic procedures, including an electrocardiogram, metabolic panel, glomerular filtration rate, lipid panel, urinalysis, thyroid-stimulating hormone test, sleep study, echocardiogram, serum aldosterone, 24-hour urine free cortisol, renal duplex ultrasound/MRA renal arteries, and a blood pressure log. In addition, new-onset or stage one hypertensive patients are verbally educated regarding diet and exercise recommendations.

The guidelines state that patients with a BP reading at or above 140/90 mmHg are prescribed an anti-hypertensive medication and sent home with a blood pressure machine. The patient is instructed to log their pressure daily until the follow-up appointment, which is scheduled five to seven days after the initial appointment. The NP reviews the daily BP log and performs a clinic obtained reading to discuss the current treatment and identify potential barriers. Monthly appointments are recommended until the BP reaches a desired level. If the patient is initially seen at the walk-in clinic, the patient is referred for primary care; however, if the patient is above the age of 50, the NP sets up a cardiology appointment. Once desired levels are reached, patients are seen based on other comorbidities or by patient need.

Staff and Patient Perceptions and Desire for Change

The healthcare team identified several patient management barriers: reluctance to log BP readings, unwillingness to follow-up, non-adherence to nonpharmacological and pharmacological recommendations, and interfering comorbid conditions. Additionally, office staff reported that patients commonly cancel follow-up appointments. The NP noted that the clinic adheres to a strict guideline regarding recommended laboratory and diagnostic procedures and pharmacological therapy; however, a policy does not exist on nonpharmacological therapy recommendations. A significant gap is the lack of a specific outline to follow when instructing patients on nonpharmacological BP control. Therefore, the team agreed that this EBP project could be incorporated to standardize patient education on diet, exercise, and self-management tools for BP control.

While identifying patient perceptions, an anonymous five-question survey was given to five patients diagnosed with hypertension (Appendix B). Out of five patients, one patient reported checking their BP levels daily, two patients reported weekly, and two reported that they do not check their BP until their scheduled appointment. Out of the five patients, three patients stated that they keep a BP log at home. Four out of five patients stated that they adhere to prescribed blood pressure medications. During patient engagement, all patients reported that they understand the medication prescribed and seldom miss a dose. Two of five patients reported that they are familiar with nonpharmacological interventions such as diet and exercise recommendations. During patient engagement, patients reported that they would benefit from more education regarding lifestyle changes and would appreciate verbal and written BP management education. One of five patients reported that they would consider a self-management program. Most of the comments for why they would not consider joining included

concerns such as busy schedules, other comorbid conditions, lack of interest, and reluctance to change daily life routines. However, after describing how uncontrolled BP affects overall patient health, all five patients expressed a strong desire to learn more about nonpharmacological BP management techniques through verbal and written educative material.

Potential Barriers and Resources for Implementation

The healthcare staff voiced several potential barriers for incorporating patient-tailored treatment plans involving medication and lifestyle interventions. Staff noted that limited time and lack of patient engagement to change diet and exercise are potential barriers for implementation, partially due to the COVID-19 pandemic. Additionally, staff felt that patients would dispose of printed educative material, and reiteration would only force patients to feel aggravated and annoyed. The NP noted that self-management programs and patient-tailored plans take time and resources that are likely unavailable given the current pandemic status. Moreover, self-management programs require research and time to discover best-evidence programs. Material costs would include cost of paper (approximately $7.00 for a 50-count pack), production of the educational packet, printing, and distribution. Education of staff will also need to be allocated. Even though barriers exist, the staff felt that they see an increased number of patients with hypertension. Therefore, the staff is willing to try new ways to integrate BP management material, increasing overall pharmacological and nonpharmacological intervention compliance.

Implementation and Evaluation Plan: Hypertension Management

Evidence-Based practice sets the foundation for best practice treatment plans discovering whether current practice is safe, effective, timely, accessible, costly, and high quality (Poe et al.,

2018). For the PICO, “In adults (18-60 years old) with hypertension seen in the primary care setting, how does implementing evidence-based nonpharmacological interventions in addition to pharmacological interventions alone regulate blood pressure and reduce cardiovascular disease risk,” four beneficial recommendations were identified and supported by quality appraised and reviewed evidence. The first “Grade A” recommendation suggests incorporating nutritional plans such as the DASH or Mediterranean diet, which includes increasing consumption of fruits, vegetables, and limiting consumption of red meats into hypertension management treatment plans (Caligiuri & Pierce, 2017; Lelong et al., 2015; Mahmood et al., 2019). The second “Grade A” recommendation suggests that while adopting nutritional plans, physical activity guidelines should be strongly recommended in hypertension treatment plans; therefore, promoting weight and BMI control (Caligiuri & Pierce, 2017; Lelong et al., 2015; Mahmood et al., 2019). The third “Grade A” recommendation is that while actively engaging with the patient, clinicians should encourage lifestyle interventions in addition to medication therapy for adequate blood pressure control utilizing effective management programs (Caligiuri & Pierce, 2017; Jang et al., 2021). A final “Grade A” recommendation is that clinicians should integrate patient-tailored treatment plans incorporating self-management programs; furthermore, partnering with patients to accurately measure and manage hypertension while sharing decision making, BP self-monitoring, and affordable medications (Egan et al., 2018; Gerage et al., 2017; Sadeghi et al., 2020; Truong et al., 2021).

Next, a clinical setting assessment was performed identifying potential practice gaps regarding the proposed EBP project. The clinical setting was evaluated by comparing EBP recommendations to the practice in the setting. Potential hypertension management gaps were identified while conducting healthcare team and patient interviews. Several gaps were identified,

including reluctance to log BP readings, follow-up unwillingness, provider recommendation non-adherence, and interfering comorbid conditions. Upon setting assessment completion, the healthcare team and patient interviews revealed that a self-management program is needed while considering current EBP hypertension guidelines. The nurse practitioner (NP) emphasizes that the practice focuses more on pharmacological education, leaving gaps in significant HTN control strategies such as diet, exercise, and other self-management interventions. The NP confesses to initially prescribing antihypertensive medications rather than educating the patient regarding nonpharmacological interventions. Therefore, incorporating the first, second, and fourth EBP recommendation into practice will potentially close identified gaps in the clinical setting.

Implementation Plan

The implementation plan involves a self-management program that provides a standardized lifestyle education protocol, thus improving BP control. Utilizing EBP recommendations, the program creates a way for clinicians to instruct patients on important self-management behaviors. The program also enhances patient knowledge on BP self-monitoring by counseling patients on proper BP techniques; therefore, tracking BP progress while integrating recommended lifestyle changes. The program includes providing patients with a questionnaire, a written brochure, and verbal education regarding brochure components. The program addresses the specific implementation steps, including key personnel, timeline, facilitators, barriers, resources, communication plans, and outcomes.

The Hypertension Management toolkit will be used as a helpful guide for designing the implementation plan (Edelman & Gordan, 2017). Prior to implementing the program, staff will need to be engaged and prepared (Edelman & Gordan, 2017, p.7). After realizing that 39% of the patient population is being actively managed for HTN, all team members were highly engaged in

the implementation program presented. Moreover, the staff realized that lifestyle education was lacking in the setting. All members agreed that patients would benefit from more diet, exercise, and other nonpharmacological BP control educational strategies. Increasing engagement, public recognition will be presented to those who adhere to the program requirements and actively engage with patients on lifestyle behaviors (Centers for Disease Control and Prevention, 2021, pg. 74-78).

Eligibility criteria includes adults, between the ages of 18 to 60, with a previous hypertension diagnosis of either stage one, two, three, or four. Eligible patients will be made aware of the program, and verbal consent will be obtained. In addition, a brochure of written educative materials will be provided in easily understandable terms. The brochure includes incorporating nutritional plans such as the DASH or Mediterranean diet, physical activity recommendations, accurate BP measurement, smoking cessation, and self-management adherence. The questionnaire will be a modified High Blood Pressure Self-Care Profile (HBP SCP) tool consisting of questions regarding diet, exercise, weight control, smoking cessation, accurate BP home self-measurement, and other self-management behaviors (Han et al., 2014).

