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Hypertension Education and Management Intervention (HEMI) in the Urgent Care Setting

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HYPERTENSION EDUCATION AND MANAGEMENT INTERVENTION (HEMI)
IN THE URGENT CARE SETTING

A DNP Project Submitted to the Graduate Faculty of
Jacksonville State University in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Nursing Practice

By

CONRAD LANE CASH

Jacksonville, Alabama

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ABSTRACT

Background: Hypertension, being a very prominent disease, is a common problem found during urgent care visits. By beginning in the urgent care setting, hypertension management can be started early; thereby preventing complications from uncontrolled hypertension.

Purpose: This DNP project aimed to improve patient knowledge of hypertension and overall blood pressure readings by providing one-to-one provider-patient education.

Design Method: This DNP quality improvement project was a pre- and post-test design using quantitative data. The goal was to assess if there was a change in patient education pre, post, and three months follow-up along with a change in blood pressure.

Results: This DNP project demonstrated a statistically significant improvement in both hypertension knowledge and blood pressure measurements.

Conclusion: Urgent care centers frequently observe individuals with no primary care providers and undiagnosed hypertension. More structured one-to-one provider-patient education along with handouts were needed to help decrease and manage hypertension.

Implications for Nursing: Education beginning in the urgent care setting for individuals without a primary care provider and meeting criteria for hypertension can result in a positive outcome for patients.

Keywords: hypertension, hypertension management, urgent care, hypertension education, blood pressure, provider education, hypertension clinical practice guidelines

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Hypertension Education and Management Intervention (HEMI) in the Urgent Care Setting

Introduction

Urgent care centers allow access to primary care, and bridge the gap between primary care and emergency services (Katz, 2019). With many urgent care centers assisting with acute injuries and illnesses, often hypertension is overlooked in patients utilizing these services. Hypertension is defined as systolic blood pressure (SBP) greater than or equal to 130 or diastolic blood pressure (DBP) greater than or equal to 80 (American Heart Association, 2020). Hypertension can affect anyone and can have lasting effects on the body. According to the Center of Disease Control and Prevention National Center for Health Statistics, the prevalence of hypertension in adults 18 years of age and older is 29% (CDC, 2020). With the prevalence increasing among the general population, certain groups are at an increased risk. Prevalence increases with age. Individuals ages 18-39 years account for 7.5%, those age 40-59 make up 32.2%, and the rates in age 60 and older is an astounding 63.1% (Fryar, Ostchega, Hales, Zhang, & Kruszon-Moran, 2017). In addition to age affecting prevalence, gender and race also contribute to hypertension. Men have a higher prevalence of hypertension than females, and non-Hispanic African Americans have higher prevalence when compared to non-Hispanic Caucasian, non-Hispanic Asian, and Hispanic adults (Samanic et al., 2020).

Many times people are unaware they have hypertension and have little to no side effects related to current blood pressure readings. Hypertension can be easily treated with lifestyle modification and medication compliance, starting in an urgent care setting and

continuing into primary care. Initiating hypertension treatment in the urgent care setting will help to decrease healthcare costs for both patients and healthcare organizations by decreasing the long-term complications from uncontrolled hypertension. Providing an educational intervention for hypertension management early in the urgent care setting will allow patients to have healthier lives and decrease the costs of associated health-related problems.

Background

Urgent care centers have consistently grown since their emergence in the 1980s, and currently over 7,000 exist, providing healthcare access to more than 160 million patients annually (Ashton, 2017). Urgent care centers offer medical services for acute illnesses and injuries when emergency services such as the emergency room are not warranted. Most urgent care centers operate on a walk-in basis and are located in convenient locations to homes or workplaces. Many urgent care center providers see individuals in rural and urban areas who do not have primary care providers.

The Center for Disease Control and Prevention (CDC) indicated that 108 million or 45% of adults in the United States have a diagnosis of hypertension (CDC, 2020). Of the 108 million, nearly one-third, 30 million adults are not prescribed or are not taking medication for hypertension management (CDC, 2020). Uncontrolled hypertension place individuals at higher risks of health complications, including heart disease and stroke, which are the leading causes of death in the United States. In addition to increasing health risks, hypertension is the primary cause of death of 472,000 individuals yearly and costs \$131 billion each year (CDC, 2020).

Hypertension has different stages that guide practice and recommendations for initiation of lifestyle modifications and/or medications. The stages for hypertension are:

- Normal SBP less than 120mmHg and DBP less than 80mmHg
- Elevated SBP 120-129mmHg and DBP less than 80mmHg
- Stage 1 hypertension SBP 130-139mmHg and DBP 80-90mmHg
- Stage 2 hypertension SBP greater than or equal to 140mmHg and DBP greater than or equal to 90mmHg (American Heart Association, 2020).

For a patient to receive the diagnosis of hypertension, there should be two separate readings of blood pressure, with the highest one determining which category the patient would be in. The readings can be two separate office visits or one office visit and one reading from an outside office or another provider.

Barriers to healthcare can affect why people have undiagnosed hypertension or poorly controlled hypertension. Barriers that exist in healthcare are geographical barriers, long wait times and decreased access to care, lack of affordable healthcare, and a decreased number of available healthcare professionals (Standford, 2020). Urgent care centers located in geographically accessible areas promote access to care for patients; thereby, improving uncontrolled hypertension, resulting in better management of the disease process (Obuyama et al., 2019). Having access to care is an essential factor for the management of hypertension and can improve outcomes (Obuyama et al., 2019). Additionally, affordable healthcare allows patients to seek care when needed without financial concerns. Lastly, the shortage of healthcare providers causes strain to all by increasing wait times and an inability to provide quality healthcare for patients.

Problem Statement

Individuals who have pre-hypertension/hypertension (systolic blood pressure greater than or equal to 130 or diastolic blood pressure greater than or equal to 80) should be given one-to-one provider-patient education and started on hypertension treatment. Providing education to patients and beginning treatment will increase the patient's knowledge level and should result in decreased blood pressure at the three-month follow-up appointment. The PICOT question for this DNP project was: P - individuals who have pre-hypertension/hypertension (systolic blood pressure greater than or equal to 130 or a diastolic blood pressure greater than or equal to 80); I - one-to-one provider-patient education, provider education, and medication management; C - compared to no education or medication management; O - increase patient's knowledge and decrease blood pressure; and T - at a three-month follow-up appointment.

This DNP Quality Improvement Project is focused on both a clinical and education problem. The clinical portion of this project is to diagnosis and treat undiagnosed patients with pre-hypertension/hypertension. The educational portion of this project will foster a two-pronged approach. First, patient education to manage hypertension and second, provider education about teaching topics, assessing labs, and follow-up appointments.

Organizational Description of Project Site

This project will assist individuals who do not have primary care providers or are unable to get into primary care providers' offices due to demand and shortages. Since many are unable to get into a primary care provider's office, individuals turn to urgent care for treatment options. The setting of this DNP project will be in an outpatient urgent

care center located in the Birmingham, Alabama, a metropolitan area with a median household income of \$142,221 (DataUSA, 2021). The urgent care center sees around 12,000 patients annually for acute illnesses and injuries as well as to offering primary care services.

Review of the Literature

Urgent care centers have 89 million visits per year for acute injuries, illness, and primary care (Dolan, 2019). The high volumes of visits are related to patients being unable to get into primary care offices or not having a primary care provider. Many times during urgent care visits underlying conditions, such as hypertension, are found, and treatment is delayed/deferred to primary care providers. Urgent care clinics are affordable options for individuals and allow treatment to be given sooner rather than later (Katz, 2019).

Hypertension is a health problem occurring in 45% of the United States population (CDC, 2020). Hypertension is systolic blood pressure greater than or equal to 130 or diastolic blood pressure greater than or equal to 90 (Reboussin et al., 2017). Untreated and uncontrolled hypertension can lead to severe health disparities including cardiovascular disease, stroke, chronic kidney disease, and ultimately death (Ebrahim & Hassan, 2018). Healthcare providers who recognize and begin treatment can facilitate improvement in health outcomes for patients and prevent complications from other health disparities.

Many times, urgent care providers are not routinely up to date with the newest primary care and hypertension guidelines and recommendations, and are unsure what

should warrant treatment, what should be checked/how often (labs), which medication would be best for the patient, and how long before a patient should follow-up. By following protocols and guidelines issued, providers would begin a journey to better control this silent killer (Satish, Khetan, Raithatha, Bhende, & Josephson, 2019). While guiding treatment options, a protocol provides a standardized plan for patient education that would assist providers in the communication of hypertension education. Scholars have found that communication skills are a critical component associated with improvement in hypertension outcomes (Tavakoly-Sany et al., 2018). With the prevalence of hypertension increasing each year, it is essential to understand the barriers between patients.

Gebrezgi, Trepka, and Kidane (2017) conducted a qualitative study using interviews of 48 participants diagnosed with hypertension to learn more about the barriers patients faced. Participant follow-up occurred every three months and patients received provider counseling each time. Participant interviews consisted of pre- and post-interview close-ended questions about demographic information and open-ended questions related to the awareness and practice of the participants regarding hypertension management. Participants were asked about their experiences living with hypertension, knowledge of hypertension, perception of the principles of hypertension management, the practice of lifestyle modification, barriers, and facilitators to hypertension management. The findings of this study demonstrated participants had a good understanding of what was needed regarding adherence to medication, salt consumption reduction, physical activity, diet control, and lowering of alcohol consumption. Also, this study found that counseling patients about care with appropriate physical activity as well as how to adhere to diet

recommendations with affordable food choices could potentially increase their adherence to the principles of hypertension management. (Gebrezgi et al., 2017). Barriers that were identified included: adherence to medication, sodium consumption reduction, physical activity, diet control, and lowering alcohol consumption (Gebrezgi et al., 2017). Understanding these barriers increased adherence and understanding of self-care practices; thus, enhancing patient education (Gebrezgi et al., 2017).

In a study by Worku et al. (2020), 385 adult hypertensive patients were assessed on their knowledge of hypertension and self-care practices. The study utilized a cross-sectional study design at the University of Gondar Comprehensive Specialized Hospital from April 2019 to May 2019. Participants were given a Hypertension Self-Care Activity Level Effects (H-SCALE) assessment to measure knowledge of effects of hypertension. The H-SCALE is a validation tool for patients with hypertension to measure their knowledge on self-care related to hypertension. When participants scored median or above, the participants were knowledgeable of hypertension topics. If participants scored below median, they were uninformed of hypertension topics. Study findings showed that 365 (92.4%) of participants reported knowing hypertension was a serious disease and 379 (98.7%) of participants indicated that regular check-ups were essential. However, 133 (37.5%) were not aware of the normal blood pressure level. Two hundred fifteen (56%) participants scoring median and above were considered to have good knowledge about hypertension, while 169 (44%) scored below median and were considered to have a poor understanding of hypertension. In regard to self-care, 228 (59.4%) participants had acceptable self-care practices, while 156 (40.6%) had poor self-care. Of the self-care practices, 261 (68%) reported medication adherence, 266 (69.3%) maintained a low

sodium diet, and 81 (21.1%) participated in physical activity. In the cross-tabulation of self-care practices with knowledge level, a higher frequency of good self-care practices was observed among those with good hypertension knowledge. This study demonstrated that focusing on and increasing awareness of hypertension and self-management of hypertension was essential (Worku et al., 2020).

Many patients seek care in an urgent care setting, either in an outpatient clinic or emergency department, for some other form of illness. Still, while being there, patients are told they have asymptomatic hypertension and to follow up with their primary care provider. Winders et al. (2018) examined how many patients received discharge paperwork. To be eligible to participate in this study, patients were 18 years of age or older, assigned an Emergency Service Index (ESI) triage acuity of 3 or greater, and had a recorded SBP greater than or equal to 160 mmHg or DBP greater than or equal to 100 mmHg. Of the 2,504 patients discharged from the emergency department, 974 met the criteria of elevated blood pressure, 200 were successfully contacted, and 90 provided consent to participate in the study (Winders et al., 2018).

Winders et al. (2018) found that 90 patients (66%) were informed of an elevated blood pressure reading; however, only 3-5 patients received hypertension-specific written discharge instructions from a provider. The lack of discharge instructions given to patients led to 51 (57%) patients following up with a primary care provider within a 2- to 4-week time period after discharge. Less than 10% of patients who did receive hypertension education at discharge were consistent with previous studies demonstrating a lack of patient education occurring at discharge; this contributed to up to 90% of

emergency room providers not recognizing hypertension or providing proper education (Winders et al., 2018).

