

NURSE-LED HYPERTENSION CLINIC  
IN PRIMARY CARE

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## **Dedication and Acknowledgments**

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## Abstract

**Background:** Hypertension remains a global health issue affecting adults which results in increased cardiovascular disease and healthcare expenditures. Answering the Surgeon General's *Call to Action* to recognize and address hypertension, nurses within primary care are in a unique position to enhance hypertension management. **Purpose:** To improve blood pressure control and knowledge related to self-management in patients with hypertension through a nurse-led hypertension clinic, focusing on education and bi-weekly follow-up. **Methods:** A descriptive quantitative quality improvement project was implemented at a large internal medicine practice using a pre-posttest of the Hypertension Evaluation of Lifestyle and Management (HELM) knowledge scale, and a pre-post measurement of blood pressure following enrollment into a six-week nurse-led hypertension clinic. **Results:** Six participants were enrolled in the nurse-led hypertension clinic with two participants reflecting a mean blood pressure decrease of 20.4% systolic and 14.6% diastolic. Hypertension knowledge improved 21.4% from baseline. **Recommendations and Conclusion:** Recommendations for the development of nurse visits solely focused on hypertension and the development of nurse-driven protocols to monitor blood pressure, assess symptoms, and titrate medication provides numerous benefits to include increased provider access, decreased healthcare utilization and improved patient outcomes.

**Key Words:** Hypertension, Interventions, Nurse, Patient Education, Primary Care, Self-Care

## **Background and Significance**

Hypertension is called the “silent killer” because there are no obvious symptoms indicating that something is wrong, yet hypertension is a global health issue affecting more than 1.13 billion people worldwide and a major cause of premature death (World Health Organization, 2019). In the United States, hypertension affects 45% (108 million) of the adult population and is a contributing factor for the rise in cardiovascular disease, which leads to poor health outcomes, and higher healthcare utilization (CDC, 2020a). The United States spends 90% of the nation’s \$3.5 trillion annual health care expenditures caring for people with chronic health conditions, including heart disease and stroke costing our health care system \$214 billion per year (CDC, 2020b). As the population ages, cardiovascular disease continues to rise and consists of three key risk factors: hypertension, high cholesterol, and smoking (CDC, 2019). In October of 2020, Surgeon General Jerome M. Adams, MD, MPH, issued a *Call to Action* for Americans to recognize and address hypertension control as a national, public health priority (U.S. Department of Health & Human Services [HHS.gov], 2020).

### **Overview of Current Guidelines**

Hypertension is a modifiable risk factor, which is caused by both genetic and environmental factors, to include components of diet, sodium intake, physical activity, and alcohol consumption (Whelton et al., 2018). Most adults (82 million) in the United States do not have their hypertension under control, which includes those individuals currently treated with prescription medication and for those whom lifestyle modifications are recommended (CDC, 2020a). Merai (2016) noted that many people are challenged by medication regimens or how to make required lifestyle modifications such as healthy eating, sodium restriction, and smoking cessation.

Parameters used to diagnose and treat hypertension vary from clinician to clinician. In 2014, the Eighth Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 8) did not recommend any changes to the previous JNC 7 140/90 mmHg definition of high blood pressure (James et al., 2014). However, in 2017, the American College of Cardiology and the American Heart Association task force on clinical practice published new guidelines and recommendations for defining high blood pressure (Whelton et al., 2018). Blood pressure levels for clinical and public health decision making, should be categorized into 4 levels: normal ( $<120$ mmHg and  $<80$ mmHg), elevated (120-129mmHg and  $<80$ mmHg), stage 1 hypertension (130-139mmHg or 80-89mmHg) and, stage 2 hypertension ( $\geq 140$ mmHg or  $\geq 90$ mmHg) (Whelton et al., 2018).

The Centers for Medicare & Medicaid Services (CMS) contracted with National Committee for Quality Assurance (NCQA) and developed a strategy that evaluated the quality of care. In turn, NCQA created the Healthcare Effectiveness Data and Information Set (HEDIS) to improve significant public health issues, such as cancer, heart disease, smoking and diabetes. As a primary care network and practice, quality and safety metrics are guided by the standardized performance measures established by HEDIS, where the *Hypertension: BP Control* target is set at 75% (National Committee for Quality Assurance [NCQA], n.d.). In the past year, using a Tableau provider dashboard, the network has seen 69,827 patients with hypertension defined as systolic measurement  $\geq 140$ mmHg, and diastolic measurement  $\geq 90$ mmHg. Additionally, hypertension control varied by practice within the network ranging from 63.9% to 81.7%, with much of the network falling below the target of 75%, and the project implementation practice at 72.2%. Even with significant efforts to improve hypertension control, performance continued to trend downward.

Health care delivery has shifted from the hospital setting to the ambulatory setting, which leaves primary care in an optimal position to manage chronic conditions such as hypertension. Unfortunately, this shift has also led to increased patient panels, a shortage of primary care providers, and complex chronically ill patients who are living longer. Bauer and Bodenheimer (2017) noted that additional health professionals, such as nurses, are needed to deliver primary care to improve the care of patients with chronic conditions.

Nurses within primary care are in a unique position to deliver this complex coordinated care as reimbursements are shifting from a fee-for-service to a value-based care model focusing on wellness and chronic care management. Additionally, within the practice, nurses are not practicing at the top of their license and their skills are underutilized. Unfortunately, the current state at a large primary care network included practices where cardiovascular composite metrics are not meeting quality targets set by the organization. To support primary care patients with hypertension, nurses provided intentional assistance, such as individualized hypertension education, patient-centered counselling, and blood pressure monitoring.

