



## **A DNP PROJECT**

### **TITLE: UTILIZATION OF A TOOLKIT TO IMPROVE CONTROL OF HYPERTENSION IN A BLACK URBAN POPULATION**

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### **Abstract**

Hypertension (HTN) is not just a problem in the United States. In 2013, the World Health Organization (WHO) referred to hypertension as a global public health issue (WHO, 2013). While hypertension does not discriminate in who it impacts, those of African descent throughout the world suffer from higher rates of hypertension than their Caucasian or Hispanic counterparts (Zilbermint, Hannah-Shmouni, & Stratakis, 2019). Regardless of a person's ethnicity, a major contributor to uncontrolled hypertension in those diagnosed and being treated for hypertension is medication non-adherence. Uncontrolled hypertension can have serious health impacts including stroke, heart failure, and kidney damage, any of which could ultimately result in death. Studies have shown that there are a multitude of reasons for medication non-adherence, from believing a medication will not impact the source of their disease to simply forgetting to take the medication on a regular basis (Iuga, & McGuire, 2014; Rajpura & Nayak, 2014). The purpose of the following proposed quality improvement project is to improve medication adherence of hypertension medication by disease education through a power point presentation, use of a medication pillbox, and a medication log. The intervention concluded with lower blood pressure readings and increased medication adherence. The toolkit that included disease-specific patient education, disease management, and pillbox utilization showed statistically significant results for the positive correlation between disease improvement and the project intervention.

## **Introduction**

Hypertension drives the global burden of cardiovascular disease. Its prevalence is estimated to increase by 30% by the year 2025 (Abegaz, Shehab, Gebreyohannes, Bhagavathula, & Elnour, 2017). While there is no cure for hypertension, patients who take their medications as prescribed and make lifestyle changes can enhance their quality of life and reduce their blood pressure. Despite its identification and prescribed treatment, high blood pressure is often insufficiently controlled in clinical practice, a prominent reason for this being poor patient adherence to their medication regimen (Svensson et al., 2000). It is estimated that 43% to 65% of patients who are prescribed antihypertensive medications are non-adherent with their prescriptions (Abegaz et al., 2017).

In accordance with some of the significant identified factors that contribute to patient medication nonadherence, not understanding the vital necessity of antihypertensive medications and forgetfulness are often overarching themes in medication non-adherence. This project will evaluate patients' understanding of medication adherence and assess the patient's blood pressure, then provide patients the use of tools, such as a medication log and pillbox. One month after the intervention the individuals will then be re-evaluated for the patients' understanding of the recommended medication regimen and will assess its impact on their health by once again reassessing the patients' blood pressure. It is hypothesized that a toolkit which includes education, medication log, and pillbox will impact health outcomes by not only improving patients' blood pressure, but also give patients a better understanding of why medication adherence is so important. Therefore, this will increase the likelihood that these patients will continue to be adherent to their medication regimens and have better health outcomes.

### **Background and Significance**

HTN is a costly and dangerous disease that is still vastly under diagnosed and undertreated in the United States (WHO, 2013). Hypertension can affect anyone regardless of age, gender, or ethnicity. The social determinants of health, such as income, education, and housing, have a correlational influence on behavioral risk factors such as consuming fast food, sedentary behavior, tobacco use and the excessive use of alcohol (WHO, 2013). Furthermore, due to stiffening blood vessels with age, the risk of hypertension increases as an individual ages (WHO, 2013). When compared to other ethnic or racial groups in the United States, African American and others of African descent demonstrate a higher frequency of hypertension and its related comorbidities, including cardiovascular and end-stage renal diseases (Zilbermint, Hannah-Shmouni, & Stratakis, 2019).

In addition, many African Americans receiving treatment for hypertension continue to experience the detrimental effects of hypertension due to a lack of medication adherence. A 2014 study conducted by Iuga and McGuire found that forgetting is the most frequently reported reason for nonadherence. In a survey of 10,000 patients, the most common reported reason for missing medications was forgetfulness (24%), followed by fear of side effects (20%), high drug costs (17%), and the view that a prescribed medication would have little effect on their disease (14%) (Iuga & McGuire, 2014).

Patients with hypertension who do not adhere to their medication regimen will experience damaging effects of hypertension such as strokes, heart attacks or even kidney disease. One common damaging effect of hypertension that patients often unknowingly have is hypertensive urgency, which is defined as an elevation of blood pressure without any signs of target organ damage (Paini, et al., 2018). This occurs when the systolic blood pressure is higher than 180, and

the diastolic blood pressure is greater than 110 mmHg (Paini, et al., 2018). In the long term, hypertensive urgency can develop into hypertensive emergencies including cardiovascular events like heart attacks, heart failure, or stroke (Paini et al., 2018). Anecdotal evidence from the project site in an urban primary care setting indicated at least 8-10 cases a month of patients with a hypertensive urgency.

Not only are patients putting their lives at risk by being nonadherent to their medication regimen, but these patients are also contributing to staggering medical costs. It is estimated that hypertension costs approximately \$48.6 billion each year (Centers for Disease Control and Prevention, 2019). This includes the cost of health care services, medications to treat hypertension, and missed days of work (CDC, 2018). Similar studies have found age, household income, duration of diagnosis, number of antihypertensive tablets taken in each dose, daily frequency of taking medication, and social support to be related to medication adherence among hypertensive patients (Ma, 2016).

This project aimed to evaluate the toolkit effectiveness of a pillbox, medication log, and PowerPoint education session, in improving the medication adherence of hypertensive patients, and consequently improving patients' blood pressure.

### **Needs Assessment**

Hypertension has been named a global public health issue by the WHO since 2013. In their Global Brief on Hypertension, the WHO established that “hypertension rarely causes symptoms in the early stages, and many people go undiagnosed. Those who are diagnosed may not have access to treatment and may not be able to successfully control their illness over the long term (World Health Organization, 2013). Hypertension causes approximately 9.4 million deaths worldwide every year (World Health Organization, 2013). The number of individuals worldwide

who have been diagnosed with hypertension increased from 600 million individuals in 1980 to 1 billion individuals in 2008 (World Health Organization, 2013). Hypertension and its complications, including premature death, disability, personal and family disruption, and loss of income, all take a significant toll on expenses at the national level. Between 2011 and 2025 it is estimated that low- and middle-income countries will lose \$7.28 trillion in output with cardiovascular disease being responsible for half of that loss (World Health Organization, 2013).

On a global scale, the United States has better management of hypertension than most countries. Africa has the highest hypertension prevalence, with 46% of adults' ages 25 years and older having hypertension, with North and South America having a combined hypertension prevalence of 35% (World Health Organization, 2013). In 2017 it was estimated that nearly 45% of adults (108 million) in the United States had hypertension, with about 30 million of those individuals not being prescribed the antihypertensive medications they need (National Center for Chronic Disease Prevention and Health Promotion, 2020).

According to the Centers for Disease Control and Prevention (CDC), 1 in 3 adults in the United States, or approximately 75 million people, have high blood pressure (2019). However, only slightly more than half (54%) of these people have their blood pressure under control (Centers for Disease Control and Prevention, 2019). Controlled hypertension is defined as a "systolic blood pressure less than 140 mmHg and diastolic blood pressure less than 90 mmHg among those with hypertension" (AHA, 2017). Also as of 2016, "hypertension prevalence was higher among non-Hispanic black (40.3%) than non-Hispanic white (27.8%), non-Hispanic Asian (25.0%), or Hispanic (27.8%) adults" (Fryar et al., 2017). Although the prevalence of hypertension in the United States has not significantly changed since 2010, the prevalence of



individuals diagnosed with hypertension who do not have controlled hypertension continues to be astronomical with devastating physical, emotional, and financial impacts.

Over the last decade, New Jersey has had a prevalence of hypertension that is slightly elevated in comparison to the United States average. In 2018 the prevalence of hypertension in New Jersey was 33% of the general population in comparison to the United States average of 32.3% (United Health Foundation, 2018). Individuals with hypertension in New Jersey are most likely to be over the age of 65, (60.5%) (United Health Foundation, 2018). Furthermore, the highest prevalence of hypertension with 41.2% of individuals being black (United Health Foundation, 2018). Additionally, hypertension prevalence is greatest in individuals with less education and lower incomes, as 41.3% of individuals who make \$50, 000 a year or less having hypertension, as well as 40.5% of those without a high school education (United Health Foundation, 2018). While there is currently no specific data found regarding hypertension medication nonadherence in New Jersey, there is data available regarding uncontrolled blood pressure and its effects on a larger scale.

Cardiovascular disease, a long-term impact of uncontrolled hypertension, is currently the number one cause of death in New Jersey (New Jersey State Health Assessment Data, 2018). Approximately 254 deaths per 100, 000 individuals occurred in New Jersey in 2018 as a result of cardiovascular disease (United Health Foundation, 2018). Once again, of those cardiovascular deaths, the race with the highest prevalence of cardiovascular deaths in New Jersey were black residents (United Health Foundation, 2018).

In Essex County, New Jersey, with a population of 783,969, approximately 102 deaths per 100, 000 individuals occurred as a result of cardiovascular disease in 2018 (New Jersey State Health Assessment Data, 2018). At the site for this intervention, 80% of total patients have been

identified with diagnosed hypertension and within those with the diagnosis, 60% are black. Furthermore, of the population at this clinic who have been identified as having hypertension and are being treated, 44 % continue to have uncontrolled hypertension. Currently, there is no program in place at this clinic to improve medication adherence or to address medication non-adherence.

### **Problem Statement**

Hypertension is a chronic disease that is treatable, however “evidence shows poor health control It is not just a problem in the United States; the World Health Organization considers it a global health problem. Hypertension remains a constant problem in the United States as patients do not adhere to their medication regimen for a variety of reasons, the most common being forgetfulness and ignorance leading to the detrimental effect of nonadherence.

### **Clinical Question**

Will utilizing a medication adherence toolkit in a primary care setting and providing services to a Black population have an impact on hypertension control or disease management, and increase knowledge and disease control?”

### **Aims and Objectives**

The aim of the project was to determine the impact of a medication toolkit on medication adherence and blood pressure in black patients diagnosed with hypertension at a clinic in Essex County, New Jersey. This project had to accomplish an increase in medication adherence as well as a decrease in blood pressure as a result of the interventions. By applying these interventions and seeing the change in patient’s medication adherence and blood pressure, a long-term outcome of this intervention would be to establish a permanent program at this clinic to apply these interventions and continue to see positive health outcomes. The objectives were to:

- Decrease incidents of hypertension urgencies/emergencies.
- Educate patients on medication adherence.
- Improve medication adherence.
- Improve patients blood pressure
- Implement a toolkit to help patients adhere to their hypertensive medications

### **Review of Literature**

A literature review was conducted using the databases Cumulative Index to Nursing and Allied Health Literature (CINAHL) and PubMed. A research librarian assisted in this search, using Medical Subject Headings (MESH) terms, which included "adult," "hypertension," "medication adherence," "results evaluation," and "health outcome." Other keywords searched included "medication," "adherence," "non-adherence," "health status," "compliance," "guidelines," "program," and "plan implementation." A total of 80 articles were found from the CINAHL database and a total of 104 articles from PubMed. After a detailed analysis of the articles, a total of nine articles were selected for further review

Hypertension is abnormally high blood pressure. Stage one hypertension is defined as systolic blood pressure between 130-139 mm Hg or diastolic blood pressure between 80-89 mm Hg (American College of Cardiology, 2017). Stage two hypertension is defined as a systolic blood pressure of at least 140 or diastolic of at least 90 mm Hg (American College of Cardiology, 2017).

Hypertension has been a global chronic health problem for decades, with serious long-term health effects, including stroke and end stage organ damage. Available treatments for hypertension include behavioral changes, diet modification, and a variety of medications. Despite many effective pharmaceutical treatments available for hypertension, these medications

are often not taken as prescribed and therefore not given the opportunity to be effective.

Adherence to medication regimens remains a widespread problem across the population of patients with hypertension.

Evidence regarding how to correct medication non-adherence in hypertensive patients comes down to one common theme: greater education was needed to improve medication adherence in hypertensive patients. “Corrective measures need to be started at the patient level first by motivating and educating them regarding the importance of drug intake” (Yuvaraj et al., 2019, p. 701). Additionally, “strategies utilizing patient education and engagement are needed to improve medication adherence and blood pressure control” (Roldan et al., 2018). In conclusion, the evidence suggests interventions for providers to understand the main reasons for medication non-adherence, and to know that education is a critical intervention in combating medication non-adherence. Established understandings of the cause of medication non-adherence in hypertensive patients were forgetfulness and a lack of education, but there are no current and specific guidelines for the format of the education that needs to be provided. One literature review found previously tested methods to include “educational sessions, health coaching, motivational interviewing, stage of change behavioral counseling, and pharmacist hypertension management” (Roland et al., 2018, p.34).

Several studies have tested different interventions for medication non-adherence in patients prescribed antihypertensive medication. One systematic review found the most promising interventions to include “linking adherence behavior with habits, giving adherence feedback to patients, self-monitoring of blood pressure, using pillboxes and other special packaging, and motivational interviewing” (Conn & Cooper, 2017). Another study found that “single-pill fixed-dose combinations simplify the habit of medication taking and improve medication adherence”

(Vrijens et al., 2017). The CDC's website also includes ways to improve medication adherence, such as the use of pillboxes and blister packs to organize medication regimens (Centers for Disease Control and Prevention, 2019). A recent study from 2017 tested the use of a smartphone application to improve medication adherence and reduce systolic blood pressure in hypertensive patients. Despite the innovative and modern approach, the study found "patients randomized to use a smartphone app had a small improvement in self-reported medication adherence but no change in systolic blood pressure compared with controls" (Morawski et al., 2018). In light of the systematic reviews and clinical trials available to examine, reoccurring themes in interventions to improve medication adherence include the use of pillboxes and patient education.

### **Medication Adherence**

Medication adherence is an essential factor concerning the health of patients diagnosed with acute or chronic health problems. Mackey et al. (2015) stated that only 50% of patients with chronic illnesses report medication adherence in developed countries. Furthermore, 50-60% of individuals with chronic conditions are non-adherent with medication treatment with 30% to 50% of medications not taken as prescribed (Bosworth et al., 2011; Kini & Ho, 2018).

Medication non-adherence significantly reduces patients' quality of life. It also increases the overall costs of individual treatment due to more frequent office visits or hospitalizations from poor health control. According to Bosworth et al. (2011), roughly 1.6 billion prescriptions filled each year in the United States are not taken as prescribed. This is becoming a national concern because not only are patients paying more for healthcare as a result of medication non-adherence but also sadly, medication non-adherence often results in death. "Medication non-adherence is

associated with 125,000 deaths, 10% of hospitalizations, and \$100 billion in healthcare services annually” (Kini & Ho, 2018).

