

Knowledge and Skills of Volunteer Staff Regarding Hypertension at a Free Urban Clinic

Caitlin Bodner, BSN, RN, DNP student

Amy M. Slotten, BSN, RN, IBCLC, DNP student

Michigan State University, College of Nursing

Linda J. Keilman, DNP, MSN, RN, GNP-BC, FAANP

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Abstract

Background and Review of Literature

Hypertension (HTN) is a major public health problem that impacts the lives of more than 70 million adults in the United States (US). The prevalence of HTN in the urban US Black population is approximately 45% higher than non-Hispanic Whites (NHW; 32%) and Hispanic people (30%). More than 65% of adults over the age of 65 have HTN which has a significant impact on the health and quality of life (QOL) of urban adults. Uncontrolled HTN contributes to the development of cardiovascular disease (CVD) and early mortality if not controlled.

Purpose

The purpose of this quality improvement (QI) project was to increase the knowledge and skills of a free clinic volunteer staff regarding evidence-based (EB) HTN guidelines to improve assessment skills. Improved skills would lead to improved QOL through HTN control among patients seen in a low socioeconomic status (SES) urban community.

Methods/Implementation

A pre- and post-test design was used before and after a virtual synchronous online education presentation. EB handouts were provided. Post-test scores were analyzed for measures of improvement.

Implications/Sustainability

Implications included a new EB policy for gathering data from patients with HTN and teaching them the appropriate methods to take their blood pressure (BP) at home and log the findings. All future clinic volunteer staff will be trained in accurate knowledge regarding the full scope of HTN.

Outcome/Conclusion

Volunteer staff showed improvement in post-test knowledge following the intervention. Analysis is ongoing to determine whether patients have improved control over their HTN and have increased adherence to lifestyle and medication management.

Keywords: hypertension, high blood pressure, elevated blood pressure, staff training, staff education

Knowledge and Skills of Volunteer Staff Regarding Hypertension at a Free Urban Clinic

From a global perspective, HTN is the leading cause of CVD and premature death, and the prevalence is rising (Mills et al., 2020). The increase in HTN is more profound in low and middle-income countries and accounts for 82% of all individuals with HTN (World Health Organization [WHO], 2021). In the US, approximately one adult out of every two (116 million) has HTN (Centers for Disease Control and Prevention [CDC], 2021). Of these adults, 92.1 million do not have their HTN controlled, either with lifestyle changes or medication (CDC, 2021). Lower SES and being in a minority or vulnerable population account for the majority of HTN cases in the US. Uncontrolled HTN among racial/ethnic minority individuals is higher than when compared to White adults (Aggarwal et al., 2021). HTN is more common in non-Hispanic Black (NHB) adults (56%) than in NHW adults (48%), and in non-Hispanic Asian (NHA) adults (46%), or Hispanic/Latinx adults (39%; CDC, 2021). Appendix A details the estimated HTN prevalence, treatment, and control among US adults.

Background and Significance

HTN is sometimes referred to as the *silent killer* because there are often no symptoms, especially early in the disease (American Heart Association [AHA], 2022a). Yet, the increased pressure on the blood vessels damages the arteries and circulatory system, leading to an increased risk of stroke, myocardial infarction (MI), heart failure (HF), kidney disease (CKD), vision changes, and sexual dysfunction. HTN is the second most prevalent cause of preventable deaths in the US, only trailing behind cigarette smoking (Whelton et al., 2018). In 2020, over 670,000 US adults died of HTN or HTN-related illness (CDC, 2023). HTN is the leading modifiable risk factor for death from CVD in the US.

Many factors contribute to the risk of developing HTN (AHA, 2022a). Some of these are non-modifiable such as age, gender, ethnicity/race, and family history. Aging causes a decrease in the elasticity of blood vessels. Men and women are equally as likely to develop HTN. Still, men are more likely to develop HTN at younger ages, with women's risk increasing over age 65 due to hormonal changes related to menopause (AHA, 2022b). The 2017 Joint Guideline from the AHA and the American College of Cardiology (ACC) defines HTN as having a systolic blood pressure (SBP) greater than 130 or diastolic blood pressure (DBP) greater than 80 (Whelton et al., 2018). Using this definition, the prevalence of HTN among US adults is 46% (Deere & Ferdinand, 2020). In the US, HTN disproportionately impacts Black people, affecting 59% of men and 56% of women compared to 34% Hispanics, 37% Asians, and 47% for NHW. Even after a diagnosis of HTN, blood pressure (BP) control is not always attained. According to Muntner et al. (2018), among US adults taking antihypertensive medications, 53.9% had BP readings above the 2017 ACC/AHA guidelines. This also disproportionately affects NHB Americans at 63% compared to NHW, Asian, and Hispanic adults at 50.6%, 62.9%, and 56% respectively. Genetic predisposition to HTN through identified single-nucleotide polymorphisms accounts for only 3.5% of BP variability (Whelton et al., 2018). Modifiable risk factors include environmental and lifestyle causes. Alone or in combination, poor nutrition, lack of physical activity, smoking, and excessive alcohol intake are significant contributors to HTN. Generally, there is a linear relationship between body mass index (BMI) and elevated BP (Whelton et al., 2018). Risk factors are presented in Box 1.

Box 1*Risk Factors for the Development of Hypertension*

<u>Modifiable Factors</u>	<u>Non-modifiable Factors</u>
Poor nutrition	Age
Lack of physical activity	Gender
Smoking	Ethnicity/race
Excessive alcohol intake	Family history
Excessive salt intake	
Excessive stress	
Obesity	(Whelton et al., 2018)

Failure to adhere to treatment strategies for HTN is a substantial barrier to preventing a reduction in deaths. Even filling the initial prescription for antihypertensive pharmacotherapy is a problem for 25% of patients (Whelton et al., 2018). Others do not refill prescriptions, so they only have their medication an average of 50% of the time (Whelton et al., 2018). Individuals without health insurance are less likely to even be aware of their HTN status (Carey et al., 2018). According to Ferdinand et al. (2020), African Americans are less likely to have health insurance than White Americans. Treatment and control of HTN are more difficult without health insurance because of the inability to afford medications, attend necessary follow-up (FU) appointments with health care providers (HCPs), and adhere to therapy intensification when that involves increased costs from taking multiple medications (Ferdinand et al., 2020). Adherence to lifestyle modifications and behaviors is also difficult for some patients. Patients with limited resources may face more challenges due to a lack of financial resources, health literacy limitations, and limited access to health care services and medications.

The WHO (2022) defines *social determinants of health* (SDOH) as “the conditions in which people are born, grow, work, live and age, and the wider set of forces and systems shaping the conditions of daily life” (para. 1). They are the non-medical factors impacting personal and

societal health outcomes (WHO, 2022). Limited financial resources can impact a person's ability to purchase medications and healthy foods. Housing instability or quality may interfere with a person's ability to safely store food and medications, limit safe opportunities for engaging in physical activity, and decrease access to primary care services. Transportation barriers such as lack of a car or limited convenient public transportation may increase difficulty obtaining food, medications, and attending appointments. Lack of health literacy may lessen a person's ability to understand complex health conditions and follow HCP recommendations. Racial and ethnic health disparities may overburden these same populations. The *weathering hypothesis* is another possible factor in the disproportionate rate of HTN and other chronic diseases in marginalized communities (Forde et al., 2019). This hypothesis looks at the effect of chronic exposure to racism and bias as a factor independent of poverty to explain the significant health disparities in the US.