### **Purpose**

The purpose of this project was to improve blood pressure control and knowledge related to self-management in patients with either a new diagnosis of hypertension or those with uncontrolled hypertension through a nurse-led hypertension clinic, focusing on education and bi-weekly follow-up.

### **Review of Current Evidence**

The purpose of this review was to further understand which nursing interventions were most effective at improving blood pressure and knowledge relevant to self-management in

patients with either a new diagnosis of hypertension or those with uncontrolled hypertension in the primary care setting. Using the advanced search features, a systematic review of literature was conducted in the CINAHL and PubMed electronic databases with inclusion of full text, English, primary source research articles published between 2016 and 2021. This search used single keywords and a combination of *hypertension, interventions, nurse, patient education, primary care, and self-care*. The initial query in CINAHL and PubMed electronic databases using the single keyword *hypertension* yielded 17,935 journal articles with publication dates within the last 5 years. Then, subsequent keywords *intervention, patient education, primary care* and *self-care* were independently added to the keyword *hypertension* reducing the articles to 10,483. This was followed by adding keyword *nurse* to each of the keywords plus *hypertension*, resulting in 457 articles to review. To further narrow the search, articles were first evaluated by reading the titles, then by reading the abstracts and finally the full texts of 41 articles. Gaps noted in the literature review included studies conducted in the United States and nurse-led initiatives related to hypertension management. Three common themes that emerged from the literature were nurse-led interventions, educational opportunities, and outcome measures.

### **Nurse-led interventions**

Nurses make up one of the largest segments of the healthcare workforce, and the demand for nurses will only increase as the population ages and their need for chronic care management intensifies (Bauer & Bodenheimer, 2017). Himmelfarb et al., (2016) noted that expanding the role of the nurse was one of the most effective strategies to improve blood pressure control. Clark et al., (2010), highlighted that nurse led care is associated with adherence to protocols, more regular follow-up, and potentially lower healthcare costs. Nurse-led interventions such as in-person nurse visits, educational opportunities, telephonic outreach and use of a treatment



algorithms or protocols, show meaningful reductions in either overall blood pressure, systolic blood pressure, or mean blood pressure (Clark et al., 2010, Dean et al., 2014, Drevenhorn et al. 2007, Hebert et al., 2012, Jackson et al., 2012, Kronebusch et al.,2020, Saneei et al., 2014, Suyong et al., 2018).

### **In-person Nurse Visits**

In-person nurse visits were presented in the literature using various descriptions such as “nurse-led clinics”, “RN visit”, “patient-centered counselling”, “home nursing visits” and “face to face nurse visits”. Regardless of the description, in-person nurse visits contributed most often to patients receiving individualized counselling to improve self-care behaviors (Camara de Moura et al., 2014, Drevenhorn et al. 2007, Hebert et al., 2012, Manzini and Simonetti, 2009). Additionally, in-person nurse visits were used for reviewing blood pressure targets, goal setting, and medication education and adherence ( Dean et al., 2014, Kronebusch and Rismeyer 2020).

### **Educational Opportunities**

Education was a common thread in nearly every intervention mentioned, with formats consisting of face-to-face individualized counselling, written materials, text messages, and phone calls. In the studies that used a nurse-led treatment algorithm or protocol, one of the first interventions was to have an in-person nurse visit to establish self-care goals, discuss blood pressure targets, and review medication compliance (Dean et al., 2014, Kronebush et al., 2020). Three distinct areas for patient education included general hypertension knowledge and risk factors, medication management, and lifestyle modifications (Camara de Moura et al., 2014, Drevenhorn et al. 2007, Hebert et al., 2012, Kronebusch et al.,2020, Kilic et al. 2018, Rodriguez et al., 2019). Nurse-led support was identified in several studies related to medication adherence, improved understanding of medication instructions, and lower blood pressures (Hacihasanoglu

and Gözümlü, 2011, Persell et al. 2018). Bayrak and Tosun (2018), noted that patients lacked knowledge about prevention, risk factors and symptoms of heart attack and stroke, and felt inadequate to modify their lifestyle. Magobe et al., (2017) noted that regardless of the stage of hypertension, lifestyle modifications such as regular exercise was needed to improve the quality of health.

### **Telephone Outreach**

Telephone outreach to patients with hypertension was used to reinforce self-care behaviors, address barriers, and assist participants to meet their individual goals (Suyong et al., 2018, Hebert et al., 2012). Telephone outreach can also be used as part of a larger more complex intervention or used for patients that were below target blood pressure in an effort to encourage adherence to lifestyle and medication changes (Dean et al., 2014, Hebert et al. 2012, Jackson et al., 2012). Unfortunately, a meta-analysis identified seven studies where nurses monitored blood pressure by telephone, which showed no significant outcome difference in systolic blood pressure (Clark et al., 2010). Alternatively, tailored phone counseling was noted to be more effective in achieving behavioral change than other educational interventions (Jackson et al., 2012, Rodriguez et al., Suyong et al., 2018).

### **Treatment Algorithms**

The use of treatment algorithms or protocols for nurse-led blood pressure reduction interventions are widely seen in the literature. A systematic review and meta-analysis by Clark et al. (2010), showed that 14 studies included stepped treatment algorithms, which they concluded, resulted in greater blood pressure reductions than usual care. In two of the studies that used an algorithm or protocol, the researchers also used in-person nurse visits to set goals, review blood pressure targets, and provide education related to medication and lifestyle modifications (Dean et

al., 2014, Kronebush et al., 2020). In these studies, there was a significant reduction in mean systolic blood pressure or patients reaching individualized blood pressure goals faster than the usual care group (Dean et al., 2014, Kronebush et al., 2020).

## **Outcome Measures**

In any given study, it is important to evaluate the intervention you are investigating. This is done through clearly identified outcomes which vary greatly from study to study and can be broad or narrow in scope. For this review, I have divided the outcomes into two categories: self-care behaviors and blood pressure measurement.