Providers recognizing and starting treatment of hypertension early in urgent care settings will lead to better health outcomes for patients. According to Volpe, Gallo, and Tocci (2018), patients who have uncontrolled or undiagnosed hypertension were at more significant risk for development of myocardial infarction, stroke, heart failure, CV, and all-cause mortality. This study demonstrated that starting blood pressure medication early and fast prevented major events in patients. Around 60% of patients who have pre-hypertension (SBP 120-139 mmHg or DBP 80-90 mmHg) or high normal (130-139/85-90 mmHg) will develop hypertension within four years compared to a blood pressure value less than or equal to 120/80 mmHg. Initiating medications in this group of individuals decreased CV risks by providing a protective effect. Medication implemented early or at pre-hypertension or normal high hypertension stages can prevent the progression to hypertension and decrease the risk of significant events occurring as quickly (Volpe et al., 2018).

Patients with hypertension need to understand associated risks; however, it is the responsibility of providers to ensure patients understand. According to Tavakoly et al., (2018), communication from providers can affect hypertension outcomes. Hypertension has continued to increase in the Iranian population, making it a significant risk factor with cardiovascular mortality and morbidity. A simple random sampling of 35 out of 108 healthcare providers at the Ministry of Health were enrolled in the study, and 240 out of 940 patients were enrolled. Inclusion criteria for patients included (a) high blood pressure, (b) age 18 or older, (c) prescribed at least one anti-hypertension medication

during the last three months, and (d) could read and write their native language. Exclusion criteria were (a) unable to give informed consent, (b) were affected by renal disease, or (c) had a mental disturbance, visual impairment, or upper extremity limb disability. Patients completed Health Literacy Assessment Questions (HLAQ) during their routine provider office visit. The HLAQ is a tool that assesses provider communication. After the initial office visit, the providers who participated in this study attended three sessions of focused-group discussions and two training sessions focusing on educational interventions. After the training had been completed for providers, the patients (of the providers) would complete HLAQs at their next office visit. The HLAQs found that 63.4% of patients need more support from their providers, along with 52% of patients rating their provider's communication to be non-collaborative. This study found that improvement of provider communication skills are associated with improvement in hypertension outcomes. By providers being taught and having specific training and understanding on specific topics that need further addressing allowed for patients to have a better understanding and management of hypertension (Tavakoly et al., 2018).

Petersen et al. (2020) postulated that many people live for a long time, unaware they have high blood pressure. The study *Know Your Heart (KYH)* was a cross-sectional study of cardiovascular structure, function, and risk factors in over 2,353 men and women aged 35-69 years. The study focused on three different stages: background interview, health check, and repeat health check. The blood pressure was measured with an OMRON 705 IT automatic blood pressure monitor, which was calibrated before utilizing it. Participants were then assigned two different categories based upon their systolic and diastolic blood pressure using the European hypertension guidelines. The thresholds for

this study were a SBP of 140 mmHg or more and a DBP of 90 mmHg or more. Three hundred thirty-two participants were asked to come back one year later for repeat measurements. Of the 332 participants returning, prevalence of untreated hypertension was 51.1% for males, 28.8% for females, and 40% overall. This study confirms that a relatively high prevalence of untreated hypertension occurs daily and is not treated. Initiatives are needed to strengthen the education of primary care providers to ensure hypertension management is initiated early and without delay of treatment (Petersen et al., 2020).

Delavar, Pashaeypoor, and Negarandeh (2020) conducted a randomized controlled trial from January to March 2018. The study population was comprised of older adult patients with uncontrolled primary hypertension and inadequate health literacy. Eligibility for the study included a diagnosis of uncontrolled hypertension, age of 60 or greater, as well as, no diagnosis of drug addiction, dementia, or psychiatric disorder. Three hundred fifty-three patients were referred to the study, and 118 patients were selected to participate and divided into subgroups consisting of 59 people. Primary and secondary outcomes were then measured. Primary results were the patient's blood pressure readings at the beginning, and secondary outcomes were taken six weeks after. The Morisky Medication Adherence Scale was used for adherence to medication. One subgroup was given self-medication education that was tailored to their health literacy after the initial visit and questionnaire. The Chi-square showed no significance between groups' demographic status. The results did show that there was a significant reduction of the systolic and diastolic blood pressure. In addition, medication adherence in both the control and intervention groups was poor prior to interventions. After the intervention,

the medication adherence status in the intervention group was significantly better than the control group. The findings of this study show that providing self-medication education to patients at the level of their health literacy can significantly promote medication adherence and decrease both SBP and DBP among older adult patients diagnosed with uncontrolled hypertension (Delavar et al., 2020).

Sung, Lai, Wu, and Hsieh (2017) discovered the incidence of stroke had been decreasing in Taiwan due to the increased use of anti-diabetic, antihypertensive, and lipid-lowering medications. This study consisted of all adult patients age 20 years and older between 2000 and 2013 with a principal discharge diagnosis of stroke, ischemic stroke, and intracerebral hemorrhage. The study consisted of two subgroups; the first was the un-diagnosed subgroup who had never been diagnosed with vascular risk factors (VRF) (hypertension, hyperlipidemia, and diabetes). The second subgroup was patients who had been diagnosed with a VRF within the past year at least one time. The study consisted of 16,301 adults with the first-ever stroke, of which 12,323 were ischemic strokes, and 3,978 were intracerebral hemorrhage. Of the 16,301 patients that were participating in the study, an astonishing 9,722 of the patients were diagnosed with hypertension during admission; however, only 5,447 patients had a pre-existing diagnosis of hypertension. The study found that there was generally an inverse association between age and prevalence of prior undiagnosed VRF with the first-ever stroke. It was also found that younger patients were more likely to be non-adherent to antihypertensive medications within one year prior to stroke compared to patients with a pre-existing history. This study shows the treatment of hypertension is of utmost importance in the prevention of stroke regardless of patients' age. Patients who were previously

undiagnosed with hypertension and had nonadherence to treatment for hypertension were more prevalent in young adults with the first-ever stroke in Taiwan. Interventions targeting younger people to promote early detection and adequate control of VRF should be encouraged for the primary prevention of stroke and other complications (Sung, Lai et al., 2017).

Johnson, Warner, Bartels, and LaMantia (2017) postulated young adults, 18 to 39 years of age, have the lowest hypertension control rates among any group in the United States. This study was approved by the University of Wisconsin-Madison Health Science Institutional Review Board. The study found that barriers exist with young adults and starting hypertension medication. The researchers conducted one-to-one interviews with 15 providers (physicians and nurse practitioners) from three different family medicine/family practice clinics within three different counties in Wisconsin. All providers felt the Joint National Committee 8 (JNC 8) guidelines were applicable to young adults the same as middle-aged and older adults. Providers all had similar responses to transitioning young adults to the next stage of hypertension management. Providers also felt by diagnosing hypertension in young adults, resulted in a 'sick identity', meaning more frequent returns to the clinic and waiting in rooms with older adults. All of this leads to resistance to achieving hypertension control. Another finding from the provider's interview was the concern for a false hypertension diagnosis. Many providers felt providing a diagnosis too early could cause problems. In many instances, the provider was concerned about the blood pressure variability from reversible causes (stress, white coat syndrome, caffeine, alcohol, or tobacco use) (Johnson et al., 2017).

Johnson et al. (2017) conveyed, the providers who were interviewed for this study were reluctant to start medication on younger adults due to younger adults being hesitant to make a lifelong commitment with medications, and many times, the ‘no show’ rates for younger adults were higher. In addition, gender played a big role in follow-up, with males having higher ‘no shows’ compared to females who may return for other medications to be filled, such as birth control. Overall, this study provides knowledge of barriers that must be faced by providers to enhance hypertension management. Traditional hypertension management and care must be changed to deliver ongoing blood pressure self-management in younger adults (Johnson et al., 2017).

Shrestha et al. (2018) suggested that hypertension was a significant and rising burden in Nepal due to the disease being undiagnosed and inadequately managed. This qualitative study recruited 1,073 patients age 18 and older, of which 321 were participants with hypertension in the community. One hundred sixty-one patients who were newly diagnosed with hypertension were given referral cards and asked to go to a health institution for consultation. The remaining patients who had a history of hypertension were then divided into four groups based on their treatment and care. The four groups were:

- patients who did not seek healthcare at all,
- those currently on treatment and were compliant with medications,
- those currently on treatment and not compliant with medications, and lastly, and
- those who were measured with high blood pressure in a survey.

Participants were then predetermined using open-ended guidelines with the domains of patients' knowledge, attitudes, and practices about hypertension; barriers to healthcare; and lastly, facilitators to healthcare. These findings found participants were aware that high blood pressure is common, and numbers were increasing. Participants also showed knowledge that linked blood pressure to diet and lack of physical activity; however, only five mentioned hereditary or age as a cause of hypertension. Participants were aware of the benefits to lifestyle modifications to decrease blood pressure; however, reported it was hard to practice and incorporate into daily life due to food cravings, food taste, smoking, and consuming alcohol. Many participants reported that lack of exercise was due to laziness, along with bus schedule and musculoskeletal pain that limited activities. All of the groups believed the absence of symptoms meant there was no diagnosis and reported visiting a practitioner only when symptoms were present (Shrestha et al., 2018).

Shrestha et al., (2018) indicated many who did not seek medical attention after diagnosis even believed they had hypertension. Many participants did not believe hypertension was a serious condition and did not seek treatment because it was not serious. Lastly, many did not seek healthcare after diagnosis due to being reluctant to initiate medication due to its long-term and associated costs. Treatment and follow-up findings found fear of consequences, patients' self-awareness, and self-control. Also, family and social support increase compliance with medications. This study shows newly diagnosed hypertension patients have inadequate knowledge and misbeliefs regarding hypertension and its treatments. Ultimately, health interventions improving hypertension should focus on developing and disseminating appropriate health information with a

focus on the nature of hypertension, regular medication intake, lifestyle modifications, and the consequences of poorly managed hypertension (Shrestha et al., 2018).

Rahimdel, Morowatisharifabad, Salehi-Abargouei, Mirzaei, and Fallahzadeh (2019) endorsed hypertension as accounting for 9.4 million deaths each year, with at least 45% of deaths related to heart disease. Two important behavioral determinants of hypertension were identified as excessive caloric intake and excessive sodium intake. The World Health Organization (WHO) recommendations are for adults to consume two grams of sodium per day; however, in 2010 a study found the average daily intake of sodium to be 10.06 grams per day. High dietary sodium intake increases blood pressure; however, the reduction of sodium can reduce systolic and diastolic blood pressure 4-5 mmHg and 1-3 mmHg, respectively. The reduction of sodium is one of the cost-effective lifestyle modifications to reduce hypertension. In addition, studies have shown that educational interventions have been effective in reducing sodium intake (Rahimdel et al., 2019).

Rahimdel et al. (2019) performed randomized controlled trials, utilizing the theory of planned behavior (TPH), between February 2017 and December 2017, in which participants who were identified to be at risk of developing hypertension were selected randomly. Inclusion criteria were being 35 to 50 years of age with a SBP 120-139 mmHg and DBP 80-89 mmHg, lack of congenital heart disease, and living in Shahediyeh, Yazd Province, Iran. Exclusion criteria were being on a diet or avoiding certain types of food, suffering from kidney disease, mental illness, taking anti-hypertension medications, pregnancy, and lack of providing consent (Rahimdel et al., 2019).

Rahimdel et al. (2019) indicated, 140 participants were divided into two different groups, a control group, and an experimental group. Each group completed a pre-test questionnaire that provided an understanding of hypertension and sodium intake, had their blood pressure measured, and measurement of sodium and potassium in urine assessed through a 24-hour urine sample. Afterward, the experimental group received educational content in booklet form containing information about sodium and the consumption rates in Iran, the definition of blood pressure, the effects of high sodium intake, sources of sodium and associated diseases, high sodium foods, the ways of sodium intake reduction and the amount of sodium in foods. In addition to the educational booklet, the experimental group attended a total of 10 educational sessions lasting 90 minutes each time. After two months, all participants returned to complete a post-questionnaire, measure blood pressure, and complete a 24-hour urine sample. The findings found the interventional group had behavioral beliefs, outcome evaluation, attitude, normative beliefs, motivation to comply, subjective norm, control beliefs, perceived power, and perceived behavior control over sodium intake compared to the control group. This study justified that utilizing TPH-based education interventions was effective in reducing sodium intake in individuals at risk for developing hypertension (Rahimdel et al., 2019).