The US Department of Health and Human Services (DHHS, 2023) uses the price increase or decrease, as reflected in the country's inflation adjustment, to update the federal poverty guidelines at least annually. The guidelines are then adapted to represent differences in family or household sizes. These poverty guidelines affect eligibility criteria for social service programs such as Medicaid. The most current guidelines for 2023 define the US poverty guideline as \$30,000 for a family or household of four persons (DHHS, 2023). The most recent US Census Bureau (USCB) statistics show the median household income in Detroit in 2021 was \$32,498 compared to \$59,234 in Michigan (USCB, n.d.). Michigan residents are eligible for Medicaid (also called the Healthy Michigan Plan) if their income is at or below 133% of the federal poverty level, which is about \$18,000 for a single person and \$37,000 for a family of four (Michigan.gov, 2023). Medicaid is a federal program administered separately by each state with

their own specific programs and structures (Benefits.com, 2021). In 2019, 62% of the patients at the Health Unit on Davison Avenue (HUDA) Clinic were unemployed, and 92% fell below 200% of the poverty level.

Even though Michigan is a state with expanded Medicaid coverage to 133% of the federal poverty level, there are a sizable number of people in Michigan who do not qualify for Medicaid. These individuals still cannot afford health insurance or do not have a job that offers health insurance benefits. In 2018, a survey revealed that 8.7% of Detroit residents did not have health insurance; this is a drop from 19.4% in 2013, one year before the expansion of Michigan Medicaid to include a higher poverty threshold (Wileden et al., 2018). Still, three out of five persons without insurance report being unable to access needed care, while 25% cannot afford care (Wileden et al., 2018). Residents with lower SES may use the emergency department (ED) as their primary location for health care.

Federal regulations demand that applicants to their state Medicaid program must have documentation to prove US citizenship or lawful residence of the US if they are not US citizens (Benefits.com, 2021). Undocumented individuals and non-citizen lawful residents who have resided in Michigan for less than five years are ineligible to enroll in Medicaid (Michigan League for Public Policy, 2021). Being uninsured due to immigration status is a barrier for some patients at HUDA (Abbas, 2021).

The Healthy People 2030 goal for HTN is to increase the control of high BP in adults to 60.8% (Healthy People, n.d.). The most recent report showed that 47.8% of non-pregnant adults in the US had their BP under control from 2013 through 2016. During this time, control was defined as SBP <140 and DBP <90. Updated measures from the ACC/AHA recommend BP control to SBP <130 and DBP <80 (Munter et al., 2018). The Million Hearts initiative's goal is

for patient BP control to exceed 80% (CDC, 2022). Million Hearts is a joint national campaign between the CDC and the Centers for Medicare and Medicaid (CMS) encouraging HCPs to adopt protocols and interventions to reduce HTN for secondary prevention of sequelae such as strokes and CVD (CDC, 2022).

Problem Statement/Clinical Question

Research demonstrates that uncontrolled HTN is a risk factor for increased morbidity and mortality. Adherence to lifestyle modifications and medication adherence prove to be a challenge for many people. Barriers to adherence are unique to each person so the approach needs to be individualized. Many patients at the HUDA Clinic with the diagnosis of primary HTN do not achieve readings/control within normal limits according to the Joint National Committee (JNC) 8 guidelines (James et al., 2014). Improving the skills of volunteer staff to assess HTN and provide individualized information, including goal setting, may help improve the control of BP for patients. This project aimed to evaluate if providing HTN education based on EB guidelines to volunteer staff at the HUDA Clinic would impact the team's knowledge and skills thus improving metrics for HTN control among patients.

Description of Clinical Site

Purpose

The HUDA Clinic provides free healthcare to uninsured or underinsured adults in the Detroit metro area (HUDA, 2022). The bulk of patients receive primary care services including preventive health maintenance, care of acute illnesses, and management of chronic illness. There are also on-site services for laboratory work and a dispensing pharmacy.

Care Setting/Professionals

The HUDA Clinic opened in 2004 inside the Muslim Center of Detroit (HUDA, 2022). The name is based on the original location on Davison Avenue, however, the clinic soon moved down the street into the current building on Woodrow Wilson Street in northwest Detroit. With additional space, specialty services were added on a limited basis with dental, vision screening and free eyewear, and mental health on select days per month. Medical, laboratory, and pharmacy-dispensing services at HUDA remain free to patients.

HUDA coordinates care with community providers for referral to free specialty services: cardiology, endocrinology, gastroenterology, hepatology, nephrology, otolaryngology, podiatry, physical therapy, and pulmonology (HUDA, 2022). The clinic does not receive any federal funding and does not bill Medicaid or Medicare (Abbas, 2021). Funding for the clinic comes from community grants, corporate partnerships, and corporate and private donations. In 2020, the total revenue was \$344,410 with \$226,372 coming from grants, \$117,984 from program services, and \$54 in investment income (Cause IQ, 2020). The total expenses were \$294,678, with \$70,980 in salaries and benefits, and \$223,698 from other expenses (Cause IQ, 2020).

Primary care services are provided two days per week by a staff Family Nurse Practitioner (FNP) and one day per week by volunteer physicians, physician assistants (PA), or nurse practitioners (NP). Telehealth is also available one day per week. There were 100 professional healthcare volunteers in 2019 (Abbas, 2021). A registered nurse (RN) coordinates lab services with an area health system. The RN also assists with medication teaching, especially for new injection medicines. Nursing, pharmacy, and medical students also complete clinical practicum rotations at HUDA Clinic.

Volunteers are an integral part of the operation, serving in the role of clinic helpers who room and do the initial patient interview to elicit a preliminary *history of present illness* (HPI) for the provider. There were 355 student volunteers in 2019 (Abbas, 2021). About 30 volunteers participate in direct patient care (Clinical Director [CD], personal communication, July 26, 2022). The application window for volunteer positions closes on February 1st of each year; hiring decisions are made over the following month. Volunteers write an essay as part of the application process, and a committee of experienced volunteers scores the essays and offers interviews to some of the qualified applicants. Ideally, the applicants are at least juniors in an undergraduate health or pre-health career program. The committee of experienced volunteers makes the hiring decisions about new volunteers under the guidance of the CD. New volunteers start in late March or early April of each year. Volunteer orientation begins with 2 hours of in-clinic orientation presented by the CD and 4th-year medical students and medical residents. The leaders introduce clinic procedures and general information about the most common conditions of HUDA patients. Volunteers then shadow experienced volunteer staff for at least three shifts; two shifts for the front desk and one for patient care.

The sample participants engaging in the educational intervention were a non-probability convenience sample. It included the 49 volunteer staff members currently working at the HUDA Clinic. Forty-eight staff members completed the demographics survey. While the data from this type of sample cannot represent a hypothesis about the larger population, it does give us a deeper understanding of this volunteer staff population.

The staff included 56% female compared to 44% male. 59% of the participants were 21-30 years old, 37% were less than 20 years old, 2% were 31-40 years, and 2% were greater than 40 years. Most staff identified as Asian (48%) compared to NHW (29%), Black/African

American (6%), Hispanic/Latinx (2%), and other (15%). 94% of the volunteers were single compared to married and other, 4% and 2%, respectively. 57% of the volunteers had been at HUDA for less than one year, 30% for 1-2 years, 9% for 3-4 years, and 4% for greater than 4 years. 66% of the volunteers were current students and 25% were recent graduates. Of the current students, 54% were undergraduate students, 6% were graduate or master's degree students, and 6% were other types of students. The highest level of education was master's degree for 2%, bachelor's degree for 38%, associate's degree for 2%, some college without a degree for 46%, high school for 8%, and other for 4%. Most participants identified career goals in the health care fields: medical or allopathic physician (83%), physician assistant (7%), and other medical field (4%). Doctoral degree, program planning, and other each made up 2% of the participants' career goals. The self-reported demographics of the volunteer staff are presented in Appendix B.