Considering the clinic's small size, implementing a productive project relies on the team members devotion. The key personnel include one NP, one MA, and two office staff. The NP student acts as the project leader and continuously encourages all aspects of the implementation plan. The implementation plan includes delegating appropriate tasks, gathering data, and addressing any plan barriers. During the pre-implementation phase, the project leader and office staff are responsible for preparing necessary supplies such as brochures, BP logs, and questionnaires. Next, the project leader educates team members regarding diet and exercise recommendations; therefore, all team members are aware and understand the written brochure's

components. The pre-implementation phase timeline will take approximately three-months to prepare the team, gather resources, and complete necessary staff education.

During project initiation, the office staff is responsible for determining eligible patients, contacting patients via telephone, and instructing patients to bring weekly BP measurement logs to the appointment. At check-in, the office staff administers the brochure and questionnaire. Additionally, the office staff is accountable for scanning and storing completed questionnaires, maintaining accurate BP reports, and allocating resources or budgetary needs. Next, the MA is responsible for obtaining patient vital signs, educating the patient on proper BP techniques, demonstrating proper weekly BP log documentation, and ensuring the patient understands the verbal education provided. Education will also include appropriate BP measurement positions, time, and places for accurate readings. For example, according to the Centers for Disease Control and Prevention (2021), the patient should sit upright with a straight back and supported with feet flat on the floor and legs uncrossed (pg. 61-67). Additionally, the patient should measure and record BP at the same time each day and avoid caffeinated beverages 30 minutes before checking a reading. The MA is also responsible for answering any patient questions regarding the questionnaire provided at the beginning of the appointment.

Utilizing the toolkit, the action strategy of properly incorporating patient lifestyle education into the workflow will be utilized (Edelman & Gordan, 2017, p.35). The NP is responsible for providing verbal and written education to each eligible patient. According to Edelman & Gordan (2017), the toolkit recommends a “show and tell” approach explaining written material to the patient (p.35). The NP discusses and modifies the brochure material to the patient’s specific needs, allowing ample time for discussion. After education is presented, the patient is asked to “teach-back” what they learned from the conversation and what the next steps

should be (Edelman & Gordan, 2017, p.29). Following patient education, the patient is asked to reevaluate the selected answers on the questionnaire and turn the completed sheet to the office staff. The NP documents the patient's response in the EHR. At check out, the office staff schedules the patient's two- and six-month follow-up appointments.

During the two-month follow-up, the team members assess short-term outcomes to determine lifestyle adherence and daily BP log changes. During the six-month follow-up, the questionnaire is completed again and compared to baseline data. The post-implementation phase is initiated following the six-month appointment determining long-term outcomes. The estimated timeline for the implementation phase is around eight- to nine-months. The first two-months will be dedicated to gathering paper, ink, and necessary educative material for the brochure that is easy for the clinician to present and for the patient to understand. The third month is reserved for ensuring each team member is educated on their role and understands the education that must be presented, ensuring consistency. The fourth month will be dedicated to kickstarting the program, identifying eligible patients, and beginning self-management education. The project will continue for six-months before initiating the post-implementation phase to determine long-term outcomes. After the post-implementation phase, the project is evaluated for successful outcomes, project continuation, and necessary adjustments.

Facilitators and Barriers

Potential barriers to program implementation were noted during the setting assessment. A common barrier noted amongst staff was the lack of time allocated for patient education, limiting provider-patient engagement. The implementation plan recommends giving the brochure at the beginning of the patient visit to overcome the barrier. Therefore, the patient is familiar with the education provided by the MA and NP staff. Instructing patients on reviewing the packet while

waiting allows the NP to highlight specific points, answer questions, and tailor the educative material. Additionally, the MA provides education concerning BP self-measurement while measuring vital signs. Considering that only three to four hypertensive patients are seen each day, the MA and NP should dedicate approximately five- to ten-minutes for each eligible program participant. The office staff and project leader will inform the team members of the eligible patient's appointment time; therefore, the MA and NP plans additional time accordingly. Additionally, staff recognition is given to those who comply with the program and engage with patients (Centers for Disease Control and Prevention, 2021, pg. 74-78). Staff recognition motivates team members to allocate time for patient engagement and increase overall project success. Additionally, the staff voiced concerns regarding the COVID-19 pandemic. Considering that COVID-19 numbers are trending down, the project leader identifies this as unlikely to interfere with the program. Therefore, the project leader will constantly contact the office staff regarding COVID-19 statistics. The project leader can then inform the staff if COVID-19 becomes an issue for project implementation.

An additional barrier identified by the project leader was that the staff felt that patients would feel "annoyed" by printed educational materials and that reiteration would only force patients to feel "aggravated." Overcoming the barrier, the implementation plan ensures that the NP modifies the teaching plan ensuring that education is patient-tailored. Therefore, patients are more likely to be engaged in the education presented and participate in the verbal discussion. In addition, the NP will use creative ways to engage with the patient. For example, the "show and tell" approach will be used to explain and demonstrate the educative material, and then the patient will be asked to teach-back the material (Edelman & Gordan, 2017, p. 29). Utilizing teach-back strategies, patients are less likely to feel "annoyed or aggravated" at the scheduled

appointment. Facilitators to the program's successful implementation includes the staff's willingness to try new BP management methods due to the increased number of hypertensive patients. Overcoming barriers and recognizing project facilitators will potentially increase overall project success.

Resources

The project leader and office staff estimated the required resources and budgetary needs for project implementation. A printing machine, ink, and paper will be needed regarding questionnaire and brochure development. The office staff estimated the cost for cardstock paper to be around $15 for 250 sheets. Regarding the questionnaires, the estimated cost is $50 for 500 sheets. The clinic has a discounted price when ordering items in a bundle. For printing brochures and questionnaires, a printer is required, which is already available at the clinic. The clinic leases the machine for around $256 a month, including the toner in the overall lease price. Regarding documentation, an EHR is needed for storing completed questionnaires, BP logs, and other patient education documentation. The clinic utilizes eClinicalsWorks electronic health record system that is already available for the healthcare staff. Regarding the printing and distribution costs, the estimated budget will run around $30 per month if 180 HTN patients are seen and agree to participate.

Staff training and time for education will need to be included in the project's overall budget. During patient engagement, additional time will be spent with each hypertensive patient including handing out brochures, educating on BP logs, and answering any questions. The MA and NP will need time to educate on BP measurement and lifestyle changes. The office staff must allocate an additional five to ten minutes with each program participant per visit. The MA and NP staff must allocate an additional one to two hours per week for project implementation.

However, as all team members become familiar with the program, the amount of time needed could decrease.

Communication Plan

Project communication will be provided to the key personnel by the project leader. The project leader will continuously motivate and engage staff concerning project importance and results. After obtaining short- and long-term outcomes, the project leader will post updates on social media recognizing staff as implied in the implementation plan. Additionally, the project leader will hold monthly meetings discussing any concerns, ideas, and outcomes. If the team cannot meet, the staff will utilize Zoom to conduct meetings. The project leader will keep in touch via group text message staying in constant contact as the project is implemented. At the long-term outcome meeting, the team will evaluate overall project success, continuation, and necessary adjustments.

Population Data

Utilizing the EHR, pertinent population data such as age, gender, and ethnicity are provided. Both male and female gender are eligible for program participation; moreover, evaluating project success identifies which gender is more at-risk. Patient ethnicity will not affect program eligibility; however, data will be reviewed at program completion, evaluating trends. Participants should be between the ages of 18 to 60 with a diagnosis of hypertension displayed in the patient record. Data will also include identifying any co-morbid conditions and excluding patients with any conditions that may interfere with program requirements. Additionally, information concerning overall health status, including patient perception of diet and exercise importance, is provided by self-report. Patients can also self-report any nutritional or spiritual

preferences concerning diet and exercise recommendations. Comparing program effectiveness among various patient populations is helpful for overall project outcomes.