The literature review found that a variety of methods have been studied to understand what factors contribute to medication adherence. Some of these methods include educational classes on medication adherence, counseling on the importance of adherence to medication regimens, a monthly review of medications, and behavioral support and interventions (Frydenberg & Brekke, 2012; Ludman et al., 2013). In a study in which a medication log was utilized, it was found that medications are accidentally omitted in patients’ medication reconciliation, therefore causing medication errors and potentially harmful situations (Fryden & Brekke, 2012). In a randomized control trial, Ludman et al., (2013) found that a combination of self-management support and collaborative care management significantly improved self-care knowledge and efficacy in patients who had chronic illnesses and multiple medications to manage. Milos et al., (2013) also found that involving patients in the administration of their medicines by reviewing medicines in the primary care setting with a pharmacist significantly reduced the number of patients with potentially inappropriate medications. The literature review has illustrated that implementing a medication adherence toolkit can promote medication adherence and improve patient outcomes.

### **Methods to Improve Adherence**

Numerous articles and studies support the notion that patient education is one of the most crucial aspects in ensuring patients are adherent to their medication regimen (Jimmy & Jose, 2011; Allison, 2012; Taibanguay et al., 2019). Allison (2012) concluded, “Patient education is one of the most useful tools to empower patients to take their medications as directed”. A literature review by Jimmy and Jose (2011), also found that patients often do not take their

medication as prescribed because they fear unknown information about their medication such as possible side effects. “Hence, providing clear medication-related information to patients is essential to improve adherence that includes addressing the key information of what, why, when, how and how long” (Jimmy & Jose, 2011, p. 155). A randomized control trial conducted earlier this year on patients with rheumatoid arthritis also found that “provision of a disease information pamphlet with or without directed counseling can equally enhance medication adherence of patients” (Taibanguay et al., 2019, p. 119). Regardless of the disease process, studies have found a significant increase in medication adherence when greater written or verbal education is provided. (Bosworth, et al., 2011).

Jimmy and Jose (2011) stated that medication adherence can be monitored by techniques such as patient self-reporting, detailed questionnaires, pill counts, prescription fill rate, or electronic pillboxes. Also, Porter, Taylor, Yabut, and Al-Achi (2014) conducted a study using pill counts to investigate the effectiveness of a pillbox clinic to improve blood pressure in veterans with uncontrolled hypertension taking three or more antihypertensive medications daily. The study found, based on their pill counts at follow-up appointments, that patients had  $\geq 80\%$  medication adherence when pillboxes were used as well as a clinically significant reduction in systolic blood pressure by 10 mmHg (Porter et al., 2014).

As health care providers it is essential that we identify the reasons a patient is not taking their medication as prescribed. Following the findings of this study, health care providers should emphasize to patients the necessity of their medications for their health. While it would not necessarily be a goal to instill fear in a patient, it is essential that as providers we make sure patients understand the severe health outcomes that can result, up to and including death, if they do not adhere to their medication regimen. Achieving optimal control of blood pressure is always

the focus of providers, yet poor medication adherence is a significant cause of failure to meet adequate blood pressure control despite being prescribed an anti-hypertensive.

### **Adherence and Hypertension**

In a cross-sectional study, Rajpura and Nayak (2014) distributed questionnaires to 117 patients with hypertension, approximately half of which were over age 65, to evaluate the patients' perceptions about hypertension, perceived illness burden, and beliefs about anti-hypertensive medication. The authors then observed how these perceptions and theories influenced the patients' medication adherence. Through their research, Rajpura and Nayak 2014 found that "more benign perceptions of illness and greater perceived illness burden translate to lower medication adherence". Furthermore, "threatening views of illness and stronger beliefs of the necessity of medications contribute substantially to positive medication adherence" (Rajpura & Nayak, 2014).

A systematic review, with applied meta-analysis, to investigate medication adherence in patients with hypertension, utilized the Morisky Medication Adherence Scale (Abegaz, Shehab, Gebreyohannes, Bhagavathula, & Elnour, 2017). Of the 25 studies analyzed in the articles and 12,603 subjects studied, "non-adherence to antihypertensive medications was noticed in 45% of the subjects studied and a higher proportion of uncontrolled BP (83.7%) was non-adherent to medication" (Abegaz et al., 2017, p. 83) Furthermore, it should be noted that "nearly two-thirds (62.5%) of medication non-adherence was noticed in Africans and Asians (43.5%)" (Abegaz et al., 2017, p. 83). This therefore makes an even stronger case for having the current study specifically focus on Africa American patients, as there has been found to be a higher level of medication non-adherence in this population (Abegaz et al., 2017).

### **Prevalence in Black Population**



Individuals identifying themselves as Black were chosen as the proposed target population for this project. In a study recently published in the Journal of the American Heart Association (2018), black adults are up to two times more likely to develop high blood pressure by age 55 compared to white adults, with many of these racial discrepancies developing before age 30. A study by Schoenthaler et al. (2016) tried to find any psychological aspect that would impact medication adherence in blacks from a community clinic over a period of 6- 12 months to assess adherence. It showed that self-efficacy was a key predictor of medication adherence over time in black patients with hypertension. Initial levels of self-efficacy were influenced by the presence of depressive symptoms as well as the perceived quality of patient-provider communication. The study concluded that an increase in self-efficacy over time predicted improvements in medication adherence (Schoenthaler et al., 2016)

### **Measuring adherence**

The Hill-Bone medication compliance and Morisky medication adherence have been utilized to assess the amplitude and impact of medication non-adherence in patients with chronic diseases. The Hill-Bone Compliance to High Blood Pressure Therapy Scale “assesses patient behaviors for three important behavioral domains of high blood pressure treatment: 1) Appointment Keeping (3-items)) 2) Diet (e.g. reduced sodium intake) (2-items) and 3) Medication Adherence (9-items) (Kim, Jill, Bone, Levine, 2008, p. 90). This brief instrument provides a simple method for clinicians in various settings to assess patients’ self-reported adherence and to plan appropriate interventions. Through numerous tests, researchers have established that the scale shows consistent and reliable results with “high compliance scale scores predicting significantly lower levels of blood pressure and blood pressure control” (Kim et al., 2008).

In its current form, it can be self-administered or done by interview in less than 5 minutes, thus making it a clinically useful tool for diagnosing problems with compliance in hypertensive patients. (Hill & Berk, 1995)

A cross-cultural validation study of the Hill-Bone Scale found “consistency for a modified Hill-Bone Compliance Scale, in Black, urban, hypertensive, and South African patients” (Lambert et al., 2006, p. 286). The population studied was African American individuals living in an urban setting. Studies showed the Hill-Bone scale tested on a similar study population with consistent results.

Next, the Morisky Medication Adherence Scale is one of the most frequently used questionnaires worldwide. The scale “uses a series of short behavioral questions geared in such a way to avoid “yes-saying” bias commonly seen with chronic care patients” (Sison, 2018). Furthermore the scale has, “has been verified and substantiated by numerous studies on a global scale with over 110 versions and over 80 translations” (Sison, 2018). The scale ultimately scores patient’s medication adherence by evaluating factors such as forgetfulness, symptom severity, feelings of pressure, and emotional aspects that contribute to medication non-adherence (Sison, 2018).

Park, Shin, Jeong, Song, & Lee (2018) used the Morisky Medication Adherence Scale to assess medication adherence in low-income patients with hypertension. The patients included in this study are similar to the patient population in the Park et al study at an urban private practice. Park et al. (2018) concluded “medication adherence and health literacy were significantly associated with health-related quality of life in vulnerable older people with hypertension”. The study also concluded, “to effectively promote health-related quality of life in this population, medication adherence and health literacy of patients should be considered when developing health

interventions” (Park et al., 2018).

The review of the literature illustrated different methods that have been used to improve adherence to medication, including educational programs, medication logs, counseling, and behavioral support given the patient population and in congruence with the study findings. providing a tool kit that helps patients log their medication, as well as education on the different medications, should help improve medication adherence, therefore reducing hospitalizations, the overall cost of healthcare, and thus improving patient’s quality of life.

### **Theoretical Framework**

Adherence is based upon the patient's knowledge and understanding of the medication and its usage. The Health Belief Model (HBM) is one of the first models that adapted theories from the behavioral sciences to foresee health behaviors (McEwen & Will, 2011). The Health Belief Model identified factors referred to as cues to action that are either positive or negative events that lead patients to take action to change their health behaviors. The model was first developed in the 1950s by a group of social psychologists working for the United States Public Health Service to understand the reasons why individuals fail to adapt disease prevention strategies or screening tests for the early detection of disease (McEwen & Will, 2011). Later uses of HBM were aimed at monitoring patients' responses to symptoms and adherence with medical treatments (Janz & Becker, 1984). Concepts from the HBM that are determinants of a hypertensive patient's likelihood of medication adherence include:

- perceived susceptibility,
- Perceived severity,
- Perceived benefit
- perceived barriers

- Cue for action
- Self-efficacy (Kamran et al., 2014).

The model is illustrated in Appendix A.

### **Perceived Susceptibility**

Perceived susceptibility refers to a person's opinion of the likelihood of acquiring a certain condition or disease (Champion & Skinner, 2008). Perceived seriousness, in contrast, refers to one's belief about how concerning a condition is and what its consequences are (McEwing & Wills, 2011). The achievement of any intervention intended to improve medication adherence is at least partially dependent on how the patient perceives the negative implications of having hypertension in their lives. It is essential to continue to emphasize the consequences of poor adherence to blood pressure medications on one's health and quality of life. Perceived threats about the seriousness of hypertension can help determine how patients with hypertension will adhere to their medication regimen. In order to establish appropriate interventions, it is also crucial to ask patients what their cultural perspectives on hypertension are, and inquire about their views about antihypertensive medications. It is vital that patients receive education about the serious health repercussions of poor adherence to blood pressure medications such as heart attacks, strokes, kidney failure, and even death. Education could help bring health concerns to light about the adverse effects of non-adherence with antihypertensive prescriptions. The instruction will ideally build patient's adherence with their medication regimen, and have the capability of urging a change in light of this apparent danger.

### **Perceived Barriers**

Perceived barriers refer to one's beliefs about the tangible and psychological costs of the advised action (Champion & Skinner, 2008). Perceived barriers refer to the psychosocial,

physical, or financial restrictions that may stand in the way of an individual's participation in the health-promoting behavior of medication adherence. Several obstacles face patients who want to adhere to their medication regimen. The geographical location of patients, and the time it takes to physically obtain the medication or the means by which to travel the distance, may be one obstacle a patient is facing. Other barriers to medication non-adherence include a lack of health insurance, financial difficulties, lack of knowledge, or medical illiteracy (inability to interpret blood pressure logs). Additional barriers may include mental health barriers (e.g., mental and health state; knowledge and beliefs; demographic variables such as age, sex, and education), medication factors (e.g., packaging, drug storage, cost, labeling instructions, regimen complexity), physician factors (e.g., inadequate communication, non involvement, trust, frustration), system-based (e.g., lack of medication review, follow-up), and other factors (e.g., lack of caregiver, caregiver burden, lack of immediate improvement in health state) (Lamarche, Tejpal & Mangin, 2018). Noted barriers could be reduced through patient education. The education would include informing the patients of free resources available such as rides to retrieve their medications, insurance and payment options to reduce the financial burden on the patient, health literacy education, and providing reassurance.

### **Perceived Benefits**

Perceived benefits refer to one's belief in the effectiveness of the advised action to reduce the risk or seriousness of impact (Champion & Skinner, 2008). For example, for a patient to have control of hypertension and prevent critical problems such as end-stage organ damage, patients must adhere to the lifestyle changes including a low salt diet, a health improvement plan, exercise, smoking cessation, and adherence to their medication regimen. Patients must be able to see the value to their health the perceived benefits and in order to choose to make the appropriate

changes to help control their blood pressure. It is vital for the patient to evaluate the psychological and physical advantages of taking part in the lifestyle changes necessary, so that the patient is constantly reminded of the benefits they are receiving by adhering to their treatment plan. It can be easy for patients to forget the benefits of adhering to a treatment plan when they may not see immediate health improvements. However, it still needs to be emphasized to the patient the damage that can occur to their health if they stop following their treatment plan.

**Cue to Action**

Cue to action refer to strategies to activate “readiness” (Champion & Skinner, 2008). As discussed, there are different factors that may influence why patients are non-adherent to their prescriptions. Patients can have positive and negative cues to action that eventually lead to their readiness for adherence with their medication regimen. A negative cue to action would be a patient having a headache or chest pain when their blood pressure is elevated and realizing they need to take their medication. A positive cue to action would be a patient realizing they have cut their hospitalizations in half over the last six months by choosing to be adherent with their medication regimen. Ideally patients will be able to find positive cues to action to initiate their medication adherence, as opposed to health detriments that inspire their medication adherence.

**Self-efficacy**

Self-efficacy refers to an individual’s view of his or her ability to carry out a specific task in order to produce the desired outcome (Fernandez, Chaplin, Schoenthaler, & Ogedegbe, 2008). The stronger one’s beliefs of self-efficacy, the more likely a person will be to initiate and maintain recommended health behaviors. Self-confidence in the patients’ ability to manage their disease should increase adherence to antihypertensive medication regimens. Refer to Appendix A for the HBM model framework.

## **Methodology**

### **Project Design**

To improve adherence, an interventional was designed and evaluated with an outcome of increased adherence to medication regimens. This program took place at a primary care practice in East Orange, NJ. There are approximately 1100 patients in this practice. 80 % of the patients are Black with ages ranging from 20- 85 years old. The quality improvement project included an educational session and a tool kit that focuses on patients with hypertension, managed with medication. Small groups of 10 were included in each session with total goal participation of 50. A pre-intervention test was provided to patients to assess their knowledge of medication adherence. Then, a 15-minute PowerPoint presentation based on the health belief model was provided on the importance of medication adherence and ways to increase adherence using adherence aids. Two medication adherence scales were found to be effective to assess adherence to medication, but only the Hill-Bone scale was site-approved to be used. See Appendix D.

Patients were given a tool kit; it consisted of a log sheet to track medication use and a pillbox, which held a one-week supply of medications. The participants were instructed on the use of the pillbox as a way to remember medications. Four weeks after the presentation, the participants had a follow-up visit to assess how well they were using the toolkit and re-assess the post intervention blood pressure reading.

### **Project Setting**

The project took place in a private, single physician provider, primary care/nephrology practice located in East Orange, Essex County, New Jersey. East Orange, New Jersey has a population of 64,457 people (United States Census Bureau, 2018). The ethnic composition of the population of East Orange, New Jersey is 87.2% Black residents, 9.2% Hispanic residents, 3.5%

White residents, 2.5% American Indian residents, 1.2% Asian residents, and 1.3% of residents classifying themselves as “other” two or more races (United States Census Bureau, 2018).

Speaking to office staff, it was noted that the patients in this office were primarily Black and Hispanic. Approximately 120 patients are seen per week, with a total patient population of 1900 patients. Of the patients seen per week, approximately 80% are Black, while 20 % are Hispanic or other races. The staff approximated that 60% of the patients from this practice are identified as hypertensive. This healthcare setting was selected since the majority of the patient population was Black, and many of the Black patients had been diagnosed with hypertension. The practice provides care for patients with chronic diseases such as hypertension, kidney failure, asthma, and diabetes, among others. Both insured and uninsured patients are cared for at this practice.