Patients

In 2021, there were 2,914 primary care contacts at HUDA including in-person visits, telehealth, and phone refill requests. Of those visits, 1,321 were in-person, with 1,045 unduplicated patient appointments. The self-reported demographics of unduplicated visits were:

- Black/African American 51.8%
- Asian/Asian Indian 20.0%
- White 10.8%
- Middle Eastern 5.8%
- American Indian/Alaskan Native 0.5%
- 11.1% of patients declined to answer

There were 331 patients seen in 2021 who had a diagnosis of essential or primary HTN. Most patients were from Wayne and Macomb County in Michigan (CD, personal communication, July 14, 2022).

Several other free clinics in the Detroit area are available to this population. The SAY Detroit Family Health Clinic in Highland Park reports seeing over 4,000 patients per year; the Robert R. Frank Student Run Free Clinic reports over 100 patients per year. Other clinics that do not report their patient numbers are the Cass Clinic in Detroit, the Ferncare Free Clinic Inc. in Ferndale, and the Detroit VITALS Free Clinic, which is a telemedicine-based clinic for patients who are Detroit residents.

Processes

The HUDA clinic does not report quality data, including HTN, to any national benchmarking organizations. They do not have a formal HTN assessment, management, or education policy but follow the JNC 8 guidelines from 2014. The JNC 8 guidelines suggest starting pharmacologic therapy when BP is 150/90 at age 60 or older, 140/90 under age 60, and at 140/90 at any age with a co-diagnosis of diabetes mellitus (DM) or CKD (James et al., 2014). These stated BP levels are also the goals for pharmacologic treatment. The guidelines do not instruct how many high readings are necessary for a diagnosis of HTN. Recommended initial pharmacotherapy is presented in Table 1.

Table 1*Recommended Pharmacological Treatment for Hypertension*

<u>Classification</u>	<u>Recommendation</u>	<u>Drugs</u>
Thiazide Diuretic	<ul style="list-style-type: none"> • First line recommendation for both nonblack & black populations • More effective than a CCB or ACEI at improving HF outcomes 	<ul style="list-style-type: none"> • Chlorthalidone 12.5 to 25 mg/day • Indapamide 1.25 to 5 mg/day
Calcium Channel Blocker (CCB)	<ul style="list-style-type: none"> • First line recommendation for black populations 	<ul style="list-style-type: none"> • Amlodipine 5 to 10 mg/day • Diltiazem 180 to 240 mg/day
Angiotensin-Converting Enzyme Inhibitor (ACEI)	<ul style="list-style-type: none"> • First line recommendation for nonblack populations • More effective than a CCB in improving HF outcomes 	<ul style="list-style-type: none"> • Lisinopril 5 to 40 mg/day • Enalapril 2.5 to 40 mg/day
Angiotensin Receptor Blocker (ARB)	<ul style="list-style-type: none"> • First line recommendation for nonblack populations • Do not use in patients also taking an ACEI 	<ul style="list-style-type: none"> • Losartan 25 to 100 mg/day • Olmesartan 20 to 40 mg/day

(James et al., 2014)

Guidelines suggest starting with one agent; two agents can be initiated if the SBP is >20mmHg above goal or DBP is >10mmHg above goal. If the goal is not reached in one month, in addition to stressing adherence to medication and lifestyle, the guideline recommends increasing the dose or adding a second or third agent. According to personal communication on July 14, 2022, the staff FNP does not have a set standard for how many times a BP is checked in the clinic or how long patients are encouraged to improve lifestyle habits before starting pharmacotherapy. Generally, if patients have symptoms at the time of an initial BP reading >150/100, the FNP gives hydralazine in the clinic, starts the patient on maintenance medication, and orders laboratory studies to assess CVD risk factors and possible end-organ-damage. The FNP also discusses lifestyle modifications and the possible end-organ-damage that

occurs with HTN. If the patient does not have symptoms and the elevated BP is an incidental finding, the FNP discusses lifestyle modifications and teaches patients about possible end-organ-damage without starting medication. In both scenarios, the FNP plans for FU to reassess BP and review lab work in two to four weeks (staff FNP, personal communication, July 14, 2022). There is not a standard set of teaching materials or patient handouts to introduce or reinforce lifestyle modifications for enhanced HTN control.

According to the HUDA CD, the orientation process for volunteers introduces BP monitoring using an automated BP cuff with the following guidelines:

- No talking during BP measurement
- Patient is sitting upright with the measurement arm supported at the level of the heart

There is no standard protocol for taking readings in both arms, taking and averaging multiple readings at a visit, or following up with a manual BP measurement.

The stated practice at HUDA is that patients should have a FU visit within 30 days anytime they are prescribed a new medication to ensure tolerance and monitor for efficacy (CD, personal communication, July 5, 2022). Once controlled on HTN meds, FU appointments are 3-6 months apart.

In the spring of 2022, William Beaumont School of Medicine at Oakland University gave grant money to the HUDA Clinic to purchase 12 BP cuffs to loan patients. The providers determined who should be given a loaner BP cuff for 30 days of home monitoring when BP is uncontrolled. Previously, the clinic gave wrist BP cuffs to patients for home monitoring. There is no standard procedure for who teaches patients about proper BP measurement at home, what to do if the reading is too high, or if the patient experiences symptoms related to HTN, or an

expectation for a particular schedule for home monitoring. The clinic has paper BP logs available to give patients to record BP measurements at home, but these are not routinely scanned or transcribed into the electronic health record (EHR). Recently, the clinic received a \$500 per month grant from Good Rx to use for Durable Medical Equipment (DME). According to the CD (personal communication, July 26, 2022), one goal for this grant money is to purchase enough automated BP cuffs to give to all patients with HTN for home monitoring.

Patterns

Most appointments are scheduled by phone, with limited walk-in ability two days per week. There are no walk-in appointments on Saturdays. The clinic is open for five hours for patient appointments three days per week. After completing the HPI, the volunteer takes time to write and transfer this information into the EHR before verbally presenting the case to the provider. Next, the provider sees the patient for a more thorough *review of systems* (ROS), HPI, and *physical exam* (PE). The provider then decides on a plan of care and talks with the patient about the plan. The patient will then wait for needed medications from the dispensing pharmacy or to have blood or urine collected for lab work.

Gap Analysis

When considering a QI project, it is essential to identify the internal state of the facility by looking at the gaps in current practice and determine whether there is a systemic problem contributing to the practice problem (Alexander, 2020; Mukerji et al., 2019). In order to present the strengths, weaknesses, opportunities, and threats (SWOT), a SWOT table was developed (Appendix C). Once gaps are identified by naming weaknesses in the current state, the SWOT analysis helps the team determine how to proceed (Alexander, 2020). The path to the desired state is more apparent when accounting for strengths, opportunities, and threats.

Specifically for the primary HTN QI project at HUDA, chart reviews of patients with HTN and clinical time at the facility helped develop the SWOT table (Appendix C). The guideline used for HTN management was outdated and was not incorporated into formal facility-specific guidelines for providers and staff to follow. The clinic operates in-person for 15 hours over three days per week, which may make it difficult for patients with chronic diseases to find appointments for frequent FU and medication pick-up that does not interfere with employment. In addition to the staff NP, there are rotating volunteer providers who may have different practice standards. Additionally, there is no standardized teaching or individualized goal setting for patients with HTN. Providers may find it difficult to change from current practices because of decreased autonomy with more prescribed practice parameters. Providers may also have assumptions about the willingness or ability of the patients to change their health behaviors. Although there were gaps and challenges of HTN care at the clinic, strengths and opportunities exist. The clinic serves patients with limited access to other primary care services with free office visits, lab services, and prescription medications. Enthusiastic and skilled student volunteers serve as ancillary staff. Clinic funding comes from community partners who have an interest in helping the uninsured population of the Detroit metro area. Appendix C outlines these gaps and opportunities in a way that guides the QI initiative for improving HTN control.