Expected Outcomes and Methods

The project's expected short-term outcome includes an increase in lifestyle adherence and a decrease in BP reading; however, the expected long-term outcome is an increase in questionnaire scores and a decrease in BP readings. The overall project desire is an increased knowledge of lifestyle changes, such as diet and exercise, while improving overall blood pressure control. The desired short-term outcome is an increase in overall patient adherence and a decrease in systolic BP log recordings. Regarding patient adherence, patient knowledge should increase concerning the written brochure and verbal education provided at the initial appointment. After the patient is given the written brochure and verbal education is complete, the HBP SCP questionnaire will be provided at the short- and long-term outcome appointments. The questionnaire determines whether hypertension lifestyle changes are more easily understood, diet and exercise behaviors have improved, and self-care behaviors have increased. The data method collection is evaluated by documenting questionnaire scores into an excel file. The program participants also self-report understanding to verbal education by the "teach-back" method. The self-report knowledge will be evaluated at the initial, two-month, and six-month appointments. The increased or decreased results will be available in the patient's EHR for program evaluation. Additionally, short-term outcome data should show a reduction in systolic BP averaging 5mmHg lower than baseline. The data is obtained from the EHR by reviewing the patient's initial BP, weekly BP logs, and the two-month appointment reading. The data method for determining short-term effectiveness is evaluated by entering the BP logs into an excel file, creating a graph for trend evaluation.

The desired long-term outcome is an increase in overall patient adherence to the lifestyle management program by evaluating the questionnaire scores at the six-month appointment. Patient scores will be compared to baseline results and scanned in the patients' medical record. An increase in the questionnaire score of at least three or more questions is desired at the long-term evaluation. Additionally, at the six-month appointment, the desired BP is less than or equal to 140/90mmHG or a steady trend in the short-term BP outcome (systolic BP 5mmHG lower than baseline). The long-term goal is for program participants not to regress to old habits and give up on recommended lifestyle changes. The data is collected from the six-month appointment and weekly BP logs. The data is entered into the existing excel graph, showing score trends. The program participant will also self-report once again, evaluating increased or decreased patient knowledge. The information will be stored in the participant's EHR for pre- and post-implementation trends. The pre- and post-implementation data is gathered from the program participants and differential groups are excluded from the program outcomes. The project leader gathers and compares the data determining whether short- and long-term goals were met.

Outcome Data Tracking Plan

The outcome data tracking plan is the responsibility of the office staff, MA, NP, and project leader. The MA and NP documents and analyzes the self-report EHR data, while the office staff scans and stores completed questionnaires into the patient's record. The project leader has the duty of gathering the measurements and creating an excel file for evaluation. The office staff aids the project leader with creating the file and ensuring information is displayed correctly. The project leader evaluates the results displayed in the EHR and excel document determining whether the implementation plan was successful. The data is measured at the initial, two-month,

and six-month patient appointments. The data will be managed by disseminating data in the excel file and evaluating self-report data. Program results are communicated to key personnel, determining whether a larger scale program is warranted. The project leader also evaluates project continuation outcomes and any necessary future program adjustments.

Results will be disseminated by conducting a stakeholder presentation to the setting assessment population. A brief PowerPoint presentation will be presented and include information on background and significance, target population, literature search and recommendations, setting assessment results, and project implementation and evaluation plans. Additionally, during project initiation monthly organizational results will be provided to key personnel and management informing the team on project success or weakness. Communication to key personnel and stakeholders is essential in project achievement and continuation.

Conclusion

By utilizing EBP control recommendations clinicians can integrate self-management programs into HTN patient care plans. Obtaining positive short- and long-term outcomes will support the integration and continued use of a self-management BP program. Upon completion of the EBP project, realization was made on the possibilities of ways to manage BP strictly relying on lifestyle modifications. While searching for the best evidence, the researcher gained insight into the importance of searching and appraising evidence revealing best practice recommendations. Moreover, as an advanced practice nurse treating hypertensive patients applying the best evidence recommendations ensures competent care is provided. As guidelines change over time, understanding the EBP process allows advanced nurses to formulate decisions backed by reliable evidence.

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Appendix A – Evidence Grid

Evidence Grid: Grading criteria				
Article citation in APA format **Level of evidence (I – VI)** **(10 points)**	**Purpose of study/research questions (10 points)**	**Research elements:** **- Design** **- Target population** **- Sampling method** **- Sample size** **- Brief description of methods/interventions** **- Outcomes measured** **(30 points)**	**Major findings relevant to project (25 points)**	**Strengths and Weaknesses RT validity, bias and significance for your project (25 points)**
Caligiuri, S. P. B., & Pierce, G. N. (2017). A review of the relative efficacy of dietary, nutritional supplements, lifestyle, and drug therapies in the management of hypertension. *Critical Reviews in Food Science & Nutrition, 57*(16), 3508–3527. **LOA: Level I**	**Objective:** To provide comprehensive information on the efficacy of available antihypertensive therapies including diet, nutritional supplements, lifestyle modification, and conventical antihypertensive medications. **Purpose:** 1). To evaluate populations	**Design:** Meta-Analysis of RCTs **Target Population:** Participants with normotension, prehypertension, or stage 1 hypertension. **Method of Inclusion of Articles:** Google Scholar or PubMed Databases were utilized to create a targeted search (last search performed January 3, 2016). The following key words were used: blood pressure AND meta- analysis OR randomized controlled trial, AND diet OR nutrition OR exercise OR cigarette smoking OR alcohol reduction, OR sodium, OR	Dietary interventions/functional foods: -DASH diet with or without sodium restriction: The DASH diet alone resulted in a reduction of systolic/diastolic blood pressure of 5.9/2.9 mmHg (Sacks et al., 2001). When dietary sodium reduction was added to the DASH diet, further reductions in blood pressure were observed (Sacks et al., 2001). The largest reduction in blood pressure was observed when the DASH diet was combined with dietary sodium reduction (3.5 reduced to 1.5 g/day). -Dietary sodium restriction: Results from an expansive meta-analysis of 56 clinical	**Strengths:** -The review highlights core components of successful interventions showing positive clinical and/or humanistic outcomes. -There was a clear distinction of strategies across the conditions studied. -Inclusion criteria minimized ambiguity and reduced bias in study selection decisions. -Inclusion and exclusion criteria was defined clearly by PICO and have documented and reported decisions make in the study selection process

