THE EVALUATION OF THE UTILIZATION OF TELEHEALTH FOR PATIENTS WITH HYPERTENSION- A QUALITY IMPROVEMENT PROJECT

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Abstract

Background and purpose: Hypertension is the contributing cause of death for nearly half a million people living in the United States each year. Although this condition increases an individual's risk of stroke, heart attack, and kidney failure, only one out of four people who have been diagnosed with hypertension have their blood pressure under control. The purpose of this project is to determine if patient engagement via a patient portal can be used effectively for improving blood pressure readings in patients with hypertension.

Objective: This quality improvement project aims to enhance patient engagement, improve communication between patient and provider, and reduce blood pressure $\leq$ 140/90 for those patients with hypertension.

Methods: A quasi-experimental design study was performed at a community health clinic in the Northeast area of Tarrant County. Forty-three patients agreed to participate. Blood pressures were compared before and after application use. The Patient Activation Measure survey was selected to assess patient engagement.

Findings: Paired t-test revealed an improvement of blood pressure readings after portal implementation, and the Pearson coefficient confirmed that patients who consistently accessed the system had better outcomes in their readings.

Conclusion: Increased demands are being placed on healthcare providers. Alternative methods to provide care should be considered. Patient portals are an effective form of utilizing technology to manage hypertension.

Problem Significance

The American Heart Association (AHA) defines *hypertension* as anyone who has a blood pressure ≥ 130/80. Almost 50% of adults living in the U.S. are suffering from hypertension (Centers for Disease Control and Prevention, 2020). The World Health Organization (WHO) estimates that there are 1.28 billion people worldwide who have hypertension however, 46% of adults are unaware that they have this condition and only 42% are diagnosed and treated (World Health Organization, 2021). As a result, one out of four people has their high blood pressure under control (Centers for Disease Control and Prevention, 2020). In addition, The Centers for Disease Control and Prevention (CDC) reports that 131 billion dollars are spent annually on health care costs for hypertension management (Centers for Disease Control and Prevention, 2020).

Hypertension increases an individual's risk of stroke, heart attack, peripheral artery disease, renal failure, vision loss, and sexual dysfunction. It was the contributing cause of death for almost 500,000 people in the U.S. in 2019 (Centers for Disease Control and Prevention, 2020). There is a higher incidence of hypertension in men, minorities, and those residing in southern states (Centers for Disease Control and Prevention, 2020).

Hypertension does not only affect a person physically but also has financial and emotional ramifications for the individual. At present, patients with hypertension spend $2,000 more on healthcare expenses than those without hypertension (Kirkland et al., 2018). They accumulate 2.5 times the inpatient cost, almost twice the outpatient cost, and close to triple the healthcare expenses of those who do not suffer from this chronic condition (Kirkland et al., 2018). Regarding worker productivity, patients who have hypertension will have more days off work than those who do not have hypertension or have their blood pressure under control

(Centers for Disease Control and Prevention, 2016). Loss of work will result in decreased income for the individual. In terms of a mental health perspective, studies have shown that the quality of life of patients with normal blood pressures was markedly better than those with hypertension (C. J. Lee et al., 2020).

These statistics should be necessary for the nursing profession. Whether the professional nurse works inpatient or outpatient, a large percentage of the patients will have hypertension. Patients depend on nurses in hypertension management more than ever before. “Today the roles of nurse practitioners in hypertension management involve all aspects of care, including (1) detection, referral, and follow up; (2) diagnostics and medication management; (3) patient education, counseling, and skill-building; (4) coordination of care; (5) clinic or office management; (6) population health management; and (7) performance measurement and quality improvement” (Himmelfarb et al., 2016).

One of Healthy People 2030 objectives is to increase blood pressure control for adults with hypertension (Healthy People 2030, n.d.). Healthcare professionals cannot control the nonmodifiable risk factors, but they can assist in modifying factors that can be controlled when managing those patients with hypertension. Providers will have to find ingenious ways to manage hypertension because the present methods have been substandard at best. Potential obstacles will need to be addressed. Healthcare organization barriers may include lack of resource availability, affordability, and access to healthcare services (Khatib et al., 2014). Provider-related obstacles include failure to stay current on new recommended hypertension guidelines, lack of patient education and counseling on the subject matter, increased workload demands given by the organization, and neglecting to set hypertension control as a top priority (Khatib et al., 2014).

Patients' perception is also a contributing factor in the management of hypertension. The words "cancer" and "HIV" bring forth an immediate cause of concern for those diagnosed, but the disease known as "the silent killer" fails to get a similar response. The AHA reported that some performed surveys revealed that many respondents were not concerned after receiving the diagnosis of hypertension (American Heart Association, 2019). Possible theories of a patient's lack of concern can be attributed to the absence of symptoms, unwillingness to change their lifestyle, or the unawareness of the seriousness of the condition (American Heart Association, 2019). Possible barriers by the patient, facility, or provider should be considered in the management of hypertension.

The Coronavirus pandemic caused significant changes in the healthcare community. The pandemic's rapid spread caused immediate changes in healthcare providers' care for their patients (Chang et al., 2021). Patients who needed healthcare services were hesitant to visit the community health clinics and hospitals due to fear of contracting the virus. Staff was reduced, elective surgeries were suspended, and face-to-face encounters were limited (Chang et al., 2021). Telehealth technology was the only option, and many healthcare facilities had to immediately prepare for this method of providing healthcare even if many were not prepared. Hospital personnel and patients are now asking if this is the new normal. According to many epidemiologists, this may only be the beginning.

It is pertinent that healthcare providers manage their patients' conditions outside of the workplace. The Institute for Healthcare Improvement (IHI) is promoting the need for organizations to decrease the demand on the providers to increase access to care (Institute for Healthcare Improvement, 2021). Managing patients outside of the typical healthcare facility will help the "system absorb current or future levels of demand" (Institute for Healthcare

Improvement, 2021). The U.S. Preventive Services Task Force (USPSTF) also gives a grade A recommendation for patients to monitor their blood pressures from home before starting any treatment for hypertension (U.S. Preventive Services Task Force, 2021).

Practice Setting

The organization of focus is a community health clinic in Texas. It is owned by a county hospital that incorporates 12 family health facilities, also known as medical homes. The facility is a not-for-profit organization that provides healthcare to those who are considered to be underserved. There are roughly 4500 patients at this facility(Taylor, 2021). The majority of the patients have low socioeconomic status with little or no insurance. Many of the patients at this facility do not speak English, and some are undocumented. Other languages include but are not limited to Spanish, French, Vietnamese, Nepali, Arabic, and Bengali. Several have multiple comorbidities, and there is a high prevalence of patients with mental illness. Many of these patients have low health and digital literacy. Increased no-show rates or patients arriving late for their appointments are not uncommon for this medical facility. This practice's care delivery system is based on the PCMH (patient-centered medical home) model. "The PCMH emphasizes ongoing patient-physician relationships, improved care access, and provision of comprehensive care by addressing all health needs" (Sklar et al., 2019). This PCMH has incorporated quality metrics to assess the facility's performance. Examples include: ensuring patients' hemoglobin A1c's are within normal limits for those with diabetes, cervical screenings for recommended age groups, mammogram screenings for females over 50, and controlled blood pressures for the population.

Needs Assessment

The organization's mission statement is "to transform care for those they serve" (JPS Health Network, n.d, para. 1.). The vision statements are "to improve patient and family experience, increase access to care and improve the quality and outcomes of the patient population" (JPS Health Network, n.d., para 2.). Each facility has to track its metric scores monthly. Providers, the clinic manager, the support staff, and administrators have a designated meeting time to discuss these scores. The monthly metric report for the facility revealed that the scores were low in the management of hypertension. The results were not up to standard before the Coronavirus outbreak but have worsened after the pandemic. The institution has set a target goal of 75.7%, which means that at least 75.7% of those patients with diabetes have to have their blood pressures within normal limits (Taylor, 2021). In September, the metric scores for this population were 69.6%(Taylor, 2021). The providers' scores at this facility for blood pressure management of their patients with diabetes ranged from 64%-78%(Taylor, 2021). None of the family clinics were at the target goal for the organization (Taylor, 2021). This indicates that 100% of these clinics associated with the hospital were out of compliance with certain governmental agencies and the institution's mission and vision statements.

Low metric quality scores due to the inability to control the blood pressures of those with diabetes can cause unfavorable results for the organization and the patients. The county hospital is a not-for-profit organization that depends on governmental funding. Declining quality scores may affect reimbursement and access to specific grants. Metric scores also affect whether the providers will receive any bonus incentives. Below average scores for hypertension management can have detrimental effects on a population who is already considered disadvantaged. These specific patients' social determinants put them at risk for health care disparities. The lack of

quality care widens this gap. Health care disparities can lead to premature mortality in this patient population (Spencer et al., 2018).

A cause-and-effect diagram (Fishbone diagram) was utilized to find possible causes of the declining metric scores (see Figure1). The diagram is divided into five categories. These categories include social determinants, communication, patients, providers, and environment. Possible causes of hypertension include patients having no insurance or money (social determinants), language barriers between the provider and the patient (communication), cultural influences or patients' self-adjustment of their medication (patients), time constraints posed by the organization (providers), and clinic capacity and wait times of the facility (environment). Providers cite insufficient time and increased patient complexity as reasons for poor performance on hypertension management goals. The Institute of Medicine (IOM) has endorsed the use of information technology to improve healthcare quality ("Effective Patient-Physician Communication," 2014). However, the providers at this healthcare facility were not utilizing the EHR (electronic health records) to its full potential. One of which is the use of the MyChart application.

Telehealth, also known as mHealth or eHealth, is the use of mobile devices to manage health conditions. Due to the increased use of smartphones and smartphone applications, this innovative approach will be the standard of care in the next couple of years (Omboni, 2019). It has shown great promise in several aspects of healthcare. One of which is the convenience for the organization's patient population. Patients who have a mobile phone or computer can manage their condition in the comfort of their own homes. In addition, telehealth via patient portals such as the MyChart application allows for fewer office visits. This option would be preferred for those patients who have difficulty getting off work to attend appointments. It is also beneficial

for those who have limited income or want to limit the number of office visits due to the fear of contracting coronavirus. The use of telehealth will also generate revenue for the organization. The home management of those patients with hypertension will create availability for the clinic to receive new patients trying to establish care at the facility.

Target population

The population of interest was patients ages 18-75 diagnosed with hypertension and currently have a blood pressure of ≥ 140/90. Although AHA defines *hypertension* as anyone having a blood pressure ≥130/80, the primary goal is meeting the organization's requirements of maintaining patients' blood pressure ≤140/90. For patients with increased risk of cardiovascular disease, such as those with diabetes, have a smoking history, or renal failure, a target of <130/80 was utilized to manage hypertension. Exclusion criteria for patients included pregnancy, intellectual disabilities, severe psychiatric issues, those whose blood pressure was managed by a specialist, patients who had not been seen in over a year, or those who lacked access to a smartphone or a computer.

SWOT Analysis

SWOT analysis stands for strengths, weaknesses, opportunities, and threats (see Figure 2). This tool helps analyze internal and external factors that should be considered before implementing any quality improvement project (D. Moran et al., 2020). SWOT analysis informs the stakeholders of the organization's current status, whether good or bad (Virtualstrategist, 2016). The objective is to build on the strengths, work on the weaknesses, invest in the opportunities, and monitor the threats (Virtualstrategist, 2016). The organization must utilize its strengths to expand its opportunities (MindTools, n.d.).