Conceptual Framework

Conceptual frameworks are important for QI because they present a standardized way to examine research questions and identify variables and meaningful interventions (Hamilton et al., 2020). A well-chosen conceptual framework also provides a structure to organize the knowledge needed to design, implement, and evaluate a QI intervention through consistent and manageable steps (Hamilton et al., 2020; Institute for Healthcare Improvement

[IHI], 2022). Lewin's Theory of Change and the PDSA Cycle Model were used to guide this project.

Lewin's Theory of Change

Lewin's Theory of Change can be helpful in this context. This model involves three stages. Stage one is unfreeze, stage two is change, and step three is refreeze (Nursing Theory, 2020).

Unfreeze is when the need for change is identified. In this case, the realization was the volunteer staff of the HUDA Clinic do not receive formal training regarding EB management of HTN. This needed to change for their population to have improved outcomes by gaining control of their HTN, reaching their management goals, and following up regularly with the clinic to maintain their disease process. **Change** is implementing EB training for volunteer staff regarding HTN management. **Refreeze** occurs when volunteer staff utilize the new training regularly, and the clinic integrates the new processes into the existing workflow.

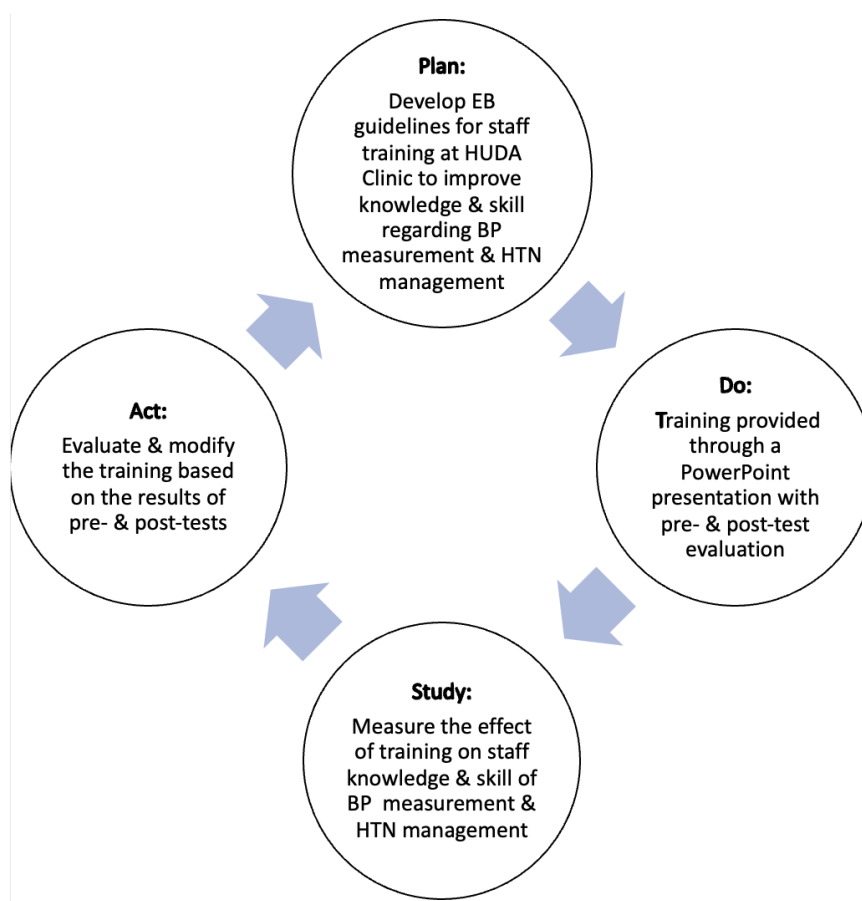
PDSA Cycle Model

The PDSA Cycle Model is especially helpful related to the educational intervention. The model is divided into four steps; **Plan**, **Do**, **Study**, and **Act** (Figure 2). This model provides not only a framework to assist in implementing an intervention, but also gives an opportunity to modify the intervention within the model's framework (IHI, 2022). The **Plan** step was to implement EB guidelines within the existing volunteer training program at the HUDA Clinic to improve staff's knowledge and skill level while providing HTN management and care to the patient population. The **Do** step was to provide training information for volunteers before they provided care to patients and test their knowledge with a pre- and post-training test. The **Study** step monitored the effect this training had on volunteer knowledge, confidence, and ability to

provide care to this population. Lastly, **Act** was to evaluate and modify the training to best serve the volunteers in this setting according to the results of the pre- and post-test.

Figure 2

The PDSA Cycle Model



Fishbone Analysis

The fishbone analysis (Appendix D) demonstrates the factors potentially contributing to inadequate control of patient HTN at the HUDA Clinic. The domains of policy, patients, resources, and providers help examine these barriers and provide a level of understanding as to why this patient population may not be reaching their goals. After this analysis, the QI team was

able to specifically craft interventions to increase medication adherence rates and lifestyle modification uptake for this population. This intervention should help patients experience better control of HTN, decrease their risks for morbidity and mortality, and improve QOL.

Review of the Literature

This QI project explored the literature using the problem statement: *"Does providing HTN education based on EB guidelines to the volunteer staff at HUDA affect the team's knowledge and skills and improve metrics for HTN control among the patients?"* To conduct the literature review, the Cumulative Index of Nursing and Allied Health Literature (CINAHL) was chosen. Search strategies included the Boolean operators of "hypertension" or "high blood pressure" or "elevated blood pressure" or "htn" and "staff education" or "staff knowledge" or "staff training." Search results were further limited to the years 2017-2022, academic journals, and the English language. Overall, 23 articles were found on CINAHL. Through a review of article abstracts, 16 studies were excluded that did not take place in outpatient settings, did not capture the non-pregnant adult population, or were specific to particular phenotypes of HTN. Another three articles were included from outside sources. The chosen articles are included in the literature table (Appendix E).

Summary of Evidence

Through the literature search, a total of nine articles were included for examination. There were a variety of study designs, all intending to improve the control of HTN in outpatient settings. Common themes surfaced among the studies: accurate BP readings, staff training, policy implementation, nurse-led interventions, and standardized BP techniques.

Accurate Blood Pressure Readings

Obtaining accurate BP readings can be challenging because outside variables such as patient positioning, equipment size, and patient disposition can be highly influential. Both Doane et al. (2020) and Stuligross et al. (2022) discuss the importance of recognizing *white coat syndrome* during office visits and implemented an intervention using unattended automated office blood pressure (u-AOBP) or unattended automated blood pressures (uABP), respectively. In both studies, when someone had a high BP reading during routine vital sign obtainment, another reading was taken while the patient was alone in the room. The staff member placed the equipment, pressed start, and walked out of the room until the measurement was obtained. The patient was instructed to sit still and wait for the staff member to return. In both studies, staff reported this practice was effective, and while it took additional time, it did not negatively affect the office workflow. In fact, obtaining uABP lowered the incidences of white coat syndrome and provided more accurate data to the provider.

Out-of-office measurements of BP also proved to be useful in both the Doane et al. (2020) and Stuligross et al. (2022) research and aided in avoiding the influence of white coat syndrome altogether. BP readings taken while the patient was functioning in everyday life allowed providers to obtain more accurate data to ensure proper treatment and management of patients living with HTN.

Staff Training

Knowledge of HTN, how it is measured, and how it is managed is essential when ensuring a patient receives proper care. Due to the susceptibility of the accuracy of BP readings, it can be challenging to ensure proper measurement; without adequate training, it is nearly impossible. Several articles stressed staff knowledge and practice as having a significant effect

on the monitoring and management of patients with HTN. Knowledge gaps can occur at many levels, but with proper training, these gaps can be filled, and better diagnostics, treatment, and management can occur. Brown et al. (2018), Egan et al. (2018), and Thomas (2022) focused on staff training with proper measurement and treatment as their intervention. All studies showed BP management improved within their patient populations after training.

