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Implementation of a Self-Care Management Program Utilizing Telehealth in Adults with Hypertension

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**Implementation of a Self-Care Management Program Utilizing Telehealth for Adult
Patients with Hypertension: A Quality Improvement Program**

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Abstract

Hypertension (HTN) can lead to heart disease which is the leading cause of death in the United States for men, women, and most racial and ethnic groups. Evidence-based practice supports early recognition of available self-care management (SCM) modalities to impact hypertension improvement and medication adherence. Best practices for heart disease prevention and management include lifestyle modification, reducing out-of-pocket costs, self-management support and education, and self-measured blood pressure monitoring. Successful evidence-based approaches within literature have addressed the modalities and successful outcomes.

The Plan-Do-Study-Act (PDSA) is a quality standard of The Institute of Health Improvement (IHI) was used to conduct this project to improve hypertension, including self-knowledge questionnaires, telehealth utilization, and a hypertension diagnosis code from electronic health records (EHR). The results of this quality improvement program demonstrated that the combination use of self-care knowledge assessments identified areas contributing to hypertension. In telehealth care, blood pressure (BP) readings improved and were clinically significant. The analysis and recommendations provided information to consider continuation of a SCM program to improve patient outcomes of hypertension, including patient education and access to telehealth.

Keywords: hypertension, telehealth, telemedicine, and self-care management of chronic illnesses.

**Implementation of a Self-Care Management Program Utilizing Telehealth for Adult
Patients with Hypertension**

Hypertension (HTN) can lead to heart disease and stroke which are the leading causes of
death in the United States for men, women, and most racial and ethnic groups (CDC, 2023).
Heart disease is also the leading cause of death in the state of Ohio (CDC, 2023). An elevated
blood pressure is a risk factor extending to the economic burdens of hypertension. In the United
States alone $131-$198 billion is spent each year in the management of hypertension (CDC,
2022).

In 2017, a community health survey collected responses from adults addressing perceived
health problems of the count from 675 individuals in Jefferson County, Ohio. This report found
that heart disease, high blood pressure and high cholesterol were in the top six health problems
affecting the community (Jefferson County Health Department and the City of Steubenville
Health Department, 2017). Jefferson County ranks number 75 of 88 counties in Ohio and among
the least healthy (County Health Rankings, 2023). Other health outcomes identified in **Table 1**
are categorized as not included in the rankings are adult smoking, adult obesity, physical
inactivity, and adult obesity (County Health Rankings, 2023).

Table 1

Additional Health Outcomes (not included in overall ranking)

Health Outcomes			
	Jefferson County	Ohio	United States
Adult Smoking	26%	20%	16%
Physical Inactivity	29%	24%	22%
Adult Obesity	39%	36%	32%

Note. County Snapshot of Health Outcomes among the state, county, and United States.

https://www.countyhealthrankings.org/explore-health-rankings/ohio/jefferson?year=2023

Patients with uncontrolled and undiagnosed hypertension, due to lack of access to medications and clinical care will often experience a higher risk for heart disease, including myocardial infarctions and congestive heart failure. Approximately 48% of adults in the United States population have been diagnosed with hypertension, raising the risk of heart attack or stroke in every one in four adults (CDC, 2023, July). In 2019, Jefferson County, Ohio ranked 37.7% in high blood pressure prevalence which was an increase from 36.9% in 2017 (Conduent Healthy Communities, 2023).

This county is also designated by Health Resources and Services Administration (HRSA) as a Health Professional Shortage Area (HPSA) with a score of 15 of 26 (2021). This impacts the community's ability to provide its residents with needed health and illness management. Early detection of hypertension impacts access to health professionals especially for those residents with other barriers of care, such as being underinsured or homeless.

While the pursuit of hypertension management begins with early identification, the Affordable Care Act (2010) has established new expectations for primary care providers to provide structured chronic care management programs strategies and programs (CMS, n.d.). Self-care management and early interventions via telehealth in primary care settings have been shown to improve access to care and reduction of poor patient outcomes. Telehealth offers patients an opportunity to engage in the management of their own healthcare by self-monitoring BP measurement and reporting and receiving and sharing clinical information outside of traditional primary care visits.

There are five levels of blood pressure: normal; elevated; hypertension stage 1; hypertension stage 2; and hypertensive crisis (AHA, 2023). If elevated BP readings were identified early, patient interventions including medication evaluation, knowledge of

hypertension, and scheduled telehealth sessions result in a self-care management process leading to improved blood pressure results. Early intervention of hypertension identification in patients is often faced with barriers to disease management including limited access to healthcare; laboratory testing; screening; managing hypertension; anti-hypertensive medications; and a lack of a system for clinical monitoring and performance evaluation (Skeete, et al., 2020). Telehealth can serve multiple purposes in the early identification of HTN by reducing trips to the emergency room, improving healthcare access, and assisting with earlier responses to questions and patient education.

This quality improvement project took place at a clinic in Jefferson County, located in Northeastern Ohio. Among the 88 counties in Ohio, Jefferson county is ranked among the least healthy counties in Ohio at below 25% (County Health Rankings, 2023). The purpose of this DNP quality improvement project is to expand self-care management resources using telehealth to improve the cardiovascular status in adults diagnosed with hypertension.

Literature Review

The Johns Hopkins Nurse Evidence-Based Practice (JHNEBP) model was used as the framework to approach the literature review of this Doctor of Nursing Practice (DNP) project. This model offers a specific approach to best practice and practice improvements in clinical practice. Incorporating tools for practice problem solving including identifying the practice question, evidence, and translation to support a clinical decision-making model in healthcare organizations. Appraisal of evidence for strength and quality support the components of the practice question. Best practice in healthcare is the optimal goal when using the JHNEBP model. This DNP project focuses on the impact of telehealth towards hypertension self-care management reflective of the use of JHNEBP model.

A literature review was performed using the following databases: PubMed, Cochrane Data base of Systematic Reviews, and Cumulative Index to Nursing and Allied Health Literature (CINAHL). The following were used as key search terms for each database including hypertension, Medication adherence, telehealth, telemedicine, and self-care management of chronic illnesses.

Evidenced-based, peer reviewed articles from 2018 to 2023 were selected. Articles were chosen based on the outcomes of clinical intervention and access to care. Additional articles later than 2018 were identified as supportive practice shaping the recent interventions. The JHNEBP evidence levels and quality ratings were the criteria used to meet the objectives of this quality improvement project. A summary of the synthesis and appraisal of the literature is in Appendix A.

Self-Care Management

The use of technology is an effective tool to complement and support chronic disease management education and prevention (Santos et al., 2022). Using a self-care tool to assess HTN knowledge offers early identification of patient knowledge and care practices about chronic disease management and opportunities towards improvement. The HELM is a valuable tool of 14 questions divided among three domains that establish basic aspects of HTN knowledge (Schapira et al., 2012). The domains are:

- General hypertension knowledge
- Lifestyle and medication management
- Monitoring and setting goals

Administering the HELM helps to identify the individual's basic understanding of hypertension, its symptoms, and its complications if left untreated (Schapira et al., 2012). Once identified, a program that offers skills to manage chronic conditions, hypertension, will support the individual to strategize a plan towards improved outcomes of their health. CDC offers interactive self-management education (SME) programs for a fee to help individuals learn skills, feel confident in carrying out the strategies towards improvement, and to manage symptoms of their condition (2018). The following self-study kits are also included: workbook "Living a Healthy Life with Chronic Conditions; Information sheets briefly describing common problems and helpful solutions; a self-test that helps to identify elements and set priorities for a personal self-management plan; action plan description with instruction and examples for developing a unique plan; and exercise action plan with hints and instruction on use of the other exercise and activity materials, relaxation CD and exercise CD (CDC, 2018). The self-test, and HELM, both identify elements and set priorities when it comes to managing a chronic disease such as hypertension.