The main goal of this project was to improve the metric scores by increasing patient engagement and improving the management of those patients with hypertension. The hospital had many strengths to assist with implementing this quality improvement project. The organization had a governmental grant program used to healthcare services for those with low income. Through that program, the patients can access resources they would not have had before. The patients could get their medications at a reduced price through the 340 B Drug Pricing Program. The EHR (electronic health records) enabled the provider to view the patients' records if a specialist or an outside provider had seen them. Financial statements also reveal that this not-for-profit organization had a surplus for the past years with a profit margin of 59% and 62% in 2018 and 2019 (*Tarrant County Hospital District-d/b/a JPS Health Network*, 2018). A patient's non-adherence to the treatment plan is one of the primary causes of resistant hypertension. The program provides aid to those who cannot afford their prescriptions. This assistance should improve medication adherence. Patients' access to their medications to control their blood pressure is an essential part of this DNP project.

The weaknesses within the organization can hinder the process of any project. Because this is an internal factor, key stakeholders such as patients, the clinic manager, providers, nurses, and the support staff can identify those barriers. Many patients have negative attitudes toward county hospitals with a false perception that they are receiving substandard care. Patients have also expressed their frustrations over prolonged wait times to see the providers. Because patients with limited to no income have increased access to these healthcare services, the hospitals and clinics are inundated. Increased demands on the providers have resulted in reduced time for much-needed patient education. Other avenues to build communication with the patients have to be explored.

There are many opportunities that this organization can utilize to move forward. The Covid pandemic changed how many healthcare institutions manage the patients they serve. One opportunity for improvement is to increase the use of telehealth. The applications allow for consistent communication between the healthcare providers and the patients they serve (Milani et al., 2016). Implementation of these mobile health devices also allows the staff to engage in evidence-based practices to manage those with hypertension.

The potential threat to the organization is nurse retention. Many staff have communicated that they were overworked due to the Covid pandemic. They now have a tremendous amount of stress, and their salaries are not comparable to their peers who work in the surrounding areas. Outside hospitals offer incentives and opportunities for healthcare professionals to grow within their organizations. Adequate staffing is essential in any organization. Quality improvement strategies are more challenging to implement when there are staff shortages. Reports show that staffing shortages threaten the quality that an organization can provide(American Association of Colleges of Nursing, 2020).

SMART (specific, measurable, achievable, relevant, and time-based) goals were used to establish an action plan (see Figure 3). The purpose or goal of this DNP project was to improve metric scores. The objective was for patients and providers to utilize the MyChart mobile application to manage hypertension. The aim was to improve patient engagement, reduce blood pressures to less than 140/90 for those patients with hypertension, and improve communication between patient and provider. By February 10, 2022, 75.5% of the patients with diabetes will have their hypertension controlled at this facility. This goal aligns with the AACN (American Association of Colleges of Nursing) Essentials 8.1 g, which states to “identify best evidence and practices for the application of information and communication technologies to

support care" (American Association of Colleges of Nursing, 2021, p. 46). Progress can be measured by retrieving records and comparing blood pressures before and after implementing this mobile application. Metric scores can also be examined to see if the organization is closer to the target goal. This goal is attainable. The utilization of the MyChart application will be at no additional cost for the facility. Patients can be scheduled during the nursing visits to illustrate how to use the MyChart application. Handouts will also be provided in the patient's preferred language. Blood pressure monitors will be provided for those who cannot afford one. The social worker has access to these monitors through government assistance programs. Finding alternative ways to treat these patients aligns with the hospital's mission, which is to transform the healthcare delivery for those they serve (JPS Health Network, n.d.). Regarding time, providers can begin to utilize this application once trained, which will take less than 20 minutes. It will take at least three months to introduce this form of telemonitoring to those patients with hypertension.

Possibly barriers were also considered. A critical factor in implementing evidence-based practice is for the researcher to do a barrier assessment (Tucker & Melnyk, 2019). This assessment will assist in identifying strategies and minimizing the effects of these possible obstacles (Tucker & Melnyk, 2019). A FMEA (Failure Mode Effect Analysis) was performed for this DNP project (See Table 1).

PICOT

The following PICOT question is the basis for this DNP project.

How does the implementation of telehealth integrated with the standard of care impact patient engagement and hypertension in patients with blood pressures $\geq$140/90 over 3 months?

P= Adult patients in an underserved family clinic with blood pressures $\geq$140/90

I= Implementation of telemedicine patient guideline

C= Standard of care (no telemedicine)

O= Impact on blood pressure and patient engagement

T= 3 months

Theoretical Framework

Implementation of nursing theories into practice is essential for advancing the nursing profession (Hampton, 1994). A framework was used to apply these theories in the healthcare facility. A theoretic framework describes specific processes of the model (process models), explains potential influences that affect a particular outcome (implementation framework), or focuses on specific outcomes such as the evaluation framework (Nilsen, 2015). The objective of this DNP project was for patients to utilize the MyChart application (a form of telehealth) to become engaged and participate in the management of their healthcare needs. A model that focuses on the implementation process was beneficial when implementing an evidence-based practice intervention in a clinical setting.

In 1971, Imogene King introduced a conceptual systems theory (Gunther, 2017). This theory consists of three systems: personal, interpersonal, and social systems (Gunther, 2017) (see Figure 4). Examples of personal systems include perception, body image, coping skills, growth and development, and self concept (Gunther, 2017). Concepts of interprofessional systems are roles, communication, stress, interactions, and transactions (Gunther, 2017). Status, decision making, organization, authority, and power are all concepts included in social systems (Gunther, 2017). According to this theory, each person is considered an open system. A person's behaviors, actions, reactions, and perceptions are determined by how these systems interact with one

another. From this theory, King later introduced a middle-range theory known as the Theory of Goal Attainment (see Figure 5).

The Goal Attainment Theory focuses explicitly on the interaction between the nurse and the provider. Both nurse and patient come to the clinic with their own ideas, beliefs, and expectations. During the office visit, the patient and nurse will have a transaction. This transaction would include the nursing process in which the patient is assessed, and data is collected, problems are identified, diagnosis made, goals and plans established, implementation of the actions to reach the goal, and evaluating if the goals were achieved (Current Nursing, 2021). The basic assumption of this model is that if the nurse and patient roles are congruent, there is clear communication between the two parties, and conflict is avoided, then goal attainment is possible (Current Nursing, 2021).

For this DNP project, the patient was assessed during every visit. If the patient's blood pressure ≥140/90, the provider discussed the possible causes of hypertension; examples being diet, weight, or lack of prescription therapy. Providers also discussed with patients their knowledge and beliefs about hypertension. Patients were diagnosed with hypertension, and the patient and provider developed a mutual plan of care on how to control their hypertension. A goal was set for blood pressure ≤ 140/90 or ≤ 130/90 if the patient had an increased risk of cardiovascular disease. King believed that the patient should be involved in goal setting because she felt that patients became empowered when performing such activities (Helen Colby, 2018). During this phase, the patient was asked if they would like to participate in submitting their home blood pressure readings in MyChart for hypertension management. The provider and patient implemented the activities to promote and assist in lowering the patient's blood pressure. Patients were evaluated, and blood pressures were documented. Imogene King stressed the

importance of documenting the goals so that the clinician and patient would know when the goal had been met (Helen Colby, 2018). King's theory assisted in this DNP project by setting goals for those patients with hypertension.

Literature Review

The PICO question is, "How does the implementation of telehealth integrated with the standard of care impact patient engagement and hypertension in patients with blood pressures over 140/90 over 3 months? CINAHL, PubMed, and ProQuest were the databases used to find pertinent articles for this search. CEBM (Centre for Evidence-Based Medicine), CASP (Critical Appraisal Skills Programme), and Jadad were the appraisal tools that were chosen to evaluate the articles. A total of 13 studies were found; nine of the articles were specifically about the relationships of mobile applications with the management of hypertension (see Table 2).

The first four articles were found in the CINAHL database. The search terms used were "telemonitoring, hypertension, and high blood pressure." The Boolean item AND was used to find articles that contained all three search terms. This inquiry resulted in 107 articles. The search was narrowed only to include articles that were published after 2015. Out of the 61 articles found, only four were chosen. Three were random controlled trials, and the fourth was a systematic review. Systematic reviews are Level 1, and random control trials are Level 2 studies on the evidence-based pyramid (Ascension, 2021).

Bryant et al. (2020) was the first random control trial used in this literature search. The study was based out of the United Kingdom and 2,590 randomly selected participants to either be in the control group or the treatment group. The patients in the treatment group received various levels of interventions. Predictions were made of the probability of antihypertensive intensification in 12 months between the treatment and control groups (Bryant et al., 2020). A

simulation model was then used to predict blood pressure control in five years. Results showed SMBP (self-monitored blood pressure) with co-interventions such as telemonitoring contributed to a reduction of a patient's blood pressure and decreased provider inertia (Bryant et al., 2020). The Jadad appraisal tool was used to appraise this article. Unfortunately, there was no blind study and the authors did not provide any information on the power analysis of the study.

A random control trial conducted by Joeng et al. (2018) sought information on possible interventions that could be provided with the telemonitoring system to reduce a patient's blood pressure. The participants were ≥ 60 years of age and had blood pressures of ≥ 140/90. The research found that older patients or those with low health or digital literacy needed counseling by nurses or providers before initiating telemonitoring (Jeong et al., 2018). The results from the article revealed that telephone support by nurses caused a reduction in blood pressure and improved patient engagement (Jeong et al., 2018). The CEBM appraisal tool was used to analyze this study. Control and treatment groups had similar demographics to limit heterogeneity, and both groups were treated equally. The investigator was blinded to the treatment that the intervention group received.

Pan et al. (2018) was the last random control trial found with these search terms, and it was performed at a community health clinic. A sample of 107 patients were randomly selected to the intervention group who not only received telemonitoring but had a supportive team which included a provider, hypertension specialist, nurse, and manager to assist with the intervention (Pan et al., 2018). The control group received standard care. Results showed that there was a reduction in the SBP (systolic blood pressures) of those who received telemonitoring but the changes in the DBP (diastolic blood pressure) were clinically insignificant (Pan et al., 2018). The CASP tool was used to evaluate the article. The control group and treatment groups were not

treated equally. Although both received health education, only the treatment group received sphygmomanometers (Pan et al., 2018).

One systematic review met the criteria for the search terms that were used. The purpose of this study was performed by Chandak and Joshi (2015) to explore the role of technology in self-management among patients with high blood pressure. Twelve studies were analyzed and revealed that the most of the patients in the study had comorbidities. Various technologies were used, such as telemedicine via videoconferencing, telephone-based telemonitoring, and education (Chandak & Joshi, 2015). Some of the studies also educated providers of the JNC (Joint National Committee) recommended guidelines for hypertension management (Chandak & Joshi, 2015). The studies with the most significant reductions provided education for both patients and providers (Chandak & Joshi, 2015). The CEBM appraisal tool was used for assessment. The limitations of this study were the variations in what patients are considered to be hypertensive (Chandak & Joshi, 2015).

Dates and search terms were changed to find additional articles in the CINAHL database. The Boolean term OR was used to find additional search terms. The search terms were “mobile applications, apps, mobile apps, mHealth, eHealth, and hypertension or high blood pressure.” This search yielded 476 articles. The search was narrowed by choosing only academic articles that were published from 2018 to 2021. The U.S. was also chosen as the geography for the articles. This inquiry resulted in 77 results. Two random control trials and two systematic reviews were found.