Policy Implementation

Egan et al. (2018) implemented a new HTN guideline protocol in 16 Family Medicine clinics. The **M**easure accurately, **A**ct rapidly, and **P**artner with patients (MAP) protocol had previously shown positive results in the pilot study at one clinic. The first part of the protocol involved staff education to ensure staff accurately **measured** BP. In the **A**ct rapidly portion, clinicians were given guidelines for when to intensify pharmaceutical therapies in response to the office BP readings. Finally, **P**artner with patients emphasized patient engagement during office visits, shared decision-making, and BP self-monitoring. The authors credit the simplicity of the MAP protocol as a vital part of its success. Notably, control of HTN during the MAP implementation appeared to be at least as effective for BP control in Black adults as it was in White adults.

Hannan et al. (2021) described the *Call to Action for Nurses* in response to the 2020 Surgeon General's *Call to Action to Control Hypertension*. The Call to Action workgroup joined individuals from public health nursing, CV nursing, community health center nursing, nursing and medical associations, and academia to ensure nurses had the information and resources needed to initiate the Surgeon General's Call to Action to improve control of HTN. The workgroup outlined specific actions for RNs, advanced practice registered nurses (APRN), schools of nursing, QI and population health nurses, and nurse researchers to prevent HTN and

improve HTN control among patients. Hannan et al. (2021) presented these actions as well as tools and resources to implement the initiatives into practice for all nurses. These resources can guide policy in all settings where nurses are present to put HTN prevention and management at the forefront of health care.

Another study explored the effectiveness of interventions based on cultural competency methods of effective interventions (Rashid et al., 2017). The Health Empowerment Lifestyle Program (HELP) is an expansion of the Diabetes Empowerment Education Program and strove to educate participants about the chronic diseases of DM, HTN, and obesity through community health worker (CHW)-led education classes in Chicago. In Houston, the MyRx Medication Adherence Program used health care workers skilled in motivational interviewing and cultural competency to conduct pharmacist home visits and group education classes for older adults. The CHW-led class participants realized a statistically significant reduction in SBP, increased knowledge of high BP management, and improved dietary behaviors. The MyRx program found improving rates of clinical biomarkers, health behaviors, and medication adherence, but they were not statistically significant.

Nurse-Led Interventions

Another theme to emerge from the literature review was nurse-led, small-group interventions. In one study at an urban private hospital in Uganda, nurses led monthly education and support groups of participants currently receiving care for HTN (Nanyonga et al., 2021). Participants received text-message follow-ups after the meetings. On average, 37 participants attended each meeting. The support meetings began with 15-minute educational sessions encouraging lifestyle modifications such as improving diet, increasing activity, smoking cessation, decreasing alcohol, and taking medication as prescribed. Participants had an overall

mean reduction in SBP of 9.5mmHg ($p=0.001$) and a mean difference in weight of 7.7kg ($p=0.001$) over the course of the study. The results also showed that participants were better able to consume fruits and vegetables, take medication as prescribed, eat a low-fat diet, try to lose or control weight, reduce stress levels, and call a nurse or doctor for guidance. There were also significant improvements in self-care confidence with recognizing changes in one's health, following treatment recommendations, and taking action to control BP.

Spies et al. (2018) conducted a literature review to evaluate the effectiveness of nurse-led interventions for patients with HTN in East Africa. The authors acknowledged a lack of research since only six studies met their search criteria. The studies varied in their design including cross-sectional, descriptive analysis of adherence to HTN management, a descriptive qualitative study, a pre-post test of nursing skill and knowledge, retrospective analysis of clinical HTN data, and descriptive quantitative. The researchers conducting this review concluded that expanding the role of nurses to provide screening, diagnosis, education, and treatment of HTN was an effective and affordable tool.

Standardized BP Techniques

The importance of accuracy in obtaining a patient's BP cannot be understated. Rakotz et al. (2017) state the most essential part of taking a BP is the proper training of the person doing the measurement. Even a mischaracterization by 5mmHg can incorrectly label someone as having HTN. Mislabeling a BP as normotensive can also have serious consequences. Uncontrolled HTN, as discussed previously, can have serious adverse short-term and long-term effects on a person's health. Improper patient positioning can mean the difference between accurate and mislabeled BP:

- Talking or listening during the measurement can add 10-15mmHg

- Using a BP cuff that is too small can add 2-10mmHg
- Positioning the BP cuff over clothing can add 5-50mmHg
- Letting the arm be unsupported can add 10mmHg (American Medical Association [AMA], 2021).

Most technique errors result in falsely elevated BP measurements which may lead to classifying patients in the incorrect BP category. This may subject them to unnecessary and potentially harmful intervention with initial pharmacotherapy or escalation of treatments when HTN incorrectly appears uncontrolled (Rakotz et al., 2017). Therefore, it is imperative that proper EB training is given to staff to establish standardized techniques when measuring BP to ensure that HTN and possible uncontrolled HTN are not over or under-diagnosed.

In addition to standardized initial training, Muntner et al. (2019) recommend that facilities consider retraining staff every 6-12 months to ensure continued EB skills for BP measurement. They suggest six steps for standardized measurements:

1. Properly prepare the patient
2. Use proper technique
3. Take proper measurements for diagnosis and treatment
4. Document BP readings accurately
5. Average the readings
6. Provide readings to the patient

Goals, Objectives, and Expected Outcomes

This QI project aimed to improve the knowledge and skills of the volunteer staff at HUDA Clinic concerning HTN management. This was accomplished through the education of the volunteer staff about how to incorporate EB practices into interactions with patients with

HTN. The expected outcomes were that volunteer staff would use their increased knowledge about HTN to utilize EB best practice when caring for patients with HTN.

Methods

The format of the QI project was a pre- and post-test structure. Volunteer staff were given a pre-knowledge and skills online assessment prior to the HTN educational intervention. The educational intervention was a synchronous PowerPoint (PPT) with one embedded video discussing the best practice for BP measurement, how to ask questions about HTN risk factors, how to assess for symptoms of HTN, how to teach patients how to measure BP accurately at home, and how to help patients make specific, measurable, achievable, relevant, time-bound (SMART) goals to enhance HTN management. Informational handouts were also provided to the staff. The video was an enactment with simulated actors performing in roles of HCP and patient. The embedded video demonstrated proper BP measurement. The online knowledge and skills post-test was then administered.

Project Site and Population

The QI project took place at HUDA Clinic in Detroit, Michigan. The educational intervention and surveys were administered to the volunteer staff at the clinic.

Ethical Considerations/Protection of Human Subjects

Michigan State University Internal Review Board (IRB) non-research status was obtained prior to initiating the QI project. Participants remained anonymous on pre- and post-test surveys, and teaching material was presented synchronously in a virtual format to reduce the time burden on staff.

Setting Facilitators and Barriers/Limitations

The HUDA CD facilitated the implementation of the QI project. The facility agreement letter is found in Appendix F. The education presentation for HUDA staff was provided on three separate dates: two in the evening and one on a weekend morning. This was in response to several barriers, one of which was the schedules of the volunteer staff who work flexible hours due to other commitments such as being full-time university students. Therefore, a one-time, in-person presentation was not a realistic way to accommodate as many staff as possible. There were also religious limitations for scheduling. Many Muslim staff members were unavailable during evening prayer times. Having several presentation times gave participants flexibility so the educational interventions would be the most effective for the clinic.

The virtual format, while useful for the QI project, did provide several barriers to the project. None of the participants turned their video on so it was impossible to gauge the reaction and engagement of the audience during the presentation. This format may also be unable to accommodate different learning styles. While the presentation benefitted auditory and visual learners, a hands-on learning style could not be incorporated virtually.