### **Self-Care Behaviors**

In 2004, six self-care activities were identified by JNC7 that enhanced the patient's overall ability to care for themselves. These activities included weight management, diet, physical activity, moderate alcohol consumption, cessation of smoking, and following antihypertensive medication regimens (U.S. Department of Health and Human Services, 2004). In the self-care activity related to diet, research focused the intervention on behavior changes related to improving adherence to the Dietary Approaches to Stop hypertension (DASH) dietary plan (Kronebusch et al., 2020, Rodriguez et al., 2019). Every day, nurses provided counselling to patients about the six self-care activities, however Manzini and Simonetti (2009) reminded readers that despite this educational intervention, there are those who choose not to change their lifestyle and persist with self-care deficits.

### **Blood Pressure Measurement**

Blood pressure measurement inconsistencies in the literature were noted by the following measurements: overall blood pressure reduction, overall reduction in systolic blood pressure, percentage of patients reaching blood pressure goal, reduction in mean systolic and diastolic

blood pressure, and blood pressure reduction over time (Drevenhorn et al. 2007, Hebert et al. 2012, Jackson et al., 2012, Kronebusch et al.,2020, Saneei et al., 2014, Suyong et al., 2018). Individual outcome measures varied from reduction of systolic blood pressure ranging from -2.67 mmHg to -21.1 mmHg, with the greatest reduction noted in studies that used a nurse-led treatment algorithm (Dean et al., 2014, Saneei et al., 2014). Additionally, Kronebusch et al., (2020) used a nurse-led protocol that led to 93% of the intervention group reaching their blood pressure goal within 2 weeks, which was 6 weeks quicker than the usual care group.

## **Discussion**

Nurses are in a strategic position to make a difference in managing and sustaining positive health outcomes (Roussel et al., 2013). This is exemplified in the ambulatory setting where innovative models of care are influencing patient outcomes. After reviewing the studies related to nurse-led interventions supportive of hypertension reduction in the primary care setting, it appeared that a combination of interventions such as individualized hypertension education, frequent follow-up, and reinforcement of self-care behaviors were needed to yield better outcomes than usual care.

## **Conceptual Framework/Theoretical Model**

Orem's Self-Care Deficit Nursing Theory (SCDNT) guided this project. Orem's theory primarily focuses on the concept of self-care, where patients are active participants, capable of making decisions that positively affect their health. Three interrelated theories associated with the SCDNT model are theory of self-care, theory of self-care deficit, and theory of nursing systems. The theory of self-care relates to the activities that an individual completes to maintain well-being. Whereas the theory of self-care deficit takes place when the demand for self-care is

greater than the individual's ability to attain it, and once a deficit is identified, this brings about the need for nursing care. The nurse then works to eliminate or reduce the self-care deficit (Petiprin, 2020).

Parker (2010) emphasizes that Orem's SCDNT is applicable to nursing in diverse settings and with diverse populations. Applying this theory to blood pressure improvement in the primary care setting was relevant since nurses provide education to those individuals who are unable to achieve adequate blood pressure control on their own. Since Orem's theory primarily focuses on the concept of self-care, patients are considered active participants that can make decisions that positively affect their health. This belief guided the development of a structured approach to education, blood pressure measurements, and lifestyle modifications.

## **Methods**

### **Design**

This descriptive quantitative project used a pre-posttest of the Hypertension Evaluation of Lifestyle and Management (HELM) knowledge scale, and a pre-post measurement of blood pressure following participation in the nurse-led hypertension clinic. Data was collected through a retrospective chart review of adults 18 years of age and older, with either a new diagnosis of hypertension or those with uncontrolled hypertension who agreed to participate in the nurse-led hypertension clinic. The convenience sample consisted of voluntary participants provided by one of three internal medicine physicians in a primary care practice in the Research Triangle region of North Carolina. Three primary care physicians inquired if patients were interested in receiving care in the nurse-led hypertension clinic once they received a new diagnosis of hypertension (with or without medication) or had a follow-up appointment for uncontrolled

hypertension. My goal was to evaluate whether these patients benefited from structured education and close follow-up provided by the nurse-led hypertension clinic empowering patients to reach the blood pressure target of <140/90.

### **Translational Framework**

The Iowa Model of Evidence-Based Practice to Promote Quality Care was used for implementation/ dissemination of this project. This translational framework provided systematic guidance for implementing evidence-based practice change by following the steps of assessing, deciding, planning, implementing, and evaluating. The Healthcare organization, primary care network, and primary care practice recognized that hypertension was a problem that needed improvement. A team was formed to include the clinic manager, nurse manager, practice medical director and hypertension champion (provider). The team reviewed current literature and developed a plan by examining current state, setting goals, and identifying gaps in current processes. Next, baseline data was collected, counter measures were proposed and a timeline for implementation created. Lastly, interventions were implemented then evaluated to determine sustained practice change.

### **Setting**

This project was implemented at a large primary care practice in the Research Triangle Region in North Carolina. The 16 providers at this internal medicine practice consisted of physicians, nurse practitioners and a physician's assistant, three of which see both internal medicine and pediatric patients. There are 36 exam rooms, and average patient visits per week (including telemedicine) was 620. At the time this project was implemented, data obtained using a Tableau provider dashboard revealed the assigned practice panel was 22,206 patients with 15,876 who were seen by their primary care provider in the past 2 years.