### **Study Population**

A convenience sample of Blacks ranging from age 20 to 85 years old with both stages I and II hypertension were used for this project. Stage I hypertension was defined as having systolic blood pressure (SBP) between 120 and 159 mmHg or diastolic blood pressure (DBP) between 80 and 99 mmHg. Stage II hypertension was defined as having SBP higher than or equal to 160 mmHg or DBP greater than or equal to 100 mmHg (Hagins, Rundle, Consedine, & Khalsa, 2014). The inclusion criteria included: (1) patients must identify as Black, (2) patients must be between the ages of 20 and 85 years old, (3) patients must have a diagnosis of stage I or stage II hypertension, (4) patients must be prescribed at least one anti-hypertensive medication, (5) participants must be able to consent to participate in the program. The exclusion criteria include patients with untreated hypertension comorbidity such as strokes, organ transplants, dialysis and patient on more than 4 blood pressure medications.



**Subject Recruitment**

Recruitment was completed through the use of flyers and in-person recruitment. Flyers were posted in the waiting room and patient rooms (see Appendix J). Interested participants had the study explained to them in person and signed a consent form if they agreed to participate. Participants were provided flyers summarizing the project as well as contact information (email and telephone number) of the primary investigator for any questions or concerns (see Appendix J). Participants were informed that participation was voluntary, and their decision to participate did not impact the care they receive.

**Consent procedure**

Written consent was provided and mandatory to participate. Participation was entirely voluntary. Once patients agreed to participate in the project, they signed the consent. The consent was in accordance with the Rutgers University IRB (see Appendix K). The participants were provided an opportunity to read the consent, ask any questions, and could withdraw from participating in this study at any time. Participants were assured that there are no risks, and the responses they provide will remain confidential, as well as entirely anonymous.

**Risk/Harm/Ethics**

All patients and employees were kept safe from harm and any violations of their rights. The intervention was designed to pose no risks while maximizing potential benefits. Patients' privacy and confidentiality were maintained throughout the project. No patient identifiers were used. Informed consent was mandatory and was obtained before the start of the study. This study posed no risk or harm to any patients. The Health Insurance Portability and Accountability Act (HIPPA) was maintained through the study.

**Subject Costs and Compensation**

Pillboxes were given as compensation for study participants. The minor costs of the study, including the cost of the flyers, pillboxes, and medication logs, will be the sole responsibility of the primary investigator.

### **Project Timeline**

The timeline is attached in accordance to project planning and implementation of the intervention (see for Gantt chart).

### **Resources Needed/Economic Considerations**

The project had few expenses. Costs included recruitment material, educational handouts and material for educational programming, pillboxes, medication logs that will be distributed to participants and light refreshments. A budget is located in Appendix M.

### **Evaluation Plan**

To evaluate the project, the investigator used both the pre- and post-intervention survey responses. See Appendix E. The data collected assessed patients' adherence with the pillbox and medication log, how patients' use of the pill box and pill log affected their adherence to the proper medication regiment, and how taking their medications as scheduled affected their blood pressure and reduced the risk of hypertensive crisis. The medication log sheets with medication instructions were reviewed for completeness. Blood pressure was compared before and after the intervention, and answers to the two questionnaires were evaluated to examine whether or not patients with the highest adherence to their toolkit had the most reductions in blood pressure.

### **Data Analysis Plan**

Data was analyzed and entered into SPSS (VERSION 26). Data points included age, gender, education level, the number of pills being taken for hypertension, and the Likert scale

result in using the pill box. Data was comparatively of the two data collections – pretest and posttest of the Hill-Bone tool.

### **Data Maintenance/Security**

Consents, as well as the identified data collected, pre-post tests were assigned unique identifiers to protect patient identification. All program data is stored in a locked safe at primary investigators' home office and only the investigator had access to the safe. Data will be destroyed upon completion of the project, submission of manuscript, and closure of IRB per Rutgers University's guidelines.

### **Methods**

The survey period began November 1, 2019, after the IRB approval (see Appendix N) and was concluded on December 11, 2019. The study began with a scripted introduction of the study, followed by a PowerPoint education session on medication adherence. A total of 17 (N) participants were involved. Among the participants, 41.2 % (n=7) were male, and 58.8 % (n=10) were female, with ages ranging from 40-81 years old and a mean age of 54. Educational levels ranged from high school to university level and patient's total pills per day ranged from one to four. Demographic data is represented in Appendix F.

The purpose of the pretest survey was to determine patients' knowledge regarding medication adherence and their diet and appointments routines. Patients' knowledge and attitudes were measured with 4-point Likert-type scale questions that ranged from one meaning all the time to four meaning none of the time. The Hill-Bone Scale assessed patient performances for three vital behavior areas of high blood pressure treatment: Appointment Keeping (3-items), Diet (2-items), Medication adherence (9-items). The participants were all recruited from the provider's lounge room over a ten-day period. The educational sessions were held three different days over a

two-week period. Patients were also given medication log sheets to help them document their medication administration and a pillbox to help them remember to take their medications.

Patients were then asked to return in four weeks to complete the post-survey. It was anticipated that after the four weeks, patients had an increase in medication adherence. They filled out a post-test survey, which was similar to the pretest; this helped assess if the intervention provided helped the patients become more adherent with their medication regimens or if their medication-taking habits changed. The patients were also asked the likelihood of their continued use of the pillbox that they were provided.

### **Setup and Description of Analysis**

The data collected from the pre- and post-survey was analyzed using the SPSS version 26, the Wilcoxon Signed-Rank test was used to run the data. The Wilcoxon Signed- Rank Sum test also called the Mann- Whitney test is a nonparametric test used to compare two relative samples (Corder & Foreman, 2014).

The results of both pre and post results were presented in the following manner. Demographic data varied in type including numeric, binary, or categorical. The survey questions were all categorical, or ordinal, in nature. A Likert scale was used for the responses. Each question had four responses. The responses choices were as follows, all of the time, most of the time, some of the time and none of the time, The Mann-Whitney U-test was chosen for statistical analysis as it does not make assumptions about the population and can be performed on categorical (ordinal) data. Using the Mann-Whitney U-test as a framework, one and the null hypothesis is that our Z-Score will be more than 1.28, which is to say the alpha is 10%.

To perform the Mann-Whitney U-test on ordinal data, the data was transformed by ranking it. This process involved taking a question's responses, from both pre and post results,

comparing them, and organizing them relative to one another. Once the ranks were calculated, the rank sums for both pre and post responses was calculated. It derived the mean of the ranks and calculates the  $U$  statistic for both pre and post results.

Where  $N_{pre}$  the count of pre results is,  $N_{post}$  is the count of post results, and  $Post\ Ranks$  are all of the ranks for post results. From there, the lowest  $U$  statistic was taken, from pre and post results, the standard deviation were derived and the Z-Score was obtained.

$|Z|1.28 > \therefore Accept\ H_0$

### Analysis

Appendix F shows the total study population (N=17) 53% takes two pills for hypertension (n=9) while only 35% take one pill (n=6) and the remaining 12% take three pills (n=2). The population gathered through a convenience sample of individuals that already visit the site as patients consisted of 59% (n=10) female and 41% male (n=7) with the inclusion criteria of Black adults age 40-85 without any comorbidities. Among the study population 35% (n=6) completed high school as their highest education level, and the remaining 65% (n=11) completed either college or attended at the university degree level.

The study participants completed a 14-question survey about their lifestyle in relation to their hypertension. A 4-point Likert-type scale was utilized to analyze the results. After running a Z score test, questions 1, 2, 7-11, and 14 showed the highest probability of the toolkit that includes the power point presentation or medication education, medication log sheet, and use of a pill box impacted health outcomes for study participants. See Appendix B.

Of the fourteen-pre and post survey questions, eight out of the fourteen questions showed a statistically noteworthy change. This majority of the questions were calculated to have an alpha less than 10%, which indicates to an impact from outside the test environment, which in this box

was the toolkit. The questions all focused on topics that the toolkit and education information focused on. Of the six questions that did not show a statistical difference, three focused on food consumption, two dealt with doctor appointments, and one touched on taking another person's medication.

The results, as described below, clearly showed that the use of a tool kit and educational information had an impact on medication adherence. Note the mean of the box plots appears the same due to the fact that the questions only had a four point Likert scale. Even extrapolating those into a broader ranking, there is little room for variability in the question rank means. Looking more closely at the questions that accepted the alternative hypothesis, an average percentage change of 82% from the 'incorrect' responses to the more 'correct' response, was noted, with question one having the largest change, 156%.

Out of the 14 questions, 8 had a z-score greater than 1.28 to accept the hypothesis that a toolkit that includes education, medication log, and pillbox impacted health outcomes. There was a significant increase in pre and post survey as shown on Appendix J. Out of the 14 questions, as mentioned above, 8 questions also showed a higher probability that an outside source which is this box is the toolkit did affect the outcomes. The probability ranged from 99.77% to 91.58 %.

The toolkit that included a medication pillbox, labeled days of the week, improved medication adherence as presented in Appendix B. During the pre-intervention stage, when study participants were asked how often they forget to take their blood pressure medicine, 12% (n=2) said none of the time compared to the post intervention stage, 47% (n=8). In question two when asked how often the participants willingly decide not to take their antihypertensive medications, 35% (n=6) said none of the time compared to the post intervention increase of 53% (n=9). Thus implying an increase in medication adherence.

Furthermore, lifestyle decisions related to blood pressure management such as doctor's appointments and prescription refills were reviewed. During pre-intervention stage, 17% (n=3) never missed doctor's appointments compared to 41% (n=7) during post intervention stage. When asked how often they forget to fill their prescriptions, 41% (n=7) never forgot and post intervention it increased to 59% (n=10). Moreover, only 23% (n=4) never let their prescriptions run out during the pre-intervention stage compared to an increase to 53% (n=9) in the post intervention stage. Participants were also asked how often they skip their antihypertensive medication before a doctor's appointment, 17% (n=3) said none of the time during the pre-intervention stage compared to 47% (n=8) post intervention. These survey questions imply that there was a positive correlation that the healthcare decisions made were correlated to the study intervention of a power point presentation emphasizing the impact of keeping updated with doctor's appointments and fulfilling prescriptions on time and not letting them run out. (See appendix B)

Lastly, the survey asked the participants about psychosocial behaviors that can affect medication adherence. When asked how often they miss taking their antihypertensive medication when they feel better, 17% (n=3) said none of the time compared to post intervention results of 47% (n=8). Then, when asked how often missed medications happen in times of carelessness, 17% (n=3) said none of the time during the pre-intervention stage compared to 41% (n=7) post intervention. These questions emphasize the positive correlation of the intervention of having a medication log to remind the patient when medications were last taken. As shown above, there is a higher probability that the toolkit had a significant effect on the patients' adherence.

The null hypothesis as shown in Appendix H, supported the hypothesis that a toolkit that includes education, medication log, and pillbox can impact health outcomes. The dichotomy

between the questions not addressed by the usage of the toolkit and educational material provides an even greater indication that the toolkit had the desired result on medicine adherence.

Participating patients were also asked what the likelihood was of them to use the pill box provided, of the 17 participant's n=12 stated they would likely use the pill box to help them remember when to take their medication. (See Appendix I)

Blood pressure readings pre and post-intervention were monitored. Accordingly, systolic blood pressure were lower post intervention ( $M=14.29$ ,  $SD=13.17$ ) as well as diastolic blood pressure ( $M=5.88$ ,  $SD=6.62$ ). P value for systolic BP was 0.03560, with a P value at 0.05, and diastolic p value was 0.4988. Systolic change in blood pressure was significant while diastolic changes rejected the null hypothesis and occurred by change not directly correlated to the intervention. See Appendix C, this change can be attributed to the utilization of the toolkit during the study period.

### **Project Objectives**

The aim of the project was to determine the impact of a medication program on medication adherence and blood pressure in black patients diagnosed with hypertension at a clinic in Essex County, New Jersey. This project accomplished an increase in medication adherence as well as a decrease in blood pressure as a result of the interventions. Due to the positive results archived for the study, a long-term outcome of this intervention would be to establish a permanent program at this clinic to apply these interventions and continue to see positive health outcomes.

The first objective of this project was to decrease patients' incidences of hypertension urgencies. During the project implementation period, there were no cases reported by provider of hypertension emergencies, this could have been due to the project. By using the pillbox, it helped patients who participated remember to take their medications as prescribed. The second objective



was to educate patients regarding medication adherence; this was achieved during the 15-minute PowerPoint presentation that addresses the reasons for non-adherence and ways to improve adherence. Information was also provided on the consequences of not taking the prescribed medications, such as cardiovascular complications and stroke. Additionally, the project addressed the hypertension treatment guidelines with the physician to ensure it was followed when prescribing patient medications. The final objective was to improve medication adherence; this was evaluated once the patients returned for the four-week follow-up and completed a post-survey questionnaire.

### **Facilitators and Barriers**

Various facilitators assisted the project. The Hill-Bone survey tool assisted to ask patients questions about their adherence with medications and their daily habits. The tool was used as an assessment tool to help guide the investigator in assessing patients' medication adherence thus making the implementation process easier.

Conducting the pre-test, educational session and giving the intervention toolkit on the same day ensured that no participants missed any initial steps in the implementation process, which helped facilitate this project. Lastly, participants were more willing to participate due to the rapport already established with them, given that the investigator completed their clinical twice weekly in this facility before the study, and therefore had already established rapport.

Having the support of the physician of the facility made it easier to implement the project. He loved the project and waited to see patients after I had finished my educational sessions. He liked the idea of providing a pillbox for his patients to help them remember to take their medication.

Several barriers were encountered during the project. The main regret was not meeting the anticipated sample size of 50 patients, despite having posters advertise the project in the provider's lounge and patient rooms. Some patients canceled their appointments, and some days the providers moved the patients schedule times, all contributing to barriers in this project. Other barriers included the fact that the project was limited to four weeks of data collection, allowing less time for the number of patients who could participate. The project was also implemented during the winter season, and around holidays, which may have limited patients coming to see the providers due to busy schedules and inclement weather conditions.

Another barrier that affected the results were some questions asked on the project survey were not focused towards medication adherence but rather on food consumption, two dealt with doctor appointments, and one touched on taking another person's medication. These questions had no effect on toolkit use and did not show any significant changes after the implementation of the toolkit. Despite the toolkit being a hypertension adherence toolkit, the questions were poorly scored and rejected the null hypothesis that a toolkit will impact patient's adherence.

Lastly, a change in staffing impacted the recruitment process since the office was orienting two new staff, and had many organizational changes since the beginning of the project. The previous staff was aware of the project, and how the project was going to be implemented. The investigator had limited interactions to recruit participants while also making sure the new staff knew the plan.

### **Implications/Recommendations**

#### **Clinical Practice**

High blood pressure is a significant threat to not only public health but also specifically the health of Black populations (Lindhorst.Alexander, Blignaut, & Rayner, 2007). The project

implemented an educational tool kit, including a PowerPoint presentation, pillbox, and medication log, to examine the impact this toolkit would have on medication adherence in patients prescribed antihypertensive medications. As was discussed in the project's results, this project found the implementation of the toolkit reduced the patient's blood pressure (as shown in Appendix C) following the implementation of the toolkit and increased medication adherence. This study took place at a small primary private care office in Northern New Jersey, with an exclusively Black population.