The clinic itself provided several barriers to the implementation of the QI project. Importantly, the clinic refers to outdated guidelines for the diagnosis and management of HTN. The clinic's EHR was of limited utility because it was not able to track metrics for HTN control at both the patient and the clinical cohort level. The clinic also does not report any metrics to a benchmarking organization so does not receive feedback on meeting national standards.

Lastly, there can be a lack of continuity for the patient population that the HUDA Clinic serves. The clinic has two paid providers and a large rotating group of volunteer providers who come from different practice backgrounds. Since some are at the clinic infrequently, patients

may rarely see the same provider. This can make it difficult to ensure a consistent approach to intervention, treatment, and follow-up care. Project limitations are summarized in Box 3.

Box 3

Limitations

- Scheduling
- Virtual format
- Outdated guidelines
- Limited EHR utilization
- No benchmark organization
- Continuity of care

The Intervention and Data Collection Procedure

The educational intervention of the QI project utilized a pre- and post-test format to measure the volunteer staff's knowledge and skills concerning BP measurement and clinical HTN information. The survey used a five-point Likert scale and short answer format (Appendix G).

The QI project used an educational intervention to measure if the use of a synchronous virtual educational presentation with PPT, along with informational handouts, would accomplish the following:

- increase knowledge about HTN,
- improve the skills and confidence of staff to perform accurate BP measurement,
- ask EB questions about HTN risk factors and symptoms, and
- facilitate goal setting with patients to address factors that contribute to HTN control.

The intervention occurred on three separate days in October of 2022. Before the educational intervention, the presenters read a short statement regarding integrity instructions to preserve the validity of the knowledge and skills pre- and post-tests (Appendix H). The surveys were created using the Qualtrics^{XM} software app, a platform to capture questionnaire data. The presenters shared an anonymous link for the demographics questionnaire (Appendix I) and the pre-test

knowledge and skills assessment during the synchronous Zoom meeting, with the PPT presentation delivered after the pre-test. Post-intervention, the knowledge and skills assessments were given again to volunteer staff through an online anonymous link. Results and/or improvements were examined and compared. After completion of the educational intervention, volunteers were given informational handouts by email from the CD (Appendices J-M).

Timeline and Budget

The project timeline is a chronological overview of the tasks necessary from beginning to completing the QI project. The project moved in a linear direction encompassing four phases: planning, implementation, evaluation, and dissemination. Communication with the community partner and project faculty advisor was ongoing throughout all project phases. Appendix N contains a Gantt chart to visually represent the QI project timeline visually.

This project did not include personnel costs for the organization. The project community liaison is already employed as the CD at the facility and the duties were included in the job description. The personnel costs account for the hours of the DNP students. The project budget includes money for color copies of the HTN materials to ensure the volunteer staff have references to reinforce and supplement learning as needed. The project budget is included in Appendix O.

Measurement Instruments/Tools

The measurement instruments used to determine effectiveness of the educational intervention were the pre- and post-knowledge surveys distributed to volunteer staff (Appendix G). The goal was to compare the results of the post-intervention knowledge survey with the pre-intervention knowledge survey. To obtain measurable data, five-point Likert-scale responses were provided for the participants for questions 1-10 (1=Strongly Disagree, 2=Disagree,

3=Neutral, 4=Agree, 5=Strongly Agree). Open-ended knowledge questions were used to gather quantitative data for questions 11-18.

Analysis

Data was collected using online pre- and post-intervention knowledge surveys; results were entered into Excel statistical software. Forty-nine staff participated in the online educational interventions; 48 staff members completed the demographics survey and pre-test and 49 completed the post-test. One attendee did not complete the demographics survey and pre-test. Descriptive statistics were used to summarize the data characteristics and key measures. The pre- and post-intervention survey answers were not paired for the participants, so statistics were analyzed using aggregate data from the sample group.

There was an increase in the mean knowledge scores from the pre-intervention to post-intervention answers for the 10 Likert survey questions. The Likert questions addressed whether the participants were taught certain skills or had knowledge of specific HTN information. The mean pre-intervention scores ranged from 2.85 to 4.25. The mean post-intervention scores ranged from 4.5 to 4.8. The increases ranged from 0.25 to 1.95. A graphical depiction of the improvement in the mean knowledge scores is included in Appendix P.

Open-ended knowledge question responses were categorized by the number of participants with correct responses. There was an increase in the percentage of correct responses from pre-intervention questions to post-intervention questions for the 8 open-ended questions. The increases ranged from 10.5% to 48%. A graphical depiction of the percentage of correct answers is included in Appendix P. The data convey practical significance that the difference between pre- and post-intervention measures were enough to justify the resources used for the educational intervention.

Sustainability Plan/Next Steps

Accurate measurement of BP and staff knowledge of HTN risk factors and end-organ consequences is a gap in many settings, including the HUDA Clinic. While there is an initial training session for volunteer staff to discuss BP measurement, there is no specific process for standardized EB teaching about HTN. The clinic also does not use the most up-to-date EB guideline for direct care. Therefore, the PPT with voiceover created for this project will be incorporated into new volunteer staff orientation in the future. There is also an intention to update and implement a HTN management standardized plan for providers to reflect up-to-date guidelines after discussion by the Board of Directors. New staff will also be given hard and electronic copies of the PPT slides and educational handouts. They will have an initial skills check-off at orientation and then at a future date, likely in 6 months, another skills check-off. With an increase in grant money, the clinic has been distributing BP cuffs to all patients with HTN. The staff have been scanning the patient's home BP record into the EHR. Additionally, the CD is tracking the level of HTN control among those patients.

Discussion/Implications for Nursing

Accurate BP management and HTN control continues to be an essential component of patient care for urban adults, including those at the HUDA Clinic. As discussed, accurate measurement of BP and therefore accurate and timely diagnosis of HTN is vital to this population. Staff understanding and having the tools to work cooperatively with patients concerning HTN education, lifestyle modifications, and personalized goal setting can lead to decreased morbidity and mortality, as well as increased QOL. Using pre- and post-test knowledge evaluations, it was shown that an EB educational PPT significantly improved knowledge scores among volunteer staff. The volunteer staff at HUDA spend a significant

amount of time with the patients and are uniquely positioned to provide individualized HTN education. HTN is a disease process that affects multiple body systems. When diagnosed, it can be treated with both pharmacological and non-pharmacological interventions. Successful management of HTN requires the APRN and patient's participation. Many non-pharmacological interventions, like a healthy diet and increased physical activity, require patient education but have proven to be extremely helpful in improving patient outcomes and may be more accessible and affordable for certain populations.

Understanding this, APRNs who are committed to the best patient outcomes and QOL should be committed to understanding and training everyone in their practice environment who measures BP and has contact with patients with HTN. Policy recommendations include the following:

- Mandating accurate information regarding people of color and pre-existing health care disparities be taught in all healthcare professional curriculums
- Incorporating health literacy standards into all healthcare curriculums, discussions, and patient teaching
- Mandatory inclusion of social determinants of health (SDOH) into all healthcare professional curriculums
- Adopting current EB guidelines for the diagnosis and management of HTN in all clinics
- Creating accurate EB policy/procedures for collecting subjective/objective, holistic data from patients with HTN and teaching them the appropriate methods to monitor their BP at home
- Requiring all EHR entities to incorporate SDOH and health disparities into forms for every patient visit

- Developing Current Procedural Terminology (CPT) codes for reimbursement of teaching patients and their family/caregivers about HTN management
- Training all clinic staff in accurate knowledge regarding the full scope of HTN
- Working with patients to develop individualized goals for self-management of HTN
- Increasing public awareness of health-related risks from uncontrolled HTN through government policy and advertisement

Cost Benefit Analysis/Budget

The QI project's cost-benefit analysis was minimal due to the virtual nature of the intervention and the clinic's unpaid volunteer staff. The main cost was the time of the two project personnel, a faculty advisor from Michigan State University, a statistician from Michigan State University, and the CD employed by the HUDA Clinic. The other main component was paper to produce handouts for use within the clinic for reference and patient education. The intervention required about an hour of the staff member's time. The clinic benefits from updated HTN guidelines, increased staff confidence and knowledge, and improved patient outcomes. See Appendix N for specific monetary details regarding the budget.