Jahangeer, Bano, Khan, Qamar, and Adil (2019) posited that hypertension is a global health risk with far ranking impact on quality of life and its duration. According to the last national health survey, 18% of Pakistanis 15 years of age or older had a diagnosis of hypertension. The report demonstrated that only 50% of the population were diagnosed, and of the affected, only half had access to treatment. Findings further

indicated that compared to larger countries, the controlled rates of hypertension are not encouraging, with only 35% achieved in the United States, 24% in Australia, 8% in China, and 6% in India. Prior to this study, there had been none conducted in Pakistan at the basic health unit level, which is the baseline healthcare installation of government's health department and organizational structure (Jahangeer, et al., 2019).

Jahangeer, et al. (2019) explained the purpose of this study was to identify and gauge the dynamics of hypertension knowledge and preferences among the rural population in Pakistan. A cross-sectional study was conducted at the Basic Health Unit (BHU) Mangat Neecha during a one-month period in 2018 consisting of 143 patients who had a diagnosis of hypertension in the BHU health records. Questionnaires were designed based upon existing knowledge and approaches to rural areas. The findings suggested that 83 participants (58%) of the study did not have knowledge regarding ideal blood pressure readings for a normal individual. Furthermore, the study proposed that 32.2% of individuals who participated did not know the correct cut-off for normal blood pressure, and only 19.6% were able to correctly identify SBP and DBP. Positive findings indicated that 126 (88%) individuals did affirm hypertension posed a significant impact on their health and 72.7% agreed that having lower blood pressures would significantly improve quality of life. However, 38 participants (26.6%) did not believe interventions would make any impact on their blood pressure. Lastly, the study revealed that all individuals were informed of having high blood pressure from their healthcare provider; however, only 43 (30.1%) had been informed about what their blood pressure should be, and 60 (42%) were never informed of individual optimal blood pressure readings (Jahangeer, et al., 2019).

The study findings from Jahangeer et al. (2019) suggested inadequate knowledge and awareness about hypertension present greatly in rural areas. Many rural individuals do not recognize hypertension as a very serious health concern; therefore, strengthening the need for extensive education and counseling to improve adherence to medication and decrease cardiovascular events (Jahangeer, et al., 2019).

According to Owen (2019), hypertension affects a third of all Americans, and 20% have undiagnosed and untreated hypertension. Undiagnosed hypertension increases the morbidity and mortality of the patient by increasing cardiovascular events and chronic kidney disease. Often, patients of primary care providers present with elevated blood pressure measurements, and it remains undiagnosed (Owen, 2019).

Owen (2019) conducted a DNP quality improvement project to determine the effectiveness of an educational intervention on the rates of diagnosis and treatment of hypertension in a primary care clinic in Kansas City, Kansas. This DNP project was created to improve follow-up with individuals at risk for undiagnosed hypertension by measuring pre-intervention blood pressures, providing education, and comparing post-intervention blood pressure readings. For participants to be enrolled in this project, SBP must be greater than equal to 130 or DBP greater than or equal to 80, and no hypertension diagnosis. The individuals were given educational handouts about common signs and symptoms and complications of uncontrolled HTN, lifestyle changes to improve BP, and DASH diet recommendations (Owen, 2019).

Owen's (2019) DNP project consisted of 635 eligible patients evaluated in both pre-and post-intervention phases, including 301 in the pre-intervention and 334 in the post-intervention stage. Average BP before the intervention was 121.1/76.3mmHg and

122.3/78.6 post-intervention. The DNP project also found 30.2% or 91 out of 301 participants had undiagnosed hypertension before the intervention, and 35.9% or 120 out of 334 had undiagnosed hypertension post-intervention. This increase in the post-intervention group was the opposite of what was expected. Ultimately, both the Shapiro-Wilk test and the Wilcoxon rank-sum test were determined not to be valid. Although this DNP project's findings were not what was expected and not statistically significant, the data does indicate a large proportion of the population during the timeline of this project had undiagnosed hypertension, suggesting a practice problem that should be addressed (Owen, 2019).

Hypertension is a dangerous, common, costly, and fatal disease if left untreated. In many incidences, hypertension can be treated and maintained with lifestyle modifications such as dietary changes, weight loss, and exercise. Nagib (2019) conducted a DNP quality improvement project, and the goal was to improve uncontrolled hypertension through improving self-management strategies by creating educational tools for hypertensive patients and follow-up face-to-face nursing visits for blood pressure checks in the primary care setting. The timeline for this DNP project was eight weeks, with data collected pre-intervention and post-intervention. The clinic staff was educated on the proper way to take blood pressure. The participants were educated on utilizing an automatic blood pressure cuff at home to record blood pressures. Criteria for inclusion were individuals ages 20 to 85 years of age with uncontrolled hypertension. They excluded underlying disease that causes uncontrolled hypertension such as hormonal abnormalities, sleep apnea, renal artery stenosis, smoking, alcoholism, illicit drug use, decongestants, corticosteroids, and nonsteroidal anti-inflammatory (NSAIDs)

medications. A total of 12 patients were included in the DNP project. Blood Pressure readings were collected pre-intervention, during a second nursing visit and a third nursing visit, as well as post-intervention at two months after initial measurement (Nagib, 2019).

Nagib (2019) selected patient's interventions which included the DASH diet, patient blood pressure logs, blood pressure recording table, reviewing blood pressure techniques, and lifestyle changes to improve blood pressure. Utilizing the paired t-test, blood pressure readings pre-intervention and post-intervention were measured. The average pre-systolic BP was 152.17, and pre-diastolic BP was 89.09. The average second SBP was 143.08, and the second DBP was 78.67, and the final average SBP was 129.67 and DBP 76.17. This DNP project's findings supported patient education through educational handouts and having close follow-ups with patients to improve hypertension values for hypertensive patients. However, this project's limitations are the small sample size and should be conducted on a larger scale for a more robust statistical analysis (Nagib, 2019).

Urgent care centers see a large numbers of patients each year for an array of illnesses, injury, and primary care. Hypertension is one of the problems that is under-diagnosed, and the prevalence continues to increase, thus showing treatment should begin being addressed in the urgent care setting. Treatment beginning earlier in patients can help patients understand the risks associated with long-term uncontrolled hypertension and improve outcomes. In addition, by providers having a better understanding of barriers that patients experience can help improve medication adherence and help to reduce blood pressures.

Evidence-Based Practice: Verification of Chosen Option

Many individuals have uncontrolled or untreated hypertension and are unaware of treatment and lifestyle changes that could be instituted for prevention and management. This DNP project will provide better understanding of individual's knowledge of hypertension; in addition to providing educational materials to help these individuals further maintain/manage their blood pressure.

After reviewing the literature findings suggested that patients have a lack of what blood pressure measurements should be, what life-style modifications could be changed to decrease and improve blood pressure, what long-term effects hypertension has on their body, what barriers to care patients had, what providers needed to be educated on to appropriately manage hypertension, and what providers could do to improve education and compliance for patients. These findings implied there was a need for this DNP project to help promote and improve hypertension education and management in the urgent care setting.

Theoretical Framework/Evidence-Based Practice Model

Nola Pender's Health Promotion Model is a middle-range integrative theory that defines the goal of nursing care as optimal health (Butts & Rich, 2018). Pender's approach focuses on allowing improvement and treatment for the individual. The three main categories of Pender's Health Promotion Model are:

- individual characteristics and experience,
- behavior-specific cognitions and affect, and
- behavioral outcomes (Butts & Rich, 2018).

Every individual has unique personal characteristics and experiences that subsequently affect their actions and view of health. Having an understanding of health concerns, such as hypertension, facilitates patients being accountable for their health, thereby, fostering improved outcomes. Healthcare providers can increase the well-being of individuals by providing primary education and health promotion to manage hypertension. Utilizing Pender's Health Promotion Model will lead to behavioral change in patients.

Questionnaires will follow the three main categories of Pender's Health Promotion Model. Questions for patients will be focused on individual understandings of characteristics and experiences that can have an effect on blood pressure, behavior-specific effects that can affect blood pressure and the behavioral outcome that will improve blood pressure.

In addition to applying Pender's Health Promotion Model, Imogene King's Theory of Goal Attainment will improve outcomes for individuals. The nine significant concepts of goal attainment are:

- communication,
- growth and development,
- interaction,
- perception,
- role,
- space,
- stress,
- time, and lastly,

- transaction (King, 1981).

Healthcare providers who are interacting with individuals and communicating effective health promotion behaviors will enable the transition to better health outcomes in patients. Communication between healthcare provider and patients will increase the goal attainment process and improve individual learning and coping mechanisms.

Imogene King's Theory of Goal attainment will help guide this DNP project by focusing on specific concepts of goal attainment. For this DNP project, communication, perception, and time will be followed. Having effective communication of education from providers to patients will increase the knowledge of blood pressure. In addition, the communication will be enhanced by understanding the perceptions of patient's knowledge of blood pressure. Lastly, this theory will provide a timeline that could improve patient's blood pressure.

Goals, Objectives, and Expected Outcomes

The goal of this project was to first, improve the education of patients with undiagnosed or uncontrolled hypertension by increasing patient education and disease management to decrease blood pressure readings in the urgent care setting. Secondly, this project was to provide education to providers about recommendations/guidelines and education topics to discuss with patients. The following objectives were applied in order to meet the project goals:

- Provide education to patients who have blood pressure readings greater than or equal to 130/80.
- Start appropriate medication at the time of visit if warranted.
- Check and analyze appropriate lab specimens.

- Follow-up with patients in appropriate timeframes.
- The individuals will show a decrease in hypertension by the third month.

The expected outcome for this project was an increase in patients understanding, knowledge, and management of hypertension over a three-month time span.

Project Design

This DNP project was structured using an educational teaching program with evidence-based practice research and guidelines for both patients and providers in order to reduce hypertension in patients. The DNP project manager provided teaching methods to patients to understand hypertension management better and provider education about specific topics that should be taught to patients, labs that should be followed, and follow-up periods for patients to improve both practice and process. The method that the writer used was quantitative for patients' blood pressure readings.

This project was a Pre- and Post-Test Design using quantitative data. Quantitative data for this project was collected by measuring patients' blood pressure at the initial visit; then again at the three-month follow-up appointment. In addition, for this project a pre- and post-questionnaire was given to patients. Patients completed the pre-questionnaire prior to any intervention to assess knowledge level. The post-questionnaire was given post-educational intervention to assess knowledge gained.

By implementing this project, the project leader hoped to demonstrate a process improvement to providers by showing exactly what can help patients with hypertension and a practice intervention by specifically showing improvement in both patient education and blood pressures.

Project Site and Population

The project took place in an urban urgent care setting, with medium household income of \$143,221, that manages both acute illnesses and primary care (DataUSA, 2020). The urgent care facility sees patients with acute diseases and injuries such as upper respiratory infections, sinusitis, urinary tract infections, fractures, etc., in addition to chronic conditions such as hypertension, diabetes, and so forth. The urgent care providers had patients from infancy to geriatric age for any condition as previously mentioned and more. The participants for this project were men and women greater than or equal to 18 years of age and older, as well as the providers (nurse practitioners, physician's assistants, and physicians). Recruitment of participants was from patients coming in for office visits. Inclusion criteria was patients:

- With a SBP greater than or equal to 130 or DBP greater than or equal to 80.
- Age of 18 or older.
- Having no primary care provider.
- Having had no previous management of blood pressure.

Exclusion criteria was patients:

- Less than 18 years old age.
- Already on hypertension management.
- Having a primary care provider.

Setting facilitators.

The resources that were available for this project were patients coming in for visits and being able to diagnosis hypertension at these visits. This process was facilitated

by providing a questionnaire for ancillary staff to ask patients to find out information such as primary care providers or diagnosis of hypertension.

Setting barriers.

Constraints and barriers existing with this project were patients believing to have normal blood pressure usually and believing blood pressure was elevated due to illness or injury going on at the time of the urgent care visit. Additionally, a barrier that existed for this DNP project was failure of patients to follow-up with scheduled appointments or to show up when the project manager was not on site. To overcome the barrier of the patient believing they have normal blood pressure usually, the blood pressure will be checked twice 15 minutes apart. Depending on the actual blood pressure readings the patient was directed to self-check blood pressure at home and follow-up at a given time. If patients failed to follow-up at the given time frame, the project leader provided a telehealth visit with the patient. Additionally, constraints to patient follow-ups were due to the setting being in urgent care and implementation taking place during the COVID-19 pandemic. Lastly, a constraint was the socioeconomical status of the community.