While this project shows promising results, it would be recommended that before implementing this toolkit permanently, a larger and longer study be performed, with more consideration for variables that may have convoluted the results. This study only involved 17 participants, although the goal was to have at least 50. A repeat study should involve more patients to further verify the results. The study also took place over four weeks; if the study took place over a longer duration of time, such as six months, to ensure that patients consistently use the pillbox and medication log overtime, it presumably can yield even more promising results. Furthermore, a follow-up study should include more significant questions regarding patient's average salt intake before, during, and after the study, as well as the patient's degree of physical activity. Knowing this information will help to validate that any changes in blood pressure occurred as a result of the toolkit, and to ensure that they were not due to other lifestyle factors participants changed. If a follow-up project found the same promising results, a reduction in blood pressure, increased medication adherence, and consequently a decrease in the likelihood of patients experiencing a hypertensive crisis, it would be recommended that the toolkit be implemented for every patient receiving antihypertensive medication. The toolkit could be administered to patients as soon as they are written a prescription for their antihypertensive

medications, the PowerPoint education could be provided, and patients could begin using the tool kit at the onset of their medication prescription, hopefully experiencing the same positive results as were found in the studies.

### **Healthcare Policy**

Medication non-adherence is a significant public health concern, affecting health outcomes and general health care costs (Iuga & McGuire, 2014). As a result of the findings of this project, when creating care plans for patients with hypertension requiring medication, it should be mandated that patients are provided with tools similar to the tools found in the toolkit used, and therefore improve patient's blood pressures and reduce the risk of a hypertensive crisis. As the World Health Organization and Centers for Disease Control and Prevention have both identified the epidemic that is hypertension, implementing changes in healthcare policy as well as practices that will improve health outcomes in patients with hypertension should not be taken lightly. Health care policies are plans and actions put into place in order to achieve healthcare goals within a society. If we wish to improve healthcare outcomes in patients with hypertension, it is essential that we increase patient education in regard to the importance of medication adherence, and that patients are provided with these low-cost non-invasive tools, as they have demonstrated an improvement in patient outcomes. Patient education and medication adherence tools should be mandated aspects of healthcare policy when caring for patients with hypertension requiring prescription medication. AHA guidelines should also be amended to include guidelines on medication adherence.

### **Quality & Safety**

The value provided by a healthcare resource is a measurement of the quality of healthcare. The degree of quality healthcare can be used to determine whether or not the healthcare being

provided is suitable for its purpose. Continuing to prescribe patients antihypertensive medications, knowing the likelihood of non-adherence with these medications, if no additional tools are provided, demonstrates a lack of healthcare quality. It is not suitable to continue prescribing antihypertensive medications if patients are non-adherent. It is recommended that in light of the findings of this project, education and the other tools included in this project be mandated for patients who are prescribed antihypertensive medications, in order to improve healthcare quality (Kristen Allison, 2012). By implementing this toolkit, patients should continue to show increased medication adherence, therefore allowing the medications to fulfill their purpose, and consequently increase healthcare quality. Not only will healthcare quality increase as a result of this implementation, but healthcare outcomes and the quality of life for patients will also improve as a result.

It is also recommended that the tools utilized in this project be implemented for all patients being prescribed antihypertensive medications, as patient safety will increase as a result. Prescribing patients antihypertensive medications, knowing the statistical chance of medication non-adherence, creates an unsafe situation for patients in whom there is a significantly higher chance of patients experiencing hypertensive crisis and the resulting health outcomes as a result of their medication non-adherence. Mandating this toolkit be implemented for patients prescribed antihypertensive medications, and therefore reducing the likelihood of high blood pressure and hypertensive crisis will improve patient safety.

**Education**

Education is deemed to be an important part of medication adherence, as a result of this project. Education needs to be provided to healthcare providers regarding the findings of this project. The current health epidemic of hypertension, and medication adherence in relation to

hypertension, should also be presented to healthcare providers. By educating healthcare providers regarding the seriousness of medication adherence, and the current lack of medication adherence, providers will better understand the necessity of the implementation of the recommended tools.

Next, patients need to be educated regarding hypertension and medication adherence. This education should begin by interviewing patients and reviewing their current level of knowledge regarding the antihypertensive they are prescribed. Then, patients should be educated, and any gaps that were identified in education should be filled, regarding the impact of their antihypertensive medications, and the consequences that can result if their medication regimens are not followed (Allison, 2012).

Following the implementation of the toolkit, patients once again should be surveyed regarding their understanding of hypertension, the health effects of hypertension, and the importance of being adherent with antihypertensive medications. It would be important to complete follow-up education on each visit so that in the event patients remain non-adherent with their medication regimen, despite the implementation of the toolkit, a better understanding can be gained as to why these patients continue to be non-adherent.

### **Economic**

Non-adherence to medications prescribed for hypertension has a huge economic impact not only for individuals but the economy of the nation and healthcare costs as a whole. It is estimated that there is a 50% non-adherence rate for long-term therapy for chronic illnesses, including hypertension (Cutler, Fernandez-Llimos, Frommer, Benrimoj, & Garcia-Cardenas, 2018). Medication non-adherence was estimated to cost anywhere between 100 to 290 billion dollars per year in the United States. Patients with chronic illnesses who are non-adherent to their

medications require, on average, three extra medical visits per year, with an estimated \$2,000 expense per visit (Cutler et al., 2018).

Antihypertensive medication adherence interventions and programs promote improved health outcomes and reduce healthcare costs. Yang et al. (2016) acknowledge that more than half of the adult Medicaid population with a diagnosis of hypertension had suboptimal adherence to their antihypertensive medications. Targeted intervention increased drug adherence correlated to decreased medical costs (Yang et al., 2016). Roebuck et al. (2011) found that medication adherence in patients with chronic cardiovascular disease promotes substantial medical savings due to decreased emergency room visits and hospitalizations.

Implementing the recommended toolkit could help contribute to medication adherence in patients with hypertension. This could help reduce the economic burden of medication non-adherence in relation to hypertensive patients for both the patient's personally and for the American healthcare system. Furthermore, the successful implementation of the toolkit on a more significant spectrum could contribute to additional toolkits being implemented for patients with other chronic illnesses that also have high rates of medication non-adherence. Therefore, adhering to the recommendations found as a result of this project could have a ripple effect on education and healthcare policies for a multitude of chronic illnesses. This could, therefore, have a tremendous impact economically, if the medication adherence of multiple chronic diseases could be improved.

#### **Other as related to Project (organization/ stakeholders)**

It would be recommended to discuss the findings of this project with the stakeholders of this primary care office. After discussing with these stakeholders the results of the project, it would be necessary to then discuss with them recommendations specific for the organization. The

first recommendation would be to implement this project on a larger scale involving more patients over a longer duration of time, to further validate the findings of the project. It would also be recommended to stakeholders to identify other staff members at the primary care facility who are willing to take on some responsibility concerning the different roles of the project so that there is not one primary and sole investigator responsible for all aspects of the project. Once the project had been completed on a larger scale, it would be recommended to stakeholders to not only implement the toolkit permanently for hypertensive patients but also to share their findings publicly, possibly having the study findings professionally published. This could encourage other organizations to implement such toolkits, and would give the primary care clinic public recognition for their research. Additionally, it would be recommended to the stakeholders to implement similar toolkit studies for other patient groups with common chronic illness, to discover if increased medication adherence could be achieved within these populations as well.

### **Sustainability**

Beyond this DNP project, several steps would have to be taken to maintain the sustainability of the project. Site stakeholders such as the primary care physician, the office manager, and medical assistants need to be recruited and involved. Only with stakeholder support and increased help would it be possible to maintain this project. Increased help with the project would be necessary, as all providers at the clinic would have to agree to provide the toolkits to patients being prescribed antihypertensive medications, and to provide the essential education included in the toolkit. This will require additional time on the part of these staff members.

Some funding would also be required in order to sustain the project financially. The cost for each pillbox was \$1.15; fliers were printed for \$1 per flier, educational costs for this 17-person



study was \$150. An ideal solution may be to seek funding from a pharmaceutical company in order to help mitigate these costs. See Appendix L.

In conclusion, it would be necessary to develop a partnership with the organization in order to continue to sustain this project. Policies at the clinic would have to be amended in order to include the implementation of the project, and funding would have to be formally allocated and reflected in the clinic's budget in order to sustain the project. Key stakeholders would not only have to be informed, but all staff members at the clinic would have to be educated regarding the project and the importance of its implementation. Individuals would have to be selected or volunteer to be involved in the project not only to distribute the toolkits to patients but to evaluate the progress of the project and the findings regularly. Additionally, it would be necessary to establish a plan for disseminating the findings of the project to reassure stakeholders that the project is successful, and the anticipated results are occurring.

### **Professional Reporting**

There are several ways in which the project's results will be reported and shared following the completion of this DNP project. The aggregate results of this project will be shared with attending providers in the project site office. At this time, an overview of the project will be shared, with a demonstration of the toolkits that were provided to patients, as well as a discussion regarding any setbacks that occurred in the project's implementation. Not only will the results of the project be shared, but also at this time, recommendations for future implications of the educational tool kits will be discussed with the project site stakeholders.

A poster presentation displaying the results of this project will also be presented in the form of a poster presentation in April of 2020 at Rutgers University on Presentation Day. During this presentation, the chief investigator will be available to answer any questions regarding the

project, and the poster will supply information regarding future implications and recommendations of the project.

As stated above, following the completion of this DNP project, the primary investigator would like to meet with the stakeholders of the project site in order to discuss continuing implementation of the project on a larger scale with increased help from staff at the site. The chief investigator would like to continue to assist in the implementation of the project and review the results of continued implementation of the project on a larger scale in order to professionally publish the study's findings. These findings can then be presented at appropriate conferences and in professional publications, in order to inspire the continued implementation of this project at other sites or to inspire others to implement such a toolkit for individuals with other chronic diseases.

### **Summary**

The purpose of this project was to develop and implement a medication adherence program to be used for adults diagnosed with hypertension who received care in one primary care setting. The overarching goal of the project was to develop a standard process of care in the primary care practice setting that improved attention to improving medication adherence among patients with hypertension. Improved medication adherence not only impacts individual patient health outcomes but also influences the overall healthcare system. Fostering awareness and equipping healthcare providers to assess medication adherence influences decreased healthcare costs. This is due in part to better recognition of patient issues with medication adherence versus simply assuming the presence of treatment resistance.

Awareness is an important predictor of behavior (Kamran et al., 2015). Medication adherence is greatly impacted by patient beliefs. Identifying risk factors that lead to poor

medication adherence is an essential component to improving overall health outcomes. Primary care providers must incorporate proactive strategies such as screening and education into patient care practices to prevent unnecessary disease exacerbations for their patients. The ability to perform the processes in this project as standards of practice could decrease emergency room visits, hospitalizations, and reduce overall healthcare costs.

This project was successful for the small number of participants involved. It is recommended that this project should be repeated on a larger scale involving more patients and over a greater duration of time. This will require fiscal and organizational support. Despite the effort that will be necessary, the implementation of this project on a larger scale, especially if the project were applied to other patients with additional disease processes, could have a huge impact on the quality, safety, and economic impact of chronic diseases on both an individual and national level. It is my hope that this project will continue to be researched and implemented, as overall, the simplicity of the project and financial aspects are minor in comparison to what can be gained from a successful implementation.

## TOOLKIT FOR HYPERTENSION MANAGEMENT

Table 1: Table of Evidence						
1	Schoenthal, 2017	Cohort study	92 hypertensive patients and 27 providers in three safety-net primary care practices in New York City.	The illustrated that poor medication adherence was greater when patient-provider relations were low and care was not patient centered.	The study subjects were primarily low-income Black and White patients; thus the findings may not generalize to higher income patients or other racial/ethnic populations.	Level IV: Good quality
2	Jamison, 2016	Qualitative interview study	28 survivors of stroke, including 14 accompanying caregivers and five GPs, were interviewed In general practice surgeries in the East of England, UK.	Study showed that patients who have had a stroke as a result of non-adherence to hypertension medication encountered multiple barriers that had hindered their adherence. The research supports the idea of combined efforts between caregivers, survivors, and healthcare professionals do help address the barriers to	The research was conducted in only five practices; this limits potential to generalize findings to the wider stroke population.	Level VI: Good quality

				medication adherence.		
3	Jigar, 2014	A cross-sectional questionnaire survey research design,	124 questionnaires that were distributed at 2 different study sites	This study examined how a patient's view of illness and burden is related to medication adherence in hypertension. The study found out that the more benign perceptions of illness and greater perceived illness burden translate to lower medication adherence.	Study participants were recruited from a small geographic region within New York City; therefore, the ability to generalize the study sample may be limited.	Level III: High quality
4	Osayi, 2017	Randomized, controlled trial	Adults with hypertension,	This study found that strategies such as teaching patients self-monitoring of blood pressure improved adherence to hypertensive medication. .	None	Level I: High quality
5	Bosworth, 2009	Randomized control	636 Patients with hypertension	This study found that interventions such as home blood pressure	Lack of generalization due to uncontrolled BP	Level 1 High quality

		trial	in an academic health center	monitoring and behavioral telephonic interventions helped patients adhere to antihypertensive medications	control at baseline, patients may have changed their diet or medication in addition to the interventions	
6	Chinnakali, et al., 2012).	Cross sectional survey	211 senior members suffering from hypertension in 7 senior centers in metropolitan areas in united states of America.	This study examined the influence of patient-physician communication influenced patient adherence to medication; physician communication is vital in improving medication adherence and outcomes.	Despite recruiting from the metropolitan area, most of the participants in the senior living homes were women (77.3 %). This could have been due to longer life expectancy, earlier treatment of illness, or willingness of females to participate or involve themselves in senior living activities	Level II: Good quality
7	Bosworth, 2009	Randomized trial	636 hypertensive patients from 2 university affiliated primary care clinics	With both home blood pressure monitoring and a tailored brief behavioral intervention this study found a significant improvement in	Changes in medication use and diet were only monitored in interventions in participants; 25% lacked 24-month outcome data; 73% had controlled blood	Level II: Good quality

				blood pressure control. Self-management is an invaluable tool for improving blood pressure control in patients with hypertension	pressure at baseline; the study was set in an academic health center, all of these factors that potentially limit generalizability.	
8	Lee, 2013	Cross sectional study	1114 patients in an outpatient clinic in Hong Kong	The study used Morisky Medication Adherence Scale (MMAS-8) to assess patients' adherence with their hypertension medication, the study reported a very poor medication adherence. The author recommended focusing on factors that cause medication non-adherence. Such as health literacy and lifestyle choices.	Data was collected from a single clinic. Patients' characteristics may differ from other clinics therefore limiting its credibility.	Level III  Good quality
9	Conn, 2016	Expert opinion	Data was collected from 53 reports of studies involving 8243	To increase adherence it's important for providers to have a face-to-face interventions with	The study only focused on meta-analysis research and may have missed other data	Level IV High quality