Hypertension Management

Hypertension is a chronic condition that leads to serious cardiovascular complications when left untreated or unmanaged. Effective chronic disease management begins by assessing the patient's baseline knowledge. As a supportive practice, an understanding of blood pressure parameters, nutritional practices, physical activity, and social habits such as smoking can better guide an individual towards the successful management of hypertension (Gyamfi et al., 2017). As described by Warren-Findlow et al. (2019), hypertension levels of systolic blood pressure greater than 120 mmHg have gained the attention from updated guidelines to include the need for lifestyle behavior data. Warren-Findlow et al. also described the purpose of H-SCALE is to

assess systolic blood pressure (SBP) and diastolic blood pressure (DBP) management in
determining potential counseling considerations in the quest to identify which self-care behavior
takes priority in having the greatest impact on hypertension management (2019).

As previously discussed, the Hypertension Evaluation of Lifestyle and Management
Knowledge Scale (HELM) assesses the patient's level of preparedness. Including a series of
questions of defining hypertension, complications, exercise, dietary practices, home monitoring,
and expected BP reading variations (Schapira et al., 2012). As reflected in Appendix B, the
HELM consists of 14 questions addressing 3 characteristics of knowledge: general HTN
knowledge, lifestyle and medication management, and monitoring and setting goals:

- General HTN knowledge: definition of HTN, symptoms of HTN, complications of HTN

- Lifestyle and medication management: healthy behaviors and blood pressure levels,
  exercise and need for medications, how to take medication, sources of salt intake, calories
  in beverages, lifestyle and blood pressure control, DASH diet, exercise and blood
  pressure levels

- Monitoring and setting goals: expected variation in BP readings, home monitoring, goal
  systolic, diastolic readings

  Each subscale of HELM was scored by either a true/false response or a multiple-choice
  selection. The HELM is a lengthy questionnaire, however, does provide a measurement
  of different levels of patient knowledge of HTN leading to the usefulness of the tool.

Medication Adherence

Another valuable self-knowledge tool used is the Brief Medication Questionnaire (BMQ)
that assesses medication adherence through the patient's ability to identify the name of
medication, frequency, missed dosages, reason for dosage, efficacy, problems or concerns, and
discontinuation of medications (Svarstad, 1999). This self-reporting tool also explores a patient's

assistance needs in their medication management. In identifying a patient's day-to-day medication practice, the BMQ does not secure a 100% accuracy, but offers a point of discovery towards the development of a program of improvement. For example, it is recommended to ask about behavioral practices with medication regimens using a shorter recall period versus long recall periods to improve reporting errors (Svarstad, 1999). Another aspect impacting medication adherence is the wording of a question which may impact memory responses to the BMQ including language that may suggest carelessness of the patient (Svarstad, 1999). A full view of the BMQ is reflected in Appendix C.

While these techniques are considered when it comes to improving patient outcomes, individuals living with multimorbidity, the coexistence of two or more chronic conditions, polypharmacy increases risk of non-adherence in self-report measures (Foley et al., 2021). Clear communication is represented here by the different delivery modes of questioning including the consideration of what impacts memory responses and the time frame for recall. In telephonic outreach, for example, medication adherence in hypertension was improved using behavioral interventions through 10 phone calls over 6 months (Bingham, et al., 2021).

Telehealth

Healthcare delivery experienced a change during the COVID-19 pandemic. Individuals and healthcare providers were faced with challenges in managing both acute and chronic illnesses. The demand for telehealth and telemedicine increased in an effort to prevent the spread of COVID-19. The terms telehealth and telemedicine are often used interchangeably as telemedicine is under the umbrella of telehealth (Gajarawala &Pelkowski, 2021). Both telehealth and telemedicine are good supplements for in-person delivery of healthcare (Gajarawala & Pelkowski, 2021). According to Indraratna et al., telemedicine using smartphone apps and text

message reminders did improve medication adherence that led to BP reductions (2020). Another

result includes that the readings of blood pressure were significantly lowered by including short

message service (SMS) reminders to promote adherence and healthy behaviors (Indraratna et al.,

2020).

Telehealth interventions resulted in either similar or increasingly positive clinical

outcomes for patients when compared to usual care and improved overall cardiovascular disease

outcomes (Snoswel, et al., 2021). The consideration of telehealth use must involve the

continuation of evaluating clinical effectiveness as a supportive platform for disease

management. According to Snoswel, et al., telehealth will not compromise the effectiveness of

clinical care when compared with conventional forms of health service delivery, but discipline

specific must also be considered (2021).

In a two federally qualified health centers who serve diverse population in Arkansas,

Arizone, Kentucky, and Mississippi, telehealth use was increased during COVID-19 pandemic

(Sreedhara et al., 2022). During this time, telehealth offered healthcare especially when

transportation was a barrier and offered consistent or improved health care for some patients

diagnosed with hypertension (Sreedhara et al., 2022).

 Telehealth offers effective education in hypertension management. Each patient enrolled

will experience telehealth sessions to report home blood pressure readings and can ask questions

about their diagnosis and management. Telehealth is a promising tool that offers a remote

healthcare delivery service to manage acute and chronic diseases (Omboni et al., 2020).

Clinically, telehealth interactions between patients and caregivers can be either synchronous or

asynchronous, although typically synchronous (Omboni et al., 2020). Telehealth is a convenient

and effective communication option. The perceptions of telehealth, conveyed by clinicians

included quality, ease, and comfort especially when treating established patients versus new patients (Connolly, et al., 2022). Telehealth also facilitates the opportunity for an early intervention as an effective approach to address methods of blood pressure control for self-care management including monitoring blood pressure, medication adherence tolerance (Drake et al., 2022). Additionally, telehealth can complement and support care in non-communicable diseases, hypertension for example, in managing the population's hypertension prevention, diagnosis, treatment, and health education (Santos et al., 2022).

IHI Model of Improvement, PDSA

A process to accelerate improvement includes the framework, Plan-Do-Study-Act (PDSA) from the Institute of Healthcare Improvement (IHI, 2023). As a constant method of improvement, this process tests change for the next PDSA (IHI, 2023).

Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) developed tools to conduct evidence-based practice projects including components of the Patient/population, Intervention-Comparison—Outcome (PICO) question (JHNEBP, 2023). The PICO question for this study was, "In adults with hypertension, a chronic health condition, will the use of telehealth in disease management compared to customary care improve blood pressure readings?" This study incorporated the PDSA framework and identified telehealth effectiveness in chronic diseases; self-care management processes; self-care knowledge of hypertension and medication adherence questionnaires; access to media platforms; patient education; and blood pressure home monitoring.

<center>**Description of Project**</center>

The purpose of this DNP quality improvement project is to evaluate the effectiveness of telehealth in adult patients diagnosed with hypertension in a free health clinic located in Jefferson County, Ohio. This clinic received funding from the National Association of Free

Clinics (NAFC) during COVID-19 for telehealth which created the opportunity to focus on chronic disease management and outreach care for patients. Each patient with an International Classification of diseases (ICD10) code of hypertension was identified as eligible. Their health insurance status was also identified and documented. This documentation is reflected in the objectives.

Aim 1: Develop a self-care management (SCM) program for adult patients with hypertension utilizing telehealth within a free clinic.

> Objectives
>> a. Identify patient with hypertension using electronic health record (EHR) & International Classification of Disease (ICD) code for hypertension.
>> b. Develop a SCM program incorporating American Heart Association (AHA) educational material and videos.
>> c. Orient staff, volunteers, and healthcare providers to the program.
>> d. Develop provider and staff survey regarding telehealth utilization and recommendations post project.
>> e. Identify barriers to medication adherence using the BMQ.
>> f. Create a data collection form to document all patient outcome results.

Aim 2: Implementation of a self-care management (SCM) program at a free clinic for adult patients with hypertension utilizing telehealth.