	(normotensive, prehypertensive, hypertensive) that have undergone a dietary/natural health product, lifestyle change, or pharmaceutical treatment that can affect blood pressure, with an appropriate comparator or placebo for the intervention, with an outcome of blood pressure in meta-analyses or randomized controlled trials. 2) To provide a resource to physicians/dietitians and in earnest to start a change in how we approach medicine in order to improve the standard of care for the	drugs OR vitamins OR minerals OR calcium OR magnesium OR potassium OR bioactive peptides. Meta-analyses with the largest number of trials or of highest quality were included in the current review. The literature search was limited to full articles, reports in English, clinical research, meta-analyses, and randomized, controlled studies. **Sample Size:** analysis of 30 antihypertensive therapies from meta-analyses and randomized-controlled trials (RCTs). **Brief Description of Analysis/Synthesis Method:** The findings were graded for level of evidence and class of recommendation based on the American College of Cardiology and American Heart Association guidelines for assessment of recommendations. Studies were graded for level of evidence: A (multiple populations evaluated), B (limited populations evaluated), or C (very limited	trials concluded that dietary sodium reduction significantly lowered blood pressure. Reductions in systolic/diastolic blood pressure in normotensive participants were 1.2/0.6 mmHg and 5.4/ 3.5 mmHg in participants with hypertension. The dietary sodium reduction was assessed by urinary sodium excretion. The average reduction in urinary sodium was 118 mmol/d. -Mediterranean diet: The Mediterranean diet has been associated with cardioprotection (Nadtochiy and Redman 2011) and the reduction of cardiovascular outcomes (Estruch et al., 2013). However, the cardioprotection may not be blood pressure related, as a cur- rent meta-analysis observed a modest decrease in blood pres- sure of 2.4 and 1.6 mmHg for systolic and diastolic blood pressure (Kastorini et al., 2011). In the large clinical trial published by Estruch, those participants that were hypertensive responded better in terms of prevention of cardiovascular outcomes versus	for transparency. -Multiple appropriate databases were searched for articles. -All studies were RCTs or Meta-analysis. -Inter-rater reliability -The units of analysis used in this work were subjected to quality appraisal and graded appropriately using the criteria. -The studies were assessed for quality according to the fundamentals of the Cochrane Collaboration, and this was taken into consideration for grading the level of evidence and recommendation. - The review question was clearly stated. - All articles were randomized controlled trials and meta-analysis. -Dash diet: Blinding in a DASH trial, however, is impractical. Because the DASH diet has been studied in several clinical trials with consistent findings, it received an A Level of Evidence and Class I Recommendation. - Fiber: This meta-analysis performed quality assessment

	management of hypertension.	populations evaluated) and class of recommendation: I (should be recommended), II (reasonable/may (to) recommend), or III (no benefit or harmful). The studies were assessed for quality according to the fundamentals of the Cochrane Collaboration, and this was taken into consideration for grading the level of evidence and recommendation. The assessment of recommendations was also based on number of trials, type of trials, number of different populations, and presence of conflicting findings. **Outcomes Measured:** - Comparison of the effects of novel and well-known dietary strategies, supplements, lifestyle interventions and pharmaceuticals on blood pressure control.	normotensive subjects (Estruch et al., 2013). Lifestyle Interventions: -Weight loss: A meta-analysis consisting of 25 randomized controlled trials concluded weight loss can result in a significant reduction in blood pressure (Neter et al., 2003). The average maximal reduction in blood pressure was achieved after 35 weeks of weight loss intervention for overweight or obese individuals. For every 5.8% decrease in weight, a 4.4 mmHg drop in systolic and a 3.6 mmHg decrease in diastolic blood pressure was observed. Greater reductions in blood pressure were observed in individ- uals not on antihypertensive medications, individuals that lost >5 kg of body weight, individuals of Asian ethnicity, and those that combined both physical activity and diet for weight loss. However, gender, whether hypertensive or normotensive, age, or the initial body mass index, did not have as large an impact on weight loss and blood pressure (Neter	and scored the trials based on blinding (open, single, and double). The findings in hypertensive populations were consistent. Dietary fiber was provided an A Level of Evidence and a Class I Recommendation (Streppel et al., 2005). -Mediterranean diet: The meta-analysis was assessed by the original authors using detailed quality criteria. -Weight loss: The studies included in the meta-analysis were chosen based on select criteria of quality, and a funnel plot was used to assess for bias. - Stress reduction: The meta-analysis included clinical studies that met strict quality criteria. **Weaknesses:** - Limitations and potential bias of the methodology employed for this review may have been skewed towards reporting more effective versus noneffective therapies. - Mediterranean diet: The current research on the Mediterranean diet for blood

			et al., 2003). -Dietary (6/ 4 mmHg) and pharmaceutical therapies (9/7 mmHg) both result in substantial reductions in systolic/diastolic blood pressure. However, dietary therapies may vary in their ability to lower blood pressure more so than pharmaceuticals. Supplements (4/2 mmHg) and lifestyle interventions (5/3 mmHg) are also very effective in reducing systolic/diastolic blood pressure. When compared statistically, on average, pharmaceutical therapies resulted in significantly greater reductions in systolic blood pressure versus the other therapies. However, the therapies were not statistically different for diastolic blood pressure.	pressure reduction was provided a B Level of Evi- dence and a Class IIA recommendation due to blood pressure outcomes always being secondary outcome measures and due to the presence of conflicting findings. - Weight loss: The studies were not double blinded as this is impractical for a weight loss trial. **Significance to Project:** Patient population: Canadian population; therefore, differences exist in healthcare system, community, and religious backgrounds than project. Definitions: Similar measurements for HTN diagnosis criteria, including BP parameters. Protocols: Similar protocols that could be implemented in project. Health System: Similar health system to project.

Van Truong, P., Wulan Apriliyasari, R., Lin, M., Chiu, H., & Tsai, P. (2021). Effects of self-management programs on blood pressure, self-efficacy, medication adherence and body mass index in older adults with hypertension: Meta-analysis of randomized controlled trials. *International Journal of Nursing Practice (John Wiley & Sons, Inc.)*, *27*(2), 1–12. https://doi.org/10.1111/ijn.12920 **LOA: Level I**	**Aim:** To assess the effects of self-management interventions on systolic blood pressure, diastolic blood pressure, self-efficacy, medication adherence and body mass index in older adults with hypertension.	**Design:** A systematic review and meta-analysis. **Target Population:** Older adults 60 years and older who have received a diagnosis if hypertension or other chronic conditions with comorbid hypertension. **Method of Inclusion of Articles:** We performed searches in electronic databases including CINAHL, the Cochrane Library, Embase, Ovid-Medline, PubMed, Scopus, Web of Science and other resources to retrieve all relevant studies from inception to October 2020. Terms and keywords used in the searches included the following: (Self-management OR self-care OR self-regulation OR education OR self-efficacy OR cognitive behaviour) AND (hypertension) AND (older adult) AND (RCTs). The PubMed search strategies are presented. The references of retrieved papers were reviewed for additional studies. Articles that were	-Effects of self-management programs on SBP: The pooled effect for the 11 studies on SBP had an effect size of −0.34 ($p < 0.001$), indicating a small effect. The studies had moderate heterogeneity ($I2 = 70.17\%$, $p < 0.001$, Figure 3a). The results of the Egger's test indicated publication bias ($p = 0.007$). However, after adjustment using the trim and fill method, the results revealed a smaller and statistically significant effect size (Hedges' $g = −0.21$, 95%CI: −0.409 to −0.017). Effects of self-management programs on DBP: The effects of self-management interventions on patients'' DBP were evaluated in 10 studies, and the pooled effect was statistically significant. The effect on DBP had an effect size of −0.18 ($p < 0.001$, Figure 3b), indicating a small effect. No significant heterogeneity was observed ($I2 = 20.36\%$, $p = 0.256$, Figure 3b). Publication bias was identified by the Egger regression analysis ($p = 0.002$). However, after adjustment using	**Strengths:** -The review highlights core components of successful interventions showing positive clinical and/or humanistic outcomes. -There was a clear distinction of strategies across the conditions studied. -Inclusion criteria minimized ambiguity and reduced bias in study selection decisions. -Inclusion and exclusion criteria was defined clearly by PICO and have documented and reported decisions make in the study selection process for transparency. -Multiple appropriate databases were searched for articles. -Inter-rater reliability - To assess the result robustness of the meta-analysis comparing the changes in SBP, DBP, self-efficacy, medication adherence and BMI, sensitivity analyses were conducted by excluding one study at a time.