Implementation Plan/Procedures

Implementation of this project will include a two-pronged approach. There will be provider education and patient education.

Provider Education

A provider questionnaire was given to all physicians, nurse practitioners, and physician assistants in order to assess provider knowledge of hypertension management and understanding. This questionnaire included the following:

- What are the current recommendations for hypertension?
- What education topics should be discussed with patients?
- What labs specimens should be collected for hypertension?
- What is the appropriate timeframe for follow-up for patients with hypertension?

This portion of the project was not completed due to permission not being granted for use of survey. An educational intervention (Appendix A) was conducted for providers via email.

Patient Education

To implement the management of hypertension in patients; the starting point began with the triage of patients. Each patient had their blood pressures taken to determine eligibility to participate in the project. If the blood pressure met criteria, the patient was asked if they have a diagnosis of hypertension or have a primary care provider. If a patient was eligible to participate, the researcher explained the DNP project to the patient, asked them to participate, and initiated informed consent. When collecting data, patients answered a questionnaire about their understanding of hypertension (Appendix B) (hypertension, ways hypertension can be controlled, and the long-term effects of uncontrolled hypertension). Next, the project manager provided a hypertension educational intervention (Appendix C), had the patient complete a post-questionnaire, and scheduled the patient follow-up appointments at three months. A post-questionnaire was completed immediately following the educational intervention and again at the three-month follow-up to assess the knowledge gained and retained. Blood pressure readings were conducted on the initial visit and again at a three-month follow-up to assess for

improvement based upon the educational intervention. Depending on severity of hypertension, follow-up could have been sooner than three months.

Measurement Instruments

To measure the outcomes of this DNP project, the following instruments were used for collection and follow-on blood pressure: sphygmomanometer. Blood pressure readings were obtained on the initial visit and again at the three-month follow-up visit. For this project, the pair t-test was utilized, which tested the difference between two of the same groups at different points (Sylvia & Terhaar, 2014). A pre-questionnaire for patients was conducted and then was performed again after education had been provided. The post-intervention questionnaire for providers was conducted after education had been completed. The post-intervention survey for patients was at three-months.

Data Collection Procedure

To implement this DNP project, the writer assessed individuals who presented to the urgent care setting. The project leader checked all blood pressures in the electronic medical record (EMR) after the medical assistant had triaged patient. Any individual who had a SBP greater than or equal to 130 or DBP greater than or equal to 80 and had no current medication for blood pressure, the project leader went in and spoke with the individual. The project leader began by introducing themselves and confirmed the individual was not taking any medication for hypertension, ensured the individual had no diagnosis of hypertension, and no primary care provider. If the individual answered yes to any of the above, the individual was excluded. Next, the project leader explained the objectives, goals, risks, and benefits of the project. The individual then was asked if he/she would like to participate. If individual wanted to not participate, the project leader

would exit the room, if individual wanted to participate the project leader would have patient sign informed consent, and consent to participate in research. The project leader would then have the individual complete a pre-questionnaire and then provide education about hypertension goals, effects, treatments, and follow-up recommendations. After education had been provided, the individual completed a post-questionnaire. The project leader then provided individuals with education materials to take home and a follow-up date for blood pressure recheck and questionnaire.

To evaluate the effectiveness of this DNP project, analysis of blood pressure, pre-questionnaire, and post-questionnaire, which occurred three-months after the initial visit (unless follow-up was sooner based off blood pressure). The project leader then statistically analyzed data to learn what baseline knowledge individuals had about blood pressure, if knowledge increased after education was provided, if education was retained at three- months, and if blood pressure had a decrease with lifestyle modifications the individuals made after education materials were taught and provided.

Project Recruitment

For the recruitment of this project, patients presented to this urgent care clinic with an acute illness or injury. After the initial triage of patients took place, anyone with an elevated blood pressure and no diagnosis of hypertension was consulted with regarding DNP project participation. If the patient agreed to participate in the DNP quality improvement project, informed consent was obtained prior to any collection of data.

Intervention Steps

Patients. Once the patient had agreed to participate in the DNP project and signed consent to participate, the DNP project leader provided educational intervention on hypertension with the patient. This process included asking the patient to complete a pre-intervention questionnaire. After the patient had completed the pre-questionnaire, the DNP project leader provided educational intervention for the patient on what causes hypertension, the long-term effects of hypertension, and ways hypertension can be managed. The patient then completed the post-questionnaire. The DNP project leader decided if medication was warranted at the current blood pressure reading or if lifestyle modifications could be trialed. The provider then ordered appropriate labs. The patient was then scheduled for a follow-up visit at three-months to assess knowledge retention and collect blood pressure readings.

Providers. Providers were to be given a pre-questionnaire, and then the DNP project leader was to provide an educational intervention. Education for providers was on the specific provider-patient education that should be completed with patients during the clinic visit, appropriate labs that should be ordered, appropriate medication choices, and an appropriate follow-up time period. The plan was to have providers complete a post-questionnaire to determine if there was an increase in educational knowledge. However, the DNP project manager was not able to carry out this portion of the plan because access to the questionnaire was not granted. The provider questionnaire was not completed and only provider education was accomplished.

Data Analysis

Analysis of this DNP project utilized a paired t-test, which compared the same group of patients at different periods. The goal of this evaluation was to see if there was an improvement in the management of hypertension and knowledge of understanding of the cause of hypertension after an initial visit and three-month follow-up. Patient education was measured based on pre- and post-questionnaire findings. Management of blood pressure was measured by blood pressure readings at the initial visit and at the three-month follow-up visit.

The DNP project leader utilized a statistician to perform the data analysis. Data was entered into an excel spreadsheet with each patients' pre, post, and three month scores, along with the initial and three-month follow-up blood pressures. Data was then imported from the excel spreadsheet into SPSS to determine statistical significance. A paired-t test was utilized to perform an analysis of pre- and post-questionnaire results, post and three-month questionnaire results, and systolic and diastolic blood pressure from initial visits to three-month visits. To determine if data had statistical significance the p-value was set less than or equal to .05.

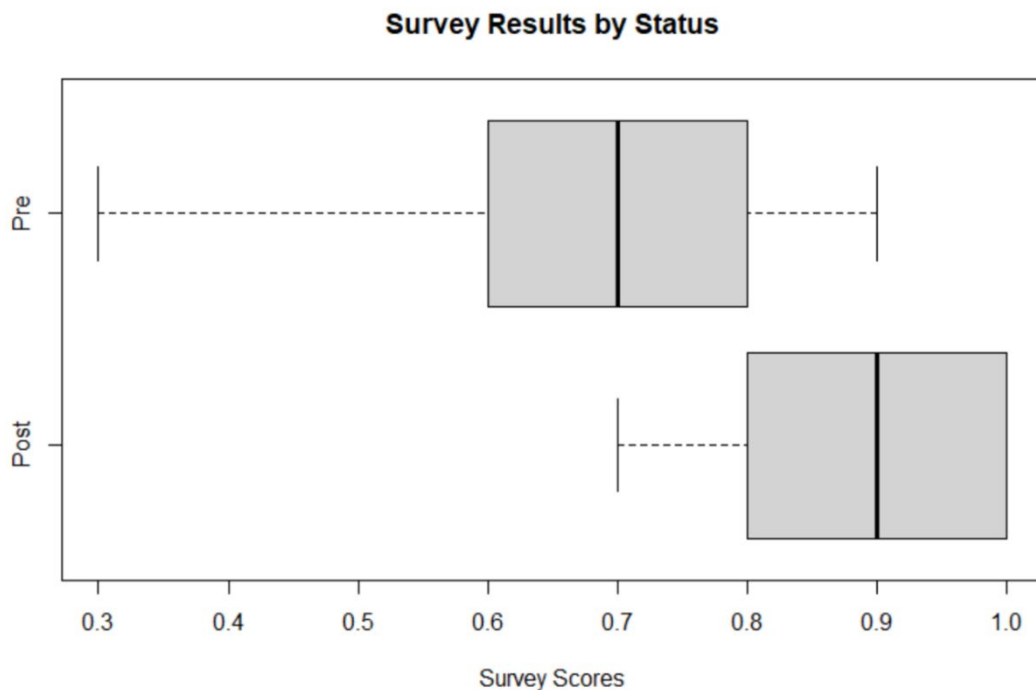
Results

This DNP project was completed with a sample size of 25 patients. The age range of participants ranged from 18 to 70 years old, both male and female. The sample consisted of 15 males and 10 females. None of the participants had a primary care provider or a past medical history of hypertension. The participant outcomes were measured by the pre, post, and three-month post hypertension knowledge test.

Additionally, the participants systolic and diastolic blood pressure at the initial visit and the three-month follow-up were compared.

The median score for participant's knowledge pre-test was 70% and post-test was 90%. To determine if the DNP project data collected from the pre, post, and three-month post-test were statistically significant a paired t-test was conducted. The p-value for the pre- and post-test comparison was less than .001, which is less than .05 (Figure 1); therefore, the results determined there was a statistically significant difference between pre and post scores. The patients on average scored better following education and their scores were higher by 0.212 points (21.2%).

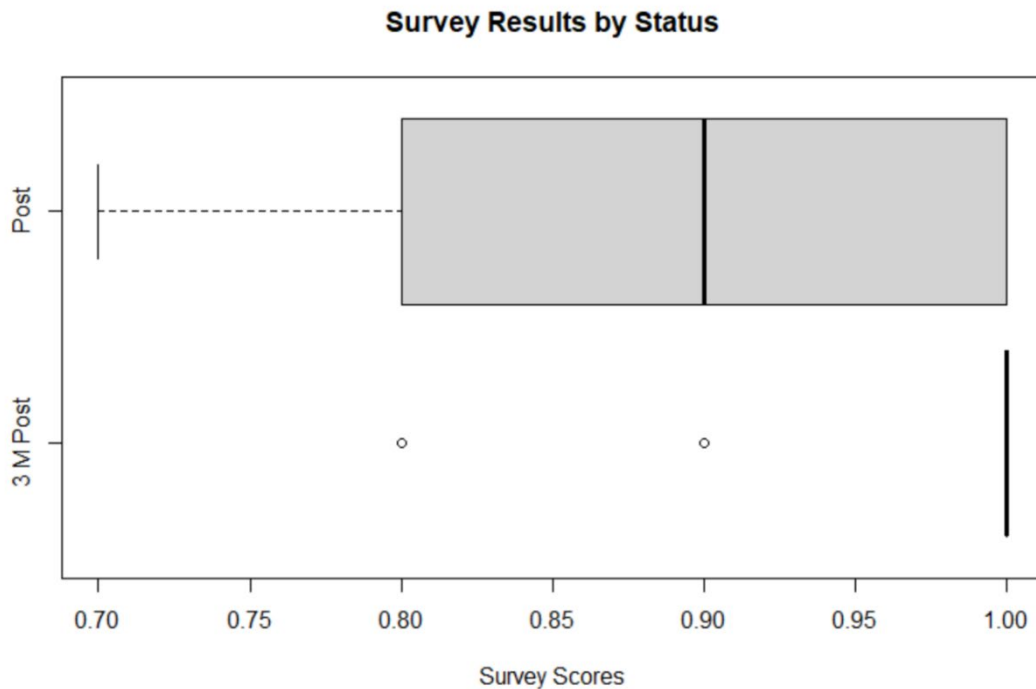
Figure 1



The results for patients' post-test and three-months post-test also demonstrated statistical significance. The post-test results were 90% and the three-month results were

100%. The p-value for this data was less than .001 which is less than .05, thus confirming statistical significance (Figure 2).

Figure 2



The systolic and diastolic blood pressure median was higher than the median blood pressure at the three-month post-visit. The mean systolic blood pressure initially was 145 and at follow up was 137. The mean decrease of systolic blood pressure was eight. The p-values for this was a difference of less than .001; therefore, validating statistical significance (Figure 3). The mean diastolic blood pressure initially was 91 and at follow up was 88. The mean decrease in diastolic blood pressure was 4. The p-value was 0.039, which determined statistical significance (Figure 4).