Gong et al. (2020) conducted a random control trial to observe the impact that mHealth apps had on medication adherence and blood pressure control. The trial studied 38 hospitals with a total of 443 subjects. Participants that were excluded were those who had a history of

cerebrovascular accidents, had secondary hypertension, or had a developmental delay that would prohibit those from having the ability to use a smartphone (Gong et al., 2020). Surveys had to be completed by the participants to assess for medication adherence. After six months, both the treatment and control had reductions in both the SBP and DBP, but there was a more significant reduction in the treatment group (Gong et al., 2020). There was also an increase in medication adherence in the intervention group, but this is a potential for bias because the survey was subjective (Gong et al., 2020). The CEBM tool was selected to evaluate the study. Therefore, a relative risk score was not provided.

Zha et al. (2020) conducted a random control trial based in Newark, New Jersey, at a community health clinic. A group of investigators evaluated the effects that mobile applications had on communities that were considered to be underserved (Zha et al., 2020). Most of the subjects were African American, Hispanic, low-income, and had a high prevalence of other chronic conditions such as diabetes (Zha et al., 2019). Out of the 30 patients that were selected, only 25 completed the study. The results revealed that although there was a reduction in blood pressures in the treatment group compared to the control group, the results for medication adherence and HRQOL (health-related quality of life) between the two groups were insignificant (Zha et al., 2019). The CASP appraisal tool was utilized for this study. The article failed to describe how the patients were randomly assigned. The potential benefits outweigh any cost or potential harm.

The goal of one study performed by Xu and Long (2020), was to describe the overall effects that smartphones had on patients regarding medication adherence, blood pressure control, and lifestyle. For this systematic review, six studies were pooled, and 1,657 participants were studied (Xu & Long, 2020). Questionnaires were used to evaluate medication adherence and

possible lifestyle changes. Results showed that the integration of smartphones effectively reduced blood pressure and improved medication adherence among the patients that were studied. There was no substantial finding that smartphones had any results on a patient's physical activity (Xu & Long, 2020). The authors reported that the limitation of the study was that the potential economic benefits of the smartphone for hypertension management were not examined (Xu & Long, 2020). The CEBM appraisal tool was used to evaluate this study. A forest plot graph was provided.

Lu et al. (2019) was the last systematic review chosen in this search. The objective of this study was to determine if the duration of the trial, intervention intensity, or a person's characteristics would have any influence on whether telemonitoring would be effective in the management of hypertension. Eleven random control trials (4,271 subjects) were studied; five of these trials were based out of the United States. The results showed a significant reduction in both the SBP and DBP when mobile applications were used to manage hypertension (Lu et al., 2019). The study concluded that mobile applications might decrease the risk of possible complications to hypertension such as cerebrovascular accidents or coronary vascular disease (Lu et al., 2019). The study also revealed patient adherence until 18 months (Lu et al., 2019). The CEBM tool was effective in appraising this article. The authors included the databases and search terms used in the study.

The final article that was chosen to examine the correlation between mobile applications and hypertension management was found in the PubMed database. An advanced search was used with the search terms "mobile health and hypertension." This inquiry resulted in 1,628 articles. The years 2018-2021 yielded 829 entries. Meta-analysis was chosen for article type, which resulted in 29 studies.

The main objective in the study performed by Li et al. (2020) was to evaluate mHealth effects on a patient's self-management of his or her hypertension. A total of 24 studies were selected from the U.S., Canada, Mexico, South Africa, Chile, the United Kingdom, Iran, South Korea, and China (Li et al., 2020). Many of the articles were based on behavioral theory (Li et al., 2020). All the studies concluded that mHealth applications provided self-management education for patients leading to improved blood pressure control, increased self-efficacy scores, patient knowledge, and medication management (Li et al., 2020). The author also discussed that increased medication adherence and self-management behavior would lead to cost savings due to the decreased risk of cerebrovascular accidents and coronary artery disease (Li et al., 2020). The authors recommended this evidence-based practice if present conditions were not optimal in one's healthcare facility. CEBM critical appraisal was used for this article. The article discussed the databases used but neglected to include search terms used to find the studies.

Literature on Patient Engagement

Four articles were selected on how mobile applications affected patient engagement specifically. Using an advanced search, a systematic review conducted by Lyles et al. (2020) was found in PubMed. The search terms used were "patient portal and engagement." Twenty articles resulted from this search. In this study, the authors selected 53 studies that were published between 2013-2019. They divided the studies into three distinct categories, which were interventions to increase portal use, useability, and patient and provider barriers (Lyles et al., 2020). The authors found that the patients were more engaged if they had additional instruction on how to use the mobile applications, especially the older population or those with low health literacy (Lyles et al., 2020). Providers'workload and the application's complexity also influenced

patient engagement for the portals (Lyles et al., 2020). The CEBM appraisal tool was used. The authors only used the PubMed database, so there is a possibility that some articles were missed.

Lee et al. (2018) was the second article chosen regarding patient engagement. It is a cross-sectional article that was found in the ProQuest database. Cross-sectional articles are considered Level 3 studies on the evidence-based pyramid (Ascension, 2021). The search terms that were selected were "telemonitoring and patient engagement." Over 6,000 articles resulted, so the search was narrowed by including only published articles from 2018-present. In addition, the PloS One publication was chosen. This search yielded 149 results after these criteria.

For this study, the authors checked logs from 1,439 users to gather data over 18 months. The study found that those who utilized the application for self-monitoring had sustained use, while others who used the application for other purposes decreased their use over time (K. Lee et al., 2018). The CASP appraisal tool was used. The study results may have been influenced by early adopters (Lee et al., 2018).

The final two articles were found in PubMed; search terms included telemedicine and patient engagement, and this yielded 1,698 results. Articles were reduced to 949 when selected dates were 2018-2021. Reviews were selected in the filter, which yielded 103 studies.

Bertoncello et al. (2018) was the first article in this search. The researchers sought information to identify what conditions or circumstances were needed to increase patients' usage of technology in managing their health conditions (Bertoncello et al., 2018). Twenty-five reviews were chosen for this meta-synthesis. The results revealed that patients' knowledge of the system, the perception about telehealth, the usability of the system, the provider's comfort level of the telemedicine application, and the potential cost benefits were all factors that influence a patient's engagement and utilization of technology to manage health conditions (Bertoncello et al., 2018).

One limitation of the study was that it was difficult to determine if one main factor or multifactorial causes would influence an individual's engagement with a telemedicine system (Bertoncello et al., 2018). Therefore, the CEBM tool was used to analyze the article. Only the PubMed database was selected for this study.

McAlearney et al. (2021) was the last article chosen for this literature review. The same search terms and dates were used in the previous study but random control trials were chosen as a filter resulting in 116 articles. The objective of McAlarney et al. (2021) study was to "examine factors related to patients' capacity to use a patient portal and test the impact of these factors on patients' portal use" (McAlearney et al., 2021, p. 1067). This trial was conducted at a Midwestern academic center, and 1,081 patients were selected for this study (McAlearney et al., 2021). Results showed that patients with low self-efficacy scores would more than likely use the patient portals (McAlearney et al., 2021). Limitation included that the study took place at a facility in which many of the patients had access to various resources, which may have different results if the study is performed in a clinic where patients are underserved. The CASP appraisal tool was selected. This article did not mention anything regarding the randomization process.

Literature Analysis

There were thirteen articles found for this literature review. There were six random control trials, five meta-analyses, one meta-synthesis, and one cross-sectional study. There were common themes in all of the articles that were included. Patients had to have a smartphone to participate. Certain groups were excluded from the intervention, such as patients under 18 or over 80 years old, pregnant patients, those with severe illnesses; such as a severe cardiac arrhythmia, or patients who lack the intellectual capacity to utilize the telemonitoring system. Every study showed some form of blood pressure improvement with mobile applications in the

management of hypertension. There was a consensus that older patients or those with limited health or digital literacy would benefit more from additional education when portal use for blood pressure control. Many articles stressed the importance of a supportive team when introducing this evidence-based practice in any clinical setting. The majority of the studies were limited to 6 months, so it is challenging to predict how telemonitoring would affect a patient's engagement or blood pressure for an extended time. Regardless, two studies forecasted a possible reduction of cerebral vascular accidents and coronary artery disease caused by uncontrolled hypertension. Telemonitoring could potentially result in cost savings for those suffering from hypertension. However, the economic benefits of mobile applications for hypertension management were not provided. Most of the patients expressed improved medication adherence when using telemonitoring. Most important, the use of mHealth for the management of hypertension has shown a decrease in provider inertia. Provider inertia was identified as one of the factors that caused uncontrolled hypertension among the patient population. Most of these studies showed the investigator how easy it would be to implement telemonitoring for blood pressure management in any healthcare clinic.

Methodological Framework

The inquiry question was "Will the implementation of telehealth integrated with the standard of care increase patient engagement and control hypertension in patients with blood pressure $\geq$ 140/90?

This DNP project focused on all patients 18-75 years of age who had blood pressures $\geq$ 140/90. Information was sought to determine whether the new practice caused any changes within the target population. The hope was that the implementation would improve the organization's current condition, therefore improving the quality of care for the patient. The

research committee for this organization determined that this DNP project was a quality improvement design. “Most QI (quality improvement) projects fall under the quasi-experimental study category, in which observations are made before and after the implementation” (Ambroggio et al., 2017).

Collaboration among team members is needed in any working environment. A team approach to specific projects will have better outcomes than any individual can do by themselves (Kayser, 2021). The interprofessional collaborators at this facility are multicultural. Collaboration with people of various cultures is a strength because it broadens one’s perception of a particular subject. Interprofessional communication also ensures that the patient will receive high-quality care (Homeyer et al., 2018). Interprofessional collaboration is a core component for the American Association of Colleges of Nursing (AACN) essentials for the nursing profession (American Association of Colleges of Nursing, 2021).

The interprofessional team consisted of the clinical mentor, clinic manager, medical director, clinical pharmacist, social worker, eligibility specialist, providers, nurses, medical assistants, and a representative from the IT (information technology) department. The clinic mentor’s role was to support the researcher and offer recommendations for the project’s progression. The clinic manager would instruct the staff on their specific roles for the project. She would also provide monthly metric reports on target goals and current standings. The medical director would collaborate with those in administration and provide updates on any changes made within the organization. The clinic pharmacist would provide the investigator with current medication updates. The social worker would ensure that patients get their supplies to manage their blood pressure from home or provide transportation to and from the clinic. The eligibility specialist would be there to assist patients with paperwork so they can get approved

for the governmental program provided by the organization. The providers' role at the facility was to implement the implementation, and the nurses were there to provide patient teaching on how to check blood pressures. Finally, the medical assistants would assist in patient recruitment for this project implementation and members of the IT department would be available if the researcher needed any assistance with data retrieval. Information among the interprofessional team was transferred by email, skype, EHR messenger, or staff meetings.

Rogers Diffusion of Innovation Model

Before implementing a new evidence-based practice in a clinical setting, there are many things to consider. Implementing a new practice requires project and change management (K. Moran et al., 2020). Project management begins at the planning stages of the project. It involves "planning, organization, acquiring, managing, leading, and controlling resources to achieve the overall project goal(s) (K. Moran et al., 2020). Change management focuses on the actual process that is needed to implement the change among the stakeholders (K. Moran et al., 2020). Communication is the foundation of change management (K. Moran et al., 2020)

Everett Rogers introduced a conceptual model to describe how change occurs. His theory explains how innovation is cemented into clinical practice (Friesen et al., 2017). Rogers identified that an individual must go through five phases before deciding whether to adopt or reject a new idea into practice. The phases are knowledge, persuasion, decision, implementation, and confirmation (NSW Agency for Clinical Innovation, 2015).