The primary care patient population was comparable to other primary care practices described in the literature where nurse visits were used to improve hypertension (Dean et al., 2014, Hacıhasanoğlu and Gözüm, 2011, Kronebusch and Rismeyer 2020). The selected practice consisted of 13,367 patients over the age of 20 and 4,272 patients with the diagnosis of hypertension according to the Tableau provider dashboard. Additionally, this practice was selected to participate in this improvement project because it is one of the largest primary care practices where the leadership team, providers, and staff had experience with implementation of improvement projects.

### **Sample**

Six enrolled participants were a representation of those newly diagnosed with hypertension (treated with medication or without) or had a follow-up appointment for uncontrolled hypertension. All participants had active enrollment in the online patient portal used to access the electronic medical records (EMR), agreed to participate in the nurse-led hypertension clinic, and were comprised of both male and female, Caucasian and black, with ages ranging between 47-83 years of age.

### **Intervention**

The intervention included adult patients either newly diagnosed with hypertension (treated with medication or without) and agreed to education and follow-up. They were asked to participate in the nurse-led hypertension clinic by one of three physicians, who initiated a warm hand-off to a registered nurse (RN). The RN introduced themselves and the purpose of the nurse-led hypertension clinic and provided a copy of the Hypertension Evaluation of Lifestyle and Management (HELM) knowledge scale (Schapira et al., 2012). The RN ensured that the patient had an active online patient portal used to access their EMR and then assigned

Healthwise® information and videos related to generalized hypertension, risk factors, and home blood pressure monitoring (See Appendix B). The health system used Healthwise®, an evidence-based health education platform written in plain language. It included information about specific conditions, drugs, decision aids, instructions, procedures, lifestyle modification education videos and more. Patients were provided a home blood pressure monitor (if unable to obtain) and instructions about the electronic blood pressure log within the online patient portal used to access their EMR. Lastly, the RN scheduled appointments for a 2-week hypertension nurse visit, a 4-week virtual (or in-person) hypertension nurse visit, and a 6-week follow-up with their provider.

The 2-week hypertension nurse visit was scheduled for one hour to ensure that there was enough time to answer questions and review additional educational information. The RN reviewed the blood pressure log and recorded findings into the smart text/dot phrase (See Appendix C). Smart text/dot phrases are preformatted phrases and statements within an electronic health record that aid in completion and standardization of documentation. Next, the RN determined medication adherence and/or adverse reactions (if applicable) and provided education and resources as needed via Healthwise®. The RN measured the patient's blood pressure and if  $>140/90$  mm/Hg the Systolic Blood Pressure Intervention Trial (SPRINT) protocol was initiated followed by verifying the patient's blood pressure monitor for accuracy (accept 5-point difference). Additionally, the RN reviewed lifestyle modification information and set goals. Lifestyle modification education was provided via Healthwise® to include information and videos related to health eating, smoking cessation, and the importance of exercise. The RN engaged the provider if blood pressure was greater than 180/100.

At the 4-week 20-minute touch point, the RN reviewed blood pressure logs, medication



adherence, and/or adverse reactions if reported. The RN also discussed progress towards lifestyle modification goals and assigned additional Healthwise® education modules as needed. The RNs also attempted to contact patients who did not arrive for their scheduled appointments.

The 6-week follow-up appointment was with their provider. Blood pressure measurement was completed, and the posttest HELM was given. If the provider made any medication changes, the patient followed-up in two weeks with their provider. If blood pressure was at or below goal of 140/90, the patient was scheduled for a 6-week provider follow-up.

### **Data Collection**

**Procedures.** Primary data consisted of outcomes from the pre-posttest results of the HELM tool, blood pressure measurements at the initial, 2-week, 4-week, and 6-week visits, and completed Healthwise educational documentation in patient's EMR through a retrospective chart review. Data collection took place from June 2021 through the end of September 2021. When appropriate, patients were asked if they wanted to participate in this project by three participating physicians. Patients that agreed to participate were administered the pre-test (baseline) HELM by the RN at the initial visit and again at the posttest 6-week provider follow-up visit.

Deidentified data was entered into an Excel file that was stored via Box, a secure cloud-based storage service, and accessed using a password-protected computer. This project was deemed exempt by the institutional review board of the project site and the university.

**Instruments.** The Hypertension Evaluation of Lifestyle and Management (HELM) knowledge scale was validated for use as an assessment of knowledge relative to self-management of hypertension (See Appendix A). Schapira et al. (2012) noted a positive Pearson's correlation between the HELM and level of education, health numeracy, health print literacy, and patient activation measures. Permission to use this knowledge scale was obtained by

one of the co-authors, Marilyn M. Schapira, MD, MPH. The HELM knowledge scale consists of 14 questions covering the domains of general hypertension, medication management, blood pressure measurement, lifestyle modification, and treatment goals amongst patients who desire to be active participants in their health care. There are true/false and multiple-choice responses to the questions which can be read aloud to the patient if needed. The tool was scored based on correct or incorrect answers.

### **Data Analysis**

Descriptive statistics (i.e., means, percentages, and ranges) were used to describe the sample, distribution of the demographic data, and data from the HELM knowledge scale. A pre-post paired t-test was to be used for the HELM knowledge scale results. Unfortunately, due to the limited participant enrollment combined with participant attrition by the end of the 6-week nurse-led hypertension clinic, this statistical analysis was unable to be performed. Factors that may have influenced participant enrollment included provider time off, ongoing Covid-19 pandemic concerns and the reluctance for in-person patient appointments.

### **Results**

There were six participants enrolled in the nurse-led hypertension clinic. Of the total sample, 50% (n=3) were female, 50% (n=3) were male, 50% (n=3) were Caucasian, 50% (n=3) were Black and the mean age was 63.1 years (range 52-83). Antihypertensive medication was started on 100% (n=6) of the participants, and of those, 83% (n=5) were identified with a new diagnosis of hypertension. This project was designed as a pre-posttest survey of the HELM knowledge scale after four separate nurse visits over a 6-week period. The initial survey was completed by 100% (n=6) of the participants, with an average score of 61.1% (median=8.5, range=3). At the completion of the nurse-led hypertension visit enrollment, 16.6% (n=1)

completed the survey with a score of 78.5%. The mean score for this participant increased from 57.1% to 78.5%, reflecting a 21.4% increase.