		published in languages other than English were excluded. **Sample Size:** 12 RCTs. Sample size included 2,714 older adults. **Brief Description of Analysis/Synthesis Method:** Duplicate reports were excluded using Endnote X8. After inspecting the titles and abstracts, full texts of potential studies were independently screened by two authors (RWA and PVT) to determine their eligibility based on the inclusion criteria. Two reviewers (RWA and PVT) independently abstracted data in relation to RCTs for first author names, publication year, origin country, clinical setting, arm, mean age, % male, type of intervention, intervention duration, delivery, and control group type. Any disagreements were addressed through discussion to consensus. A third reviewer (PST) was consulted for adjudication if a consensus was not reached. Additionally, we contacted	the trim and fill method, the results revealed a smaller and statistically significant effect size (Hedges' g = −0.12, 95% CI: −0.221 to −0.021). Effects of self-management programs on self-efficacy: The effects of self-management interventions on self-efficacy were evaluated in three studies, and the pooled effect was statistically significant. The effect on self-efficacy had an effect size of 0.93 ($p < 0.001$, Figure 3c), indicating a large effect. The studies were most likely not heterogeneous ($I2 = 30.03\%$, $p = 0.240$, Figure 3c). These studies examined 130 older adults in total. The intervention duration was 3 months in two studies and 4 months in one study. Two studies were conducted in community settings in Indonesia and South Korea, whereas the Iranian study was conducted in a clinical setting. The results of the Egger's test indicated no publication bias ($p = 0.806$). Effects of self-management programs on medication adherence:	-No results were significantly altered, indicating the robustness of our results. the large number of older patients with hypertension included in the analysis (*n* = 2714). -This meta-analysis is also strengthened by our extensive search, the inclusion of relevant RCTs, and the use of meta-regression to control differences between studies. **Weaknesses:** - 91.7% of the studies had some concerns in the risk of bias - Nine studies had some concerns in possible deviations from intended interventions. ---- Nine studies had some concerns in selections of the reported result. - Because of diverse intervention designs, assessment tools, and degrees of bias control, significant heterogeneity was noted among the included studies. - The sample size was limited, and the outcomes only focused on SBP, DBP, self-efficacy, medication adherence and BMI.

		the authors of primary reports to request any unpublished data. Moderator analyses according to setting type, control group type, type of intervention and intervention duration were conducted to explore possible sources of heterogeneity in the effect sizes. The quality of studies was assessed using RoB 2.0. **Interventions:** Studies that included self-management, self-care, self-efficacy, cognitive-behavioural and education programs focusing on self-management that were delivered face-to-face and/or by using a handbook were included. **Comparison:** Studies that included at least one control group (e.g., usual care) were included in the meta-analysis. **Outcomes Measured:** Primary outcomes included SBP, DBP. Secondary outcomes were self-efficacy,	The pooled results from four studies indicated a statistically significant effect of self-management programs on medication adherence. The studies, namely three from Iran and one from the United States, examined 544 older adults in total. The intervention duration was 3 months in two studies, 9 months in one study, and 12 months in another. All studies were conducted in clinical settings. The effect on medication adherence had a Hedges' g value of 1.72 (95% CI, 0.44 to 3.00, p = 0.008, Figure 3d), indicating a large effect. The studies were highly heterogeneous (I2 = 97.14%, p < 0.001, Figure 3d). The results of the Egger's test indicated possible publication bias (p = 0.098). Effects of self-management programs on body mass index: The pooled results from four studies indicated nonsignificant effects of self-management programs on BMI, with a Hedges' g value of −0.57 (95% CI, −1.62 to 0.48, p = 0.286, Figure 3e). The studies were	- Whilst our study conducted a comprehensive search following PRISMA guidelines, publication bias was detected for certain outcomes. - The included studies adopted different guidelines for hypertension management, standards for diagnosis and treatments, all of which could have influenced the outcomes of this study. **Significance to Project:** Patient population: Adults aged 60 years and older were studied with hypertension from various countries including the United States; therefore, similarities and differences may exist in in healthcare system, community, and religious backgrounds than project. Definitions: Similar measurements for HTN diagnosis criteria, including BP parameters. Protocols: Similar protocols that could be implemented in project. Health System: Similar health system to project.

		medication adherence and BMI. Blood pressure was measured using blood pressure devices including digital sphygmomanometers or digital blood pressure devices, or sphygmomanometers; self-efficacy and medication adherence were measured using standardized questionnaires.	highly heterogeneous (I2 = 97.12%, p < 0.001, Figure 3e). The studies examined 711 older adults in total. Two studies were conducted in clinical settings in Iran and Austria, and two were conducted in community settings in the United States and Indonesia. The duration of intervention was 3, 4, 6 and 12 months, respectively, in the four studies. The results of the Egger's test indicated no publication bias (p = 0.505).	
Gerage, A. M., Benedetti, T. R. B., Ritti-Dias, R. M., dos Santos, A. C. O., de Souza, B. C. C., & Almeida, F. A. (2017). Effectiveness of a behavior change program on physical activity and eating habits in patients with hypertension: A randomized controlled trial. *Journal of Physical Activity & Health, 14* (12), 943–952.	The **purpose** of this study was to analyze the effect of a behavior change program, called Vida Ativa Melhorando a Saude (VAMOS), on physical activity, eating habits, and quality of life in patients with hypertension. The study also aimed to identify whether the possible changes in physical	-**Design**: Randomized controlled trial (true experimental). -**Population**: Adults aged 40 years and older, using antihypertensive drugs for at least 3 months prior to the study, and a diagnosis of hypertension (systolic/diastolic blood pressure ≥140/90 mm Hg) was considered. -**Sampling method**: Convenience sampling. The recruitment was carried out through local media advertisements and flyers distributed in hospitals and in the surrounding area where	- The control group increased sedentary time (407 ± 87 vs 303 ± 100 min/d; P < .05) and sedentary bouts (434 ± 86 vs 336 ± 98 min/d; P < .05) and reduced total physical activity (553 ± 87 vs 526 ± 86 min/d; P < .05). The VAMOS group improved the general healthy eating habits score (36.9 ± 6.6 vs 43.4 ± 5.8; P < .05) and quality of life (44% vs 92%; P < .05). - VAMOS program was effective in improving eating habits and quality of life in patients with hypertension. - Among the 45 participants randomized for each group,	**Validity & Bias:** -**Strengths:** Trial strengths: -Subject selection: 90 patients randomly assigned into control versus intervention groups. Group sizes are similar with similar baseline characteristics. Inclusion/exclusion criteria clearly presented. -The originality of the study. -Physical activity was objective and assessed throughout the study. Changes were precise. -Blindness of the evaluators regarding the randomization as recommended. -Outcomes: Valid and reliable tools and tests were used

LOA: II	activity and eating habits are mediated by self-efficacy and social support. **Hypothesis:** Improvements in self-efficacy and social support would lead to improvements in physical activity and eating habits among patients with hypertension	the intervention would be offered (University of Pernambuco, Recife, Pernambuco, Brazil). -**Sample size**: 90 patients with hypertension. Randomly assigned to 2 groups: VAMOS group (n=42) and control group (n=42). -**Intervention:** The VAMOS group participated in a behavioral change program aimed at motivating changes in physical activity and nutrition behavior for 12 weeks. Physical activity, eating habits, quality of life, self-efficacy, and social support were evaluated at preintervention and postintervention -**Comparison:** The controlled group participated in an educative lecture lasting 90 minutes about lifestyle changes, whereas the VAMOS group participated in a behavioral change program for 12 weeks. -**Outcomes measured:** After the 12-week program, all the participants were reevaluated	56% of VAMOS (19 women and 6 men) and 60% of CG (21 women and 6 men) attended the 12 weeks of intervention (≥75%) or the lecture and all the evaluations at postintervention. - There were no differences between the participants who completed the study and those dropped for sex, age, marital status, level of education, weight, stature, obesity, and hypercholesterolemia, both within and between groups. Furthermore, no significant differences were found between groups at preintervention among those who completed the study. - Changes in physical activity: Only 23 VAMOS participants and 26 CG participants had validated accelerometer data at preintervention and postintervention. - Changes in quality of life: Group by time interaction effect indicated that a higher proportion of VAMOS participants improved their overall quality of life with more VAMOS participants reporting good or very good quality of life when compared with CG	including The Shapiro–Wilk and the Levene's tests ensuring accurate results. Examined qualitative results minimizing recall bias and yielding information on day-to-day variability. -**Weaknesses:** Trial weaknesses: Subject selection and assignment: Several data were collected by self-reporting questionnaires (eating habits, quality of life, self-efficacy, and social support), which should be considered with caution while interpreting the results. In both groups, a considerable dropout (>37%) was observed, which reflects in low sample power to detect the real effect of the intervention in some analyzed outcomes in which the changes are less expressive. In addition, although the dropouts were not attributed to the VAMOS program, other studies involving behavior change programs have shown better compliance rates - Participants in behavioral change programs based on social cognitive theory, who are