Rogers also identified four key concepts or elements that must be considered when implementing innovation into practice. The concepts are innovation (new practice), communication channels (nurse transmitting ideas), time (rate of adoption of change), and social systems (community, facility, or stakeholders) (NSW Agency for Clinical Innovation, 2015).

Lack of addressing these elements may lead to project failure. These concepts will be addressed when introducing the MyChart application for blood pressure management to the patient population.

Innovation

Rogers describes innovation as "an idea, practice, or project that is perceived as new by the individual or other unit of adoption" (Sahin, 2006). Uncertainty and consequence are two significant concepts during this phase (Sahin, 2006). These concepts can become obstacles for the practitioner. Uncertainty is the fear of the unknown. Patients may be fearful that change will affect the current standard of practice. They may feel that they may not get as much attention from the provider if they self-manage their blood pressures from their homes. The consequence is the result of the change (Sahin, 2006). Individuals come with their ideas and visions regarding healthcare. How a patient envisions the possible consequence of the innovation will affect his or her decision to implement the new action.

Rogers informs the innovator to address the preconceived ideas of the patient. His advice is to inform the patient of the advantages and disadvantages of the new practice (Sahin, 2006). He also recommends that the patient be informed of what is expected (Sahin, 2006). For this project, the patient was informed of the advantages of telehealth. The advantages are the reduced expenses due to fewer patient visits, the convenience that patients will have because they will be able to manage their blood pressure from their homes, and the autonomy that this innovation affords each individual with hypertension. Time will be discussed as a disadvantage. Patients will have to take time out of their schedule to check their blood pressure and input their data into the system for the provider to view. The nurse practitioner can also inform the patient what will

be expected of the new change. For example, the patient will be informed that they will still have in-person follow-up appointments with the provider every three months.

Communication

The communication channel can be defined as messages being transferred from one person to another; innovations are spread (Communication Theory, n.d.). Diffusion or the effectiveness of the communication channel is mainly dependent on the relationship between the nurse practitioner and the patient (Sahin, 2006). It can be challenging to develop an interpersonal relationship if the nurse and the patient's expectations are not homogeneous (Sahin, 2006).

For this project, communication can be enhanced if the healthcare provider utilizes a communication guide when collaborating with the patient. AIDET is a useful communication tool that provides healthcare professionals with instructions on communicating effectively with the patient. AIDET stands for acknowledging, introduce, duration, explanation, and thanking the individual (Avila, 2021). This form of communication is practiced in many healthcare institutions. Therefore, active listening and the AIDET tool will assist with the diffusion of this DNP project.

Time

Rogers describes time as the rate of adopting the innovation (Sahin, 2006). The Diffusion of Innovation Theory describes four adoption types that will define the expediency of the implantation (Science Direct, 2021). The five types are innovators, early adopters, the early majority, the late majority, and the laggards. Innovators and early adopters are often in leadership positions (NSW Agency for Clinical Innovation, 2015). They are considered highly educated and socially accepted (NSW Agency for Clinical Innovation, 2015). The early majority may take a little longer to adapt to the new idea, but they will agree to the changes faster than the average

individual (NSW Agency for Clinical Innovation, 2015). The late majority are highly skeptical, and those who are considered laggards are resistant to change altogether (NSW Agency for Clinical Innovation, 2015).

Considering that the target hospital is a county facility, a large percentage of the patient population would more than likely be considered to be the early majority, late majority, or laggards. When working with individuals who are considered to be the early majority, it is essential to remain persistent and proactive (Tucker & Melnyk, 2019). Persistence by the provider may be beneficial in getting the early majority to begin using the MyChart application; for example, speaking to the patient about the telemonitoring system during office visits or by calling everyone that has hypertension on the provider's patient panel to discuss this new tool. In addition, the early majority seeks advice from their peers so they prefer new ideas that have been tried by their colleagues (Sirk, 2020). Informing them that other patients at the clinic are participating in the innovation and have expressed approval may assist with the adoption process.

The late majority will be highly skeptical (Department of Defense, n.d.) For the late majority, "the innovation must definitely have the weight of system norms behind it to convince the late majority" (Department of Defense, n.d.). They may also adopt the new idea out of economic necessity (Department of Defense, n.d.). Additional counseling was needed for this group. An example is meeting with the patient and discussing the step-by-step processes of utilizing the system. American Heart Association (AHA) recommendations on the blood pressure guidelines were also provided. Patients were asked to illustrate how to maneuver the system. This technique is what is known as the teach-back method. "The teach-back method is a way of checking understanding by asking patients to state in their own words what they need to know or do about their health" (U.S. Department of Health & Human Services, 2020). The economic

benefits will also be mentioned; the reduction of office visits will be beneficial for those who cannot get off work, lack transportation, or live remotely.

Laggards do not like change and will attempt to avoid it as much as possible. Laggards make up 16% of the population and are usually older (Sirk, 2020). Those who are laggards will have to see the results before implementing any practice (Sahin, 2006). The plan was to get family support to assist the patient in utilizing the MyChart application. For example, they were showing the family members how to record the data into MyChart when the patient takes his or her blood pressure at home. The provider would also provide reports on how the implementation has been beneficial for other patients at the facility. There is an understanding that this particular group may never adopt the innovation.

Social System

The social system is the final concept in the innovation-diffusion process (Sahin, 2006). Rogers stresses that the organization profoundly affects innovation, growth, and development. If those in management are not supportive of implementing evidence-based practice in a clinical setting, diffusion will not occur. For this DNP project, frequent updates to the clinical manager and medical director were provided. One of the steps for project implantation was to keep those in leadership informed. The researcher should "use compelling data and rationales to identify whether and why change is needed" (Tucker & Melnyk, 2019). Identifying care gaps, comparing benchmarks to actual scores, and providing information on the cost of the implementation may assist in leadership buy-in (Tucker & Melnyk, 2019).

Data Analysis

A quasi-experimental design study was performed at a community health clinic in the Northeast area of Tarrant County. Approval was sought from the organization's compliance

committee to obtain records of every patient with hypertension at this facility. The community health analyst runs monthly metric reports on those patients with blood pressures ≥ 140/90. In addition, patients with hypertension were asked either by phone or in-person if they wanted to use the patient portal to monitor their hypertension.

Forty-eight patients volunteered to participate in this project. Patients were asked to enter their home blood pressure readings on their blood pressure log in the hospital's patient portal known as Mychart. The portal could be accessed by downloading it on their smartphone or through the website from their home computer. Flowsheets were retrieved from the electronic health records on every patient that entered data from September 10, 2021, to February 10, 2022. Blood pressure readings between these two specified dates were manually recorded during clinic visits.

The Patient Activation Measure was used to assess patient engagement. This assessment tool is a subjective survey that contains 13 questions. It can be assessed on the company's website that has the rights to this survey. This tool is offered in 52 languages. Each question contains a Likert scale. The options were agreed, strongly agree, disagree, strongly disagree, or non-applicable. Raw scores can range from 0-100, with most people falling between a total score of 30-60, which are levels 1-3 (Insignia Health, 2021). Level 1 means that the patient is disengaged and overwhelmed, level 2 shows that the patient is becoming aware, level 3 reveals that the individual is taking action. Level 4 reveals that the patient has adopted new behaviors (Insignia Health, 2021). Patients' raw scores and levels were retrieved once responses were entered in the Excel program on the company's website. Scores were assessed pre-and post-implementation. The minimal period between pre-and post-reading was one month. Any change in score can be a meaningful finding (Insignia Health, 2021). An increase of three to four

points shows that the individual has moved from not engaging to engaging in a particular health practice (Insignia Health, 2021). The Patient Activation Measure has an internal consistency of (Cronbach α 0.81) (Prey et al., 2016)

The survey was given to the eligible patients. Those excluded were patients who were already using the patient portal before the investigator received the license to use this tool for the study. There were also those patients who filled out the survey but neglected to use the Mychart patient portal for their blood pressure management.

Information was de-identified by excluding names, date of birth, and medical record numbers. SPSS 28.0 software was used for data entry and analysis. Because each participant entered data at different times and frequencies, the average reading for the systolic and diastolic pressure was entered for every month that the patient participated in the study. A second investigator was present to review the data entered to maintain the integrity of the study. A paired t-test was used to compare blood pressure readings pre-and post-implementation to assess for improvement. Pearson's correlation was used to determine if there was a correlation between the number of times a patient utilized the system and its impact on the patient's blood pressure readings. A metric grid was constructed to show all of the measurements that were used for this project (see Figure 6). In addition, metric reports of current standings and run charts were provided for the stakeholders to provide information on the progression of the project. Texas Woman's University's Center for Research & Data Analytics (CRDA) faculty members were asked to perform a power analysis to determine the clinical significance of the study. An a priori power analysis was conducted using G*Power 3.1.9 to determine the minimum sample size required to find statistical significance using a paired t-test. With a desired level of power set at .80, an alpha (α) level at .05, and a small to moderate effect size of .40 (d), it was determined that

a minimum of 51 participants were required to ensure adequate power (Cohen, 1988). (See Figure 7).

A Gantt chart was utilized to show the timeline for all the tasks needed to implement this new practice in this facility (see Figure 8). No additional fees were incurred with the implementation of this project. Blood pressure machines were provided through the grant money that the clinic receives. Blood pressure monitors were provided to self-pay or those under the grant program sponsored by the organization. The monitors were supplied from the outpatient case management budget. There was a limit on how many we can get per month due to budget cuts, which is roughly 20 per month among all of the medical homes in the organization. Medicaid covers the blood pressure machines for their recipients. Blood pressure monitors were not provided for those with Medicare or private insurance to purchase a machine themselves. Patients were provided education on how to use the application. These appointments were made as nurse visits, so patients were not charged a fee for the visit. The nurse visits were performed during regular office hours, so there were no additional charges for the hospital.

Findings

Characteristics of the Sample

Forty-eight patients agreed to utilize the Mychart application for this DNP project; however, five participants were removed from the project. Four of the participants failed to use the patient portal, and one had a positive pregnancy test and was transferred to a provider in obstetrics. Forty-three patients accessed the patient portal from September 2021 to February 2022. There were 24 females and 19 males ranging from 31 to 71 years. The composition of this group included 39% White, 28% Hispanic, 19%, Black or African, and 14 % other, which included Native American and Asian. Some of the patients were not U.S. citizens. Of the 43 participants,

9 were current smokers, 8 were former smokers, and 26 had no smoking history. Forty-four percent of the patients had comorbidities which included diabetes, peripheral vascular disease (PVD), coronary artery disease (CAD), human immunodeficiency virus (HIV), Hepatitis C, and chronic obstructive pulmonary disease (COPD). Out of the 43 participants, 72% were either obese or morbidly obese. Forty-two percent of the patients were married.

Outcome

Only the blood pressures that were taken in the clinic were evaluated. A run chart was used to show the patient portal's effects on the systolic and diastolic pressures for the past 3-6 months (see Figure 9). Results showed a reduction in the systolic mean by 4.56 over three months and 6.87 in 6 months. The diastolic mean declined by 3.17 and 8.74, respectively. Patients' blood pressures and the number of times they used the MyChart application were the variables used to calculate Pearson's correlation coefficient. This measure was used if there was a relationship between the two variables and to determine the amount of engagement for each patient. There was a moderate positive correlation between the amount of application use and the change in the individual's systolic ($r = .34$, $n = 43$, $p < .05$) and diastolic ($r = .33$, n = 43, $p < .05$) blood pressure after utilization. As the number of usage times increased, so did the patient's blood pressure change.