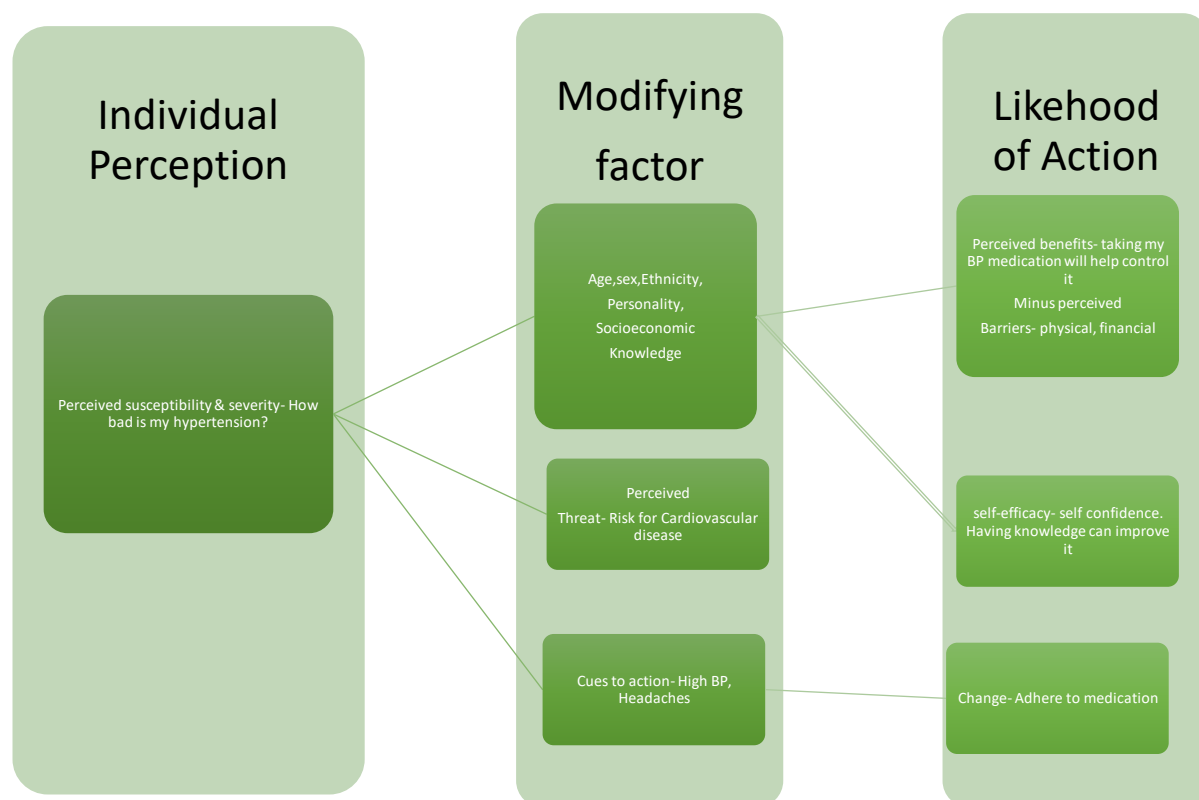


			individual participants	patients and educated them on importance of adherence to medication regimens and make sure patients understand the consequences of non-adherence.		
10	Whelton, 2017	Guideline		The guidelines suggests once-daily drug dosing, rather than multiple dosing, to help improve medication adherence in patients		Level I High quality

## TOOLKIT FOR HYPERTENSION MANAGEMENT

Table 2 Project Timeline	
<i>Implementing a Medication Adherence Tool Kit for Primary Care Providers to Reduce Risk for Hypertensive Crisis</i>	
Hypertensive Crisis Tool Kit Study Timeline	
<b>Step</b>	<b>Time for Completion</b>
Proposal development	May 2019
Proposal presentation	May- June 2019
IRB submission and approval	July- August 2019
Recruitment and intervention	September 2019
Implementation	September- November 2019
Intervention	September 2019
Completion/ Evaluation	December 2019
Data analysis	January 2019
Final writing	January 2020
Final Project presentation / Dissemination	April 2020
Graduation	May 2020

## Appendix: A- Framework model- HMM model



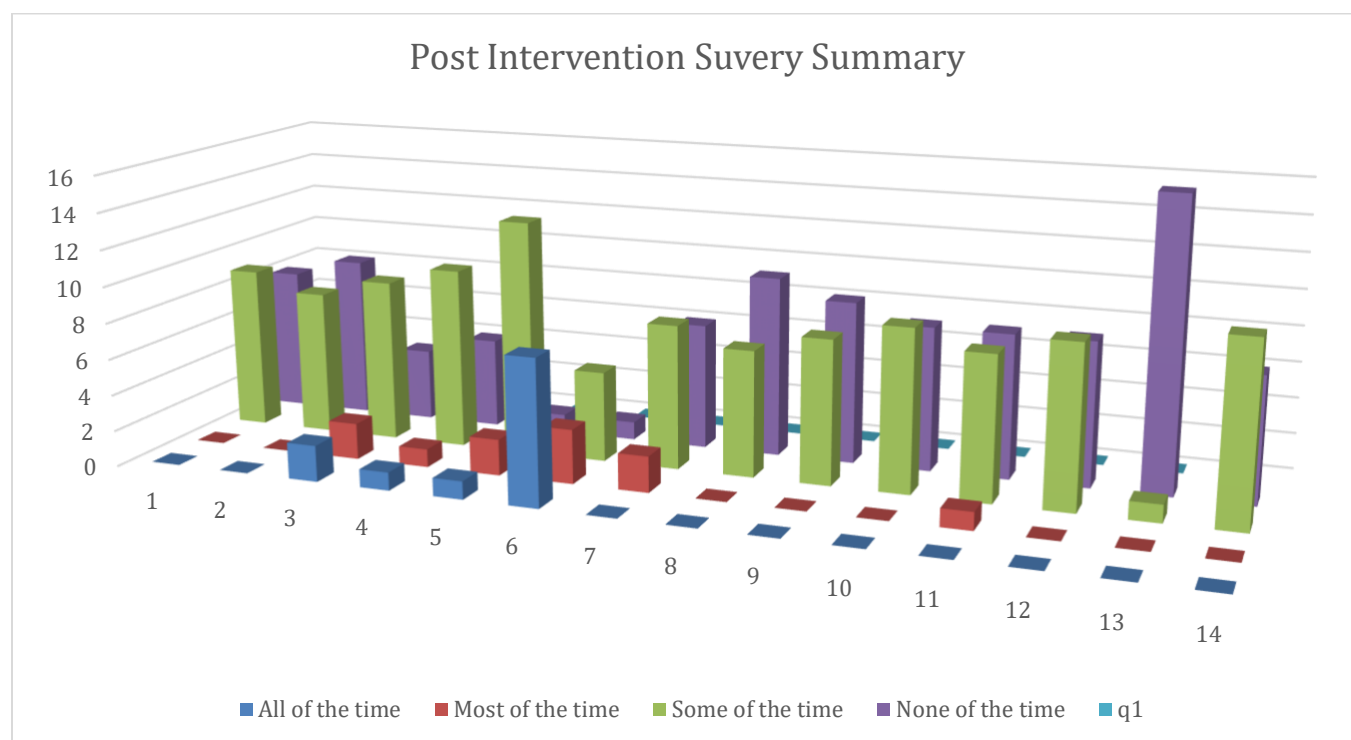
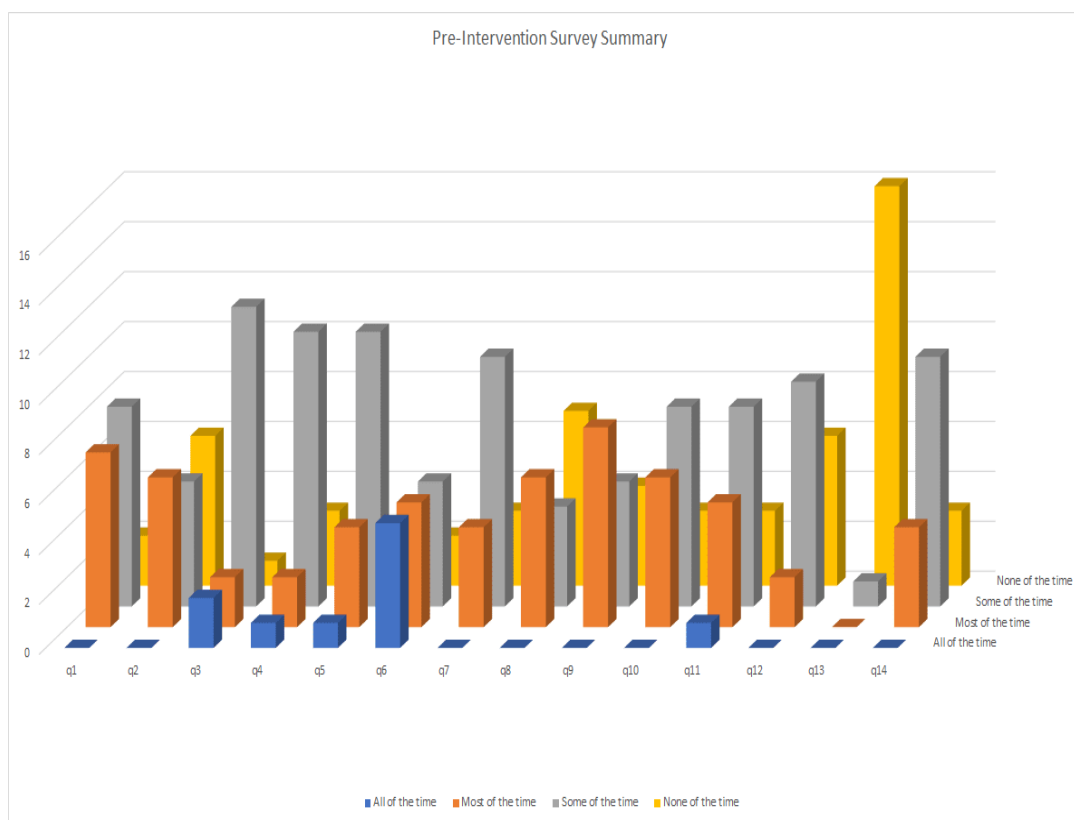
Appendix: B pre-test survey: Table 1

	Hill-Bone compliance to High blood pressure therapy scale (HB-HBP) Questionnaire	All the time	Most of the time	Some of the time	None of the time
1	How often do you forget to take your high-pressure medication?	0	7	8	2
2	How often do you decide NOT to take your high blood pressure medication?	0	6	5	6
3	How often do you eat salty food?	2	2	12	1
4	How often do you shake salt on your food before you eat it?	1	2	11	3
5	How often do you eat fast food?	1	4	11	1
6	How often do you make the next appointment before you leave the doctors office?	5	5	5	2
7	How often do you miss scheduled appointment?	0	4	10	3
8	How often do you forget to get prescription refill?	0	6	4	7
9	How often do you run out of you prescription refill?	0	8	5	4
10	How often do you skip your high blood pressure mediation before you go to the doctors?	0	6	8	3
11	How often do you miss taking your high blood pressure pill when you feel better?	1	5	8	3
12	How often do you miss taking you high blood pressure pills when you feel sick	0	2	9	6
13	How often do you take someone else/s high blood pressure medication pills?	0	0	1	16
14	How often do you miss taking your high blood pressure medication pills when you are careless?	0	4	10	3

Post Results: Table 2

	Hill-Bone compliance to High blood pressure therapy scale (HB-HBP) Questionnaire	All the time	Most of the time	Some of the time	None of the time
1	How often do you forget to take your high-pressure medication?	0	0	9	8
2	How often do you decide NOT to take your high blood pressure medication?	0	0	8	9
3	How often do you eat salty food?	2	2	9	4
4	How often do you shake salt on your food before you eat it?	1	1	10	5
5	How often do you eat fast food?	1	2	13	1
6	How often do you make the next appointment before you leave the doctors office?	8	3	5	1
7	How often do you miss scheduled appointment?	0	2	8	7
8	How often do you forget to get prescription refill?	0	0	7	10
9	How often do you run out of you prescription refill?	0	0	8	9
10	How often do you skip your high blood pressure mediation before you go to the doctors?	0	0	9	8
11	How often do you miss taking your high blood pressure pill when you feel better?	0	1	8	8
12	How often do you miss taking you high blood pressure pills when you feel sick	0	0	9	8
13	How often do you take someone else/s high blood pressure medication pills?	0	8	1	16
14	How often do you miss taking your high blood pressure medication pills when you are careless ?	0	0	10	7

pre/post survey graph



Appendix C: BP change table

Before BP Systolic	After BP Systolic	Systolic Difference
156	130	26
155	140	15
145	135	10
120	123	-3
140	138	2
148	135	13
135	122	13
168	126	42
188	138	50
138	130	8
132	128	4
152	140	12
125	118	7
145	128	17
140	130	10
130	122	8
110	101	9
<b>Mean</b>		14.2941176