Figure 3

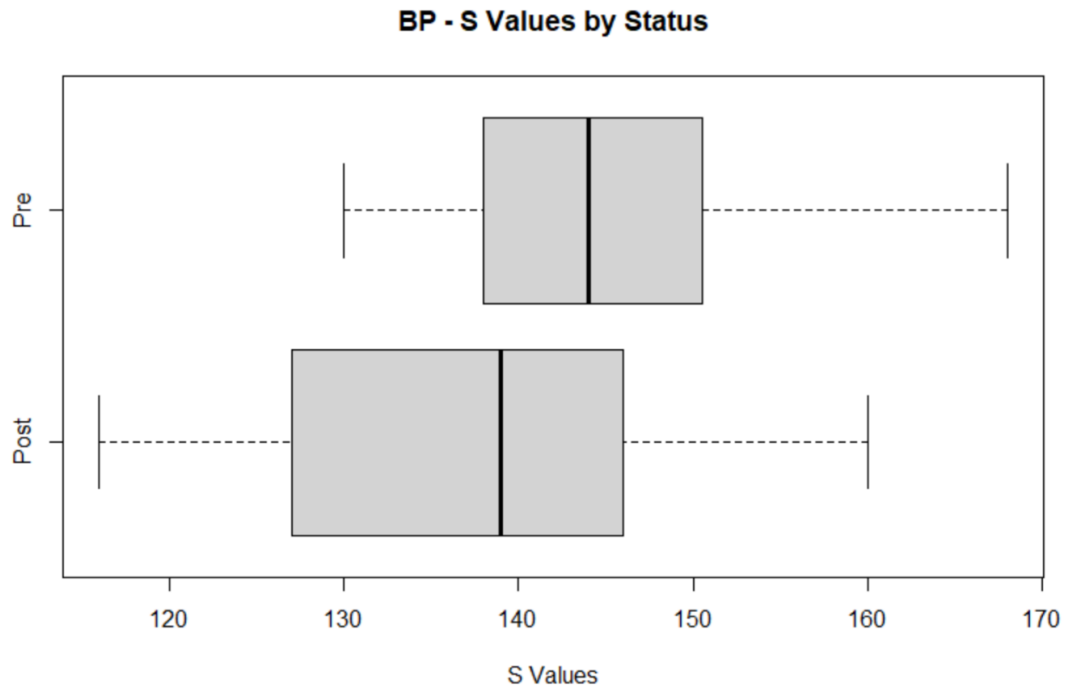
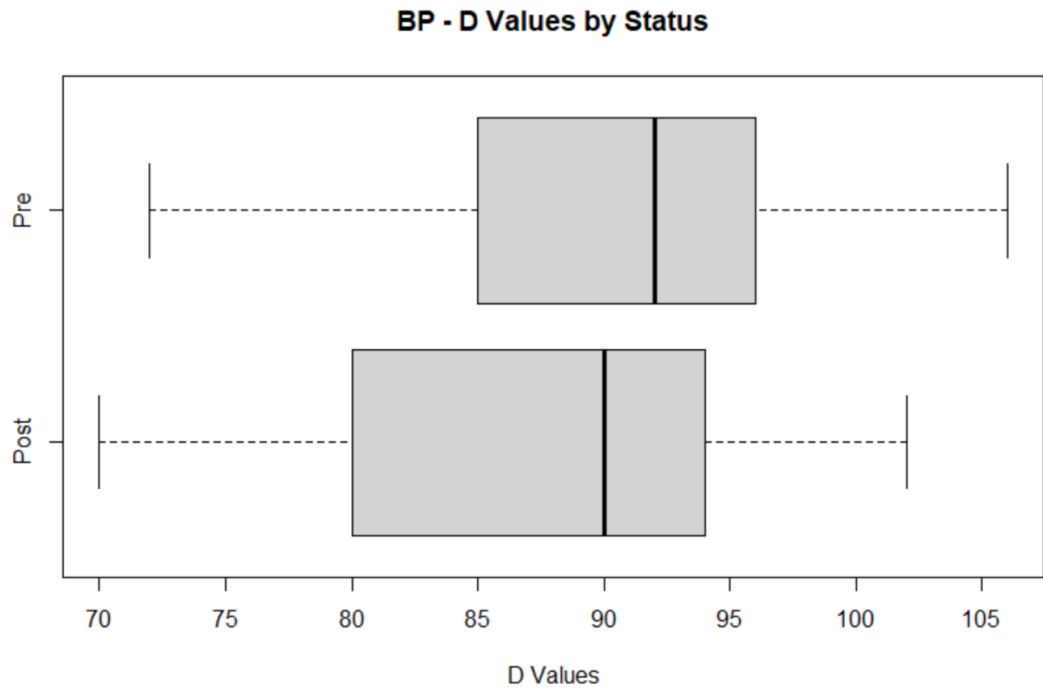


Figure 4



Interpretation/Discussion

This DNP Project intervention, which combined patient education and a pre- and post-questionnaire utilizing constructs from the Health Promotion Model and Imogene King's Theory of Goal Attainment, were effective in improving patient knowledge level regarding high blood pressure as well as decreasing systolic and diastolic blood pressure short-term. These findings suggest this intervention would be effective for patients with no primary care provider who are lacking in education regarding high blood pressure or are unaware of having high blood pressure. This type of intervention could be utilized in other chronic conditions in the urgent care setting. In addition, this type of intervention could be utilized in the primary care setting for newly diagnosed patients with chronic conditions.

Limitations

This DNP project does have limitations due to the location and educational level of patients in the location where the study was completed. In addition, since this project was completed in a walk-in urgent care setting, patients were unable to schedule follow-up appointments and had to be notified by phone call to return to the clinic for follow-up.

Cost-Benefit Analysis/Budget

For this DNP project, the project leader needed a sphygmomanometer for blood pressure readings and access to paper and printer services for educational materials for both patients and providers. The cost of this was provided by the facility, which did not increase cost due to patients receiving educational handouts already. In addition, the

project leader had provided and printed questionnaires for data collection about patients pre- and post-educational sessions. The actual costs of supplies are as follows:

- Sphygmomanometer \$22.98
- Stethoscope \$99.98
- Printer Paper \$3.97 per pack
- Printer \$349.99
- Toner \$76.99

Timeline

The timeline (Appendix D) for this DNP project began with Institutional Review Board (IRB) (Appendix E) and Project Evaluation and Review Committee (PERC) committee approval in October. Subject recruitment began in October once IRB approval had been obtained. Data collection began in October with the initial visit and continued at the three-month follow-up appointment. Data analysis began in April 2021 with the interpretation of results following.

Ethical Considerations/Protection of Human Subjects

The Jacksonville State University IRB approval (Appendix E) was obtained before initiating the DNP project. The project leader participated and completed the Jacksonville State University IRB and CITI (Appendix F) training courses. All participants were protected by the Health Insurance Portability and Accountability Act of 1996 (HIPAA) which, among other guarantees, protects the privacy of patients' health information (USDHHS, 2020). Prior to participation in this DNP project, the project

leader obtained informed consent (Appendix G) and participation in research (Appendix H) from the participant. The list of patients and providers who participated in this project was kept within a locked cabinet, only accessible by the project leader. Participant confidentiality was assured by coding participants with an individual unique identification number. Any electronic files containing identification or protected health information was password protected to prevent unauthorized access. The risks to patients participating in this project were no different from the risks of patients receiving standard care in the urgent care setting.

Conclusion

In conclusion, urgent care centers see a vast number of individuals annually, many of which do not have primary care providers and have undiagnosed hypertension. A diagnosis of hypertension is when a systolic blood pressure greater than or equal to 130 or a diastolic blood pressure greater than or equal to 80. Hypertension if left untreated can lead to heart attack, stroke, kidney failure, and multiple other problems. Literature shows that many individuals do not know the normal range for blood pressure or the long-lasting effects of untreated hypertension. In addition, many individuals are not sure what can be done to decrease blood pressure prior to medication being started. The patient's knowledge level regarding hypertension should be assessed, proper education should be provided, and educational material should be given. This DNP project revealed statistically significant data in that individual's knowledge about hypertension increased after educational materials were given, knowledge was retained over a three-month period, and that both systolic and diastolic blood pressure decreased. This study proved

that urgent care centers should focus on providing more educational materials for patients as well as scheduling additional primary care visits for patients to adequately treat blood pressure sooner rather than later.

Implications for Nursing

This DNP project demonstrated there was an increase in individuals' educational knowledge and improvement in blood pressure. This proves the need for future DNP projects focused on hypertension education. In addition, this project could be carried out on a larger scale to show educational knowledge and blood pressures readings over a six-month period and one-year period.

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Appendix A: Provider Education



American
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Hypertension Guideline Toolkit

Nearly half of American adults have high blood pressure, but you can make a difference.

The 2017 Guideline for the Prevention, Detection, Evaluation and Management of High Blood Pressure in Adults (**2017 Hypertension Clinical Practice Guideline**) has important implications for the treatment of nearly 103 million adults in the United States. As healthcare providers, you need resources to help you integrate the new guideline into your practice so you can provide optimal care for patients with elevated blood pressure (BP) or hypertension.



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American Heart Association's efforts to improve healthy choices related to living with high blood pressure is proudly supported by TYLENOL®.

heart.org/bptools

CONTENTS

This toolkit offers you a variety of essential guideline-related resources:

- 3** HBP is associated with these **life-threatening diseases**
- 4** **CVD risk factors** tied to hypertension
- 5** **Definitions** of normal and elevated BP and hypertension
- 7** **Diagnosing** BP
- 9** **Meds that can contribute** to high blood pressure

PLUS

- Summaries of evidence-based recommendations
- Links to treatment algorithms
- Printable resources to help your patients

5 Things to Know

From the 2017 Hypertension Guideline that Will Impact Your Clinical Practice

From the 2017 Hypertension Clinical Practice Guideline

1 Blood pressure classifications have changed. The guideline establishes a new evidence-based classification of BP in adults, with hypertension defined by systolic and diastolic BPs that are lower than the previous thresholds.

2 The prevalence of hypertension in America is higher. Nearly half of all adults in the United States will have high BP under the updated classifications.

3 Treating high blood pressure begins with accurate measurements. Accurate measurement of BP is essential for categorizing BP, determining the risk of atherosclerotic cardiovascular disease and managing high BP. Diagnosis and management of hypertension should be based on accurate measurements not only in the office but also through self-monitoring.

4 Lifestyle changes are a first line of treatment for many patients. Nonpharmacologic interventions aimed at addressing poor dietary habits, physical inactivity, and/or excessive consumption of alcohol are fundamentally important in managing the underlying causes of high BP in most adults. Healthcare providers should also discuss the importance of medication management and discuss all prescription and over-the-counter medications with patients.

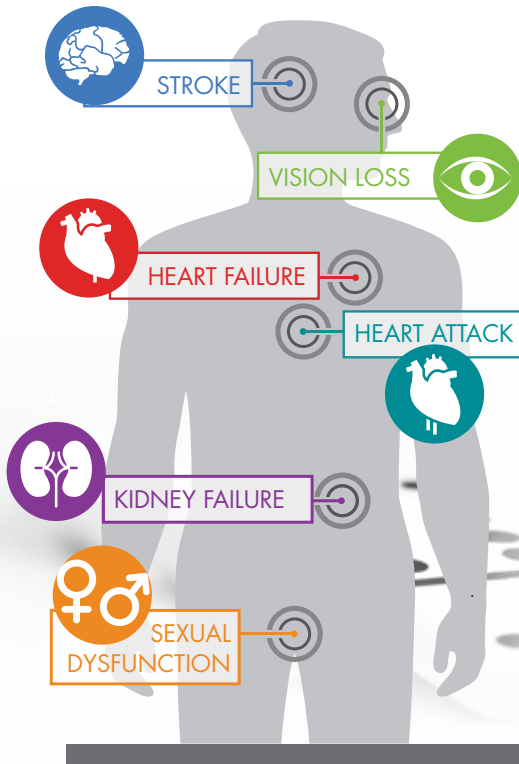
5 Team-based approach to improving treatment and control in adults with high blood pressure. Most adults receiving antihypertensive drug therapy have an average systolic BP and/or diastolic BP above the target level recommended in this guideline. Recommendations to improve treatment and control are provided, including a team-based approach to management.

In Practice

Top 10 Things to Know

The Domino Effect

High blood pressure is often the first domino in a chain or “domino effect” leading to devastating consequences, like:



Coronary heart disease

Higher BP has been associated with an increased risk of CVD, and the rate of myocardial infarction increases as BP increases.

Stroke

Hypertension is the leading modifiable risk factor for stroke, with hypertension causing approximately half of all strokes.

Heart failure

High BP is associated with increased risk of heart failure in both men and women, and as many as 91% of patients with newly diagnosed heart failure have a history of hypertension.

Kidney disease/failure

Hypertension is the second leading cause of kidney failure, and nearly half of patients with chronic kidney disease do not have adequately controlled hypertension.