> Objectives
>> a. Enroll patients to the program from April 10 to July 1, 2023
>> b. Monitor use of data collection procedure using clinic policies
>> c. Implement the SCM program:
>>> a. Visit #1: In-person
>>>> i. Assure each patient has access to a home monitoring blood pressure cuff and provide a BP log.
>>>> ii. Investigate patient access to telehealth, internet, and telephone.

        iii. Share AHA "Understanding Blood Pressure Readings"

            handout.

        iv. Conduct 1st HELM and 1st BMQ.

    b. Visit #2: Telehealth

        i. The provider reviews the BP log and answers questions.

        ii. The provider reviews the patient's medications and provides clarification.

    c. Visit#3: Telehealth

        i. The provider reviews the BP log and answers questions.

        ii. The provider reviews the patient's medications and provides clarification.

        iii. Conduct 2nd HELM and 2nd BMQ.

Aim 3: Analyze data collection and make recommendations.

    Objectives

    a. Conduct and analyze three question survey with providers and staff regarding telehealth utilization.

    b. Analyze responses of the HELM and BMQ from Visit #1 and Visit#3

    c. Compare results of participant BP readings from Visit #1 and Visit #3

    d. Summarize findings of the project.

    e. Develop recommendations for action

Methodology

The Plan-Do-Study-Act (PDSA) method of IHI was used as the framework for this DNP project to identify factors and potential sources of hypertension management. The following steps were created and implemented in this project using aims and objectives.

Appendix D displays the PDSA model used in this project. This scientific model is implemented after established measurements have been identified to determine whether a change leads to an improvement (IHI, 2023). The PDSA method lists the reasons to test changes as : increasing your belief that the change will result in improvement; decide which of several proposed changes will lead to the desired improvement; evaluate how much improvement can be expected from the change; decide whether the proposed change will work in the actual environment of interest; decide which combinations of changes will have the desired effects on the important measures of quality; evaluate costs, social impact, and side effects from a proposed change; and to minimize resistance upon implementation (IHI, 2023).

This DNP project utilizes the following types of changes:

- Implementing two self-care questionnaires focusing on medication and hypertension knowledge
- Demonstrate proper technique of home blood pressure monitoring for accurate readings
- Combine telehealth sessions with in-person visits

The approach to action-oriented learning defines the method for testing a change (IHI, 2023). Deciding a proposed change leading to a desired improvement is the testing change approach chosen for this project. This project will help patients get a better understanding of hypertension, medication adherence, and early communication to improve outcomes of managing a chronic disease. A logic model was developed to illustrate connections between input, activities, and outcomes as reflected in **Table 2**.

The questions to be answered in the quality improvement program are:

- Did patient knowledge of hypertension improve?

- Were there barriers to home blood pressure monitoring?

- Were patients engaged in the use of telehealth?

These quality improvement questions were based on the type of testing changes, approach of the change, and the outputs of the logic model. The PDSA model supports the process of identifying the quality improvement questions to be answered.

A logic model was used to identify the project's shared relationships among the inputs, activities, and outputs. Table 2 displays this process which helped guide the development of the project and forms its aims and objectives.

Table 2
SCM Program Logic Model

Input	Activities		Outcomes		
What we Invest	What we Do	Who we Reach	Why This Project: Short-Term Results	Why This Project: Intermediate Results	Why This Project: Long-Term Results
Patient educational sessions for telehealth and self-monitoring for blood pressure	Create two brief instructional videos including explaining how to use a telehealth platform (Doxy.me) or the" audio only" option and a home blood pressure machine.	20 adults over 18 years of age during a six-month period	Patients will expand their knowledge of the use of telehealth platform and blood pressure monitoring	Patients will experience comfort in participating in a telehealth appointment prepared with blood pressure readings	Enhanced ease and use of technology to improve overall health
Provide an educational materials chart for "Know Your Numbers"	Promote the use of the chart by the patient		Patients will have access to current blood pressure guidelines	Patients will develop lifestyle changes to improve their numbers	Improved blood pressure readings
Provide individual blood pressure goals	Establish individualized blood pressure reduction goals of 5%		Patients will record daily blood pressures	Patients will see improved readings	Improvement of health

Assumptions	External Factors
Educational sessions are identified "Know Your Numbers" reference materials will be provided Individualized goals will be provided	(+) Patients will embrace the use of technology and equipment (+) Patients will experience improvement of their blood pressure (-) Lack of technology proficiency may lead to reduction in participation (-) Patient refusal to use telehealth (-) Language barrier

Note: Adapted from *2016 Sample Logic Model,* by Royce, D., Thyer, B.A. and Pagett, D.K.

Program Evaluation: An introduction to an evidence-based approach (6th ed.)

Setting & Population

The setting of this quality improvement project was a non-profit free health care clinic in Steubenville, Ohio, which offered free primary medical care to adults in Jefferson County and immediate surrounding areas. This clinic is considered a medical home to individuals who are uninsured or underinsured, in need of healthcare services, and are living in homeless shelters. Primary care is provided to everyone from volunteer certified nurse practitioners or medical doctor. Services offered include blood analysis, especially in chronic disease management, urinalysis, ECG, Medicaid application processing, and pharmaceutical assistance. Pharmacological services are offered to uninsured individuals who meet the clinic's enrollment guidelines.

This clinic is in the heart of the downtown area accessible by walking, city transportation and ample parking for those who drive themselves. Recruitment of participants included men and women, with and without health insurance, who reported a need for telehealth access. Additionally, participants had to have been either currently or newly diagnosed with hypertension, prescribed medication for hypertension, and/or currently an established patient.

Implementation of Quality Improvement

This quality improvement program took place as a result of a telehealth opportunity to help patients manage their chronic diseases including hypertension. Three years prior to the beginning of this program, telehealth became a popular platform to use in patient care due to the COVID-19 pandemic. As a result, a grant funded opportunity to deploy telehealth at this organization became a reality to further assist patients with continuity of healthcare. The initial discussion of this project began in September 2022 with open discussions with the organization's staff. These discussions led to narrowing the search for the main topic to include telehealth as a

means to offer early communication to patients with chronic diseases including hypertension. Telehealth use was a welcome adoption at the organization and providers were making great efforts in learning and utilizing this platform. This was encouraging for patients as well because healthcare access was now available to them as another option for hypertension management.

A self-care management program that helps patients manage their HTN depends on the accuracy of program delivery and data collection. This involved a multi-step process of training employees and volunteers from introduction to data collection. These steps included a group orientation to the program details; how to talk with the participant; reviewing the questionnaires for complete responses for each item; organizing line items to an excel spreadsheet for calculation; scheduling telehealth sessions in a timely manner to obtain blood pressure results; and repeating the questionnaires at the end of the program. Each questionnaire was delivered to participants including clarification of questions and responses. The use of the BMQ and HELM met validity as a previously published and implemented study. The intervention steps and development of an SCM logic model is used to illustrate the input, activities, outcomes, assumptions, and external factors in **Table 3.**

Table 3
SCM Program Timeline

Week #	Tasks
	Between April 10, 2023-July 1, 2023
Week: 1	Meet with staff and volunteers to describe the QI SCM project
Week: 2	Develop the Self-Care Management Program using educational materials from AHA and instructional video on monitoring blood pressure at home
Week: 3	Receive approval for using standardized measurement tools: HELM, BMQ
Week: 4-8	Recruit participants: Program Implementation and completion of tools
Week: 9	Collect Data: Provider and Staff surveys

| Week: 10-11 | Analyze data: HELM, BMQ, Provider and Staff surveys |
| Week: 12 | Present findings to staff, board of directors |

Note: Description of program timeline by author of this project.