Conclusion

Staff understanding and implementation of EB HTN skills and knowledge are an essential part of helping patients prevent and control HTN. However, due to various barriers it was clear that not all facilities, including HUDA Clinic, follow an EB plan for the education and skill-acquisition of staff. So, implementing basic knowledge of HTN risk factors, accurate BP measurement, and staff opportunities for facilitating individualized chronic disease goal setting is a vital first step toward improving HTN control among patients at HUDA Clinic. By comparing pre- and post-intervention knowledge assessments after an EB educational intervention, staff

could assess their level of understanding of HTN, improved skills regarding accurate BP measurement, and their ability to enlist patient engagement in the chronic disease management process. One hope is that control of HTN will be improved among the patients at HUDA Clinic. Next is that HUDA Clinic will write a formal policy for all staff and providers with the most up-to-date EB guidelines about HTN assessment and management. Lastly, is the hope that HUDA Clinic will formalize the HTN education and training component for volunteer staff. In order to provide quality care to this urban, lower SES population, staff need to empower patients with knowledge and skills that they have the capacity to make positive changes that can improve their health.

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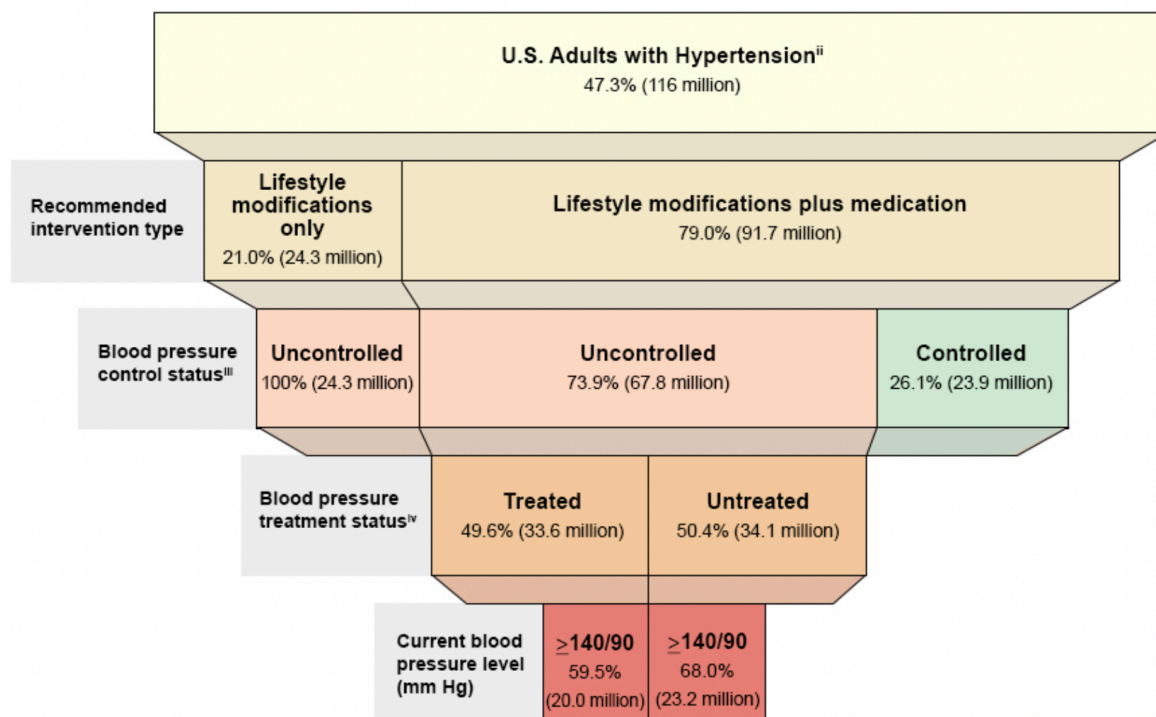
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Appendix A

Estimated Hypertension Prevalence, Treatment, and Control Among US Adults

Applying the Criteria From the American College of Cardiology and American Heart Association's (ACC/AHA) 2017 Hypertension Clinical Practice Guideline—NHANES 2015–2018



- Among adults ages 18 years and older; estimates may not equal 100 due to rounding
- Blood pressure $\geq 130/80$ mmHg or currently using prescription medication to lower blood pressure
- Controlled is defined as having a blood pressure $< 130/80$ mmHg
- Treatment status refers to current use of prescription medication to lower blood pressure

Figure from a United States government public domain diagram by the CDC at <https://millionhearts.hhs.gov/data-reports/hypertension-prevalence.html>