Blood pressure measurements at the nurse-led hypertension clinic were completed at enrollment (first visit) and at two, four and six weeks. The average blood pressure measurement at the first visit was 165/86 mm/Hg (n=6). Sixty-seven percent (n=4) followed-up at the two-week appointment with an average blood pressure of 145/84 mm/Hg. The four-week follow-up had an average blood pressure of 143/87 mm/Hg (n=3), and 33% (n=2) followed-up at six weeks with an average blood pressure of 140/76 mm/Hg. The mean blood pressure reading from baseline to six weeks decreased for two participants reflecting a 20.4% decrease in systolic blood pressure and a 14.6% decrease in diastolic blood pressure. Participants were encouraged to monitor blood pressure readings at home and upload blood pressure data into their electronic health record. Registered nurses reviewed home blood pressure monitor readings which were obtained by 50% (n=3) of the participants with 33% uploading blood pressure data into their EMR. At the initial visit, the following Healthwise® educational videos were assigned: "The Effects of High Blood Pressure", "What is High Blood Pressure?", and "High Blood Pressure: Make the Most of Home Monitoring". An average of eight Healthwise® educational videos were presented to the participants. Thirty-three percent (n=2) of the participants watched an average of 64% of the assigned educational videos and four of them did not watch any of the videos assigned.

## **Discussion**

This quality improvement project sought to improve blood pressure control and knowledge related to self-management in patients with hypertension through a nurse-led hypertension clinic, focusing on education and bi-weekly follow-up. The Iowa Model of

Evidence-Based Practice to Promote Quality Care provided the organizing framework to guide this project by applying evidence-based practice changes necessary to improve desired outcomes. Key findings included improved participant knowledge related to hypertension (n=1) and a decrease in the mean systolic and diastolic blood pressure readings (n=2) at the six-week visit. The improvements noted with the participant knowledge and blood pressure readings demonstrated the theory of self-care in Orem's SCDNT, whereas the other participants may still exist in a self-care deficit. It is in this self-care deficit where the hypertension nurse visit is used to reduce the deficit and return the patient to a state of self-care and capable of making decisions that improve their health. By utilizing structured nurse visits for hypertension management, nurses in primary care are in a unique position to improve patient care outcomes. Additionally, they are able to practice at the top of their scope and support changing reimbursement structures that emphasize value-based care models for chronic conditions (Bauer & Bodenheimer, 2017).

### **Limitations**

This project was limited by its small sample size. Participant enrollment was dependent upon three internal medicine providers to refer patients into the hypertension nurse clinic. At the conclusion of the project, provider feedback included time constraints during the office visit which led to overlooking the project thus missed opportunities. In a similar study, Kronebusch et al., (2020) noted that reminders and regular communication was needed to encourage provider referrals when they began their RN hypertension quality improvement project. In the future as a way to increase provider engagement and recruitment into the nurse-led hypertension clinic, all of the providers at the practice location would receive enhanced education to familiarize them with the components of the hypertension nurse visit. Furthermore, recurring feedback and reminders would be provided during the daily huddle. An additional limitation noted in this

project was patient commitment to scheduled follow-up appointments and reviewing assigned educational materials.

### **Recommendations for Future Study**

Recommendations for future clinical practice includes developing a nurse-driven protocol used to monitor blood pressure readings, assess symptoms, and titrate medication. The benefits for using a nurse-driven protocol include increased provider access, improved patient outcomes, and enhanced patient, provider, and nurse satisfaction (Kronebusch et al.,2020). Another recommendation would be to create a separate template for nurse visits solely focusing on hypertension or use an existing nurse visit template and incorporate appointments that are specifically reserved for hypertension management. This improves clinical practice by standardizing best practices, increasing provider confidence, and encouraging top of scope nursing practice. Nurse-led interventions such as in-person hypertension nurse visits is supported in the literature to improve blood pressure control and potentially lower healthcare costs (Clark et al., 2010, Himmelfarb et al., 2016).

### **Relevance and Recommendations for Clinical Practice**

This project was convened at one primary care practice; however, the implication for sustained clinical practice change was realized when the author was asked to participate in the network-wide (47 total practices) hypertension rapid improvement event (RIE). Following the hypertension RIE, a workgroup tasked with improving the hypertension nurse visits for the entire network adapted my smart text/dot phrase structure (see Appendix C), and Healthwise® patient education related to general hypertension, lifestyle modifications, and hypertension medications and side effects. There are currently three pilot sites collecting data and developing best practices that will ultimately spread throughout the network.

## **Conclusion**

The implementation of nurse visits specifically addressing hypertension, serves to support the *Call to Action* issued by the U.S. Surgeon General. By focusing specifically on hypertension education and close follow-up, patients improved their blood pressure and increased their knowledge related self-management. Additionally, when blood pressure is effectively managed, cardiovascular risk factors decrease, organizational quality metrics improve, overall hospital expenditures decrease, and most importantly patient health is optimized. Moreover, nurse-led interventions empower patients to take a proactive approach toward improving their health.