Data Management Plan

The internal data sources for this project included adult patients identified using the ICD10 code for hypertension, sex of the patient, date of birth, blood pressure readings, and the completion of HELM and BMQ questionnaires. The external data sources included the HELM and BMQ questionnaires, and AHA blood pressure category table. The frequency of data collection was upon recruitment beginning with the patient completion of the HELM and BMQ questionnaires. Blood pressure cuffs for home monitoring were provided along with a blood pressure recording form, and a color print handout of AHA blood pressure level table reflected in **Table 4**. The HELM was provided at the initial visit and at the end of the program to evaluate progress. At the second visit a telehealth session was scheduled for the purpose of discussing the blood pressure home readings, and overall progress evaluation including medication tolerance.

Table 4

Healthy and Unhealthy Blood Pressure Ranges

BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)	and/or	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

Reprinted -Healthy and Unhealthy Blood Pressure Ranges, by American Heart Association, 2023,

https://www.heart.org/en/health-topics/high-blood-pressure/understanding-blood-pressure-readings

In analyzing the data, the HELM and BMQ offered a scoring regimen to reference patient responses and targets that helped to identify progress or need of further interventions. The program timeline was brief at 12 weeks; however, the initiation of the program was well received and had begun to encourage patients and the management of their chronic condition.

The analytical process was conducted from April to June 2023 using a mixed-methods approach. Adults diagnosed with hypertension, with or without health insurance, established or new patients, and/or prescribed anti-hypertension medication were selected. Data was successfully collected from the BMQ and HELM questionnaires. In-person interviews with patients were time-consuming activities. Each telehealth session was recorded as an appointment in electronic health records. The results of patient blood pressure readings were documented on

an excel spreadsheet and included any additional questions from the patient. Item analysis of the

HELM reflects the validation process of correct responses (Shapira, et al., 2012).

<p style="text-align:center">Project Results/Findings</p>

Aim 1

The data collected from the clinic's health record system followed a secure procedure

according to clinic policies. The results of this aim identified 11 participants using the ICD code

of hypertension. Each participant agreed to participate in the program. Of the 11, six were men,

and five were women. The literature search revealed a valid, standardized medication adherence

self-knowledge questionnaire. The BMQ is a self-reporting tool which helps patients identify

their needs with their medication (Svarstad, 1999). Appendix C is the representation of the BMQ

self-reporting tool completed by patients. The levels of hypertension in a participant are

reflected in Appendix E.

Aim 2

This Aim was to initiate the SCM program measures. Orientation and details of the

program were presented by the author during a planned round table discussion. The project

timeline was 12 weeks. This Aim identified telehealth access, provision of the HELM and BMQ

self-care tools, and ICD10 HTN diagnosis. The results included 11 patients who had access to

telehealth, phone, and blood pressure monitoring devices. However, of the 11 patients, seven

admitted to having access to the internet, two did not have access, and two reported intermittent

access to the internet as reflected in Appendix F.

Aim 3

This stage of the SCM program included analyzing data and making recommendations. Responses from the HELM and BMQ identified pooled data from each questionnaire. The comparison of the HELM responses between Visit #1 and Visit #3 revealed an increased number of patients answered "true" to the question "that uncontrolled hypertension can lead to kidney failure". The responses of "true" to the second question increased when asked if "weight loss is likely to lower blood pressure". These responses are reflected in a graph form in Appendix G.

The BMQ comparison between Visit #1 and Visit #3 revealed an increase response from nine to ten as "yes" at Visit #3 to the knowing their correct number of medications for hypertension treatment. There was no change in the second question at Visit #3 which asked the patient to identify the name of the medication, this response remained at two. The comparison responses are reflected in Appendix H in the form of a graph.

Blood pressure results were clinically significant in the improvement from Visit #1 and Visit #3 as reflected in **Table 4.**, Out of the five AHA blood pressure guidelines, the categories reflected were normal, elevated, stage 1, stage 2, and crisis. Responses of patients at Visit #1 revealed a zero in the normal level, three in the elevated and stage 1, four in stage 2, and one in crisis level. Visit #3 patient response increased to the normal level, a reduction in the elevated level, increase in stage 1, decrease in stage 2, and zero in the crisis level. The percentage of improvement for the normal blood pressure responses was 27%.

Provider and staff surveys consisted of three questions focused on the use of telehealth with patients. The questions followed a qualitive method of category and theme analysis. The section of "additional comments" was especially revealing. Provider telehealth responses were "preferred face-to-face interaction for the most part; am not totally opposed to it", "telehealth

closes the loop of communication". Full details of the survey questions are reflected in Appendix

I and J.

Table 4
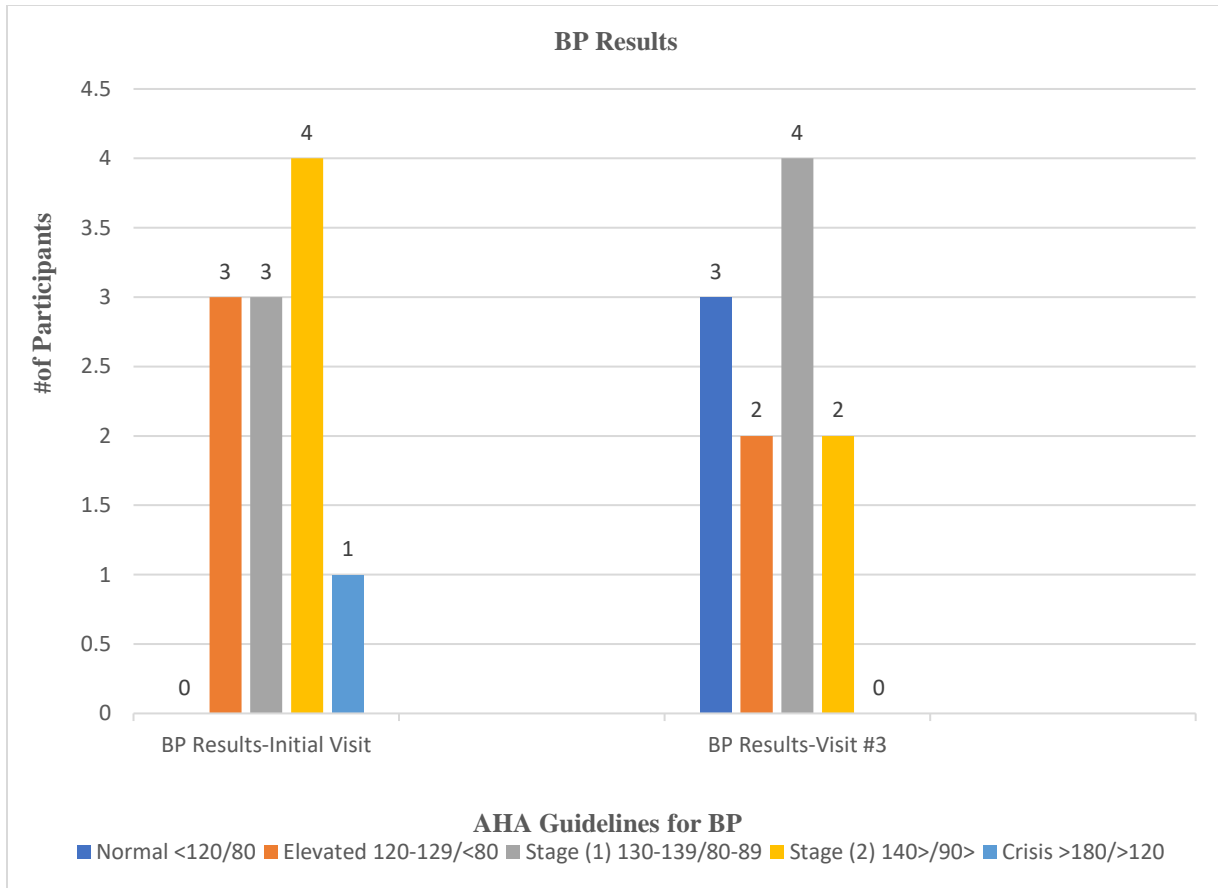
Action

   The recommendations include the acceptance of this SCM program, pursuit of on-going

funding to include the telehealth platform, develop other high risk/high volume chronic illness

SCM and telehealth programs, and develop QI criteria to continue to evaluate program outcomes

and patient and provider satisfaction. Another consideration would be to extend the program over

a longer period which provides an opportunity for more patients to enroll and identify changes of

the blood pressure and overall health.