A paired t-test was conducted to analyze if there were differences in mean systolic and diastolic pressures before and after the use of the patient portal. There was a statistically significant decrease in the means in both the systolic and diastolic readings. Systolic pressures readings decreased from ($M = 144.50$, $SD = 13.64$) to ($M = 136.72$, $SD = 13.42$), 7.77, t (42) = 3.34, $p = .002$, $d = .51$). Diastolic pressures were ($M = 85.05$, $SD = 8.95$) before portal use and ($M = 80.17$, $SD = 9.60$, 4.87, t (42) = 3.63, $p < .001$, $d = .553$) after use. The results revealed a

6-mmHg systolic and a 7-mmHg diastolic reduction in blood pressures when providers use the patient portal to manage hypertension.

Paired t-test was used to evaluate the PAM scores. Eleven patients completed their surveys to assess for patient engagement. Mean scores for patient engagement were (M = 60.15, SD = 8.26) before application implementation and (M = 72.86, SD = 165.84, t (10) = 2.99, p. = .015, d = .884) after utilization. These results show a 21% increase in patient engagement scores (see Figures 10 and 11).

Conclusion

The results of this inquiry had similar findings as to the research articles that were found for this project. For example, Gong et al. (2020) study also revealed that both systolic and diastolic pressures declined when telehealth was used for monitoring. In addition, Bertoncello (2018) showed the impact that technology had on patient engagement scores although there was some uncertainty as to what was the main principal factor that contributed to the improved healthcare behavior among the participants.

There were no differences in the barriers experienced in this study than those that were reviewed. Lyles (2020) study showed that providers' involvement had profound effects on whether a patient utilizes telehealth for blood pressure monitoring. For example, one of the participants who initially agreed to participate for this project stopped abruptly due to the provider's failure to communicate to the patient that the readings had been reviewed. Provider communication with the patient or lack thereof can determine the success of this new practice.

Many of the studies that were reviewed showed that older patients might need more time to adapt to the new system. For this project, every attempt was made to ensure that each patient received adequate teaching on portal use. However, there were those that required additional

counseling. The use of this application was complex for those older patients who were non-English speaking or those who were heavily dependent on a family member to assist them with technology. Trying to convince a patient who is apprehensive about using any form of technology can be challenging for any provider and was an obstacle for this DNP project.

Limitations

This project was not without its limitations. Although this quality improvement measure resulted in improved blood pressure readings among the those participating, it was underpowered according to the power analysis performed so the results are not considered statistically significant. Homogeneity among the participants was not assessed. Clinic structure may have affected the results. A provider may get 2-3 new patients at this facility a day. Many of these patients have hypertension. They automatically affect the provider's metric scores even though they have not been a patient at the facility for an extended period. Therefore, it is difficult to evaluate the provider's productivity or the full effects the patient portal has on the metric scores. Although patient teaching was provided to each participant, there was the possibility that the patient did not check his or her blood pressure correctly. Those with underlying anxiety or white coat syndrome may have had some effects on the results reported. Finally, the patient activation measure (PAM) is subjective; therefore, social desirability bias could be a factor. There were also a limited number of respondents who completed the survey.

Recommendation for Practice

This DNP project satisfies many of the competencies for the DNP Essentials. Some include but not limited to (1.2 f) Synthesize knowledge from nursing and other disciplines to inform education, practice, and research, (2.6 f) Monitor aggregate metrics to assure accountability for

care outcomes, (2.8 g) Incorporate the use of current and emerging technologies to support self-care management, (5.1o) Advance quality improvement practices through dissemination of outcomes, (8.1 g) Identify best practice an practices for the application of information and communication technologist to support care, (8.1 k) Identify the impact of information and communication technologies on workflow processes and healthcare outcomes, and (8.4 f) Employ electronic health information exchange, interoperability, and integration to support patient-centered care (American Association of Colleges of Nursing, 2021).

Benefits

The implementation of technology in managing certain health conditions such as hypertension is a viable option for any healthcare organization. It is of particular advantage for those who practice in rural areas or those organizations whose patients have decreased access to healthcare due to financial hardships, lack of transportation, or provider availability. Telehealth is a cost-effective option, however adequate staffing, supportive management, and provider involvement is needed for favorable outcomes.

Ethical Considerations

Some ethical ramifications should be considered when incorporating telemedicine in any practice. Extra time for patient education may be needed for older patients or those in which English is not their primary language. Additional counseling is an attempt to minimize healthcare disparities. Before implementing this practice in any facility, providers should be aware that if the patient is using the portal, the readings must be addressed as if patient was being seen in the clinic. Patients with disabilities such as a visual or intellectual impairment may have difficulty using this system.

Self-Reflection

Some things could have been done differently that may have hastened the project's progression. Dissemination of this new practice is slowly developing because many of the patients are still not aware of the patient portal abilities and how it can be used to manage their healthcare needs, such as monitoring their blood pressures. In hindsight, there should have been more of an attempt to work with the communication team at the organization to receive approval to get signage placed throughout the clinic. This attempt would have allowed for a greater information dispersal to the patient population.

This project is essential for the patients and the community. There has been a noticeable improvement in patients currently utilizing the Mychart application for blood pressure monitoring. The patients have expressed how the portal has benefited them. Patients have made comments such as they have had positive lifestyle changes since starting the application, the portal educated them on which pressure was normal and abnormal. The telehealth feature improved their access to the provider. At present, only two out of the three objectives have been met. The clinic's metric scores began at 69.63 and have increased to 71.13 but have yet to reach the target goal of 75.7. The goal has not been met, but the use of patient portals has impacted the metric scores for those providers who are currently using the patient portal to manage hypertension. Additional time and more patient exposure to this application is needed to meet the target goal in the near future.

Dissemination

The lead investigator will sustain the project, who will continue to order the Mychart application for those with hypertension. Individual instruction will be provided for every provider in the clinic. The clinic pharmacist will schedule follow-up appointments with the

patients with resistant hypertension and provide instruction on portal usage and medication management. She will also collaborate with the primary care provider regarding their patients.

The results will be disseminated to those in managerial positions, such as, the vice-president of clinical operations. She was chosen because she can make the necessary changes for all the community health clinics in the organization. Findings will be presented to the diabetic bundle committee. The panel aims to improve the metric scores among the outpatient facilities. The results of this scholarly project will also be submitted to the Texas Woman's University (TWU) electronic repository.

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Figure 1

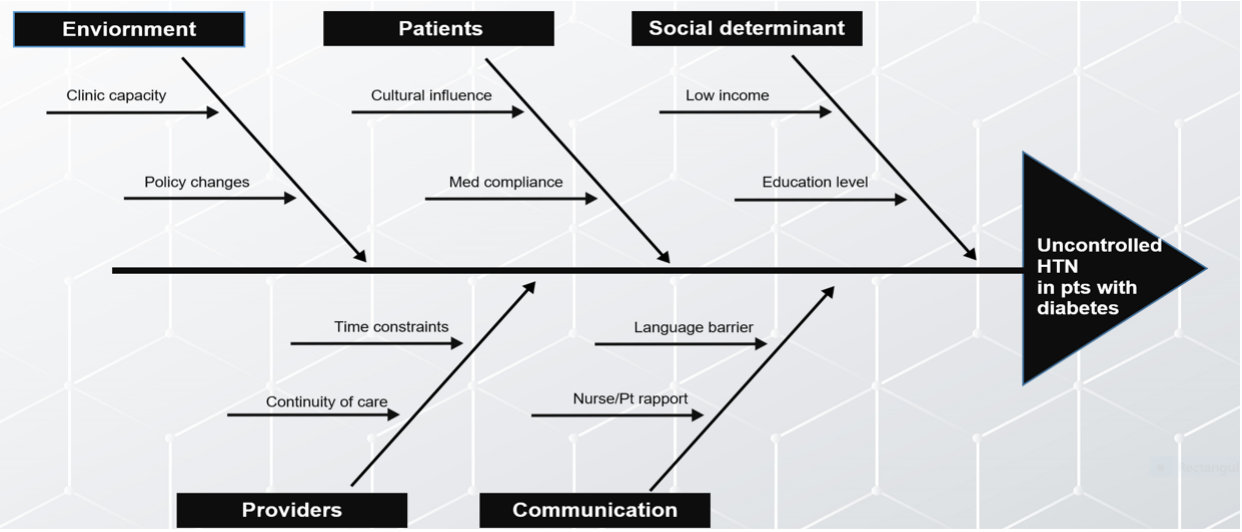


Figure 2

Strengths What do you do well? What unique resources can you draw on? What do others see as your strengths?	Weaknesses What could you improve? Where do you have fewer resources than others? What are others likely to see as weaknesses?
Governmental programs 340 B Drug Pricing Program Patient Assistance Program (PAP) Excellent teaching facility EHR system (easy communication with the specialsit within the organization Profit margin 59-62% in the previous years	Delay in services Long wait times Population perception Salaries Staffing Planning Not utilizing EHR to potential
Opportunities What opportunities are open to you? What trends could you take advantage of? How can you turn your strengths into opportunities?	**Threats** What threats could harm you? What is your competition doing? What threats do your weaknesses expose you to?
Era of technology EHR has telemonitoring capabilities Utilize market strategies Opportunity to increase salary	Competitors (outside healthcare institutions) offering staff positions for higher wages Goverment policy changes

Figure 3

S	**Specific**	*What do I want to accomplish?* *Why do I want to accomplish this?* *What are the requirements?* *What are the constraints?*	Reach target goal that 75.7% of the patients with diabetes have their blood pressure under control.
M	**Measurable**	*How will I measure my progress?* *How will I know when the goal is accomplished?*	Progression will be measured by the monthly metric reports.
A	**Achievable**	*How can the goal be accomplished?* *What are the logical steps I should take?*	The goal can be accomplished by having the patients and provider utilize the MyChart application in the management of hypertension
R	**Relevant**	*Is this a worthwhile goal?* *Is this the right time?* *Do I have the necessary resources to accomplish this goal?* *Is this goal in line with my long term objectives?*	The goal is intended to improve the quality of care that is provided for the patients and for healthier patient outcomes.
T	**Time-Bound**	*How long will it take to accomplish this goal?* *When is the completion of this goal due?* *When am I going to work on this goal?*	The goal will be accomplished by March 1, 2022.