Vision loss

Long-term hypertension can harm vision in many ways, including retinopathy, choroidopathy (fluid buildup under the retina) and optic neuropathy.

In Practice

Help your patients to avoid the serious problems that can result from blood pressure being too high for too long.









Hypertension, the “silent killer,” is associated with a variety of life-threatening diseases or conditions.

Hypertension and CVD Risk Factors

The guideline recommends screening for and managing these risk factors.

Several **modifiable CVD risk factors** are commonly found in people with hypertension, including:

-  **Current cigarette smoking, secondhand smoke**
-  **Diabetes mellitus**
-  **Dyslipidemia/hypercholesterolemia**
-  **Overweight/obesity**
-  **Physical inactivity/low fitness**
-  **Unhealthy diet**

In addition, several **relatively fixed risk factors** associated with hypertension should be considered, including:

- Chronic kidney disease
- Family history
- Increased age
- Low socioeconomic/educational status
- Male sex
- Obstructive sleep apnea
- Psychosocial stress

In Practice

Help your patients understand the risks of high BP and the substantial benefits of lowering their BP. Emphasize the central role they play in preventing and managing elevated BP.



A 10 mm Hg reduction in systolic blood pressure can significantly reduce risk of several conditions:

Coronary Heart Disease

17%
reduced risk

Stroke

27%
reduced risk

Heart Failure

28%
reduced risk



NEW Categories of Hypertension

The **new** categories reflect a more aggressive approach to managing BP, with elimination of the prehypertension category, and lowering of the threshold for hypertension to 130/80 mm Hg.

BP CATEGORY	BP (MM HG)		
	Systolic		Diastolic
NORMAL	<120	and	<80
ELEVATED	120-129	and	<80
HYPERTENSION			
Stage 1	130-139	or	80-89
Stage 2	≥140	or	≥90
HYPERTENSIVE CRISIS	>180	and/ or	>120

In Practice

Help your patients understand their BP readings.

Print this table, circle their BP category, and give it to them along with other appropriate resources.

The table is available in **English**, **Spanish** and **Traditional Chinese**.

Prevalence of Hypertension

According to the new BP threshold, hypertension ($\geq 130/80$ mm Hg) affects approximately **46% of the U.S. adult population.**

The prevalence varies according to sex, age and race-ethnicity, with the highest prevalence found among people 75 years or older, especially women, and in the non-Hispanic black population.

Patient Characteristics	BP $\geq 130/80$ mm Hg ^a	
	Men (n=4717)	Women (n=4906)
Overall Crude	46%	
Age-sex adjusted	48%	43%
Age group (yr)		
20-44	30%	19%
45-54	50%	44%
55-64	70%	63%
65-74	77%	75%
≥ 75	79%	85%
Race-ethnicity ^b		
Non-Hispanic white	47%	41%
Non-Hispanic black	59%	56%
Non-Hispanic Asian	45%	36%
Hispanic	44%	42%

^aOr self-reported use of antihypertensive medication.

^bAdjusted to the 2010 age-sex distribution of the U.S. adult population.

Prevalence of Hypertension Based on 2 SBP/DBP Thresholds

[Download PDF of table with full detail](#)

Diagnosing BP

The appropriate diagnosis of elevated BP or hypertension should involve accurate measurement of BP, self-monitoring of BP in the home, screening for white-coat hypertension or masked hypertension and for secondary causes of hypertension, and evaluating the use of BP-increasing medications and substances. In addition, BP readings from self-monitoring should be integrated into practice to confirm the diagnosis. For patients with a diagnosis of stage 1 hypertension, the ASCVD Risk Calculator should be used to estimate the patient's 10-year and lifetime risk for atherosclerotic CVD. This estimate is a factor in determining the most appropriate treatment. A team-based approach is recommended.

In Practice

Download the ASCVD Risk Calculator or launch a web version.

Measuring BP

Accurate measurement of BP is essential to proper prevention, detection and management of BP. Errors in measuring BP can have a substantial effect on BP, with estimated changes of 2 to 50 mm Hg. Recognizing the importance of accurate measurement of BP, the 2017 guideline focuses on the standards for accurate measurement of BP.

A team-based approach to care is recommended. Such an approach has been associated with lower systolic and diastolic measurements as well as an increased proportion of people with controlled BP. Teams consisting of physicians, nurses, physician assistants and pharmacists

can have the greatest impact on improving the monitoring and management of blood pressure.

The guideline describes six key steps for proper measurement of BP.

STEPS FOR ACCURATE BP MEASUREMENT

1. REST PATIENT WITH FEET FLAT ON THE FLOOR, RELAXED AND QUIET FOR 5 MIN. HAVE PATIENT EMPTY BLADDER AND SMOKE FOR 30 MINUTES, REMOVE CLOTHING FROM ARM.
2. USE PROPERLY VALIDATED, CALIBRATED MEASUREMENT DEVICE. SUPPORT PATIENT'S ARM AND POSITION CUFF ON BARE ARM AT LEVEL OF THE HEART, USING THE CORRECT CUFF SIZE.
Use arm circumference 22-26 cm (8.5-10.2 in) for standard cuff, 27-34 cm (10.6-13.3 in) for adult cuff, 35-44 cm (13.8-17.3 in) for large adult cuff, 45-52 cm (17.7-20.5 in) for thigh cuff.
3. RECORD SBP AND DBP - NOTE TIME OF FIRST READING; BP NOT TAKEN BEFORE MEASUREMENT.
4. USE AN AVERAGE OF 2 READINGS OBTAINED FOR CALCULATING THE ESTIMATE; THE INDIVIDUAL'S LEVEL OF BP.
5. FIRST VISIT RECORD BP IN BOTH ARMS, USING THE ARM WITH HIGHER READING; SEPARATE REPEATED MEASUREMENTS BY 1-2 MINUTES.**
6. PROVIDE PATIENT THE APPROPRIATE FEEDBACK VERBALLY AND IN WRITING.

LEARN MORE AT HEART.ORG/HBPROUTINE

AHA recommended blood pressure levels

BLOOD PRESSURE CATEGORY	SYSTOLIC BLOOD PRESSURE (mm Hg)	DIASTOLIC BLOOD PRESSURE (mm Hg)	USUAL CUFF SIZE
NORMAL	LESS THAN 120	LESS THAN 80	Small adult
ELEVATED	120-130	80	Adult
HIGH BLOOD PRESSURE (HYPERTENSION STAGE 1)	130-139	80-89	Large adult
HIGH BLOOD PRESSURE (HYPERTENSION STAGE 2)	140 OR HIGHER	90 OR HIGHER	Adult thigh
HYPERTENSIVE CRISIS	HIGHER THAN 180	HIGHER THAN 120	

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Use of the wrong size cuff is the most common error in measuring BP. The discrepancy in systolic BP can be as great as 10 mm Hg if the cuff is too small; the difference in diastolic BP can be as great as 8 mm Hg. To ensure accurate measurements, the guideline offers the following recommendations for selecting the appropriate size cuff.

Arm Circumference (cm, inches)	Usual Cuff Size
22-26 (8.5-10.2)	Small adult
27-34 (10.6-13.3)	Adult
35-44 (13.8-17.3)	Large adult
45-52 (17.7-20.5)	Adult thigh

Screening for White-Coat and Masked Hypertension

The prevalence of white-coat or masked hypertension has been approximately 10% in population-based surveys and in as many as 33% of patient registries. These conditions can have a substantial impact, with white-coat hypertension leading to overtreatment and masked hypertension to undertreatment. An important component of accurately diagnosing elevated BP or hypertension is screening for these two phenomenon.

The guideline states it is reasonable to screen for white-coat hypertension in adults with:

- **untreated systolic BP**
> 130 mm Hg, < 160 mm Hg
- **diastolic BP:**
> 80 mm Hg, < 100 mm Hg

It is reasonable to screen for masked hypertension for adults with untreated office-measured BPs that are consistently **120-129 mm Hg (systolic)** or **75-79 mm Hg (diastolic)**

Algorithms for Detecting White-Coat or Masked Hypertension

- **Patients Not Receiving Drug Therapy**
- **Patients Receiving Drug Therapy**

Screening for Secondary Hypertension

Determining whether hypertension has a secondary cause is also a component of the appropriate diagnosis of elevated BP or hypertension. Secondary causes of hypertension are responsible for high BP in approximately 10% of patients with hypertension. The following are the most common causes of secondary hypertension with prevalence indicated in parentheses.

- Obstructive sleep apnea (25-50%)
- Renovascular disease (5-34%)
- Primary aldosteronism (8-20%)
- Drugs or alcohol such as sodium containing antacids, caffeine, nicotine, NSAIDs, oral contraceptives and others (2-4%)
- Renal parenchymal disease (1-2%)

Note: Some uncommon, but important causes of secondary hypertension include pheochromocytoma/paraganglioma, Cushing's syndrome, hypo- or hyperthyroidism, aortic coarctation and others.

See more information on secondary hypertension, clinical implications, prevalence, physical examination and screening tests.

Algorithm for Screening for Secondary Hypertension

Self-Monitoring of BP

Patient self-monitoring of BP is an important focus of the 2017 guideline. Patient training should be done under medical supervision, with focus on evaluating the device used in the home and providing **detailed instructions for proper measurement.**



In Practice

Emphasize the importance of **monitoring BP at home** and encourage patients to use **online resources** to help ensure accurate measurements and tracking.

Identifying Medications and Substances that May Cause Elevated BP

Several medications and other substances may cause an elevated BP. Be sure to ask your patients about their use of medications, including over-the-counter medicines or other substances. Discuss how these substances may increase BP and **identify any that your patients should avoid, limit or stop to help maintain a healthy BP.**

Chronic pain affects more adults than coronary heart disease, diabetes and cancer combined. As a result, the use of pain relievers is common. Nonsteroidal anti-inflammatory drugs (NSAIDs) can increase BP because they reduce renal blood flow and cause sodium retention. Patients older than 65 years are at most risk for this effect. For patients with high blood pressure, pay extra attention when selecting medications for pain relief. Certain pain relievers can interfere with their hypertension management.

BP Raisers
Learn What Could Raise Your Blood Pressure

Many things can affect your blood pressure (BP). It is critical to understand what medications and substances you should avoid to support a healthy BP.

SMALL CHANGES CAN MAKE A BIG DIFFERENCE
Be your own health advocate by following a healthy lifestyle, such as reducing sodium and checking your blood pressure as part of your daily routine.

High blood pressure – a systolic blood pressure reading of 130 mmHg and above or a diastolic reading of 80 mmHg and above – is a serious health condition that can increase your risk of heart disease and stroke. Take these steps to control your risk.

AVOID:

- Ricit and recreational drugs
- Herbal supplements
- Foods that contain tyramine when taking antidepressants, such as MAOIs (monoamine oxidase inhibitors)

TALK TO YOUR HEALTHCARE PROVIDER ABOUT STARTING, STOPPING OR CHANGING:

- NSAID pain medication (drugs like acetaminophen are less likely to increase BP)
- Anesthetics
- Certain medications to treat mental health
- Corticosteroids, such as prednisone
- Immunosuppressants
- Oral birth control (consider alternative forms such as barrier, IUD, abstinence)
- Certain cancer medications (such as angiogenesis inhibitors)

NOTE: Do you suffer from chronic pain? Certain medicines can raise your BP or make your BP medication less effective. Talk to your healthcare provider for guidance if you have any questions.

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heart.org/bp/raisers

Download this infographic to help easily identify potential BP Raisers.



In Practice

Encourage your patients to talk openly about what over-the-counter medicines and substances they consider using. **Print the list of medications and substances shown above**, create an encouraging environment and start the conversation with your patients. Encourage patients with elevated BP or hypertension to consider using pain relievers other than NSAIDs.



Treating Elevated BP or Hypertension

Guideline-recommended treatment includes nonpharmacologic interventions for patients with elevated BP or stage 1 hypertension and an estimated 10-year CVD risk of less than 10%.

A combination of antihypertensive medication and nonpharmacologic interventions is recommended for patients with stage 1 hypertension and an estimated 10-year ASCVD risk of 10% or higher and for all patients with stage 2 hypertension.

In Practice

Talk to your patients about the benefits of lifestyle changes in reducing BP. Give them the **“What Can I Do To Improve My Blood Pressure”** resource as a reminder for them at home.

Nonpharmacologic Interventions

The guideline recommends several **nonpharmacologic interventions** that have been shown to reduce systolic BP by as much as 11 mm Hg in adults with hypertension. These interventions also can help prevent hypertension in adults with normal BP.