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## Appendix A

### HELM

#### Hypertension Evaluation of Lifestyle and Management

1. A person is considered to have hypertension if either their systolic blood pressure is 140 or their diastolic blood pressure is 90 or higher on two separate occasions	<input type="radio"/> True <input type="radio"/> False
2. Most people can tell when their blood pressure is high because they feel bad.	<input type="radio"/> True <input type="radio"/> False
3. Uncontrolled hypertension can lead to which of the following:	<input type="radio"/> Lung Cancer <input type="radio"/> Kidney Failure <input type="radio"/> High Cholesterol <input type="radio"/> Diabetes
4. Which of the following increases your risk of having hypertension?	<input type="radio"/> Weight lifting <input type="radio"/> Drinking >2 cups of coffee a day <input type="radio"/> Smoking a pack of cigarettes <input type="radio"/> Gaining 15 pounds
5. People with hypertension do not need to take medication if they exercise regularly	<input type="radio"/> True <input type="radio"/> False
6. Which of the following statements about taking blood pressure medicine is TRUE?	<input type="radio"/> Blood pressure medicine should always be taken with food <input type="radio"/> More than one type of blood pressure medication can be taken at one time <input type="radio"/> Blood pressure medicine works best if taken at bedtime <input type="radio"/> Blood pressure medicine should not be taken if a person drank alcohol that day
7. Most of the salt Americans eat is added with a salt shaker	<input type="radio"/> True <input type="radio"/> False
8. There are about as many calories in 12 ounces of regular orange juice as there are in 12 ounces of regular cola	<input type="radio"/> True <input type="radio"/> False
9. An overweight 60-year-old man has hypertension. He drinks on bottle of beer and 4 cups of regular coffee a day. He adds regular table salt to his food at most meals. Which one of the following changes is most likely to lower his blood pressure?	<input type="radio"/> Lose 10 pounds <input type="radio"/> Stop drinking alcohol <input type="radio"/> Switch to decaffeinated coffee <input type="radio"/> Switch to sea salt
10. Which of the following changes to your diet is most likely to lower blood pressure?	<input type="radio"/> Eat more fruits, vegetables, whole grains, and low-fat dairy products <input type="radio"/> Eliminate spicy food <input type="radio"/> Drink one glass of red wine daily <input type="radio"/> Drink herbal tea instead of coffee

<p>11. Which one of the following statements about exercise and blood pressure is true?</p>	<ul style="list-style-type: none"> <li>○ People who are the feet most of the day will not benefit from more exercise</li> <li>○ Exercising for 30 minutes every day lowers blood pressure more than exercising 30 minutes, 3 days a week</li> <li>○ Weight lifting should be avoided by people with high blood pressure</li> <li>○ When exercising, you must raise your heart rate to at least 100 beats a minute to improve blood pressure</li> </ul>
<p>12. A man reports that his blood pressure is 148/78 mm Hg when he checks it using the blood pressure machine in the pharmacy, 144/66 mm Hg in family doctor's office, and 132/74 mm Hg when it checks it at home. Which of the following statements is TRUE?</p>	<ul style="list-style-type: none"> <li>○ It is common for blood pressure readings to vary like this</li> <li>○ The highest blood pressure reading is the correct one</li> <li>○ The lowest blood pressure reading is the correct one</li> <li>○ He can be reassured that his blood pressure is normal</li> </ul>
<p>13. When measuring your blood pressure at home, you should:</p>	<ul style="list-style-type: none"> <li>○ Always take your reading before you take your blood pressure medication</li> <li>○ Take several readings, a minute or 2 apart, and record the lowest one</li> <li>○ Take your blood pressure reading right after exercising and at least 2 hours after a meal</li> <li>○ Take two readings, a minute or 2 apart, and write down the average value</li> </ul>
<p>14. Blood Pressure is measured with two numbers, an upper number and a lower number. It is usually written as upper number/lower number. If some is told that their goal blood pressure is 126/76, when have they reached their goal?</p>	<ul style="list-style-type: none"> <li>○ When the upper value is below 126 and lower is below 76</li> <li>○ When the upper is below 126, even if the lower is over 76</li> <li>○ When the lower is below 76, even if the upper is over 126</li> <li>○ When the average of the upper and lower is &lt;100</li> </ul>

**TABLE IV. The HELM Knowledge Scale**

Item no.	Stem	Response Choices
1	A person is considered to have hypertension if either their systolic blood pressure is 140 or their diastolic is 90 or higher on two separate occasions.	<u>True</u> False
2	Most people can tell when their blood pressure is high because they feel bad.	True <u>False</u>
3	Uncontrolled hypertension can lead to which of the following:	Lung cancer <u>Kidney failure</u> High cholesterol Diabetes
4	Which of the following increases your risk of having hypertension?	Weight lifting Drinking >2 cups of coffee a day Smoking a pack of cigarettes <u>Gaining 15 pounds</u>
5	People with hypertension do not need to take medicine if they exercise regularly	True <u>False</u>
6	Which of the following statements about taking blood pressure medicine is TRUE?	Blood pressure medicine should always be taken with food <u>More than one type of blood pressure medicine can be taken at the same time</u> Blood pressure medicine works best if it is taken at bedtime Blood pressure medicine should not be taken if a person drank alcohol that day
7	Most of the salt Americans eat is added with a salt shaker.	True <u>False</u>
8	There are about as many calories in 12 ounces of regular orange juice as there are in 12 ounces of regular cola.	<u>True</u> False
9	An overweight 60-year-old man has hypertension. He drinks one bottle of beer and 4 cups of regular coffee a day. He adds regular table salt to his food at most meals. Which one of the following changes is the most likely to lower his blood pressure?	<u>Lose 10 pounds</u> Stop drinking alcohol Switch to decaffeinated coffee Switch to sea salt
10	Which one of the following changes to your diet is most likely to lower blood pressure?	<u>Eat more fruits, vegetables, whole grains, and low-fat dairy products</u> Eliminate spicy foods Drink one glass of red wine daily Drink herbal tea instead of coffee
11	Which one of the following statements about exercise and blood pressure is TRUE?	People who are on their feet most of the day will not benefit from more exercise <u>Exercising for 30 minutes every day lowers blood pressure more than exercising for 30 minutes, 3 days a week</u> Weight lifting should be avoided by people with high blood pressure When exercising, you must raise your heart rate to at least 100 beats a minute to improve blood pressure
12	A man reports that his blood pressure is 148/78 mm Hg when he checks it using the blood pressure machine in the pharmacy, 144/66 mm Hg in his family doctor's office, and 132/74 mm Hg when he checks it at home. Which of the following statements is TRUE?	<u>It is common for blood pressure readings to vary like this</u> The highest blood pressure reading is the correct one The lowest blood pressure reading is the correct one He can be reassured that his blood pressure is normal
13	When measuring your blood pressure at home, you should:	Always take your reading before you take your blood pressure medicine Take several readings, a minute or 2 apart, and record the lowest one Take your blood pressure right after exercising and at least 2 hours after a meal <u>Take two readings, a minute or 2 apart, and write down the average value</u>
14	Blood pressure is measured with two numbers, an upper number and a lower number. It is usually written as upper/lower. If someone is told that their goal blood pressure is 126/76, when	<u>When the upper is below 126 and the lower is below 76</u> When the upper is below 126, even if the lower is over 76 When the lower is below 76 even if the upper is over 126