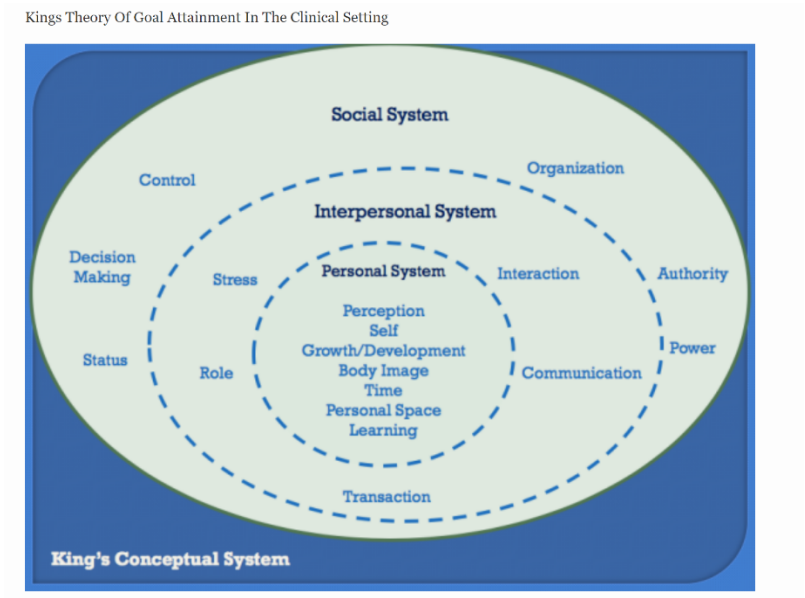
Table 1

Steps in the Process	Failure Mode	Failure Causes	Failure Effects	Likelihood of Occurrence (1-10)	Likelihood of Detection (1-10)	Severity (1-10)	Risk profile number	Actions to reduce occurrence failure
1. Contacting the patients	Incorrect Data	PARS did not check data	Inability to contact patient until patient calls for an appointment	4	7	10	280	PARS to change verbiage when get info from patient
	List not current	EHR does not update	Incorrect empanelment (Provider unaware of his/her actual patients)	4	6	10	240	Routinely update empanelment List
	Patient no longer under care of provider	Patient does not inform clinic of new PCP	Provider's metric scores are affected	5	5	6	150	Improve patient satisfaction. Attempt to contact those that miss their follow up appointments
	Patient avoiding call	Avoid billing	Inability to contact patient when	5	1	8	40	Leave messages and reach out via MyChart

			information is important					
2. Construct a brochure on how to use MyChart application	Inability to acquire the supplies Inability to get translators to assist with brochures	Supplies not in the budget No translator available for a particular language in the organization	Patients may be hesitant to use portal if they lack information on how to use MyChart Health disparity due to inability to provide information to patients who do not speak English	1 3	1 1	8 10	8 30	Avoid overproduction of materials Use alternatives such as computer software
3. Ensure patient has equipment	Patient does not have home blood pressure monitor or smart phone	Patient cannot afford or lacks desire to purchase equipment	Inability to utilize the MyChart application in the management of hypertension	7	1	10	70	Work with in-house social worker to get blood pressure monitors for patients. Get family members

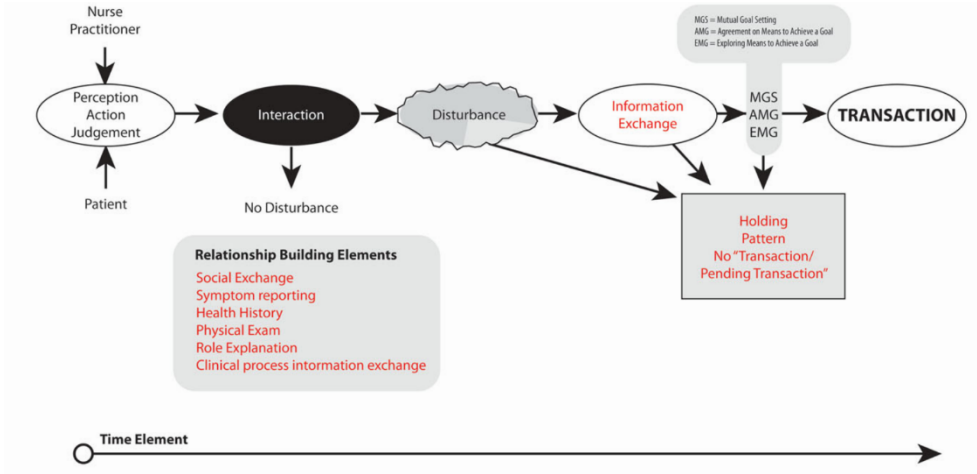
								for smart phones
4. Initial meeting with patient for instructions on correct way to check blood pressure	No show appointments	Transportation problems or patient forgets appointment/have prior engagements	Lack of patient involvement	8	1	10	80	Transportation services provided by the organization. Send reminder 1-2 days before appointment
	Limited staff	Inability to provide effective patient teaching	Incorrect blood pressure readings	7	1	10	70	Ensure that meetings with patients are scheduled on days with adequate staffing.

Figure 4



King S Theory Of Goal Attainment - cloudshareinfo

Figure 5



1) New Message! (cloudshareinfo.blogspot.com)

Table 2

Citation	Purpose/ Design	Level of Evidence	Sample/ Setting	Major variables Studied & their definitions (IV & DV)	Measure	Data Analysis	Findings	Appraisal
Bertoncello C., Colucci, M., Baldovin, T., Buja, A., Baldo (2018). How does it work? Factors in telemedicine home-intervention effectiveness: A review of reviews, *PLos One* 13 (11), 1-24.	Meta-synthesis to determine what conditions increased the chances of patients utilizing technology for healthcare management	Level 1-Meta-analysis	Two independent authors extracted relevant studies. Twenty-five reviews were chosen	Dependent variable-telemedicine usage. Independent variable included patients' knowledge, patients' perceptions, and providers' comfort level of system	Robis tool used to assess the quality of the studies that were used	Authors retrieved data independent.	Patients' knowledge of the system, patients' perception, and usability of the application determined patients' usage	Difficult to assess if one main factor or multiple factors determined patient usage. The CEBM appraisal tool was used. PubMed was the only database used for data retrieval which could limit the study
1.Bryant, K., Sheppard, J., Ruiz-Negron, N., Kronish, I., Fontil, V., King, J., Pletcher, M., Bibbins, K.	Pooled data from 4 random control trials was used for this study. Researchers used a	Level 2-Random Controlled Trials	Patients resided in the United Kingdom. Patients' blood pressure was either	Dependent variable-blood pressure results. Independent variables-Level 1-Patients	Multivariable random effects regression was used to determine the probability of	Authors simulated 1000 probable outcomes to compare blood pressure	Findings revealed that strategies that offered more support had greater	Limit-med adhere was not accessed. Studies were separate from each other. Did not account if they interact

Moran, A., McManus, R., & Bellows, B. (2020). Impact of self-monitoring of blood pressure on processes of hypertension care and long-term blood pressure control. *Journal of the American Heart Association, 9(15).*	mathematical model to project the 5-year blood pressure outcomes of those observed participants at varying levels of support.		140/90 or 130/90 if have diabetes. The average mean age was 66.6 and 53% were male. The participants were predominately white.	performed SMBP (self monitoring of blood pressure) in clinic once a month. Level 2- Home SMBP with collaboration with providers via email. Level 3-Home SMBP with telemonitoring, Level 4-SMBP and self-titration	intensification regarding blood pressure at 12 months for usual care versus SMBP.	under each of the support levels	results than standard care.	with each other. Jadad scale used for appraisal No blind study. No info given on power analysis. Due to limitation and cannot generalize to overall population, this would not be feasible
2.Chandak, A., Joshi, A., (2015). Self-management of hypertension using technology enabled interventions in primary care settings. *Technology &*	The purpose of this systematic review was to explore the role of technology in the self-management among those with high blood pressure	Level 1-Systematic Review	Eight studies were random controlled trials. Two studies used 2 by 2 RCT. Eligibility was based on self-reports problems or physician diagnosed. Study setting	Dependent variable-patients' blood pressure Independent variable-8 studies used telemonitoring on the affects of blood pressure control. Another study	Blood pressure control was measured in different ways. They were determined by the proportion of subjects with controlled blood	There were 12 studies which were analyzed. Various technologies were implemented such as internet based tele-monitoring,	The proportion of those with controlled blood pressure and reduced means scores of SBP and DBP were	Limit-literature search may have missed relevant studies. Variable values in the diagnosis of HTN between the studies. Article suggest more longitudinal studies. A

Health Care, 23(2), 119-128.			included clinical, home-based, clinic-based, and workplace. Average study duration was 33.3 months	used decision support system and telephone education and the independent variables. One study chose telemedicine and videoconference to determine effects.	pressure, change in mean SBP and DBP, medication adherence and number of BP meds.	telephone-based telemonitoring and education, internet-based education, tele-medicine via video-conferencing, telehealth kiosks and automated modem device	improved if intervention was focused on patients and providers	CEBM appraisal tool used. Article provided literature search words that were used. This action is feasible. Can be applied in a clinical setting.
3. Gong, K., Yan, Y., Li, Y., Du, J., Wang, J., Han, Y., Zou, Y., Zou, X., Huang, H., She, Q. (2020). Mobile health applications for the management of primary hypertension -a multicenter, randomized,	To assess the impact of m-Health app on blood pressure and medication adherence	Level 2-Random Control Trial	There were 38 hospitals used for the trial. Location was in Chongqing, China. Patient were ages 18-79 who were diagnosed with hypertension. A total of 443 subjects completed the trial (218	Dependent variable-blood pressure and medication adherence Independent variable-use of M-heath, standard care	The Modified Morisky Scale (MMS-8) to measure med adherence. Study group uploaded the blood pressure readings in the app system. The control groups kept BP readings on paper. Pt	SPSS 24.0 statistical analysis was used for data analysis. Student t-test used to compare the two samples. Chi-squared test were used to compare the qualitative data between the two groups.	At the 6-month interval, the SBP and DBP were significantly lower in both groups (intervention group (-8.99±6.41 and control group -5.92±6.945 for SBP and -7.04±-6.135 and the control	Limit-Difficult to determine long term outcome, i.e., reduction in CAD. Measure is subjective when asking patients on med adherence. CEBM appraisal tool used. No significant different between control and treatment

controlled trial. *Medicine (Baltimore),* 99(16), E19715.			from control group and 225 from intervention group)		had to use the same BP cuff. Patients were followed up monthly for 6 months to record BP and check that they were still active in study.		group -4.14± 8.213 mmHg for DBP.	groups. Subjects were all accounted for. A relative risk was not provided. Cannot generalize this data because patients culturally different but the treatment is feasible for the clinic setting.
4. Jeong, S., Choi, H., Gwon, S., Kim, J. (2018). Telephone support and telemonitor for low-income older adults. *Research in gerontological nursing*, 11(4), 198-206.	The purpose was to determine if nurse-led counseling improved physical condition and self-care for those older patients who are using the tele-monitor system	Level 2-A random control, single-blinded, parallel pilot trial	Setting is in South Korea. Participants were ≥60 years of age. All had blood pressures ≥140/90. The majority were female with education of middle school and less. They also had low income. Some had	Dependent variables were patients' health behavior, self-care behavior, and blood pressure outcomes. The independent variable telephone support for those using telemonitoring.	Health Practice Index (HPI) used to assess health behavior. Physical results were assessed by measuring systolic and diastolic blood pressures. Subjective instruments by Lee (1994) and Choi	Chi-square, Fisher's exact, and independent t test were all used to assess for homogeneity. Cohen's d was used to explain the effect size of the intervention.	Study revealed that increased telephone encounters by HCP can lead to behavioral modification and blood pressure control.	Limit-The study has a small sample. CASP Appraisal tool used. Both groups have similar background and each group received education. Cannot generalize due to small sample size, but subject is similar to subjects in

			history of diabetes. There were 35 subjects. Only 20 completed study from treatment group and 15 from control group.		(1998) were used to measure for self-care. behavior. Both used Likert scales.			local clinic. Can use this approach in current practice.
5.Lee, K., Kwon, H., Lee, B., Lee, G., Lee, J., Park, Y. (2018). Effect of self-monitoring on long-term patient engagement with mobile applications. *PLoS ONE,* 13(7).	Purpose is to investigate how the use of mobile applications effects on user retention.	Level 3-Cross sectional study	Log data was collected in Korea. Individual usage logs were collected from 1,439 patients during an 18-month span from August 2011-January 2013.	Dependent variable is patient engagement. The independent variable was the usage patterns of the PHR (personal health records)	The Random-effect model was used to examine the number of times the patient logged in during a given week.	The Cox proportional hazard model to observe the probability of patient stopping the use of the application.	Results revealed that although the majority of the patients used the app more to retrieve information, those few that were using the app for self-monitoring were the participants that continued using the app on	Limit-May have a patient heterogeneity. May be difficult to generalize. Study may have included early adopters since it was the first used at the facility. CASP critically appraisal was used. Author took into consideration groups more likely to use mobile app. This is easy to implement in any facility.