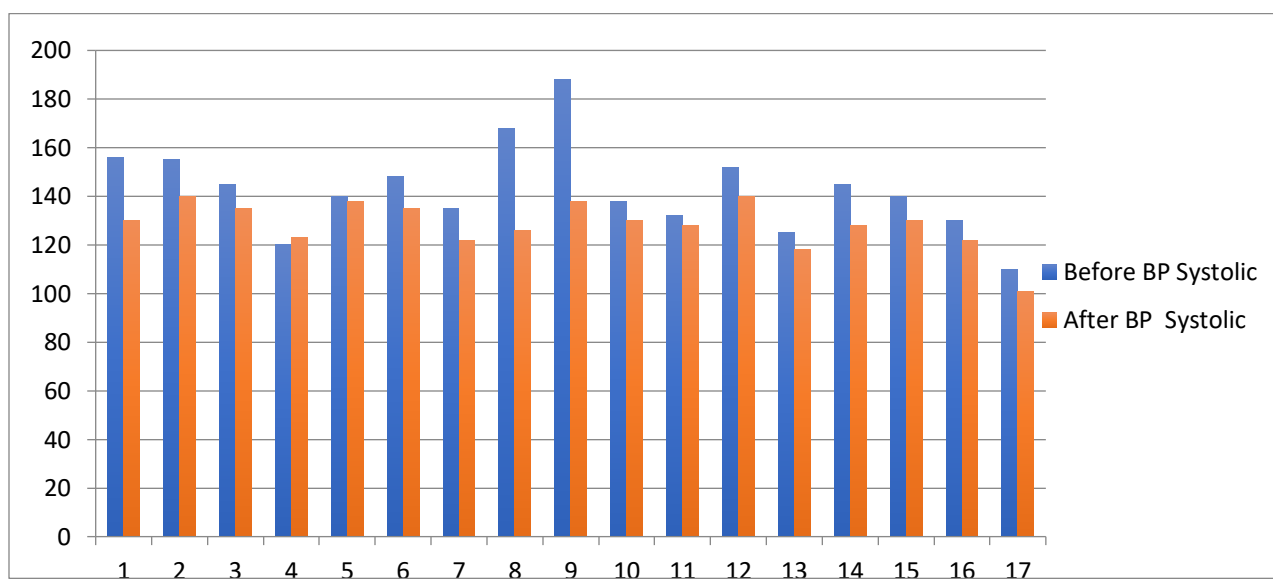
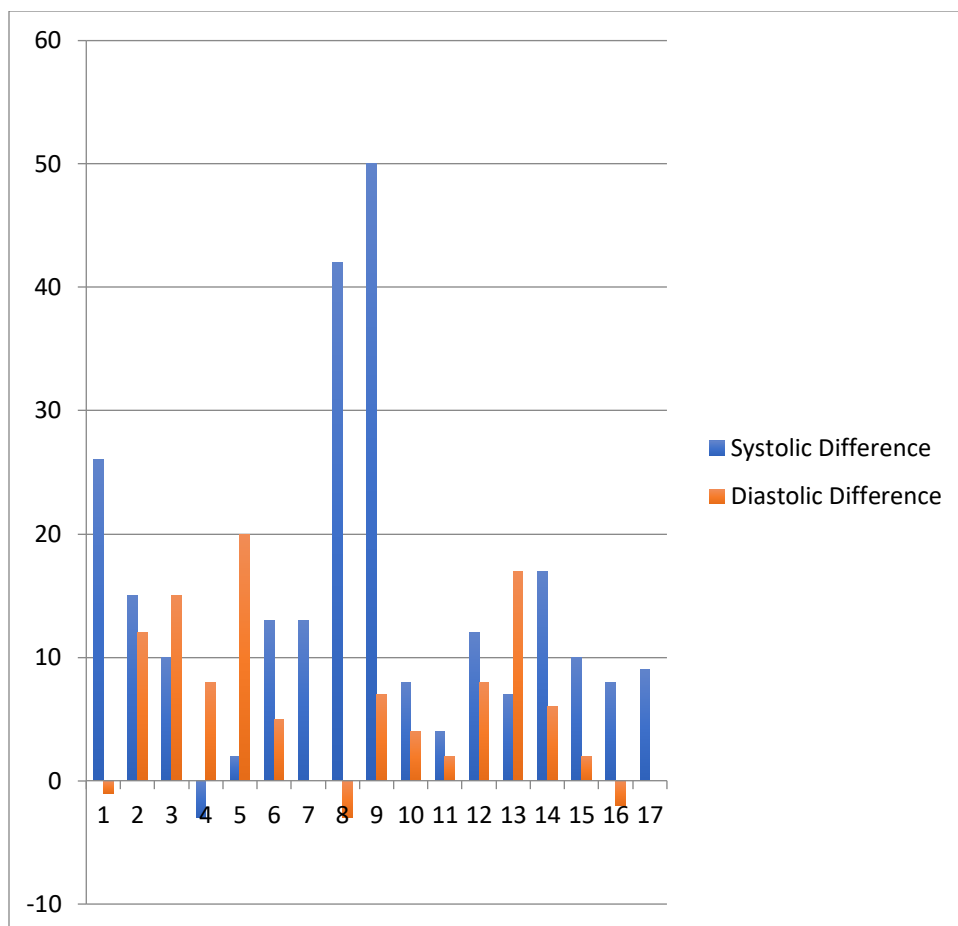
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P value: 0.03560

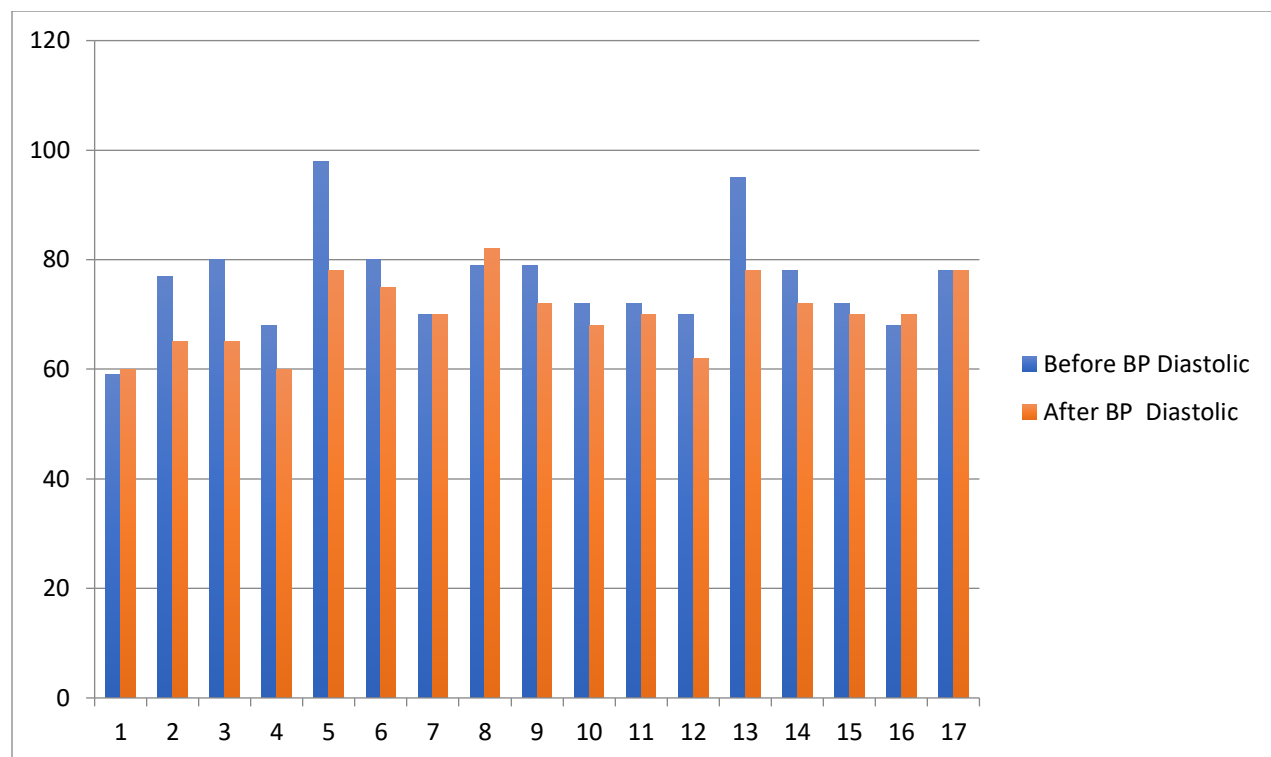
Before BP Diastolic	After BP Diastolic	Diastolic Difference
59	60	-1
77	65	12
80	65	15
68	60	8
98	78	20
80	75	5
70	70	0
79	82	-3
79	72	7
72	68	4
72	70	2
70	62	8
95	78	17
78	72	6
72	70	2
68	70	-2
78	78	0
<b>Mean</b>		5.8823529

STDEV 6.623330892

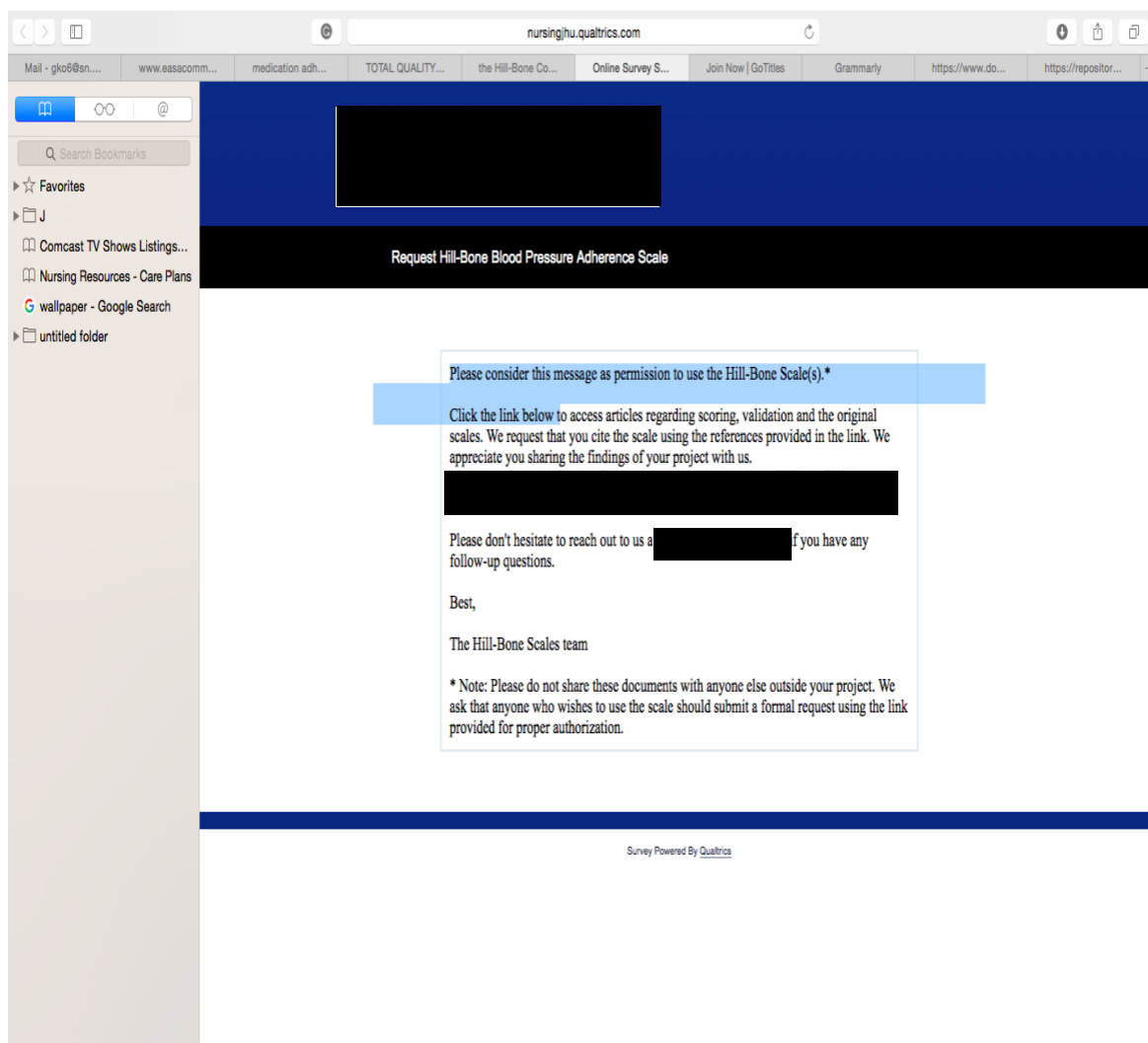
P value: 0.4988







## Appendix D- permission to use Hill- Bone scale



## Appendix: E

Hill-Bone HBP Compliance to High Blood Pressure Therapy Scale (HB-HBP)  
Pre- test Questionnaire

Age:

Gender: Educational level:

Number of pills being taken for high blood pressure: Subject number:

**Current Blood pressure:**

No.	Item	Response:	
		1. All of the Time	2. Most of the Time
		3. Some of the Time	4. None of the Time
1	How often do you forget to take your <b>high blood pressure</b> medicine?		
2	How often do you decide NOT to take your <b>high blood pressure</b> medicine?		
3	How often do you eat salty food?		
4	How often do you shake salt on your food before you eat it?		
5	How often do you eat fast food?		
6	How often do you make the next appointment before you leave the doctor's office?*		
7	How often do you miss scheduled appointments?		
8	How often do you forget to get prescriptions filled?		
9	How often do you run out of <b>high blood pressure</b> pills?		
10	How often do you skip your <b>high blood pressure</b> medicine before you go to the doctor?		
11	How often do you miss taking your <b>high blood pressure</b> pills when you feel better?		
12	How often do you miss taking your <b>high blood pressure</b> pills when you feel sick?		
13	How often do you take someone else's <b>high blood pressure</b> pills?		
14	How often do you miss taking your <b>high blood pressure</b> pills when you are careless?		

\* Reverse coding

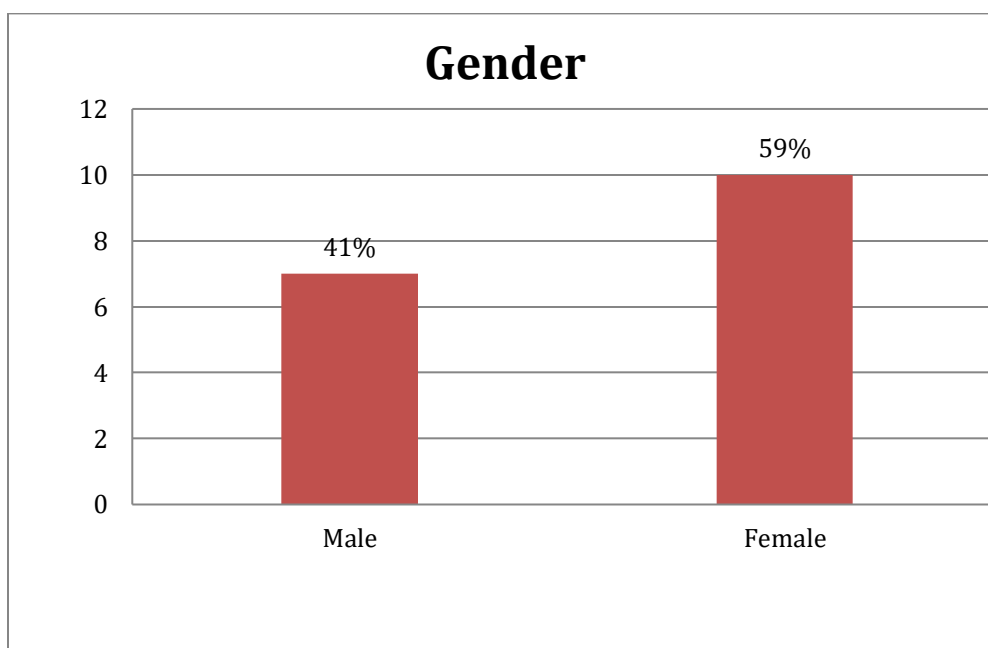
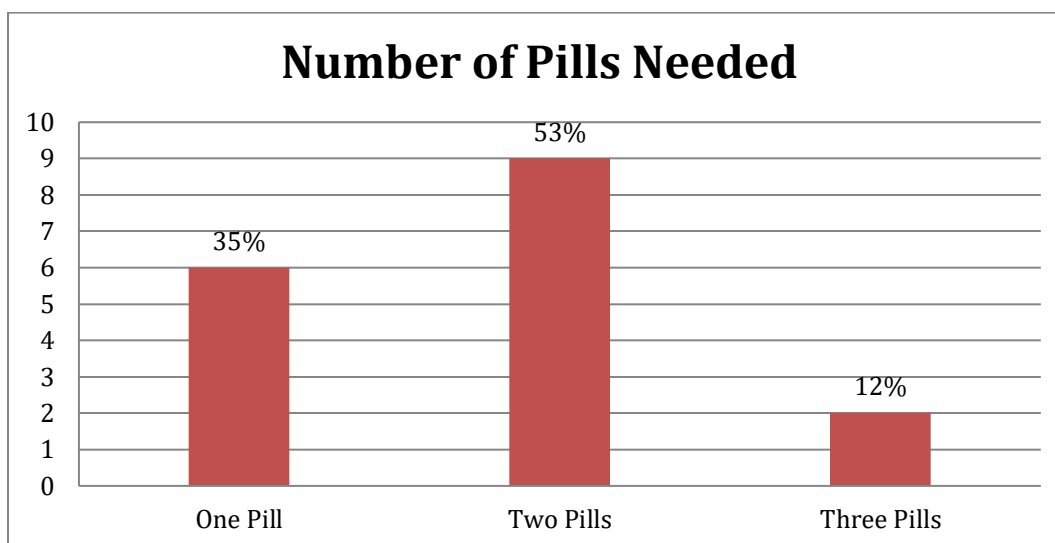
@Copyright