Summary

The key findings are that providers and staff remain committed to a self-care

management program to improve hypertension using telehealth for communication.

Communication about telehealth within this organization is positive. Each member of the

organization has an important role in improving patient outcomes for hypertension. This SCM

program is an additional educational opportunity for patients towards improved outcomes of

hypertension. Identified strengths include:

- Patient acceptance
- Telehealth use favorable
- Hypertension practice guidelines currently consistent in practice
- Adequate information within EHR

Another strength involves the role of the medical office assistant and nurse manager which was

not anticipated in the development of this program. The medical office assistant is successful in

the recruitment of patients as they enter the clinic. Their communication is primarily through

this assistant and then passed on to the provider for further scheduling. Patient contact also

comes from the nurse manager who reaches out to the provider for clarification and/or reporting

from a patient and their concerns. Incorporating telehealth as a non-urgent service for chronic

non-communicable health conditions is supported by Santos et al. (2022).

The following barriers were identified by including responses from providers and staff

represented in survey questions Appendix I and J.:

- In person appointments scheduled for more serious conditions
- Patient contact numbers changed without notice
- Limited or intermittent internet access of patients to engage in face-to-face sessions

The use of telehealth or telemedicine is here to stay and impact additional training for future

healthcare (Andrews et al., 2020). In quality improvement, early patient education is essential.

When faced with a chronic medical condition like hypertension education is key towards

improvement. Following the current practice guidelines is recognized as good practice and

always benefits the patient. Practice guidelines maintain a current level of education for

practitioners as well.

Interpretation

The use of framework and models such as the IHI PDSA and Quality Improvement will

offer insight towards managing performance of an intervention towards improvement. In this

author's experience, the quality improvement method is ideal for this clinic's size and mission.

Communication among staff, providers, patients, and patient families serves an important role in

the success of a goal. Telehealth communication has been in existence well before COVID-19,

however, was catapulted into service during the pandemic to ensure critical health care needs

were met.

The SCM program interventions and communication of the HELM, BMQ, telehealth, and

provider and staff surveys were well represented in the outcomes including improved patient

outcomes and effective use of telehealth. Direct communication between the provider and patient

streamlined the process of evaluating progress and answering questions directly. This is

supported by Omboni et al. (2020) who states that the greatest effect observed is when delivery

of the intervention is proactive and not passive and when the intervention is driven by healthcare

professionals. As evidenced by this program, this project had a positive impact on patients

diagnosed with hypertension, and the support for the clinic's genuine work to serve the

community's hypertension concerns.

Another unanticipated outcome involved the planning process, where barriers were not as visible until communicating with patients, staff, and providers revealed the following: some patient conditions warranted in-person sessions until improvement was noticed, some patients preferred to have the HELM and BMQ read aloud to them; and scheduling the telehealth sessions should be completed at the in-person session. Once these barriers are modified, a newly developed quality improvement project or program evaluation should be considered. Overall measures of blood pressure, access to telehealth, patient education, and self-knowledge are vital components for chronic disease management. This project had a positive impact on hypertension improvement in patients resulting in reduced blood pressure levels and an increase in self-care knowledge. Considering each measure towards improvement and early detection will provide a clearer picture reflective of the program effectiveness.

Consideration of potential cost includes moving towards a smartphone app directly designed by the clinic similar to a patient portal. This would permit regularly scheduled chronic disease patient education and communication when blood pressure readings are uploaded. In considering the financial burden of patients within a free clinic, phone cards and resources for internet use to engage in face-to-face sessions should be considered.

In a study for telemedicine care in patients with diabetes, a non-communicable chronic disease, text messages and automated phone calls were deployed when triggered by a fasting blood glucose value >400 by self-reporting of patients (Xu et al., 2020). As a consideration to a smartphone app for the clinic, investigation into these options to implement responses upon the established trigger value may encourage early patient action leading to improved patient outcomes.

The impact of this chronic condition within the community is an eye-opening lesson. Interprofessional collaboration among community leaders is a powerful tool towards improving cardiovascular health by starting with hypertension education and management through this program.

Limitations

The results and recommendations from this DNP project are specific to this organization. Factors with limited internal validity include blood pressure reporting from the patient. A blood pressure log is provided and reported to the provider. Educating patients on blood pressure machine memory capabilities and bringing the unit to the in-person visit will authenticate the results. The patient's testimony of their blood pressure results are accepted during the telehealth session, however, the consideration of a face-to-face session may offer visual clarification of accurate use of the blood pressure machine and readable digital results.

Limitations of this study include that the ~~sample~~ size was sufficient considering the short time frame, however, extending the time frame in the future will offer more participant engagement. Another limitation is to consider a texting option for patients to report their blood pressure results immediately and offer the provider an earlier look for intervention and treatment progress, and patient engagement. Texting may be a more affordable option if internet services are not available or if the patient is located away from home without their own blood pressure machine and using another.

Face-to-face sessions are limited due to the affordability of the internet. A consideration of funding for smart phone minutes may increase face-to-face telehealth sessions using smart phone applications for telehealth.

Conclusion

This SCM project identified key points towards the effectiveness of hypertension management in a non-profit free clinic. Adults with hypertension can achieve improvement through self-care knowledge, early communication, and comprehension of medication adherence. The initiation of self-care questionnaires encourages an environment of learning and patients can ask questions about good health practices for disease management using telehealth.

Telehealth will continue to be a source of communication between the patient and healthcare provider at this clinic. Economically, the current funding has been renewed during the development of this project leading to continued telehealth as an option for access to healthcare at this clinic. This funding provides the purchase of blood pressure machines for home monitoring, patient educational materials, and staff education. At the first visit, patients who are diagnosed with hypertension will be introduced to the program, receive a patient packet containing AHA materials, offer video viewing of blood pressure monitoring at home, and further information about upcoming telehealth appointments for progress evaluation of hypertension.

Staff and providers support the use of telehealth for medical appointments blended with in-person visits. Patients experience improved overall health and empowerment in the management of hypertension through increased number of communication options, as with telehealth. The use of this SCM program has the capability to be rendered in other chronic diseases by critiquing the process towards the specific health condition. The framework components include patient education; self-care knowledge identification; tools to take home in the form of informational hand-outs; offering early and frequent communication; telehealth; and evaluating the program at the specified time.

The implications of this project support telehealth as a viable option for convenient, early, and frequent patient-to- provider communication. Especially in a clinic of an underserved population. Healthcare providers can follow up using this platform with patients who experience transportation and financial difficulty and cannot get to the clinic in-person, or if they are contagious with a communicable disease. Their chronic care management does not have to suffer when telehealth is an option.

The important next steps are to investigate further options for financial assistance for face-to-face telehealth sessions. Affordability of mobile phone minutes or home internet service are key to improving the delivery of telehealth services in both acute and chronic health care delivery.