							long-term basis.	
6. Li, R., Liang, N., Bu, F., Hesketh, T. (2020). The effectiveness of self-management of hypertension in adults using mobile health: systematic review and meta-analysis. *JMIR mHealth and uHealth,* 8(3), e17776.	Objective is to measure the effectiveness of mHealth in the adult patients with hypertension.	Level 1-Systematic Review	There were 24 studies used, 3 from the United Kingdom, 11 from the U.S., 3 from Canada, 1 from Spain, China, Chile, South African, Mexico, Iran, and South Korea. Two studies were from rural area and 22 from urban area. The average ages were 44-78 across the 24 studies. There were 4 articles which focused on minorities.	Dependent variable is blood pressure outcomes, cost, medication adherence, and self-management behavior. Independent variable is use of mHealth (mobile health)	Mean SBP, DBP, and the proportion of subjects with controlled blood pressure was evaluated. A random-effect model was used to generate pooled data for a 95% CI. Morisky Medication Adherence Scale was used in 6 studies to assess for medication adherence.	Odds ratio (OR) and mean differences (MD) were derived from Manzel-Haenszel and inverse variance methods. An I^2 to assess for inconsistency between the studies.	mHealth intervention resulted in better BP control with SBP decreasing by 3.78mm Hg and DBP decreasing by 2.19 mm Hg when compared to usual care. Also showed education was effective. Cost effectiveness for the mHealth groups for patients who were underserved.	Limits-Risk of bias. Self-reporting can on compliance can cause bias. There were 13 studies that did not discuss the random allocation. Heterogeneity due to variation of interventions. The duration of studies was short. CEBM critical analysis performed. Authors included databases used but not search terms. Cannot replicate due to lack of search terms. Confidence intervals were provided. These results can be applied

								to the practice facility.
7. Lu, X., Yang, H., Xia, X., Lu, X., Lin, J., Liu, F., Gu, D. (2019). Interactive mobile health intervention and blood pressure management in adults: a meta-analysis of randomized controlled trials. *Hypertension*, 74(3), 697-704.	Purpose was to evaluate the effects of mHealth (mobile health) interventions on blood pressure management and discover the optimal target population	Level 1-Systematic Review	There were 11 trials and 4,271 participants. Five studies from the U.S, 2 from England, and 1 each from Spain, Honduras and Mexico, South Africa, and China. Eight studies had sample size larger than 200. One study has patients with diabetes. Hypertension was defined as blood pressure ≥140/90.	Dependent variable was patients' blood pressure independent variable-Use of mHealth	Net effect sizes were used to determine the BP change between the treatment group and control group. The random-effect model to get pooled estimates	I^2 statistics used to assess for heterogeneity. Priori-defined subgroup analysis to also assess of the effects of mHealth.	Results showed lower blood pressures after use of mHealth than those of usual care. Some reports that telephone counseling, text messages had synergistic effect with mobile app.	Limit-small sample size and heterogeneity. Potential bias because allocations was not concealed. CEBM critical analysis was used. Databases and search terms were mentioned in this article. The results were similar between the studies. The results may be utilized at the target facility.
8. Lyles, C., Nelson, E., Frampton, S., Dykes, P.,	Purpose was research patient engagement	Level 1-Systematic Review	There were 53 studies between 2013-2019.	Dependent variable-patient engagement. Independent	RE-AIM (reach, effectiveness, adoption,	Data analysis not mentioned in this article	Results showed that 1:1 training on	Limit-search terms may have excluded relevant

Cemballi, A., Sarker, U. (2020). Using electronic health record portals to improve patient engagement: research priorities and best practices. *Annals of Internal Medicine,* 172(11), S123-S129.	and to determine the barriers to patient portal use		Most involved outpatient facilities. Focus was on U.S. settings	variable-interventions, usability, barriers.	implement, and maintenance). This framework used to evaluate if the studies included relevant findings.		portal use results in increased use of portal. Patients with low health and digital literacy have difficulties with portal. Providers reported increased workload limited support of portal use.	articles since PubMed was the only database that was used. Unable to compare studies due to heterogeneity. Small sample size in some studies. CEBM analysis was used. Article states the purpose and inclusion guidelines. Many of the studies were qualitative studies and quasi-experiment studies. These suggestions are feasible at present practice setting.
McAlearney, A., Sieck, C., Gregory, M., Di Tosto, G.,	Objective is to examine factors that contributed	Level 2-Random Control Trial	There were 1,081 patients located in a	Independent variable-few resources, self-efficacy	The Health National Trends Survey	Scores from Engagement Capacity Framework	Patients with limited resources were less	Limitations-the majority of the patients had access to

MacEwan, S., DePuccio, M., Lee, J., Huerta, T., Walker, D. (2021). Examining patients' capacity to use patient portals. *Medical Care,* 59 (12), 1067-1074.	to patient use of the telemonitor system and its impact of the factors that influenced the use of the portals.		Midwestern academic medical center	scores, Dependent variable-patient portal use		(ECF) were calculated averaging numerical values	likely to utilize telemonitor system while those with low self-efficacy scores had increased amount of usage	various resources which may have influenced study results. The CASP tool was selected for appraisal. The study did not mention how patients were randomized for the study
9. Pan, F., Wu, Hl, Liu, C., Zhang, X., Peng, Wei, X., Gao, W. (2018). Effects of home telemonitoring on the control of high blood pressure: a randomized control trial in the Fangzhuang community health	The purpose of this study was to evaluate the results of telemonitoring on patients with hypertension.	Level 2-Random Control Trials	Health center in Fengtai District, Beijing. There were 110 subjects. Most were urban residents. Ages ranged from 35-75 with blood pressures >140/90. Fifteen-eighteen percent of patients had diabetes	Dependent variable-patients' blood pressure. Independent variable-Use of telemonitoring.	Blood pressures were checked at 30, 60, and 90 days after baseline.	Student's t-test to compare the post-intervention outcomes between the two groups for changes in blood pressure and Chi-square test for the control rate. Pearson's correlation analyses for the use of the app and	On average, treatment group had more reduction in blood pressure than control group. A moderate correlation (r=0.302, p=0.029) between lowering systolic blood pressure	Limits-small study sample due to limited resources. Psych effects were not measured. The two groups were comparable with similar backgrounds. CASP appraisal analysis. Patients were not equal. The intervention group was the only

center, Beijing. *Australian Journal of Primary Health,* 24(5), 398-403.			and over 45% had dyslipidemia. Patients had to have a smart phone that was compatible with the telemonitor requirements.			the reduction of blood pressure for the treatment group. A Likert scale was used to survey use of the app.	readings and use of app. The correlation with DBP was not significant.	participants that received blood pressure cuffs. This can be easily implemented into any practice.
10. Xu, H., Long, H. (2020). The effects of smartphone app-based interventions for patients with hypertension: systematic review and meta-analysis. *JMIR mHealth and uHealth,*8(10), e21759	The objective of this study was to compile evidence to determine the effects of smartphone apps on blood pressure control	Level 1-Systematic Review	Eight studies used with 1,657 participants. The target population were adults. Hypertension was described by the authors.	Dependent variable-Patients' blood pressure, med adherence, and lifestyle changes. Independent variable is the smartphone application	Morisky Medication Adherence Scale was used by 4 studies to assess for med adherence. One study uses pill count and the other used Hypertension SM Behavioral Questionnaire. Blood pressure readings	Random effects model used to calculate weighted mean difference to generate compiled estimates of SBP and DBP changes. Standard deviation used with the assumption of 0.5 correlation for those that did not report SD.	Finding revealed were that self-monitored blood pressure (SMBP) coupled with a smartphone app results in improved med adherence and improved blood pressures.	Limit-few studies included in the meta-analysis. Studies were conducted mainly in North America and East Asia. CEBM analyses critique was used. Forest plot graph was provided showing the results favors smartphone use. Smartphone use in hypertension

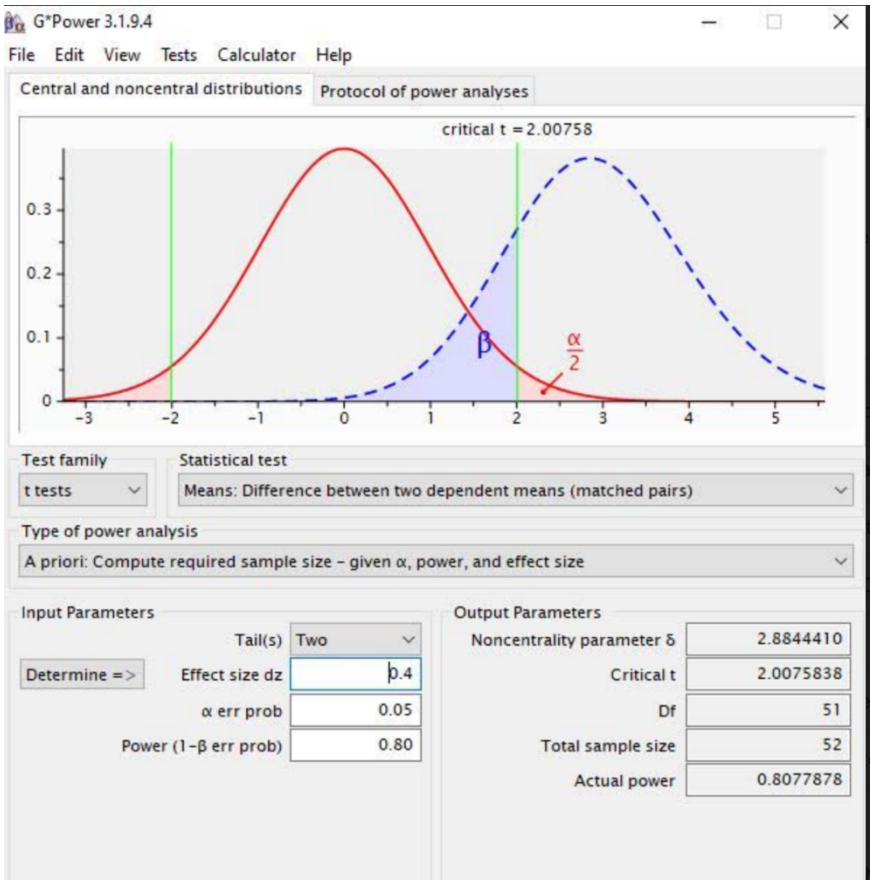
					were obtained.	The I^2 statistic to assess heterogeneity. Trial sequential analysis revealed 20% power was reached.		management is feasible.
11. Zha, P., Quereshi, R., Porter, S., Chao, Y., Pacquiao, D., Chase, S., Obrien, P. (2020). Utilizing a mobile health intervention to manage hypertension in the underserved community. *Western Journal of Nursing Research*, 42(3), 201-209.	Purpose was to observe the effectiveness of mobile apps (mHealth) on HTN self-management and hypertension management in the underserved communities.	Level 2-Random Control Trials	Local community health clinic in Newark, New Jersey. Populations consisted mostly of African American and Hispanic. The majority of low-income. High prevalence of chronic conditions such as hypertension and diabetes. There were 25	Dependent variable-hypertension self-management and blood pressure control Independent variable-mHealth mobile application	The iHealth BP7 Wireless Blood pressure wrist monitor was used to measure blood pressure and heart rate. The Medical Outcomes Study survey was used to assess health-related quality of life (HRQOL-SF-36). Medication Adherence Self-Efficacy Scale	SPSS version 24.0 was used for data analysis. Two-sided statistical analysis with P-value≤.05. Friedman test used to see if blood pressure changed at baseline. Mann-Whitney U-test to compare the value of MASES scores and SF-36 scores.	Results reviewed a significant decrease in systolic blood pressures in those who intervention group. Also showed mHealth increased patient motivation to monitor their blood pressure. No significant differences in regards to HRQOL	Limits-Study did not consider medication treatment. Patient results when taking their blood pressure could be inaccurate. CASP critical appraisal was used. Article failed to mention how the patients were randomly assigned. Benefits outweigh harms/cost. This recommendation if feasible in

			participants that completed the study		(MASES) questionnaire for patients on their medication adherence.		results between control and treatment group.	current practice.