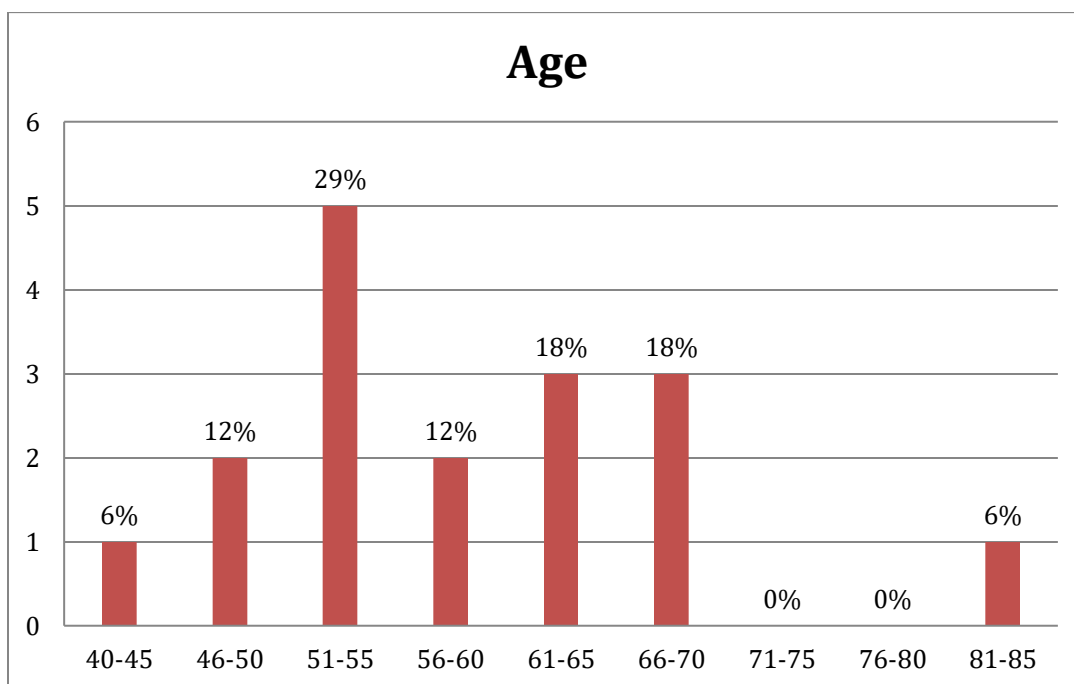
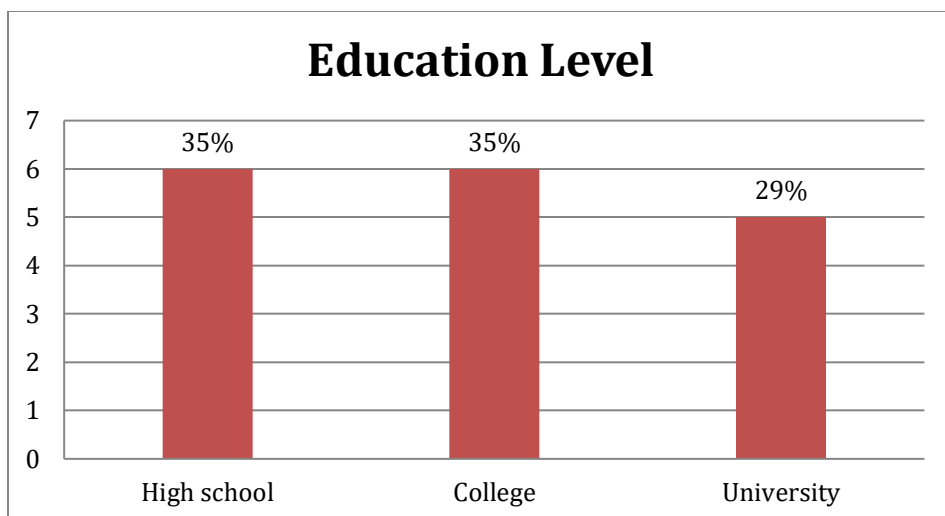
**Current Blood pressure:**

**How likely are you to use the pill box: more likely      Not likely**

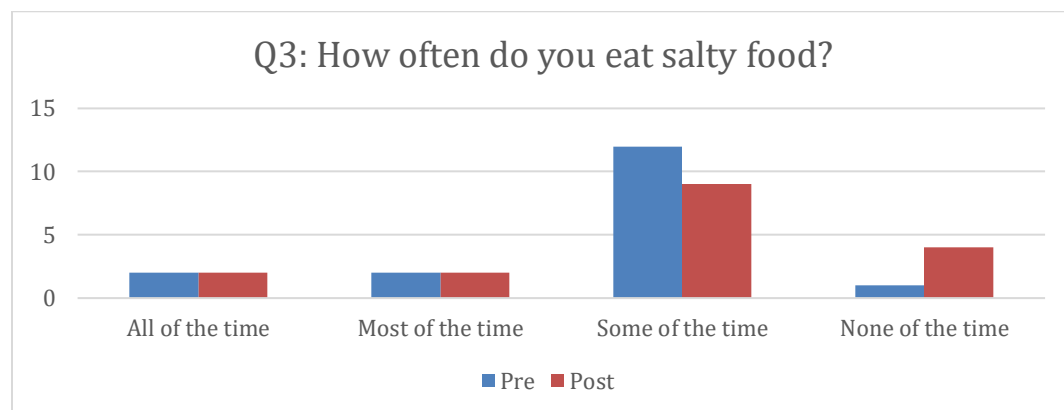
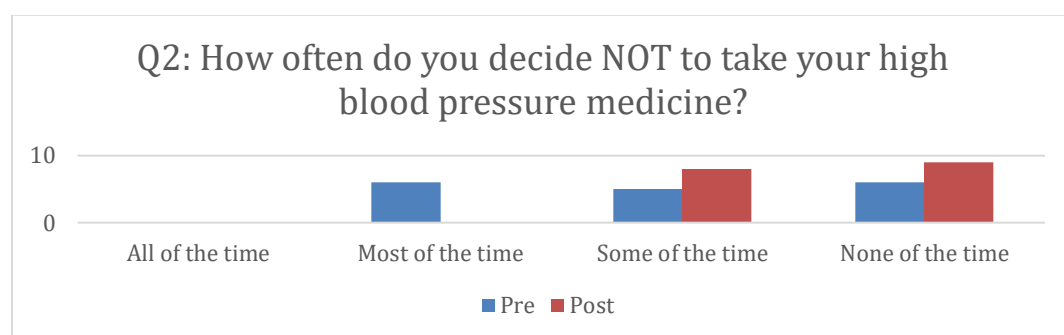
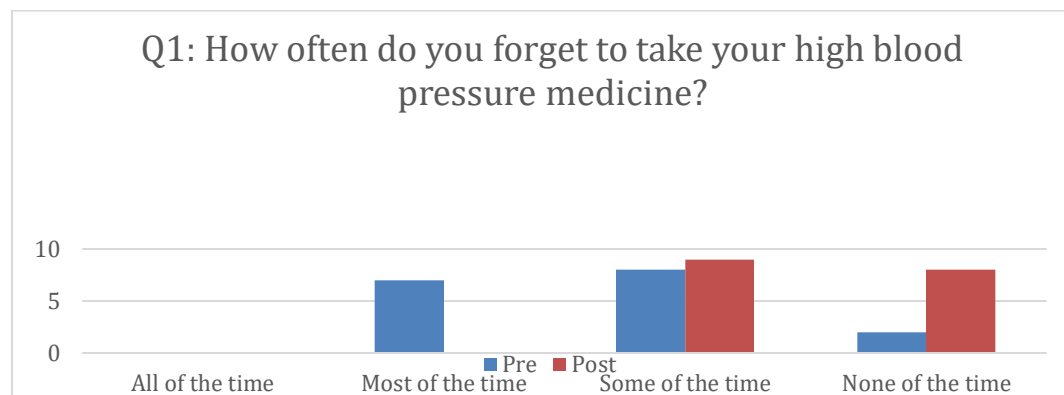
No.	Item	Response:
		1. All of the Time 2. Most of the Time 3. Some of the Time 4. None of the Time
1	How often do you forget to take your <b>high blood pressure</b> medicine?	
2	How often do you decide NOT to take your <b>high blood pressure</b> medicine?	
3	How often do you eat salty food?	
4	How often do you shake salt on your food before you eat it?	
5	How often do you eat fast food?	
6	How often do you make the next appointment before you leave the doctor's office?*	
7	How often do you miss scheduled appointments?	
8	How often do you forget to get prescriptions filled?	
9	How often do you run out of <b>high blood pressure</b> pills?	
10	How often do you skip your <b>high blood pressure</b> medicine before you go to the doctor?	
11	How often do you miss taking your <b>high blood pressure</b> pills when you feel better?	
12	How often do you miss taking your <b>high blood pressure</b> pills when you feel sick?	
13	How often do you take someone else's <b>high blood pressure</b> pills?	
14	How often do you miss taking your <b>high blood pressure</b> pills when you are careless?	

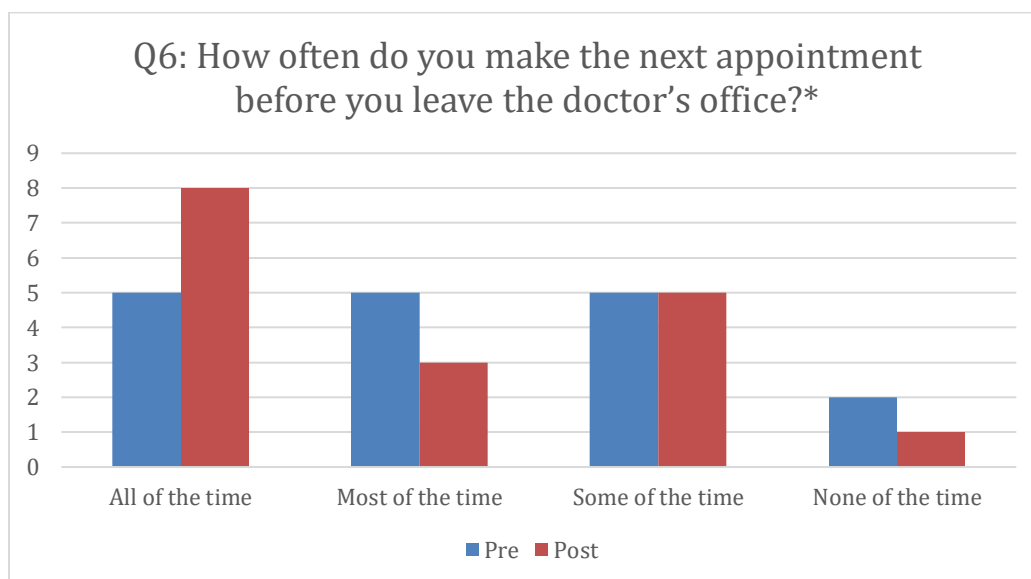
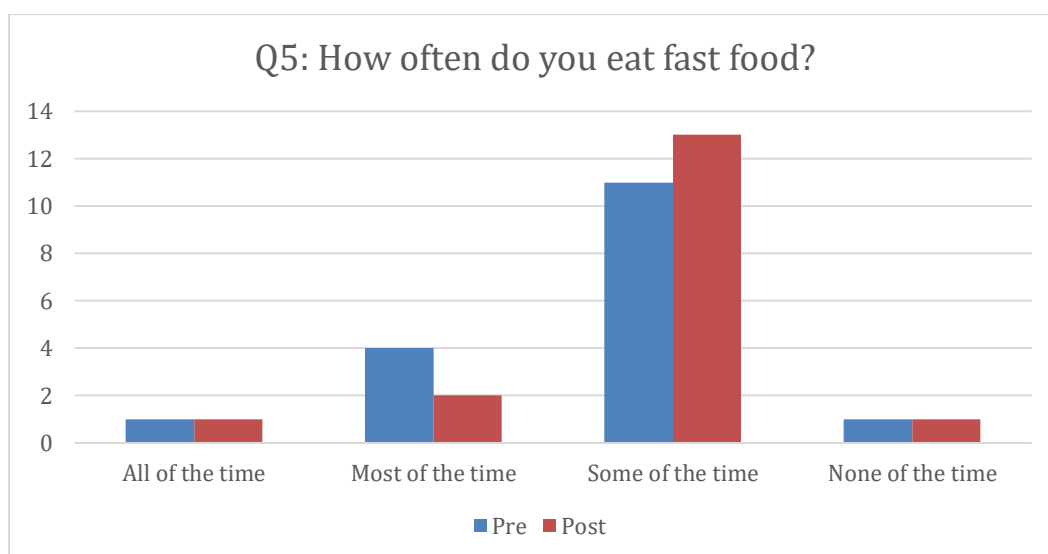
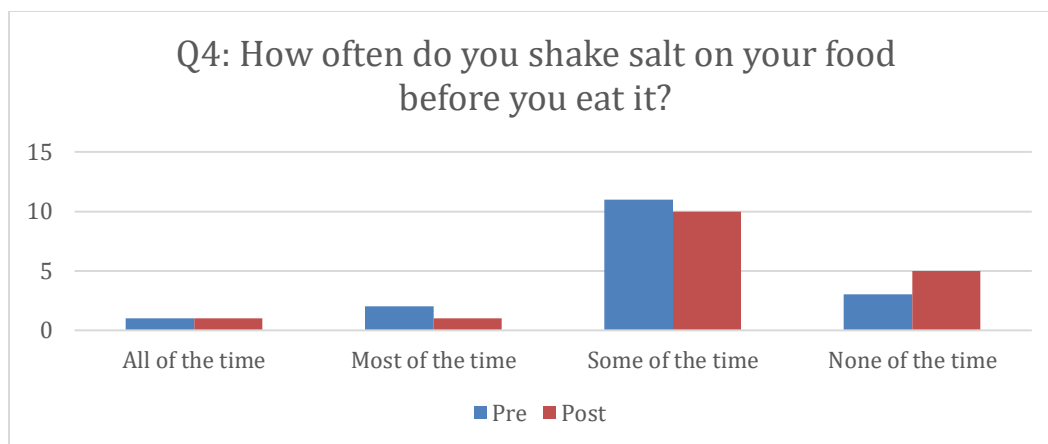
## Appendix: F -Demographics