		(postintervention) in all the aspects measured at preintervention. Changes in eating habits, physical activity, quality of life, and changes in self-efficacy and social support were measured among the control group and VAMOS group. The VAMOS group improved the general healthy eating habit score and quality of life (44% CG versus 92%) proving the effectiveness of a VAMOS behavioral change program.	participants. -Changes in self-efficacy and social support: No group by time interaction was observed for self-efficacy and social support for physical activity and healthy eating habits (P>.05). A main time effect was found for social support for walking and for negative social support for eating habits, both related with friends. -Main findings: (1) the participants of the CG increased SED and decreased time spent in total physical activity; (2) the participants of the VAMOS group increased the consumption of in natura/minimally processed foods and had general improvements in eating habits; (3) there was no change in self-efficacy and social support and these constructs were not associated with the changes observed in physical activity and eating habits.	exposed to better environmental conditions to practice physical activity, are more likely to remain in the study, suggesting the role of environmental factors in the ongoing engagement of participants, which was not controlled in this study. **-Significance for project:** Patient population: Adults aged 40 years and older were studied from Brazil.; therefore, providing advice on nonpharmacological blood pressure control adherence among the project population. Although the participants are from the French population; therefore, differences exist in healthcare system, community, and religious backgrounds than project. Definitions: Similar measurements for HTN diagnosis criteria. Protocols: Similar protocols that could be implemented in project. Health system: Health system is different than project; however,

				similarities exist that can be applied to project and PICO.
Egan, B. M., Sutherland, S. E., Rakotz, M., Yang, J., Hanlin, R. B., Davis, R. A., & Wozniak, G. (2018). Improving hypertension control in primary care with the measure accurately, act rapidly, and partner with patients protocol: Results at 6 and 12 months. hypertension. https://doi-org.spot.lib.auburn.edu/10.1161/HYPERTENSIONAHA.118.11558 **LOA: III**	**Objective:** Objectives for the current study included determining whether (1) MAP was effective in a larger number of diverse Family Medicine practice sites, and (2) improvement in hypertension control at 6 months with practice facilitation persisted at 12 months, 6 months after practice facilitation ended. **Program Purpose:** Measure accurately, Act rapidly, and Partner with patients (MAP) is a 6-month quality improvement	**Design:** Quasi-experimental, pre-versus poststudy design **Sampling method:** Eligible patients had at least 1 office visit with recorded BP during the baseline period from February 1, 2015, to April 30, 2016. Patients in the outcome analysis had at least 1 visit with recorded BP during MAP (June 1, 2016–November 30, 2016). The 6-month follow-up period (months 7–12) without practice facilitation included visits between December 1, 2016, and May 31, 2017. Adults exempt from the National Quality Foundation 18 hypertension control measure were excluded. **Sample Size:** 16,787 hypertensive adults from 16 family medicine clinics **Description of Interventions:** Measure accurately" ensured that staff was instructed on proper BP measurement and reassessment; however, before MAP was	-In 16, 787 hypertensive adults (mean, 61.2 years; 54.1% women; 46.0% Medicare) with visits at baseline and first 6 months, BP control improved from 64.4% at baseline to 74.3% (P<0.001) at 6 and 73.6% (P<0.001) at 12 months. At the first MAP visit, among adults with uncontrolled baseline BP and no medication changes (n=3654), measure accurately resulted in 11.1/5.1 mm Hg lower BP. During the first 6 months of MAP, therapeutic inertia fell (52.0% versus 49.5%; P=0.01), and systolic BP decreased more per therapeutic intensification (−5.4 to −12.7; P<0.001). -MAP supports a key national strategy for cardiovascular disease prevention through rapid and sustained improvement in hypertension control, largely reflecting measuring accurately and partnering with patients. - Our MAP study in 16 Family Medicine clinics confirmed a clinically and statistically	**Strengths:** -Simplicity of the MAP project -Use of AHA guidelines -Pooled t tests were performed to assess differences in demo-graphic and clinical characteristics between patients with a baseline visit and at least one visit during the first 6 months of MAP versus patients with only a baseline visit. - Patient-level data were extracted from the electronic health record system. -The study was conducted at 16 diverse, community-based clinic sites. **Weaknesses:** -Cost and complexity -Study limitations include assessment of baseline hypertension control by usual office BP rather than protocol-based BP measurements. More than 20% of hypertensive patients seen at baseline did not have a visit during the first 6 months of MAP with a similar loss to follow-up in the second sixth months. Loss to follow-up

	program,12–14 which includes practice facilitation, to increase hypertension control. MAP was designed and adapted for ambulatory, out-patient clinical settings without additional personnel typical of team-based care interventions.	implemented many clinics reported that only a single BP measurement was taken with no further actions. "Act rapidly" emphasized that action was made after initial BP was higher or equal to 140/90 mmHg in the clinic. "Partner with patients" encouraged patient engagement including office visits or follow-up appointments, shared management decisions, prescribing affordable and single-pill medications, and BP self-monitoring **Comparison:** Determining whether MAP was effective in a larger number of diverse Family Medicine practice sites, and improvement in hypertension control at 6 months with practice facilitation persisted at 12 months, 6 months after practice facilitation ended. **Outcomes Measured:** Improvement in hypertension control at 6 months of MAP and if control persists at 12 months and then 6 months after facilitation ended.	significant improvement in BP as reported in our pilot study.13 Hypertension control increased from 64.4% to 74.3% (P<0.0001) in 16787 hypertensive adults in only 6 months (Figure). Absolute hypertension control rates improved 9.9% although the increase was smaller than the absolute increase of 28.6% in our single site pilot.13 Implementing the project across multiple sites yielded significant but less dramatic changes than the pilot study. -	was partially a function of study design as some patients with a baseline visit were seen in months 7 to 12 but not 1 to 6 (n=1691). **Significance for Project:** Patient population: Study conducted in the United States; therefore, similarities exist in healthcare system, community, and religious background. Definitions: Similar measurements for HTN diagnosis criteria, including BP parameters. Protocols: Similar protocols that could be implemented in project. Health System: Similar health system to project.