Figure 6

	Measure or Metric Needed	Time Period for Measure (Annual, quarterly, monthly, weekly)	Type of Measure (Process, Outcome, Balancing)	Operational Definition-Denominator	Denominator Exclusions	Operational Definition-Numerator	Numerator Exclusions	Data elements needed to operationalize the measure (list each data element separately, using multiple rows)	Level of Measure Need for Data	Location of data (clinical system, survey, quality department)	Requires Permission from Data Owner for Use (Y/N)	Data owner
2	Patient engagement rates	Assess patient engagement scores	Outcome -Levels are from 1-4. Patient's score will determine patient engagement level	Patients with uncontrolled hypertension as defined with BP> 140/90	Patients who are developmental delayed, lack of smartphone or computer	Patients using the Mychart application for blood pressure management	Patients not using the application or using it for other uses than blood pressure home monitoring	Patient Activation Measure scores	Ordinal data needed-each patient receives scale scores	Survey to be given by the prov	Yes	Insignia Health
3	Rates of patients who have uncontrolled HTN	Uncontrolled HTN monthly rates	Outcome-Pts with BP > 140/90	Pts diagnosed with HTN	Patients has another PCP	Patients with BP > 140/90	Specialists managing pts BP	#pts w/ BP > 140/90 completed with total number of pts with HTN	Ratio/interval data	Monthly metric scores in Excel	No	Clinic manager
4	Number using application for BP management	Monthy rates of Mychart usage	Outcome-Total using application	Patients diagnosed with HTN	Patients with BP< 140/90	Pt submitting readings in app	Using app for other reasons	Number of times pt uses app	Ordinal data-determine app usage	EHR/Random effects model	No	IT department
5	Pre/Post readings after MyChart implementation	Every 3 months	Process	Patients with the diagnosis o	Other providers' patients	Pts using app to monitor BP	Pts who do not use app	Pearson Correlation	Ratio/interval data	SPSS	No	IT department
6								Paired t-test	Ratio/interval data	SPSS	No	IT department
7	Patient satisfaction scores	Monthly satisfaction scores	Balancing	Patients using MyChart	Patients not using MyChart	Pts who fill out surveys	Pts who do not fill out surve	Press-Ganey scores	Ordinal data-survey	Clinic manager receive survey	No	Clinic manager
8	Provider and staff satisfaction scores	every 3 months	Balancing	Staff that work in clinic	Staff works outside clinic	Staff who use MyChart	Staff who don't use Mychart	Surveys	Nominal data	Verbal in meetings	No	None
9												
10												
11												

Figure 7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File Edit View Tests Calculator Help
Central and noncentral distributions
Protocol of power analyses
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0.3
0.2
0.1
0
−3 −2 −1 0 1 2 3 4 5
β
α/2
Test family
t tests
Statistical test
Means: Difference between two dependent means (matched pairs)
Type of power analysis
A priori: Compute required sample size – given α, power, and effect size
Input Parameters
Tail(s) Two
Determine =>
Effect size dz 0.4
α err prob 0.05
Power (1−β err prob) 0.80
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Noncentrality parameter δ 2.8844410
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Df 51
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Actual power 0.8077878

Figure 8

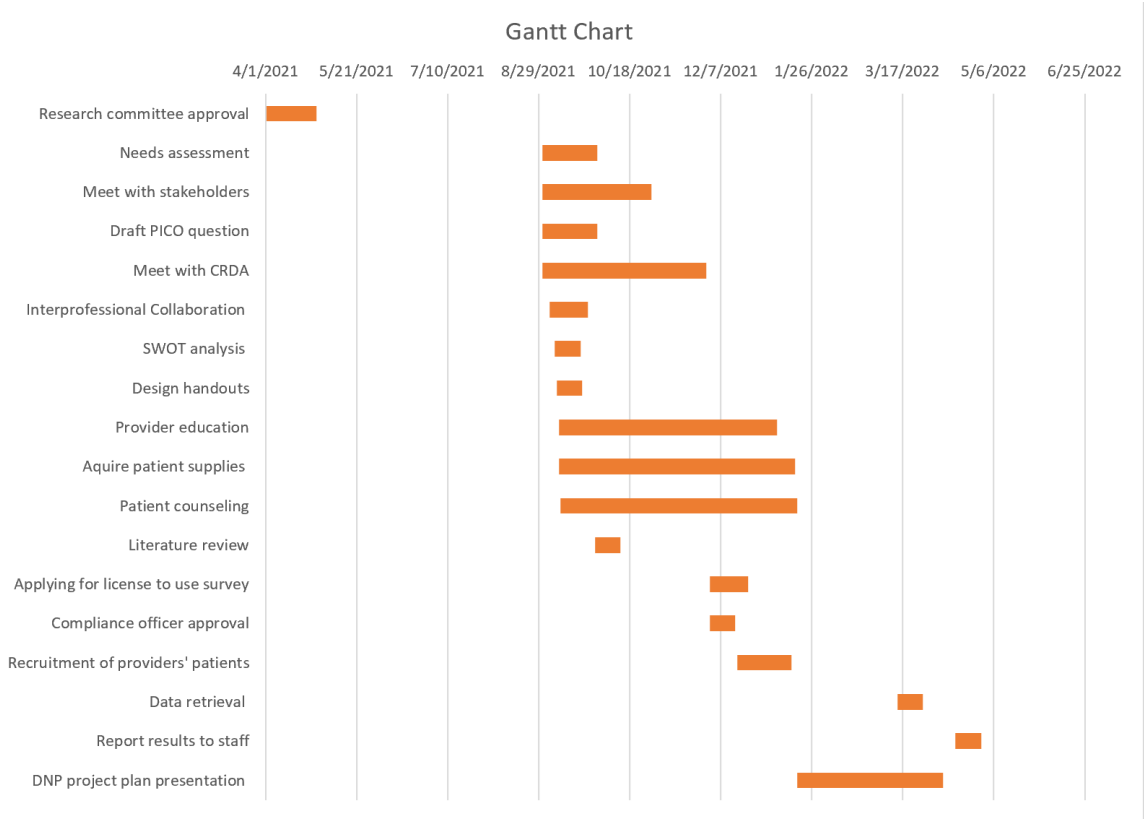
Gantt Chart
4/1/2021
5/21/2021
7/10/2021
8/29/2021
10/18/2021
12/7/2021
1/26/2022
3/17/2022
5/6/2022
6/25/2022
Research committee approval
Needs assessment
Meet with stakeholders
Draft PICO question
Meet with CRDA
Interprofessional Collaboration
SWOT analysis
Design handouts
Provider education
Aquire patient supplies
Patient counseling
Literature review
Applying for license to use survey
Compliance officer approval
Recruitment of providers' patients
Data retrieval
Report results to staff
DNP project plan presentation

Figure 9

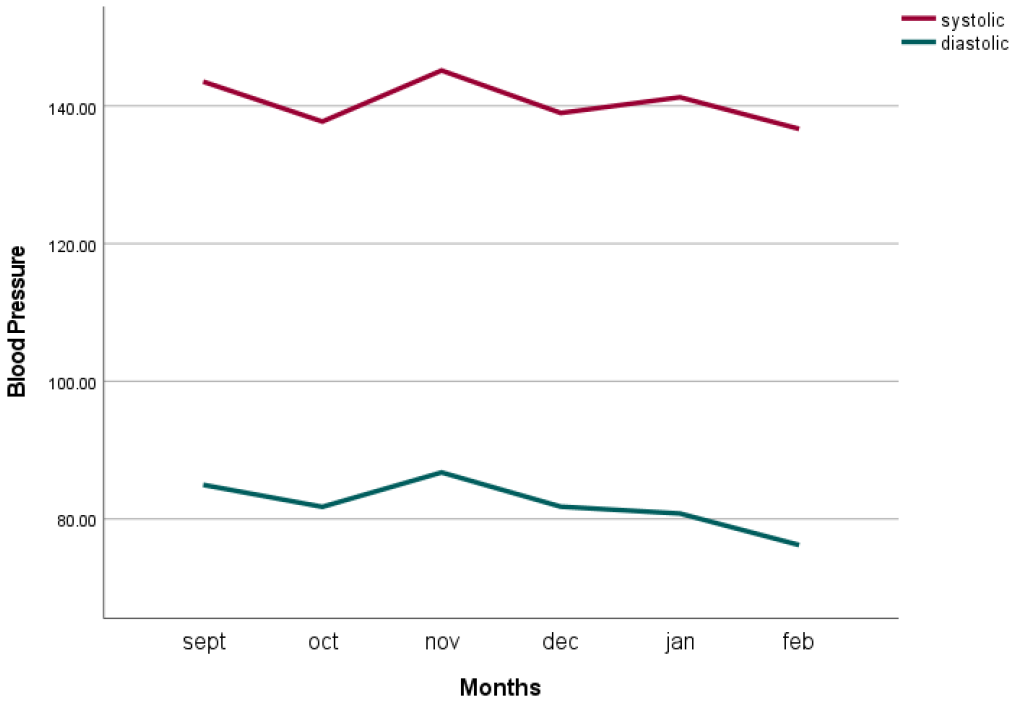
systolic
diastolic
140.00
120.00
100.00
80.00
Blood Pressure
sept
oct
nov
dec
jan
feb
Months

Figure 10

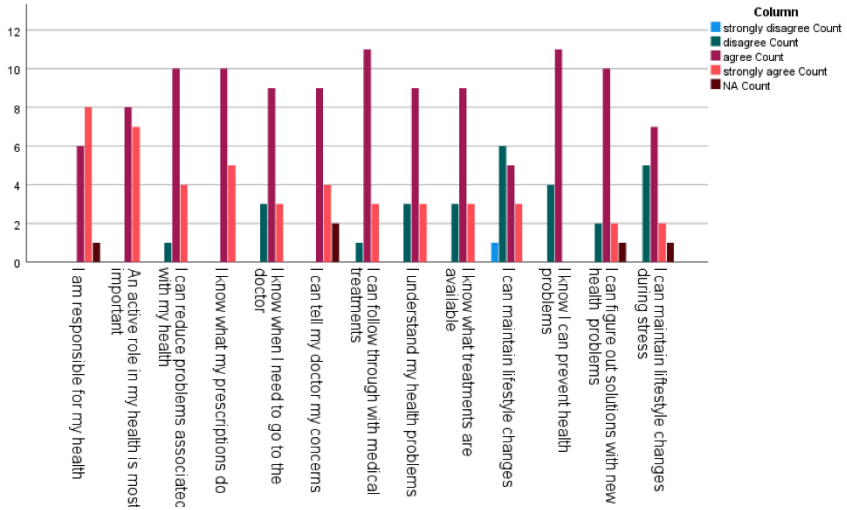

Figure 11