## **Appendix B**

Healthwise® is an accredited health web site and provider of evidence-based health education, technology, and services. Healthwise® is an evidence-based health education platform written in plain language. It includes information about specific conditions, drugs, decision aids, instructions, procedures, videos and more.

This DNP project will provide the patient education information and video topics listed below via the electronic medical record (EMR).

### **General Hypertension**

The Effects of High Blood Pressure (Video)

What Is High Blood Pressure? (Video)

4 Heart-Healthy Changes to Lower Blood Pressure (Video)

Taking Blood Pressure at Home (Video)

High Blood Pressure: Make the Most of Home Monitoring (Video)

Hypertension: General Info

Stroke: Risk Factors: General Info

### **Medication**

Deciding About Taking Blood Pressure Medicine (Video)

Taking Blood Pressure Medicine: How Others Decided (Video)

Medicine for High Blood Pressure (Video)

ACE Inhibitors and ARBs: Helping Blood Flow Better (Video)

ACE Inhibitors: General Info

Beta-Blockers: Helping Your Heart Relax (Video)

Beta-Blockers: General Info

Diuretics: Making Them Easier to Take (Video)

HTN (Hypertension): Diuretics: General Info

### **Lifestyle**

Five Ingredients for Healthy Eating (Video)

High Blood Pressure: The DASH Diet (Video)

Chronic Health Conditions: Lifestyle Changes

Diet: DASH

Healthy Diet: Heart

Heart-Healthy Diet (Video)

Low Sodium Diet

Smoking Cessation: Health Benefits: General Info

Fitness: Moving More (Video)



## Appendix C

### Smart text/dot phrase-Initial HTN Nurse Visit

Subjective:

@NAME@ is a @AGE@ @SEX@ with diagnosis of hypertension.

Patient presented with HELM (Hypertension Evaluation of Lifestyle and Management) knowledge survey Questions and patient's responses are noted below.

- 1: A person is considered to have hypertension if either their systolic blood pressure is 140 or their diastolic blood pressure is 90 or higher on two separate occasions  
{Q1:53682}
2. Most people can tell when their blood pressure is high because they feel bad.  
{Q2:53685}
3. Uncontrolled hypertension can lead to which of the following:  
{Q3:53686}
4. Which of the following increases your risk of having hypertension?  
{Q4:53687}
5. People with hypertension do not need to take medication if they exercise regularly  
{Q5:53688}
6. Which of the following statements about taking blood pressure medicine is TRUE?  
{Q6:53689}
7. Most of the salt Americans eat is added with a saltshaker  
{Q7:53690}
8. There are about as many calories in 12 ounces of regular orange juice as there are in 12 ounces of regular cola  
{Q8:53691}
9. An overweight 60-year-old man has hypertension. He drinks on bottle of beer and 4 cups of regular coffee a day. He adds regular table salt to his food at most meals. Which one of the following changes is most likely to lower his blood pressure?  
{Q9:53692}
10. Which of the following changes to your diet is most likely to lower blood pressure?  
{Q10:53693}
11. Which one of the following statements about exercise and blood pressure is true?  
{Q11:53694}
12. A man reports that his blood pressure is 148/78 mm Hg when he checks it using the blood pressure machine in the pharmacy, 144/66 mm Hg in family doctor's office, and 132/74 mm Hg when it checks it at home. Which of the following statements is TRUE?  
{Q12:53695}
13. When measuring your blood pressure at home, you should:  
{Q13:53696}
14. Blood Pressure is measured with two numbers, an upper number and a lower number. It is usually written as upper number/lower number. If some is told that their goal blood pressure is 126/76, when have they reached their goal?  
{Q14:53697}

The patient correctly answered \*\*\* of 14 questions.

Plan:

Patient is asked to obtain a home blood pressure cuff and return to next appointment with the device to confirm proper application and usage, including monitoring BP once each morning and prior to bed. These results should be reported via the BP monitoring link with their MyChart Application.

Measured arm diameter on {left/right:311354} arm is \*\*\* cm; the best option for optimum blood pressure measurement is to use the {Optimum BP Cuff Size Home Use:53741}. When coming to the clinic, please remind your care provider to use the appropriate cuff. The clinic cuff recommended for you is the {Optimum Clinical Cuff:53742}. Please remember that your cuff size may change due to changes in your weight or arm circumference.