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Appendix A

Key Literature Appraisal

	Author	Research design	Level of Evidence	SCM effectiveness interventions
1	Al-Noumani et al. (2019)	Systematic review of quantitative studies	II Good quality	Medication adherence and health beliefs
2	Delavar et al. (2020)	RCT	II Good quality	Medication Adherence to include health education
3	Konlan & Shin (2023)	Integrative Review	V High Quality	SCM of HTN
4	Li et al. (2020)	Systematic review and meta-analysis	II Good quality	Supports SCM and medication adherence
5	Riegel et al. (2021)	Scoping review	V High quality	Encompassing SCM interventions
6	Ma et al. (2022)	Systematic Review and Meta Analysis	II Good quality	Telemedicine and chronic diseases with a dual effect: improved BP and medication adherence
7	McManus et al. (2021)	RCT	I Good quality	SCM improved better BP management and control
8	Santos et al. (2022)	Systematic Review	II Good quality	Telehealth programs effective in patients with HTN
9	Shapira et al. (2012)	RCT	I Good quality	Pilot study validated HELM tool resulted in identification of 3 domains for SCM
10	Svarstad, et al. (1999)		II Good quality	Validation of BMQ tool: Effectiveness of self-reporting to identify adherent issues
11	Zaugg et al. (2018)	Systematic review of RCT	II Good quality	Medication adherence feedback for physicians increased dialogue with patients about managing their care as compared to usual care.

Appendix B

TABLE IV. The HELM Knowledge Scale		
Item no.	Stem	Responses 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>2cups 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 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 shakier	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 diary products</u> Eliminate spicy foods Drink glass of red wine daily Drink herbal tea instead of coffee
11	Which on 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 the goal blood pressure is 126/76, when have they reached that goal?	<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 When the average of the upper and lower is <100
Abbreviation: HELM, hypertension evaluation of lifestyle and management. Correct responses are underlined.		

Appendix C

The BRIEF MEDICATION QUESTIONNAIRE (BMQ) and Instructions for Coding[1-4]

1. Please list below all medications you took in the **PAST WEEK**. For each medication you list, please answer each of the questions in the boxes below. [Use additional page if necessary]

a. Medication name	b. How many days did you take it?	c. How many times per day did you take it?	d. How much did you take each time?	e. How many times did you miss taking it?	f. For what reason were you taking it?	g. How well does this medicine work for you? 1= very 2= somewhat 3= not at all 4= don't know

2. Do any of your medications bother you in any way? (Check one)   YES [ ]   NO [ ]

     a. IF YES, please name the medication and explain how it bothers you.

Medication Name	In what way does it bother you?

3. How much problem or concern are you having in the following areas [circle one]

	None	A little	A lot
a. My medication causes side effects.	0	1	2
b. It is hard to remember all the doses	0	1	2
c. It is hard to pay for the medication	0	1	2
d. It is hard to open the container.	0	1	2
e. It is hard to get my refill on time	0	1	2
f. It is hard to read the print on the container	0	1	2
g. The dosage times are inconvenient	0	1	2

h. My medication causes other problem or concern   0   1   2
   If other problem or concern, please explain: _____

4. Did you stop taking any medications in the **PAST SIX MONTHS?** (Check one) YES [ ]   NO [ ]

   If yes, please list the medications you stopped. For each, answer the questions in the boxes below.

a. Medication name	b. For what reason were you taking it?	c. How well did the medicine work for you? 1= very 2= somewhat 3= not at all 4= don't know	d. How much did it bother you? 0 = none 1= a little 2= a lot	e. For what reason did you stop taking it?

NOTES:

1The original instrument and validity study were published in: Svarstad BL, Chewning BA, Sleath BL, Claesson C. The brief medication questionnaire: A tool for screening patient adherence and barriers to adherence. Patient Education and Counseling. 1999;37:113-124. In 2003, we made minor revisions so the BMQ can be used with additional dosage forms and cost barriers.
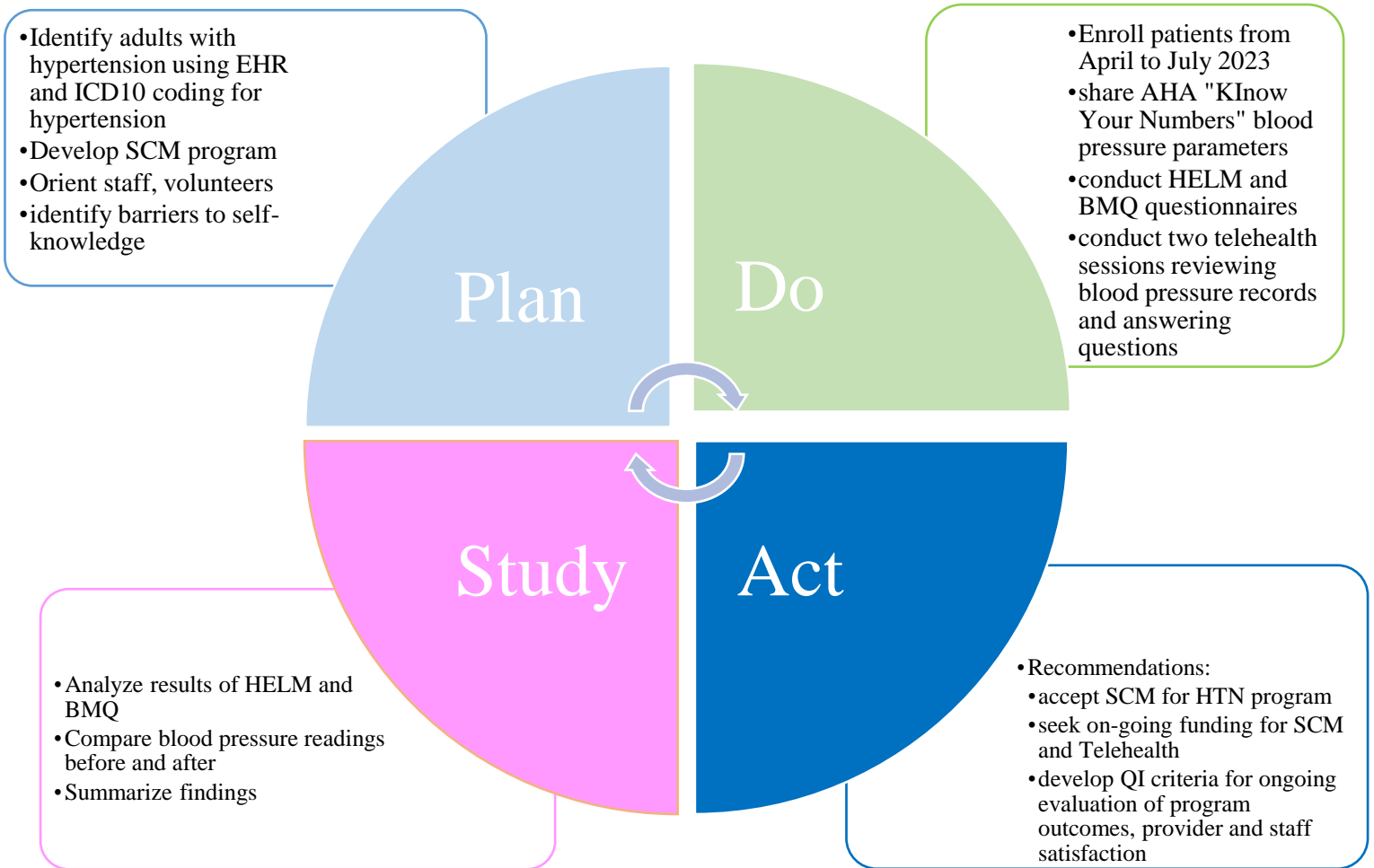
2 The main items for assessing adherence behavior are listed in the REGIMEN SCREEN (Section A highlighted below). NOTE: Before coding the patient's self-reported behavior, the researcher must determine the patient's current prescribed regimen using the patient's medical and/or pharmacy records. Also note that the REGIMEN SCREEN measures the presence or absence of any self- reported nonadherence (1=yes, 0=no). It does NOT measure the extent of nonadherence.