- Weight loss for patients who are overweight or obese
- Heart-healthy diet (such as DASH)
- Sodium restriction
- Potassium supplementation (preferably in dietary modification)
- Increased physical activity with structured exercise program
- Limitation of alcohol to 1 (women) or 2 (men) standard drinks per day

Antihypertensive Medication

The BP threshold for antihypertensive medication should be determined on the basis of the average BP levels and CVD risk.

BP Threshold (mm Hg)	Patient Scenario
≥130/80	ASCVD risk of 10% or higher OR Clinical CVD
≥140/90	ASCVD risk less than 10%

Four classes of oral antihypertensive drugs are recommended as first-line agents for the treatment of hypertension.

- Thiazide or thiazide-type diuretics
- Angiotensin-converting enzyme (ACE) inhibitors
- Angiotensin receptor blockers (ARBs)
- Calcium-channel blockers (dihydropyridines and nondihydropyridines)

Six general classes of oral antihypertensive drugs are recommended as second-line agents.

- Diuretics (loop, potassium sparing and aldosterone antagonists)
- Beta-blockers (cardioselective, and vasodilatory, noncardioselective, intrinsic sympathomimetic activity and combined alpha- and beta-receptor)
- Direct renin inhibitor
- Alpha-1 blockers
- Central alpha₂-agonist and other centrally acting drugs
- Direct vasodilators

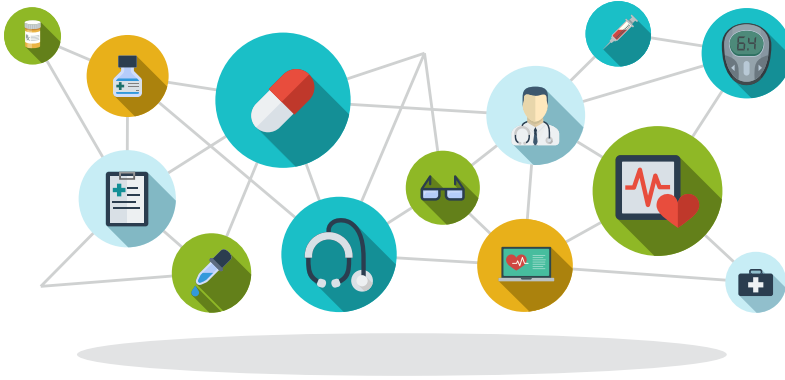
Oral Antihypertensive Drugs

Simultaneous use of an ACE inhibitor, ARB and/or renin inhibitor is potentially harmful and is not recommended for the treatment of adults with hypertension.

Follow-up

Follow-up visits to reassess BP and monitor adherence and response to treatment should be regularly scheduled according to guideline recommendations. Use of self-monitoring, team-based care and telehealth strategies is recommended.

BP Status	Recommended Follow-up/Reassessment
Normal	1 year
Elevated	3-6 months
Stage 1 hypertension	Monthly until BP goal met with BP lowering medication + nonpharmacologic interventions 3-6 months after BP goal met
Stage 2 hypertension	Monthly until BP goal met with BP lowering medication + nonpharmacologic interventions 3-6 months after BP goal met



Treatment of Hypertension in Patients With Comorbidities

When setting BP thresholds and goals of pharmacologic therapy, you should consider your patients' comorbidities.

The guideline also includes several recommendations for specific antihypertensive medications according to these comorbidities as well as others, such as acute intracerebral hemorrhage, atrial fibrillation, valvular heart disease and aortic disease.

For the following comorbidities:

- Diabetes mellitus
- Chronic kidney disease
- After renal transplantation
- Heart failure
- Stable ischemic heart disease
- Peripheral artery disease



BP Threshold $\geq 130/80$ mm Hg
BP Goal $< 130/80$ mm Hg

For secondary stroke prevention



BP Threshold $\geq 140/90$ mm Hg
BP Goal $< 140/90$ mm Hg

Resistant Hypertension

In clinical trials, resistant hypertension has developed in approximately 20% to 35% of patients with hypertension. It is important to address resistant hypertension because of an associated increased risk of cardiovascular events. The guideline defines treatment resistance and offers recommendations for evaluating and treating patients.

Algorithm for Diagnosis, Evaluation and Treatment



The guideline recommends special attention to specific patient groups. Recommendations include:

Black adults^a

Initial antihypertensive treatment should include a thiazide-type diuretic or a calcium-channel blocker. Two or more antihypertensive medications are especially recommended to achieve a **BP target of less than 130/80 mm Hg**.

Pregnant women

Antihypertensive medication should be transitioned to methyldopa, nifedipine and/or labetalol during pregnancy. ACE inhibitors, ARBs or direct renin inhibitors should **not** be used during pregnancy.

Persons 65 years and older^b

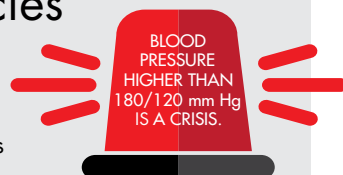
For patients with an average systolic BP of 130 mm Hg or higher, the **treatment goal should be a systolic BP of less than 130 mm Hg**.

For patients with hypertension and a high burden of comorbidity and limited life expectancy, clinical judgment, patient preferences and a team-based approach should be used to assess risk/benefit for decisions regarding intensity of BP lowering and choice of antihypertensive medications.

Read the full guidelines for instructions on persons undergoing surgical procedures.

Hypertensive Crises: Emergencies and Urgencies

Hypertensive emergencies are defined as severe elevation of BP (greater than 180/120 mm Hg) associated with evidence of new or worsening target organ damage. In such cases, BP must be immediately reduced to prevent or limit further damage.



Hypertensive urgencies are defined as severe elevation of BP (greater than 180/120 mm Hg) in otherwise stable patients without acute or impending change in target organ damage or dysfunction.

The guideline provides an **algorithm for diagnosing and managing a hypertensive crisis**, as well as a list of intravenous antihypertensive drugs for treating hypertensive emergencies.

Intravenous Antihypertensive Drugs for Treatment of Hypertensive Emergencies

^aIncludes adults with diabetes mellitus but not heart failure or chronic kidney disease.

^bNoninstitutionalized ambulatory community-dwelling persons.

Strategies to Improve Control of Hypertension

In addition to a team-based approach to managing hypertension, other strategies focus on promoting lifestyle modifications and improving adherence to antihypertensive medication.




Promoting lifestyle modifications

Small changes can make a big difference. Patients adopting and maintaining **lifestyle modifications** can improve their blood pressure. Encourage the use of strategies that can help promote necessary behavioral changes, such as the following:

- **Set goals**
- **Provide feedback**
- **Emphasize importance of self-monitoring**
- **Promote self-sufficiency**
- **Schedule consistent follow-up**
- **Use motivation interventions**



These strategies are most effective when combined.



Only 20%

of patients have sufficiently high adherence to antihypertensive therapy to achieve the benefits found in clinical trials.

In Practice

Improving adherence to antihypertensive medication

Adherence to antihypertensive therapy is suboptimal, with only 20% of patients having sufficiently high adherence to achieve the benefits found in clinical trials. Use **strategies that have been found to be effective in improving adherence**, such as the following:

- Educate patients about hypertension, its consequences and potential side effects of medication
- Collaborate with patients to establish goals of therapy and plan of care
- Prescribe medication as once-daily dosing
- Integrate pill-taking into routine activities of daily living with support tools such as reminders, pillboxes, packaging and other aids
- Use fixed-dose combination agents when available
- Use medication adherence scales to facilitate identification of barriers
- Recognize patients for achieving treatment goals

Consider the cultural and social contexts and health literacy of your patients. Create an encouraging, blame-free environment. Talk openly about expectations and goals. Listen to their concerns. Answer their questions.



**American
Heart
Association.**

Helpful Links and Other Resources

Here are some AHA tools and resources. They have been developed with guidance from AHA volunteers who face the same challenges as you do and are sources you can trust.

2017 Hypertension Clinical Practice Guideline

Hypertension Highlights

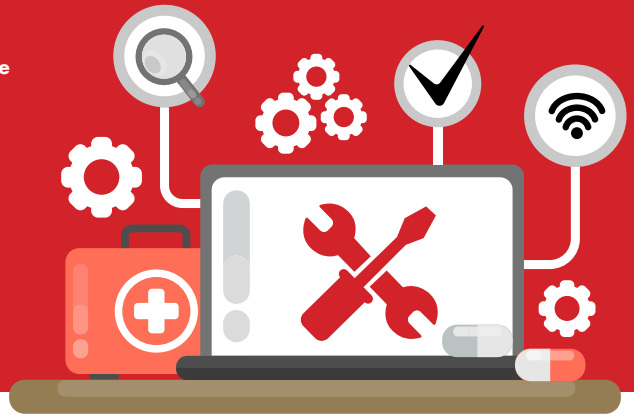
Target BP: BP Improvement Program

Video Series: Clinical Strategies for the 2017 Hypertension Guidelines

Patient Resources

High Blood Pressure

Blood Pressure Fact Sheets



Appendix B: Hypertension Knowledge Patient Pre and Post Questionnaire

Answer the following questions by circling one answer for each question.

- 1) If someone's blood pressure is 130/80 it is
 - a) High
 - b) Low
 - c) Normal
 - d) Don't know
- 2) If someone's blood pressure is 160/100 it is
 - a) High
 - b) Low
 - c) Normal
 - d) Don't know
- 3) Once someone has high blood pressure, it usually lasts for
 - a) A few years
 - b) 5-10 years
 - c) The rest of their life
 - d) Don't know
- 4) People with high blood pressure should take their medication
 - a) Everyday
 - b) At least a few times a week
 - c) Only when they feel sick
- 5) Losing weight usually makes blood pressure
 - a) Go up
 - b) Go down
 - c) Stay the same
- 6) Eating less salt usually makes blood pressure
 - a) Go up
 - b) Go down
 - c) Stay the same
- 7) High blood pressure can cause heart attacks
 - a) Yes
 - b) No
 - c) Don't know
- 8) High blood pressure can cause cancer
 - a) Yes
 - b) No
 - c) Don't know
- 9) High blood pressure can cause kidney problems
 - a) Yes
 - b) No
 - c) Don't know
- 10) High blood pressure can cause strokes
 - a) Yes
 - b) No
 - c) Don't know

Appendix C: Patient Education



What is High Blood Pressure?

Blood pressure is the force of blood pushing against blood vessel walls. It is measured in millimeters of mercury (mm Hg).

High blood pressure (HBP) means the pressure in your arteries is higher than it should be. Another name for high blood pressure is hypertension.

Blood pressure is written as two numbers, such as 112/78 mm Hg. The top (systolic) number is the pressure when the heart beats. The bottom (diastolic) number is the pressure when the heart rests between beats.

Normal blood pressure is below 120/80 mm Hg. If you're an adult and your systolic pressure is 120 to 129, and your diastolic pressure is less than 80, you have **elevated blood pressure**. **High blood pressure** is a systolic pressure of 130 or higher, or a diastolic pressure of 80 or higher, that stays high over time.

High blood pressure usually has no signs or symptoms. That's why it is so dangerous. But it can be managed.

Nearly half of the American population over age 20, has HBP, and many don't even know it. Not treating high blood pressure is dangerous. High blood pressure increases the risk of heart attack and stroke.

Make sure you get your blood pressure checked regularly and treat it the way your health care provider advises.

BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)		DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120-129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130-139	or	80-89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and/or	HIGHER THAN 120

Am I at higher risk of developing HBP?

There are risk factors that increase your chances of developing HBP. Some you can control, and some you can't.

Those that can be controlled are:

- Cigarette smoking and exposure to secondhand smoke
- Diabetes
- Being obese or overweight
- High cholesterol
- Unhealthy diet (high in sodium, low in potassium, and drinking too much alcohol)
- Physical inactivity

Factors that can't be modified or are difficult to control are:

- Family history of high blood pressure
- Race/ethnicity
- Increasing age
- Gender (males)
- Chronic kidney disease
- Obstructive sleep apnea

Socioeconomic status and psychosocial stress are also risk factors for HBP. These can affect access to basic living needs, medication, health care providers, and the ability to adopt lifestyle changes.

(continued)



How can I tell I have it?

The only way to know if you have high blood pressure is to get it checked regularly by your health care provider.

For proper diagnosis of HBP, your health care provider will use an average based on two or more readings obtained on two or more visits.



What can I do about HBP?