Assigned the following Healthwise educational videos for reinforcement of effects of hypertension and to encourage following prescribed medication plan:

1. "The Effects of High Blood Pressure"
2. "What is High Blood Pressure?"
3. "High Blood Pressure: Make the Most of Home Monitoring"

Subsequent visits are scheduled for 2 weeks, 4 weeks (Video or Telephone) and 6 weeks with provider.

### **Smart text/dot phrase-2-week HTN Nurse Visit**

Subjective:

@NAME@ is a @AGE@ @SEX@ with diagnosis of hypertension. Patient enrolled in Hypertension Nurse Visit Clinic.

Assessment:

Medication compliance discussed. Medication regimen is as listed:  
@ACTIVEMODSTODCMEDS@

@NAME@ reports {Medication assessment:10573}

Home BP Cuff recommended at last visit was {Home BP Cuff:53746}.

Initial BP reading from clinic device was \*\*\*/\*\* mm Hg. Sprint Protocol {was/not:27641} indicated. Average Sprint readings were \*\*\*/\*\*.

Patient's own cuff was utilized on the same arm and read \*\*\*/\*\*.

Lifestyle concerns assessed:

Patient most recent documented weight is @LASTWEIGHT@. Patient BMI is @LASTBMI@.

Preferred exercise activities include: {EM EXERCISE:900024264}. Average duration of reported activity is \*\*\* minutes, \*\*\* days per week.

Review of reported dietary habits {Diet Related Concerns:2100035050}

Patient {DPC Smoking Amount:53776}

Plan:

Follow current medication regimen until otherwise directed by your provider. Report any of the following side effects to your provider {EM HTN MED SIDE EFFECTS:900024262}

Recommended the following Healthwise medication modules:  
{SD HW HTN MED Teaching:53862}

Patient was instructed on the appropriate use of home cuff, how to save & recall prior readings, and how to upload into the MyChart BP Flowsheet.

Recommended the following Healthwise home blood pressure monitoring modules:  
{SD HW HTN Home BP Monitoring:53863}

Lifestyle modification goals agreed upon during the visit include: {SD Lifestyle:53774}  
Aerobic Exercise interventions the patient agrees to include: {EM EXERCISE:900024264}  
Weight Control interventions the patient agrees to include: {SD HTN Weight Mgmt Interventions:53865}

The following Healthwise modules focusing on Lifestyle modification were recommended:  
{SD HW HTN Lifestyle:53864}

Patient in agreement with suggested plan.  
Subsequent visits are scheduled for 2 weeks (Video or Telephone) and 4 weeks with provider.

### **Smart text/dot phrase- 4-week HTN Nurse Visit**

Subjective:  
@NAME@ is a @AGE@ @SEX@ with diagnosis of hypertension. Patient enrolled in Hypertension Nurse Visit Clinic.

Assessment:

Medication compliance discussed. Medication regimen is as listed:  
@ACTIVEMODSTODCMEDS@

@NAME@ reports {Medication assessment:10573}

Patient's home blood pressure readings uploaded into flowsheet.

At last appointment, the patient was provided with print and/or video Healthwise educational materials. The patient reports \*\*\*

Lifestyles goals from last visit include \*\*\*

Patient reports \*\*\*

Plan:

Follow current medication regimen until otherwise directed by your provider. Report any of the following side effects to your provider {EM HTN MED SIDE EFFECTS:900024262}

Patient was instructed to continue to monitor blood pressure at home and upload into the MyChart BP Flowsheet.

Patient in agreement with suggested plan.

Subsequent visit is scheduled with provider in 2 weeks

## Smart text/dot phrase- 6-week HTN Nurse Visit

Having completed 6 weeks of Hypertension Nurse Visit Clinic follow up, the patient's understanding of hypertension was reassessed. Patient was again presented with HELM (Hypertension Evaluation of Lifestyle and Management) knowledge survey Questions and patient's responses are noted below.

1: A person is considered to have hypertension if either their systolic blood pressure is 140 or their diastolic blood pressure is 90 or higher on two separate occasions

{Q1:53682}

2. Most people can tell when their blood pressure is high because they feel bad.

{Q2:53685}

3. Uncontrolled hypertension can lead to which of the following:

{Q3:53686}

4. Which of the following increases your risk of having hypertension?

{Q4:53687}

5. People with hypertension do not need to take medication if they exercise regularly

{Q5:53688}

6. Which of the following statements about taking blood pressure medicine is TRUE?

{Q6:53689}

7. Most of the salt Americans eat is added with a saltshaker

{Q7:53690}

8. There are about as many calories in 12 ounces of regular orange juice as there are in 12 ounces of regular cola

{Q8:53691}

9. An overweight 60-year-old man has hypertension. He drinks on bottle of beer and 4 cups of regular coffee a day. He adds regular table salt to his food at most meals. Which one of the following changes is most likely to lower his blood pressure?

{Q9:53692}

10. Which of the following changes to your diet is most likely to lower blood pressure?

{Q10:53693}

11. Which one of the following statements about exercise and blood pressure is true?

{Q11:53694}

12. A man reports that his blood pressure is 148/78 mm Hg when he checks it using the blood pressure machine in the pharmacy, 144/66 mm Hg in family doctor's office, and 132/74 mm Hg when it checks it at home. Which of the following statements is TRUE?

{Q12:53695}

13. When measuring your blood pressure at home, you should:

{Q13:53696}

14. Blood Pressure is measured with two numbers, an upper number and a lower number. It is usually written as upper number/lower number. If some is told that their goal blood pressure is 126/76, when have they reached their goal?

{Q14:53697}

The patient correctly answered \*\*\* of 14 questions with the repeat assessment. Previously answered \*\*\* of 14 correctly.