3The items measuring self-reported barriers to adherence are shown in Sections B-D. These screens measure the presence or absence of any negative belief barriers (1=yes, 0=no), any recall barriers (1=yes, 0=no), and any access barriers (1=yes, 0=no). These screens do not measure the level or extent of negative beliefs, recall barriers, or access barriers.
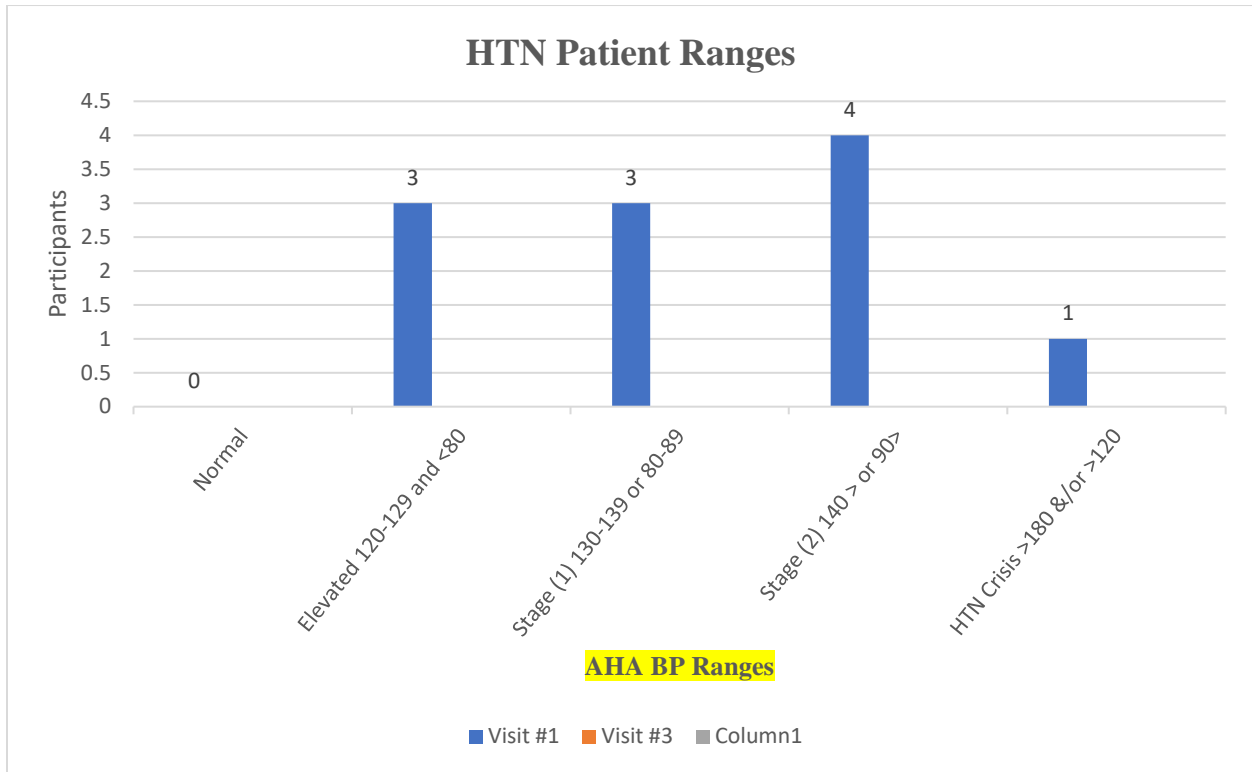
4Patient-reported adherence and barriers to adherence are measured separately, because there are circumstances where the researcher or clinician plans to target patients with a certain type of nonadherence or a certain type of barrier to adherence. For example, a positive recall screen (Subtotal C) often predicts "sporadic" nonadherence due to forgetting. This type of nonadherence can be reduced by tailoring the dosage schedule, providing a medication organizer or memory aid, and/or simplifying the regimen. Thus, the BMQ can be used to manage specific types of nonadherence or barriers to adherence.
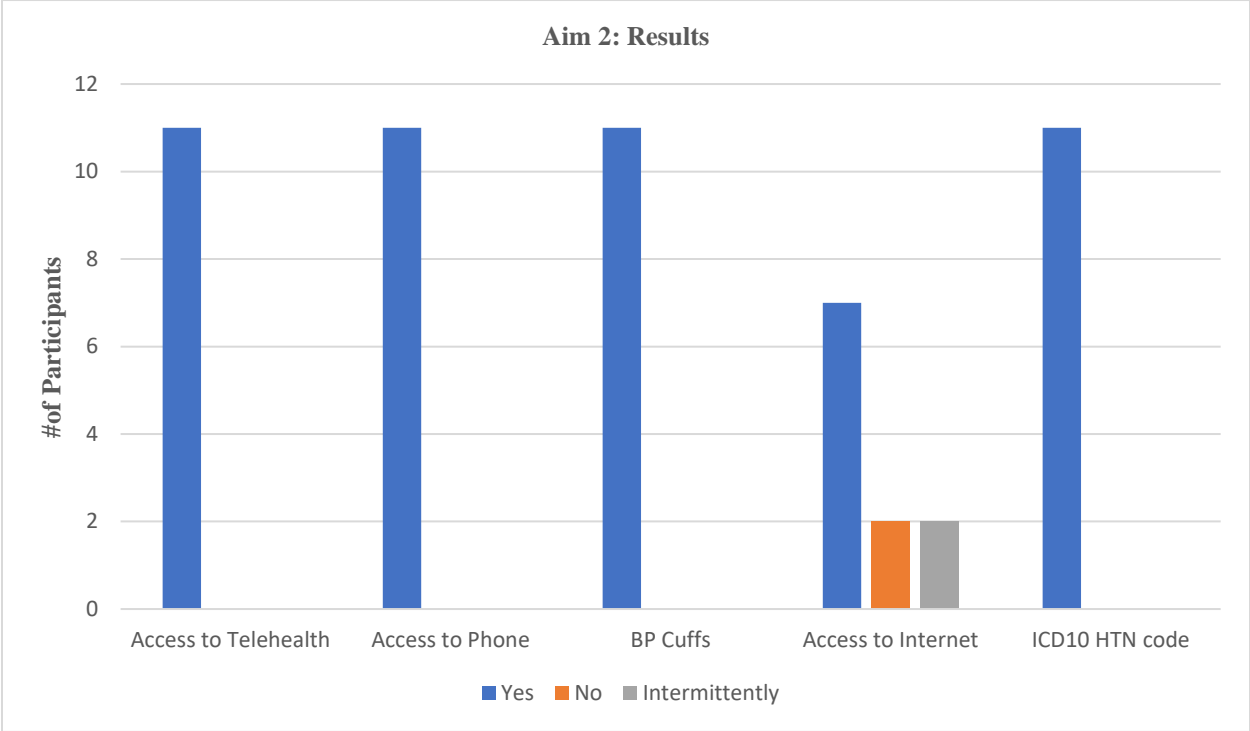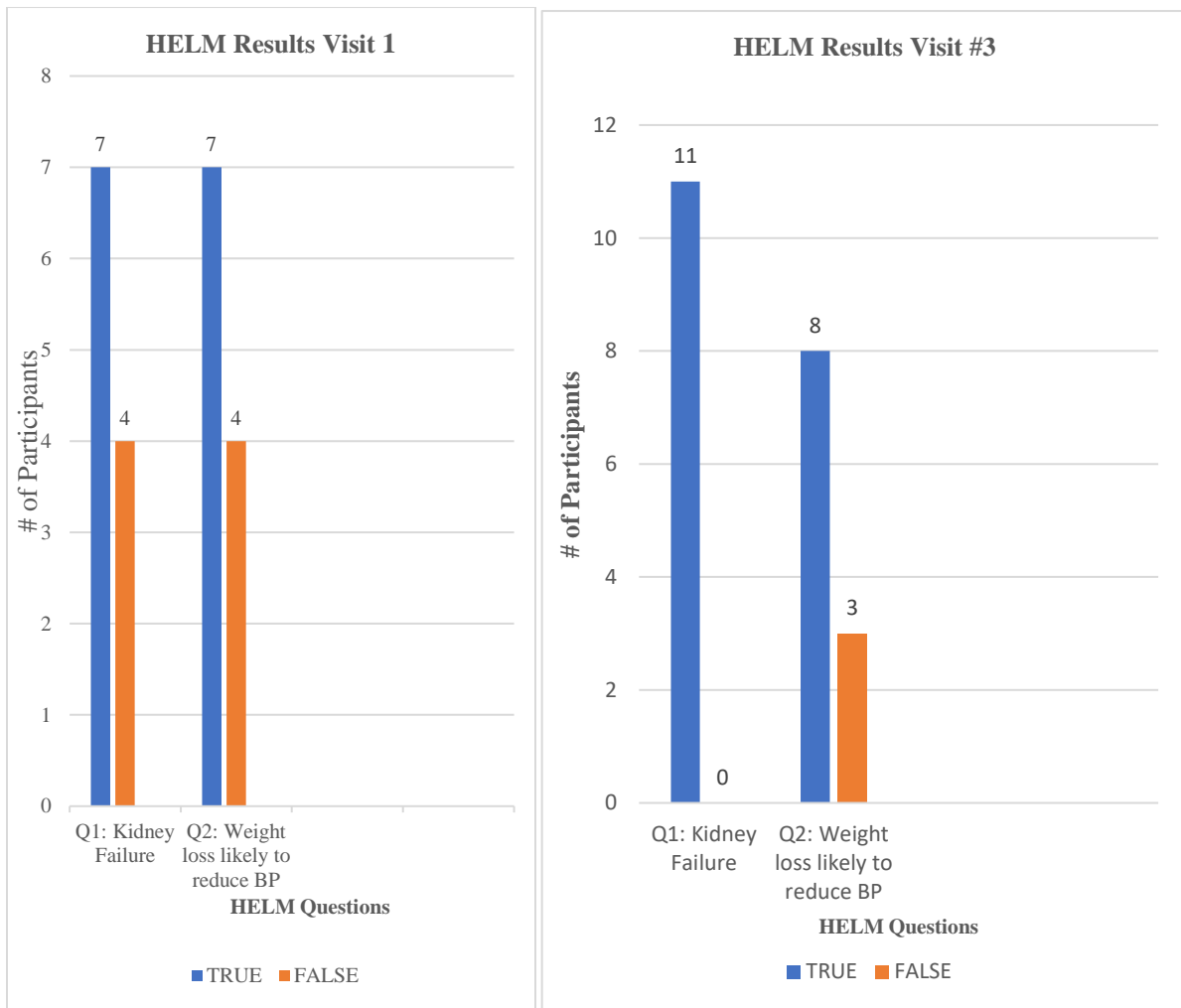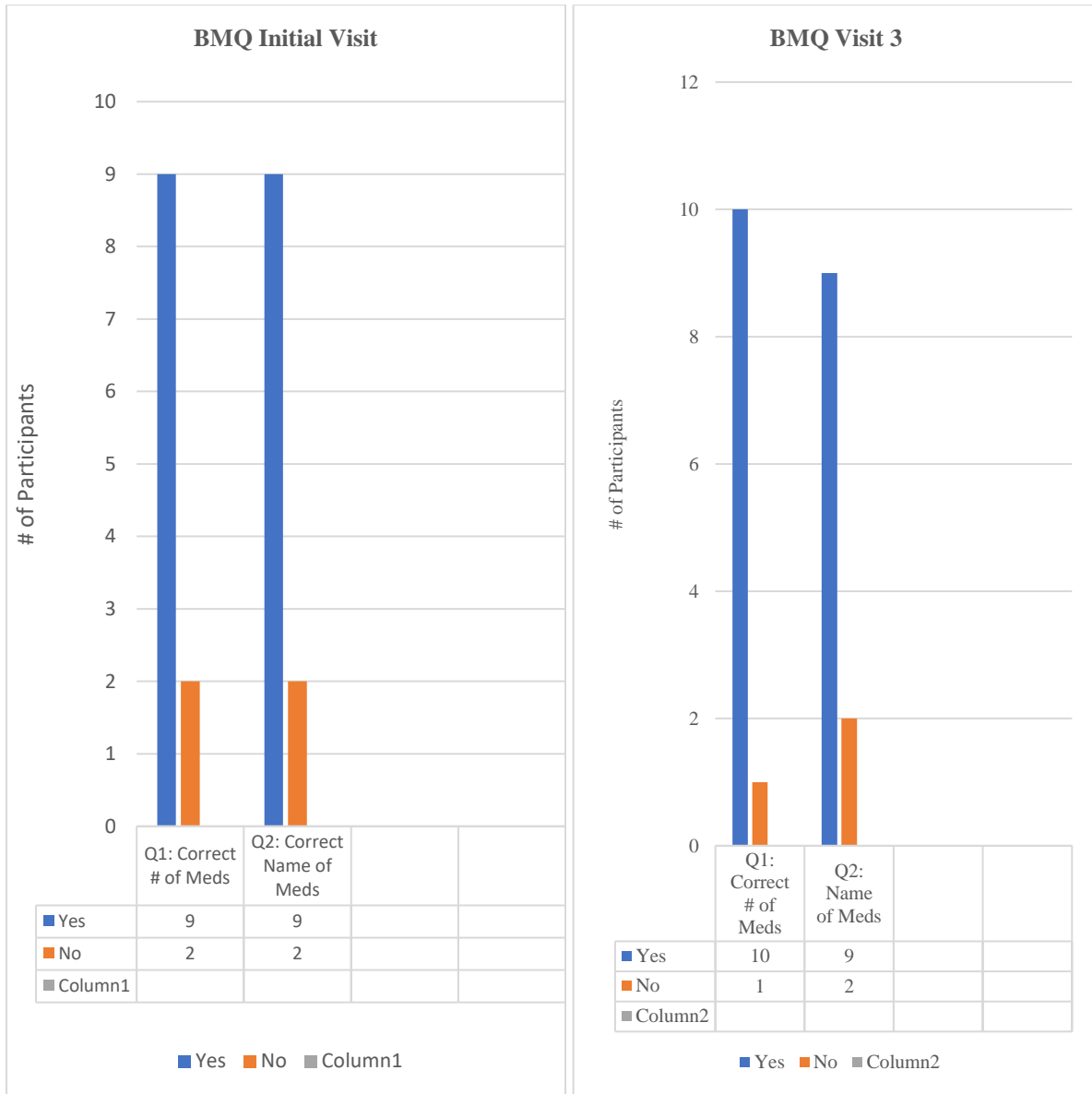
Appendix D

Plan-Do-Study-Act Diagram

- Identify adults with hypertension using EHR and ICD10 coding for hypertension
- Develop SCM program
- Orient staff, volunteers
- identify barriers to self-knowledge

- Enroll patients from April to July 2023
- share AHA "KInow Your Numbers" blood pressure parameters
- conduct HELM and BMQ questionnaires
- conduct two telehealth sessions reviewing blood pressure records and answering questions

Plan

Do

Study

Act

- Analyze results of HELM and BMQ
- Compare blood pressure readings before and after
- Summarize findings

- Recommendations:
  - accept SCM for HTN program
  - seek on-going funding for SCM and Telehealth
  - develop QI criteria for ongoing evaluation of program outcomes, provider and staff satisfaction

Appendix E

HTN Patient Ranges

Appendix F

Aim 2: Results

Appendix G

Appendix H

Appendix I

Provider Survey Questions

1. Have you used telehealth at the Ohio Valley Health Center?

2. Do you feel that patients are receptive to telehealth in the management of their hypertension?

3. Do you have any additional comments?

Appendix J

Staff Survey Questions

1. Do you feel comfortable offering telehealth appointments to patients?

2. Are patients accepting telehealth scheduling?

3. Additional comments appreciated?