Jang, S., Han, E., Kang, C., Cho, H.-M., Sohn, H. S., & Lee, J.-Y. (2021). Assessment of a medication management program targeting hypertension and diabetes patients: Impact on medication adherence. *Research in Social and Administrative Pharmacy, 17*(2), 419–427. https://doi-org.spot.lib.auburn.edu/10.1016/j.sapharm.2020.03.002 **LOA: III**	**Objectives:** To evaluate the direct outcomes of the program. **Program Purpose:** To improve medication adherence among patients with hypertension and diabetes with low proportion of days covered.	**Design:** Quasi-experimental **Sampling Method:** Difference-in-differences. Patients were identified among those who visited an outpatient clinic at least twice or used an in-patient service at least once for hypertension or diabetes during 6-month intervals and who were nonadherent based on the proportion of days covered (PDC) calculated. **Sample Size:** 2,428 hypertension patients and 884 diabetes-intervention 2,140 hypertension and 4,420 diabetes patients - controls in the non-participating regions. **Description of Interventions:** Participants were mailed an information leaflet on their own medication adherence and other tips for effective self-management of chronic diseases. For the intervention, two phone calls and three phone messages were made to patients by 24 participating regional offices. **Comparison:**	-The adjusted quarterly PDC increased by 1.96%p for hypertension ($p = 0.023$) and by 7.79%p for diabetes patients ($p < 0.001$). Approximately 40.6% and 51.7% of hypertension and diabetes patients in the treatment arm ($p = 0.0069$) became adherent after the intervention, whereas the corresponding proportions were 37.7% and 41.4% ($p < 0.001$) in the control group. -Both treatment groups showed a higher likelihood of good medication adherence (hypertension: odds ratio = 1.157, 95% CI [1.058, 1.265]; diabetes: odds ratio = 1.532, 95% CI [1.323, 1.774]). -The control group, who received only a print intervention with a mailed leaflet, also showed a dramatic increase in medication adherence.	**Strengths:** -Valid and reliable collection methods. -Clear inclusion and exclusion criteria -Low rejection rates (2-3%). -The enrollment of subjects for the active interaction program was restricted to participating regional offices, which decided to participate voluntarily. -Four of Six regional headquarters participated. -Identified hypertension or diabetes patients with low medication adherence, specifically with a PDC of < 80% without prescription refills for 2 consecutive months or longer. Therefore, all study subjects, in both the treatment and control group were non-adherent with a PDC < 80% prior to the intervention. **Weaknesses:** -Those who declined to participate in the active intervention were not separately identified in the current study. -The patients who rejected the phone-based intervention even after receiving the alert mail are

		Poor medication adherence versus non-poor medication adherence. **Outcomes Measured:** Portion of days covered (PDC)		likely to be a high-risk group with low medication adherence due to a lack of self-confidence regarding their capability to adhere. -Limited information about pre-intervention medication adherence. -Current study assessed only short-term changes in the PDC. -Did not evaluate changes in clinical outcomes following the interventions to improve medication adherence. **Significance to project:** PICO question: Describes evidence of a medication program to increase hypertension medication adherence. Definitions: Similar measurements for HTN diagnosis criteria, including BP parameters. Protocols: Similar protocols that could be implemented in project. Health System: Although article is not based in the U.S., similarities exist.

Lelong, H., Galan, P., Kesse-Guyot, E., Fezeu, L., Hercberg, S., & Blacher, J. (2015). Relationship between nutrition and blood pressure: A cross-sectional analysis from the NutriNet-Sante study, a French web-based cohort study. *American Journal of Hypertension*, *28*(3), 362–371. https://doi-org.spot.lib.auburn.edu/10.1093/ajh/hpu164 LOA: IV	This study **aimed** to 1). Evaluate and quantify the association between an individual's behaviors (in particular dietary intake), and BP among a general population of untreated French adults 2). Quantify the extent to which the recommended lifestyle factors were determinants of BP level in order to promote their individual or general implementation.	-**Design:** Longitudinal/ Cohort Study, Cross Sectional Design -**Population:** Internet-using adults volunteers aged ≥18 years. -**Sample method:** Convenience sampling. The ancillary study is a cross-sectional analysis using data from the NutriNet-Santé Study, which was carried out in the subsample of volunteers who took part in a consultation between January 2010 and February 2013." -**Sample size:** 8,670 volunteers from the NutriNet-Santé Study, an ongoing French web-based cohort study. Men= 2,075 (24%) and women= 6,595 (67%). -**Intervention:** Dietary intakes were assessed using three 24-hour records. Information on lifestyle factors was collected using questionnaires and 3 BP measurements following a standardized protocol. -**Comparison:** Age-adjusted associations and then	- Results: "SBP was higher in participants with elevated body mass indices (BMIs). Salt intake was positively associated with SBP in men but not in women. The negative relationship between consumption of fruits and vegetables and SBP was significant in both sexes. Alcohol intake was positively associated with SBP in both sexes; physical activity was not. The 5 parameters representing the well-accepted modifiable factors for hypertension reduction plus age and education level, accounted for 19.7% of the SBP variance in women and 12.8% in men. Considering their squared partial correlation coefficient, age and BMI were the most important parameters relating to SBP level. Salt intake was not associated with SBP in either sex after multiple adjustments." In project, data could support nonpharmacological BP control means.	**Validity & Bias:** -**Strengths:** -Study investigated the relationship between a BP measurement using standardized protocol and lifestyle factors in a large general population of untreated French adults. - Quality and completeness of dietary investigation method. -Closely investigated the relationship between nutritional factors and BP. -**Weaknesses:** -Sample of volunteers (both for the study and for the consultation participation) was probably not representative of the global French population. - In the study study there were fewer smokers, participants had lower BMIs, and fruit and vegetable intake was higher, particularly in men. -Internet-based recruitment - The cross-sectional design of the study did not consider that many participants could have recently modified their lifestyle in response to elevated BP, introducing a reverse-causality bias.

		multivariate associations between systolic BP (SBP) and lifestyle behaviors were estimated using multiple linear regressions. Men and women were compared in this study comparing how lifestyle factors and nutrition affect BP. **-Outcomes measured:** Relationship between nutrition and blood pressure. Effects of BMI, physical activity, alcohol consumption, dietary salt intake, DASH diet (diet rich in fruits, vegetables, and low-fat dairy products and reduced in saturated and total fat) on BP. In addition, other nutritional factors including intake of fiber, magnesium, phosphorus, and calcium may affect BP as measured in this study.		- Collected data could then be poorly representative of previous years. -Loss of participants to follow-up may contribute to experimental bias in this type of study **-Significance to project:** Patient population: French population; therefore, differences exist in healthcare system, community, and religious backgrounds than project. Definitions: Similar measurements for HTN diagnosis criteria, including BP parameters. Protocols: Similar protocols that could be implemented in project. Health System: Similar health system to project.
Mahmood S., Shah K. U., Khan T. M., Nawaz S., Rashid H., Baqar S. W., & Kamran S. (2019). Non-pharmacological management of	**Purpose:** To emphasize the significance of non-pharmacological interventions for hypertension control and to	**Design:** Narrative Review **Search Strategy and Method of Article Inclusion:** Search was carried out in Medline, Scopus, CINHAL, PubMed, Cochrane Database, and Google Scholar. The	-The changes achieved in SBP were 5.4 mmHg reduction for behavioral counseling, 3.5 mmHg reduction for dietary modifications, 11.4 mmHg reduction for improved physical activity, and 6.4 mmHg	**Strengths:** -Scholarly databases were searched. -Consistent data. **Project Significance Strengths:** -A useful strength for the PICO is the trustworthiness of

hypertension: In the light of current research. *Irish Journal of Medical Science.* https://doi.org/10.1007/s11845-018-1889-8 **LOA: VI**	provide the most recent research evidence on the success of these interventions in effective management of hypertension.	syntax used for literature search was Hypertension AND Non-pharmacological Management AND DASH Diet AND Lifestyle Modifications AND Potassium & Magnesium supplementation AND Alcohol Intake AND Low Salt Diet AND Exercise. The titles, abstracts, study protocols, and the contents of study were scrutinized through our inclusion exclusion criteria. Any reservation regarding the selection of study was resolved through consensus. The data extraction sheet was created through Microsoft Excel for the extraction of data. We excluded all studies that did not reported consistent data. The studies published in language other than English were also not included. Since this is a narrative review, hence, no ethical permission was required. **Description of Interventions:** The following non-	reduction for multiple interventions. -DASH diet: In an 08-week DASH trial, 459 participants were randomly distributed in the following three groups: (a) control diet, (b) diet rich in fruits and vegetables, (c) combination diet, i.e., diet rich in fruits and vegetables, low-fat dairy products, and reduced in saturated fats (DASH-combination diet) the salt intake was kept constant in all three groups. At the end of trial, it was observed that in the combination diet group, the reduction in both systolic and diastolic blood pressure was greater in black population where the reduction in blood pressure was 6.9/3.7 mmHg as compared to 3.3/ 2.4 mmHg in white population. Mediterranean Diet: -A 06-year follow-up study involving 9408 males and females reported that strict implementation of a Mediterranean diet resulted in reduction in SBP by 3.1 mmHg and DBP by 1.9 mmHg.	information can make it easier to ensure reliable information. -Provides evidence to the PICO concerning nonpharmacological interventions in addition to medication adherence to control suboptimal blood pressure. **Weaknesses:** - Although this review contains all major non-pharmacological interventions for hypertension management, however for future reviews, minor interventions for hypertension management like increased intake of omega-3, garlic, onion, cocoa flavanol-rich food, decreased caffeine intake, and smoking cessation should also be considered. - At present, limited literature and smaller clinical trials are available on these interventions, requiring further research to prove their effectiveness in hypertension management. -Dietary modifications: Healthcare practitioners are still not clear as which dietary approach to recommend. **Significance to Project:**