- Don't smoke and avoid secondhand smoke.
- Reach and maintain a healthy weight.
- Eat a healthy diet that is low in saturated and trans fats and rich in fruits, vegetables, whole grains and low-fat dairy products. Aim to consume less than 1,500 mg/day of sodium (salt). Even reducing your daily intake by 1,000 mg can help.
- Eat foods rich in potassium. Aim for 3,500 – 5,000 mg of dietary potassium per day.
- Limit alcohol to no more than one drink per day if you're a woman or two drinks a day if you're a man.
- Be more physically active. Aim for 150 minutes of moderate-intensity physical activity or at least 75 minutes of vigorous physical activity per week, or a combination of both, spread throughout the week. Add muscle-strengthening activity at least two days per week for more health benefits.
- Take medicine the way your health care provider tells you.
- Know what your blood pressure should be and work to keep it at that level.

HOW CAN I LEARN MORE?

- 1 Call 1-800-AHA-USA1 (1-800-242-8721), or visit heart.org to learn more about heart disease and stroke.
- 2 Sign up to get *Heart Insight*, a free e-newsletter for heart patients and their families, at HeartInsight.org.
- 3 Connect with others sharing similar journeys with heart disease and stroke by joining our Support Network at heart.org/SupportNetwork.

Do you have questions for your doctor or nurse?

Take a few minutes to write down your questions for the next time you see your health care provider.

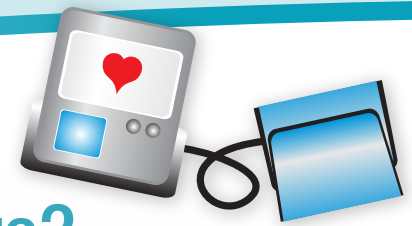
For example:

Will I always have to take medicine?


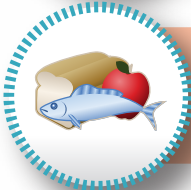



What should my blood pressure be?

MY QUESTIONS:

We have many other fact sheets to help you make healthier choices to reduce your risk, manage disease or care for a loved one. Visit heart.org/AnswersByHeart to learn more.



What Can I Do To Improve My Blood Pressure?

Modification	Recommendation	Approximate SBP Reduction Range
 Weight reduction	Maintain normal body weight (BMI=18.5-24.9 kg/m ²)	5 mm Hg
 DASH eating plan	Diet rich in fruits, vegetables, low fat dairy and reduced in fat	11 mm Hg
 Restrict sodium intake	<1500 mg of sodium per day	5-6 mm Hg
 Physical activity	Be more physically active. Aim for at least 90 to 150 minutes of aerobic exercise per week.	5-8 mm Hg
 Moderation of alcohol consumption	No more than 2 drinks/day for men and 1 drink/day for women	4 mm Hg

BP = Blood pressure, BMI = Body mass index, SBP = Systolic blood pressure, DASH = Dietary Approaches to Stop Hypertension

Ranges According to 2017 Hypertension Clinical Practice Guidelines
Recommendations for Treatment and Management of Hypertension



American Heart Association®

Check. Change. Control.®

Consequences of High Blood Pressure

High blood pressure is often the first domino in a chain or “domino effect” leading to devastating consequences, like:



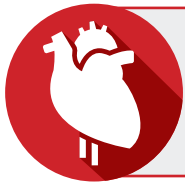
STROKE

HBP can cause blood vessels in the brain to burst or clog more easily.



VISION LOSS

HBP can strain the vessels in the eyes.



HEART FAILURE

HBP can cause the heart to enlarge and fail to supply blood to the body.



HEART ATTACK

HBP damages arteries that can become blocked.



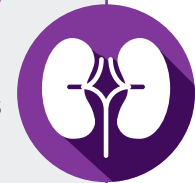
SEXUAL DYSFUNCTION

This can be erectile dysfunction in men or lower libido in women.



KIDNEY DISEASE/ FAILURE

HBP can damage the arteries around the kidneys and interfere with their ability to effectively filter blood.



A simple blood pressure check is the first step to preventing the “domino effect.”

Learn more at heart.org/hbp.



Appendix D: Timeline

Task	October	November	December	January	February	March	April	May	June	July
PERC approval	X									
IRB approval	X	X								
Recruitment of eligible participants		X	X							
Pre-questionnaire, Intervention, and Post Questionnaire		X	X							
3 Month Post-Questionnaire and Analysis of Outcomes					X	X	X			
Presentation of results									X	

Appendix E: Jacksonville State University IRB Approval



October 30, 2020

Dear Conrad Cash:

Your proposal submitted for review by the Human Participants Review Protocol for the project titled: "Hypertension Education and Management Intervention (HEMI) in the Urgent Care Setting" has been approved as exempt. If the project is still in process one year from now, you are asked to provide the IRB with a renewal application and a report on the progress of the research project.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Joe Walsh'. Below the signature is the printed name 'Joe Walsh' and the title 'Executive Secretary, IRB'.

JW/dh

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700 Pelham Road North
Jacksonville, AL 36265-1602
P: 904.782.0284
F: 904.251.5281
E: jvwalsh@jau.edu
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Appendix F: Citi Training



Completion Date 21-May-2020
Expiration Date 21-May-2023
Record ID 36655978

This is to certify that:

Conrad Cash

Has completed the following CITI Program course:

Biomedical Research - Basic/Refresher (Curriculum Group)
Biomedical Research (Course Learner Group)
1 - Basic Course (Stage)

Under requirements set by:

Jacksonville State University

Not valid for renewal of certification through CME. Do not use for TransCelerate mutual recognition (see Completion Report).



Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w44526a18-44ec-4054-a89e-725aa831b963-36655978

Appendix G: Informed Consent

Informed Consent Form for Hypertension Education and Management Intervention (HEMI) in the Urgent Care Setting.

You are being invited to participate in a research project conducted by Conrad Cash, who is a graduate student at Jacksonville State University,

You are invited to participate in a research study group about patient's knowledge of hypertension, commonly referred to as high blood pressure.

You will be asked to have your blood pressure taken, complete a 10 question multiple choice pre-questionnaire about your knowledge of hypertension, participate in a short educational experience, and then complete a 10 question multiple choice post-questionnaire survey. This will take about 15-20 minute to complete. In addition, you will be asked to follow-up 3 months afterwards to complete a second 10 question multiple choice post-questionnaire and have your blood pressure reassessed, again lasting 15-20 minutes.

There are no known potential risks associated with this study. The project leader expects the project to benefit you by diagnosing and treating hypertension sooner along with finding patients knowledge level of hypertension. There is no compensation for this study and there is no reimbursement of payments for co-payments, fees, or insurance denial claims.

If you have decided to participate in this study, please understand that your participation is voluntary, and you have the right to withdraw your consent or discontinue participation at any time without penalty. To withdraw from the study please contact the project leader at the contact information below. You also have the right to refuse to answer any question(s) for any reason without penalty.

In addition, your privacy will be maintained in all publications or presentations resulting from this study. All participants will be protected under the Health Insurance Portability and Accountability Act (HIPPA), which among others guarantees, protects the privacy of patients' health information. In addition, the list of participants will be placed under locking cabinet only accessible by the project leader. All questionnaires will have unique identification numbers assigned to participants. Any electronic files or communication will be password protected to prevent unauthorized access.

If you have any questions regarding this project, you may contact the DNP project leader at ccash2@stu.jsu.edu and/or 205-225-4363.

A copy of this consent form will be provided to you.

Signature _____ Printed name _____ Date _____

Appendix H: Consent Form for Research

**SIGNATURE PAGE OF CONSENT FORM
FOR RESEARCH INVOLVING ADULTS**
Permission Form for
Research on

Title of Project

I have read a description of the research project/study, and I understand the procedure described on the attached pages. I also have received a copy of the description.

I _____ agree to participate in the study.
Complete Name

Signature

Date

Appendix I: Permissions

Re: Use of Hypertension Knowledge Among Patients from an Urban Clinic

Karen DeSalvo <karen.desalvo@gmail.com>

Mon 10/5/2020 10:26 PM

To: Conrad Cash <ccash2@stu.jsu.edu>

Hi Conrad,

Thank you for reaching out. I am comfortable with you using the questionnaire for your research.

Best,

kd

On Mon, Oct 5, 2020 at 7:26 AM Conrad Cash <ccash2@stu.jsu.edu> wrote:

Dr DeSalvo,

My name is Conrad Cash, and I am a Doctor of Nurse Practice student at Jacksonville State University. I am currently working on my DNP project on hypertension education to increase compliance. I found your article Hypertension Knowledge Among Patients from an Urban Clinic and would like to use Table 2 questionnaires titled Hypertension knowledge items and percentage of participants with correct responses, if you would allow. This questionnaire will allow me to gain knowledge of patients and hypertension knowledge.

I have attached the article for your convenience. Please do not hesitate to reach out to me if you have any questions.

<https://ethndis.org/priorarchives/ethn-18-01-42.pdf>

Thank you for your time,

Conrad Cash

205-225-4363

ccash2@stu.jsu.edu



American
Heart
Association.

Inv #16544-CCASII
(fees are waived for student)

October 23, 2020

PRINT COPYRIGHT USE AGREEMENT

Conrad Cash
Jacksonville State University
242 Odum Road
Gardendale, AL 35071

Dear Mr. Cash:

Amount Due: **\$0.00 U.S. FUNDS (WAIVED)** (This is a fee for service and not a charitable contribution). Our tax id number is 13-5613797. **Please consider this letter an invoice.**

Approval of this request is contingent upon receipt of a 50.00 U.S Funds (WAIVED) processing fee and a signed copy of this Agreement (including Exhibit A.) Please send a check (drawn on a U.S. Bank or an international money order) payable to the American Heart Association with a copy of this Agreement to PO Box 841750, Dallas, Texas, 75284-1750. Bank transfer or credit card payment information will be provided upon request.

The conditions of this copyright use agreement are listed below and the specifics of the material to be used are set out on Exhibit A to this Agreement.

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6. This permission is not valid until we receive payment, verifying email if paid electronically and a signed copy of this agreement. If the payment and the signed agreement are not received within 30 days, the request will be considered withdrawn and no longer in effect. No reminder notices will be sent.

Upon receipt of payment and the signed agreement, permission will be granted on your original request. **Your cancelled check or credit card statement will be your receipt.**

Signature of Requestor Conrad Case

Printed Name Conrad Case

Date 10/23/2010

EXHIBIT A

Publication Name –

Blood Pressure Fact Sheets at: (items #1 - #4 below for patients)

<https://www.heart.org/en/health-topics/high-blood-pressure/finding-high-blood-pressure-tools--resources/blood-pressure-fact-sheets>

High Blood Pressure Toolkit-Resources at: (items #5 and #6 for physicians)

<https://www.heart.org/en/health-topics/high-blood-pressure/high-blood-pressure-toolkit-resources>

Specifically:

(note: permission is for a maximum of 100 copies each of the following)

1) Answers by Heart: What is High Blood Pressure? located at:

https://www.heart.org/-/media/data-import/downloadables/19/8/pe-abh-what-is-high-blood-pressure-ucm_300310.pdf?la=en

2) My Blood Pressure Log @

<https://www.heart.org/-/media/files/health-topics/high-blood-pressure/my-blood-pressure-log.pdf?la=en>

3) Consequences of High Blood Pressure infographic at:

https://www.heart.org/-/media/files/health-topics/high-blood-pressure/consequences-of-high-blood-pressure-infographic-pdf-ucm_464947.pdf?la=en

4) What Can I Do To Improve My Blood Pressure? infographic at:

https://www.heart.org/-/media/files/health-topics/high-blood-pressure/what-can-i-do-to-improve-my-blood-pressure-chart-ucm_486661.pdf?la=en

(note: permission is for a maximum of 10 copies each of the following)

5) Hypertension.2018;71:e13-e115 – Page e41, Figure 4 – “BP Thresholds and recommendations for treatment and follow-up at:

<https://www.ahajournals.org/doi/pdf/10.1161/HYP.0000000000000065>

6) Hypertension Guideline Toolkit (16 page booklet) at:

<http://aha-clinical-review.ascendeventmedia.com/books/aha-high-blood-pressure-toolkit/16/#zoom=z>

Citation/Credit Line:

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For Use In:

a print only version of the above referenced material will be used as a handout, for educational purposes only, for a maximum of 100 patients and 10 physicians in the study group for the student's DNP project titled "Hypertension Education and Management Intervention (HEMI) in the Urgent Care Setting".

Note: If the student decides at a later date to publish the paper/AHA material, the request **must** be submitted to the AHA for review/approval **before** the AHA material is published.