Appendix B

Demographics of Volunteer Staff

Figure B1

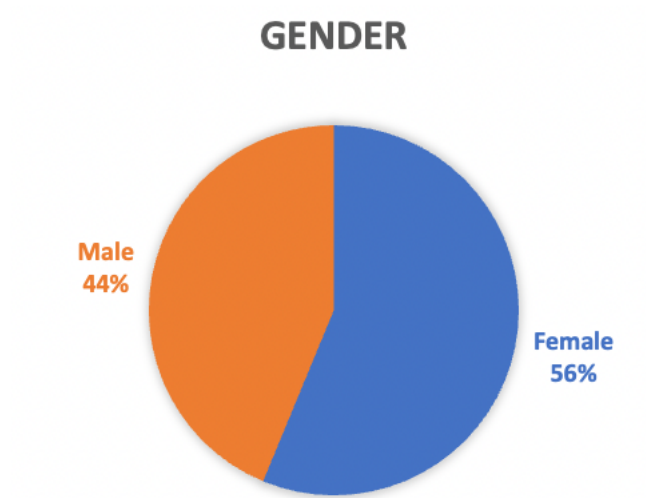


Figure B2

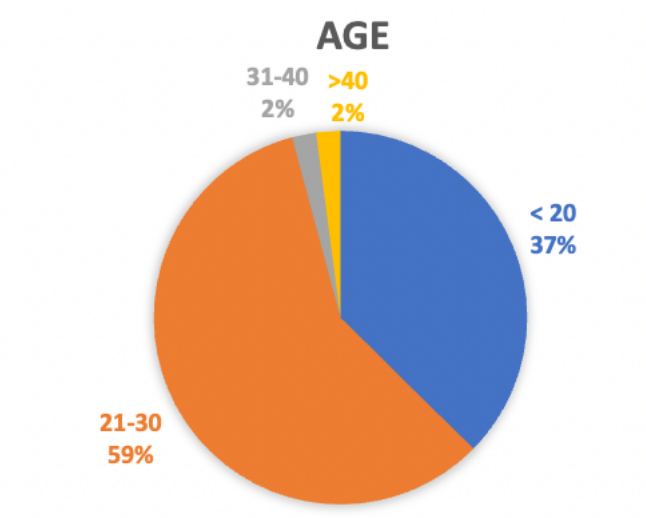


Figure B3

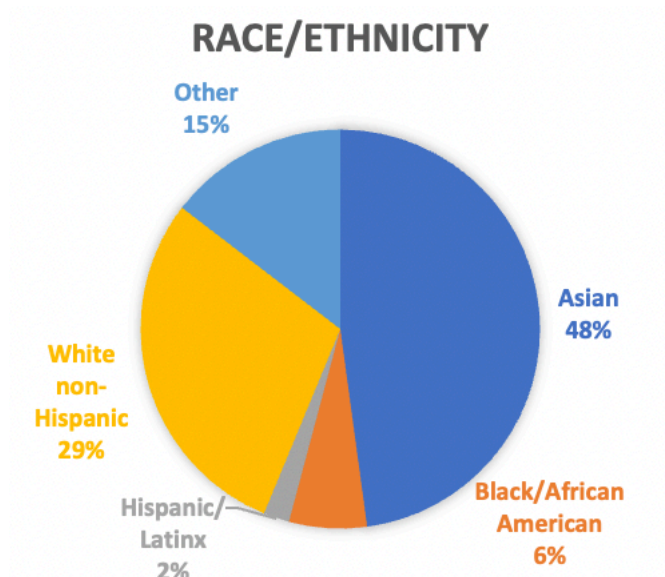


Figure B4

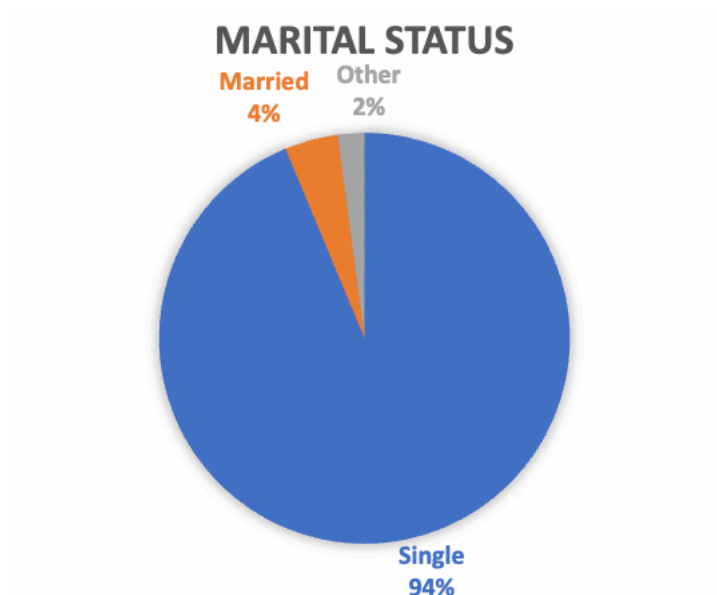


Figure B5

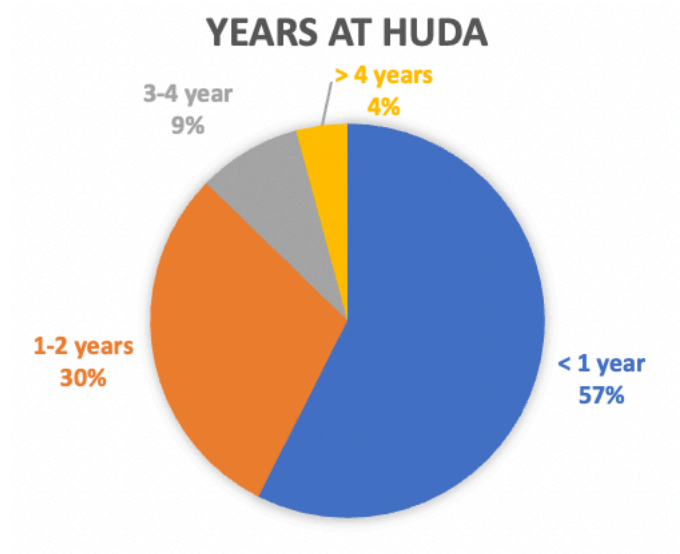


Figure B6

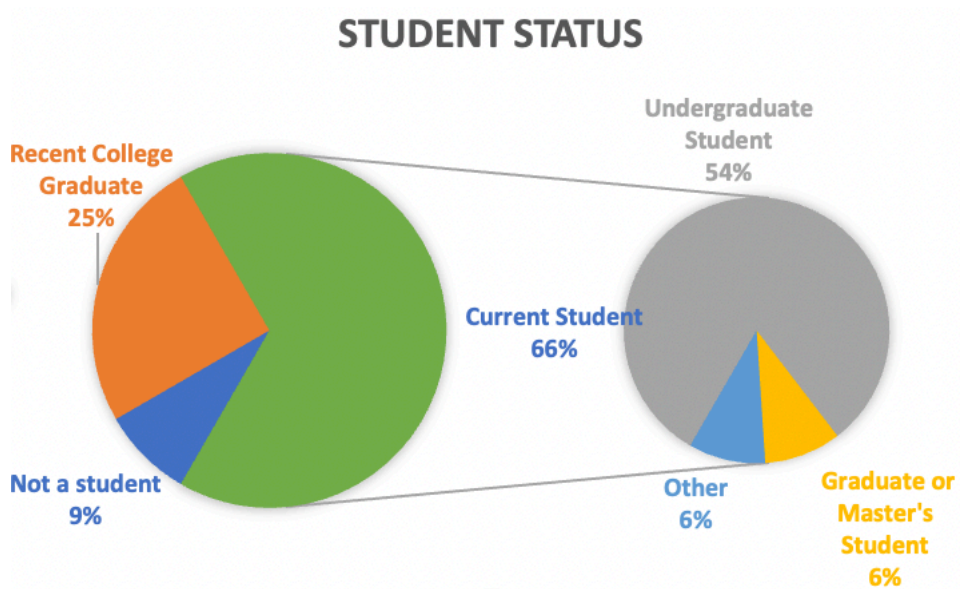


Figure B7

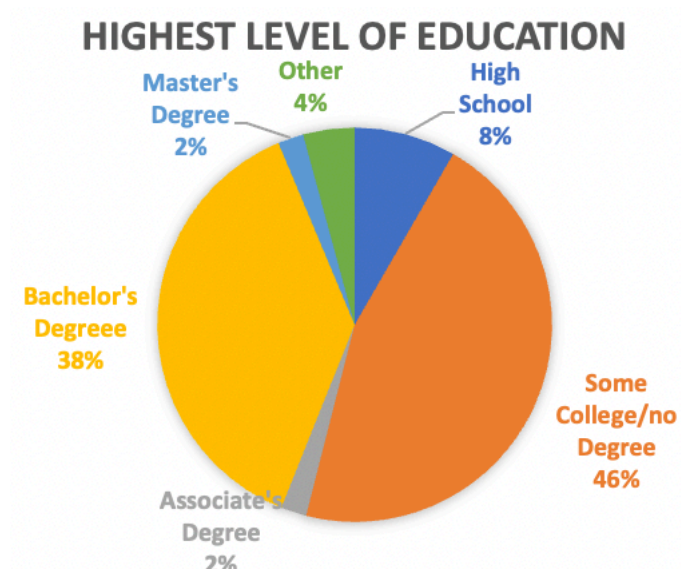


Figure B8



Appendix C

SWOT Analysis of Hypertension Care

Internal	External
<p style="text-align: center;">Strengths</p> <ul style="list-style-type: none"> • Serves uninsured patients with limited access to other primary care services • Free primary care, lab services, & prescription medications • Student volunteers 	<p style="text-align: center;">Opportunities</p> <ul style="list-style-type: none"> • Enthusiastic volunteers • Captive patient population who may not get health education from other sources • Engaged community partners with an interest in helping the uninsured population
<p style="text-align: center;">Weaknesses</p> <ul style="list-style-type: none"> • Utilizing outdated HTN guidelines • No written HTN policy/procedure • Rotating volunteer providers who may have different practice standards • Unclear communication with patients about the need for FU • Long wait time in clinic • Limited clinic hours; 5 hours/day, 3 days/week • Limited budget for educational materials • No standardized teaching or individualized goal-setting for patients with HTN 	<p style="text-align: center;">Threats</p> <ul style="list-style-type: none"> • Difficult to change from current practice • Decreased autonomy of providers with more prescribed practice parameters • Assumptions about the willingness of patients to change behaviors