		pharmacological interventions will be reviewed: (1) dietary modifications, (2) dietary sodium restriction, (3) potassium and magnesium supplementation, (4) increased Ca+2 intake, (5) minimizing alcohol in- take, (6) body weight and exercise, (7) combined effect of weight loss and Na+ restriction, and (8) reduced physiological stress and anxiety. **Outcomes Measured:** Intervention success on effective hypertension management research evidence.	-Maria Kastorini et al. in a meta-analysis of 50 clinical trials found that a traditional Mediterranean diet associated with 2.35 mmHg reduction in SBP and 1.58 mmHg reduction in DBP. Body weight and exercise: A meta-analysis of 54 randomized controlled trials involving 2419 participants revealed that ≥ 150 min exercise/week result- ed in decrease in both systolic and diastolic blood pressure by 5.13/2.78 mmHg, respectively, 121–149 min/ week exercise resulted in 4.67/2.11 mmHg reduction in both systolic and diastolic blood pressure, and ≤ 120 min/week exercise resulted in 2.82/2.19 mmHg reduction in both systolic and diastolic blood pressure.	Topic study selection: Provides a narrative review of essential nonpharmacological interventions and provides the most recent research evidence on the success of these interventions. Successful interventions support the PICO question. Definitions: Similar measurements for HTN diagnosis criteria, including BP parameters. Protocols: Similar protocols that could be implemented in project. Health System: Similar health system to project.
Sadeghi, C., Khan, H. A., Gudleski, G., Reynolds, J. L., & Bakhai, S. Y. (2020). Multifaceted strategies to improve blood pressure control in a	**Aim:** The aim of this quality improvement (QI) was to improve BP control <130/80 from the baseline rates of 20%–30% and <140/90 from the	**Design:** Quality Improvement Project utilizing the Plan-Do-Study-Act (PDSA) model of health care improvement and six Domains of the Institute of Medicine: Safe, Timely, Effective, Efficient,	-Achieved 62.6% for BP control <140/90 within the 12 months project period. We increased and sustained at 72.64% average BP control <140/90 during the post project period. - 24.477% of the patients had BP control <130/80	**Strengths:** -No significant cost. -Patient outreach to schedule clinic visits was done by clinic administrative staff as a part of their routine job. -The multi-faceted strategies utilized in this project can be replicated in other settings.

primary care clinic: A quality improvement project. *International Journal of Cardiology Hypertension, 7.* https://doi-org.spot.lib.auburn.edu/10.1016/j.ijchy.2020.100060 **LOA: VI**	baseline rates of 40%–60% between ages of 18–75 years, within 12 months.	Equitable and Patient-centered (STEEEP). **Target Population:** Underprivileged patients in a rural clinic diagnosed with hypertension. The study population at entry had multiple comorbidities. 56.03% had DM, 80.36% had hyperlipidemia, 25.03% had coronary artery disease, 26.71% had heart failure and 27.84% had chronic kidney disease. About 70% of patients had 3 or more of these diagnoses. **Sampling Method:** Convenience sampling method. In collaboration with information technology staff, physician leaders created a patient registry from electronic health records (EHR) and verified their accuracy. A retrospective review of the registry revealed about 80% patients seen in the clinic within the past 18 months had BP control >130/80 and 60% had BP > 140/90. Inclusion criteria were male and female patients aged 18–75 years old	within the 12 months project period. - Resident and Nursing Education: 100% of the residents attended training in a small group setting with PowerPoint presentation about ACC HTN guidelines. Resident team leader conducted pre and post-tests consisting of 6 multiple choice questions, we observed improvement from 50% to 75% correct answers. 100% of the nursing staff (n = 20) attended the training. - Medication Reconciliation Completion Rates: The average medication reconciliation completion rate was 641/1426 1⁄4 44.95% within project period. During the post project period, the average medication reconciliation competition rate was 45.20%.	-High functioning multidisciplinary team for the project. **Weaknesses:** -Results cannot be generalizable to other settings -We underestimated actual medication reconciliation performed by physicians during the clinic visit due to an extra manual step required to capture this in the database. Due to time constraints, most physicians forgot to complete this step after medication reconciliation completion -We were unable to report accurate data on medication adherence -Due to the limited capability of the EHR and lack of resources to analyze data manually, we were unable to report a) actual change in prescriptions (increase in dose and/or addition of other agents, b) data specifically by medications and comorbidities. Patients with resistant hypertension or with comorbidities may not have gained full benefit from this intervention. The patient who did not achieve target BP

		with a diagnosis of HTN and at least two clinic visits from May 1, 2018, to April 30, 2019. **Sample Size:** 1426 patients. Safety-net clinics. Population is largely underprivileged, urban and 75% African American. About 70% of patients are diagnosed with HTN and have multiple comorbidities including type 2 Diabetes Mellitus, hyperlipidemia, and morbid obesity (mean body mass index (BMI) of 32 (obesity 1⁄4 BMI of 30 or greater). **Methods/Interventions:** Process measures included: 1) the percentage of nurses and physicians that attended education on HTN, 2) medication reconciliation completion rates, and 3) care guide order rates for patient education. Balance measures comprised of potential increase in patient wait time and dissatisfaction of nursing staff and physicians. Key interventions were: 1) physicians and nurses'		attended fewer visits and had a higher ASCVD risk. Likely, these patients were under treatment for multiple conditions, and c) BP control rates in different ethnic groups and income groups. -Sustainability remains a challenge in QI projects. -Barriers included: 1) Physicians' knowledge gap and clinical inertia in optimization of medications, and 2) Patients' nonadherence to medication and appointments. **Significance for Project:** Patient population: Study conducted in the United States; therefore, similarities exist in healthcare system, community, and religious background. Definitions: Similar measurements for HTN diagnosis criteria, including BP parameters. Protocols: Similar protocols that could be implemented in project. Health System: Similar health system to project.

		education regarding ACC/AHA guidelines, 2) patient education and engagement and 3) enhancement of health information technology. Data analysis was performed using monthly statistical process control charts. **Outcomes Measured:** The percentage of patients with BP < 140/90 and < 130/ 80.		

Appendix B- Patient Questionnaire

High Blood Pressure Management Questionnaire

** All answers are anonymous and used for student research only.

1. How often do you check your blood pressure? Check which one applies.
    - Every day
    - Weekly
    - Monthly
    - Never
2. Do you keep a log?
    - Yes
    - No
3. Do you adhere to prescribed medication and take it as directed by your PCP?
    - Yes
    - No
4. Are you familiar with recommended diet and exercise recommendations? Such as the DASH diet and light exercise such as walking 3-4 days a week?
    - Yes
    - No
5. Would you join a self-management program if the clinic adopted one? If not, why? (A self-management program teaches you ways to control your BP and ways to modify your lifestyle to fit needed BP management goals).
    - Yes
    - No
    - If not, why?