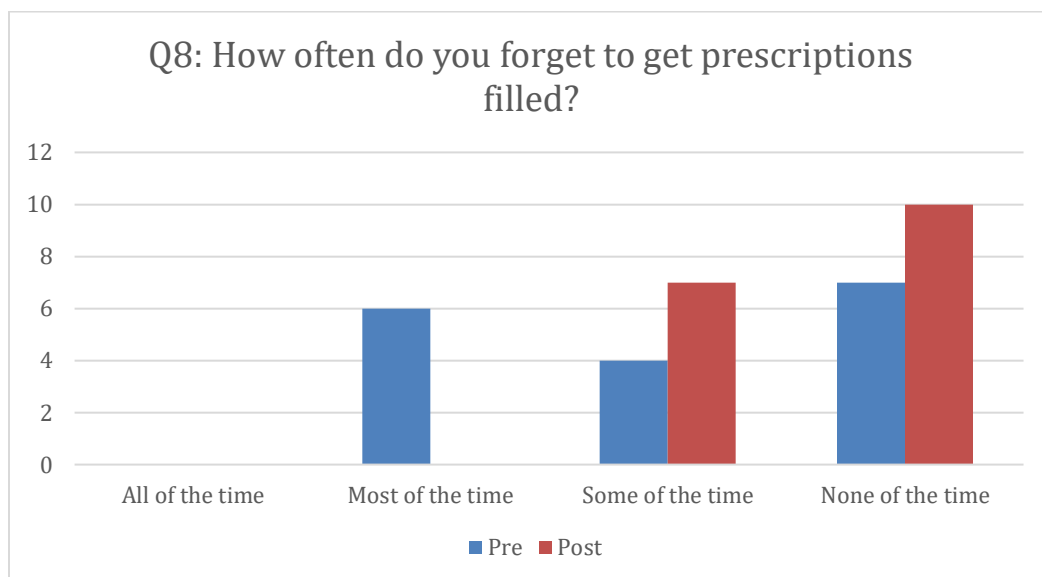
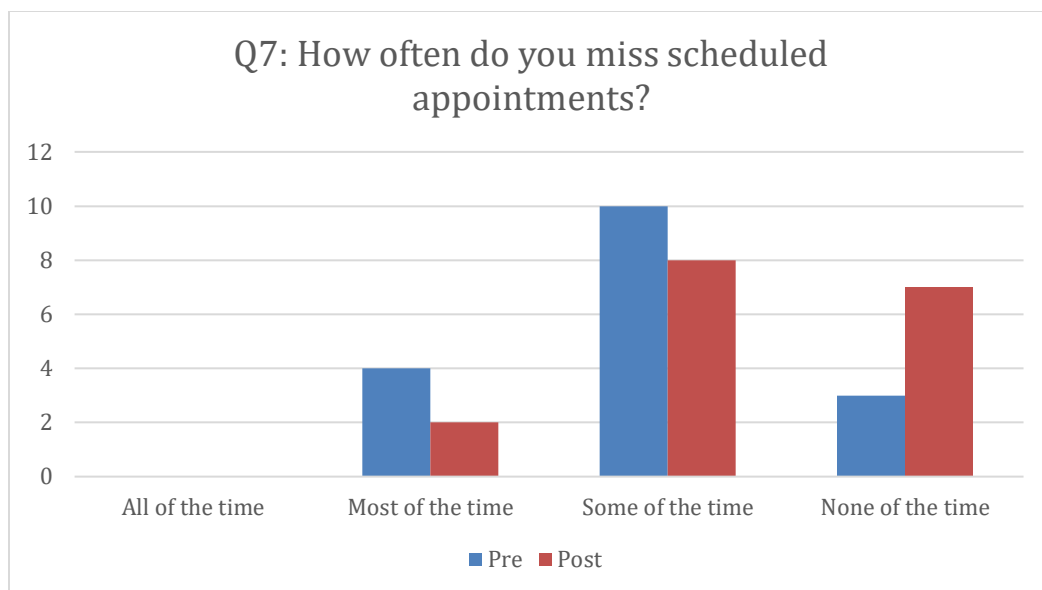


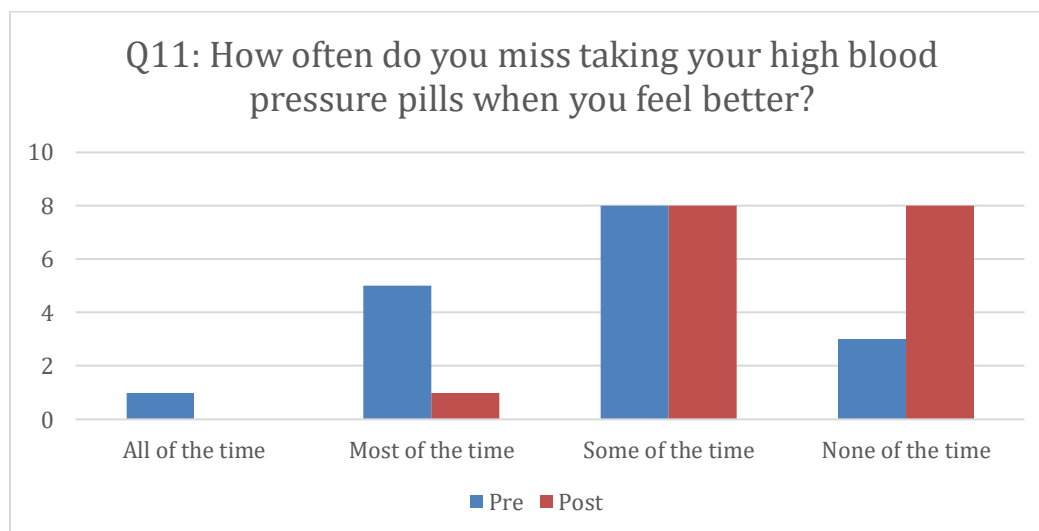
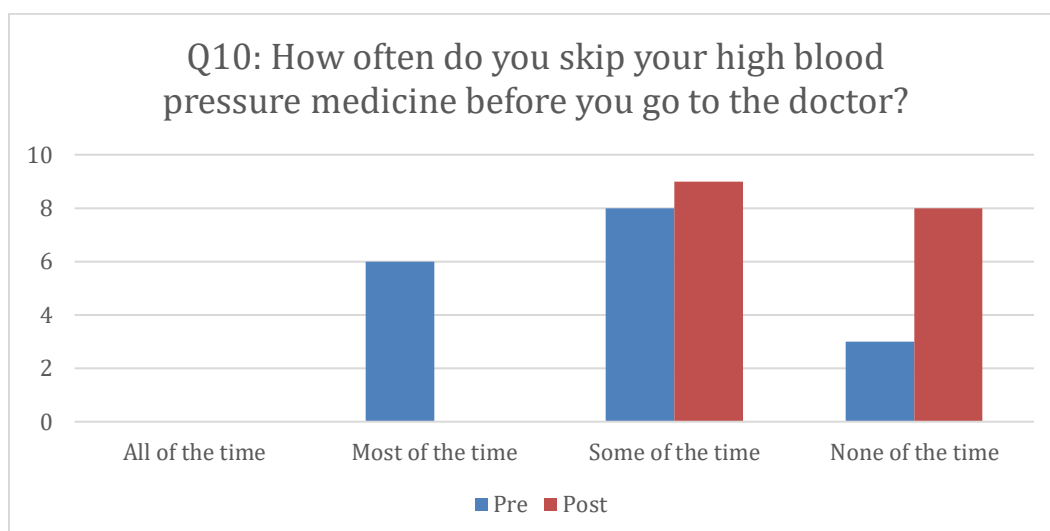
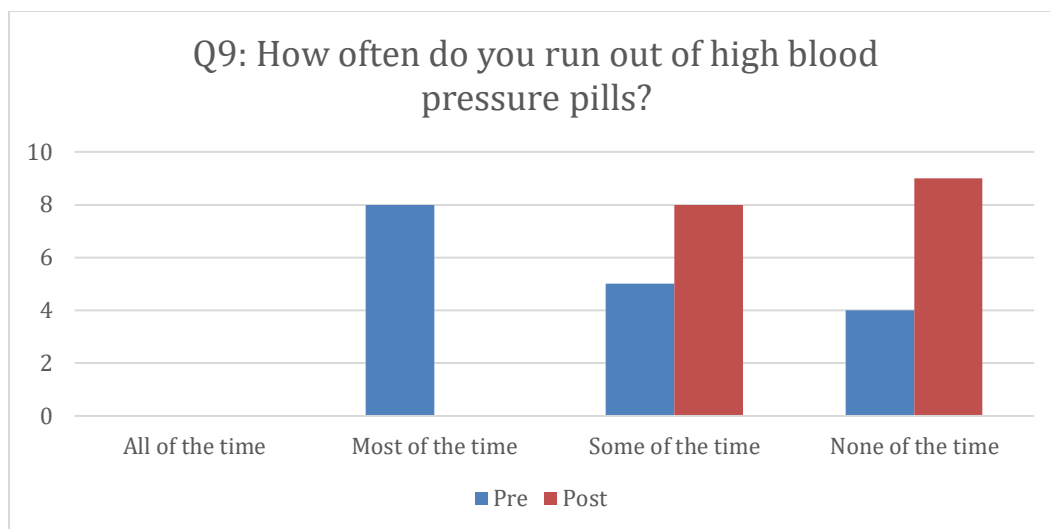
## Appendix: G -Results data

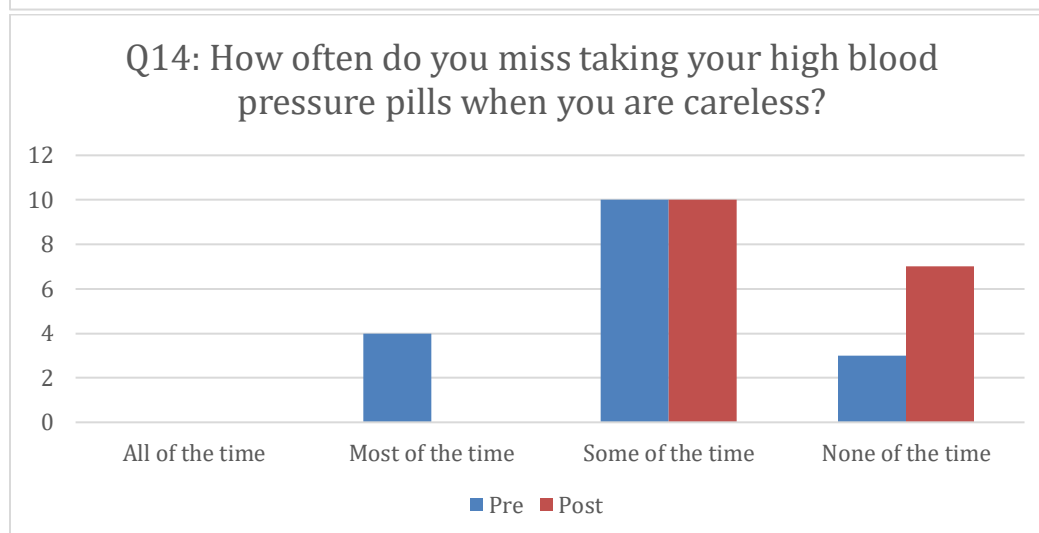
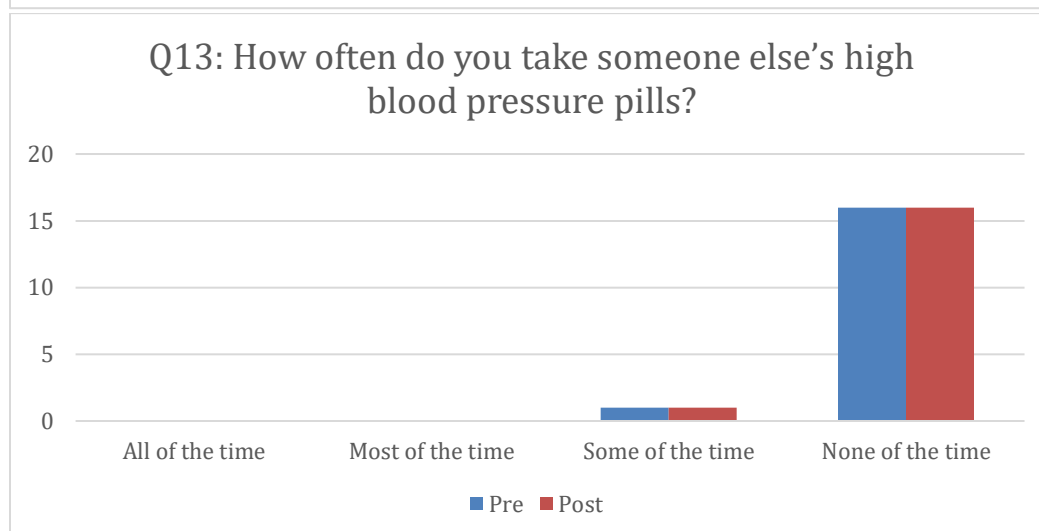
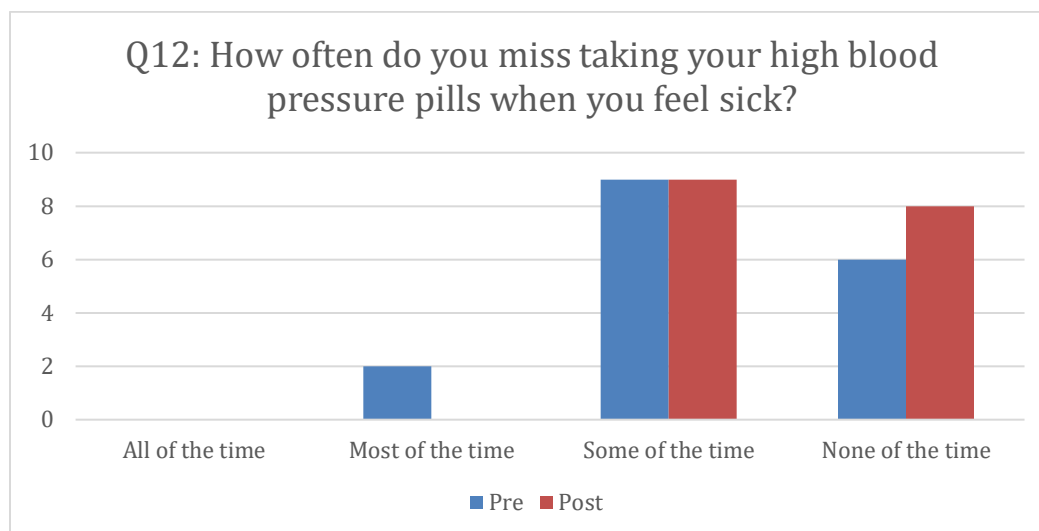








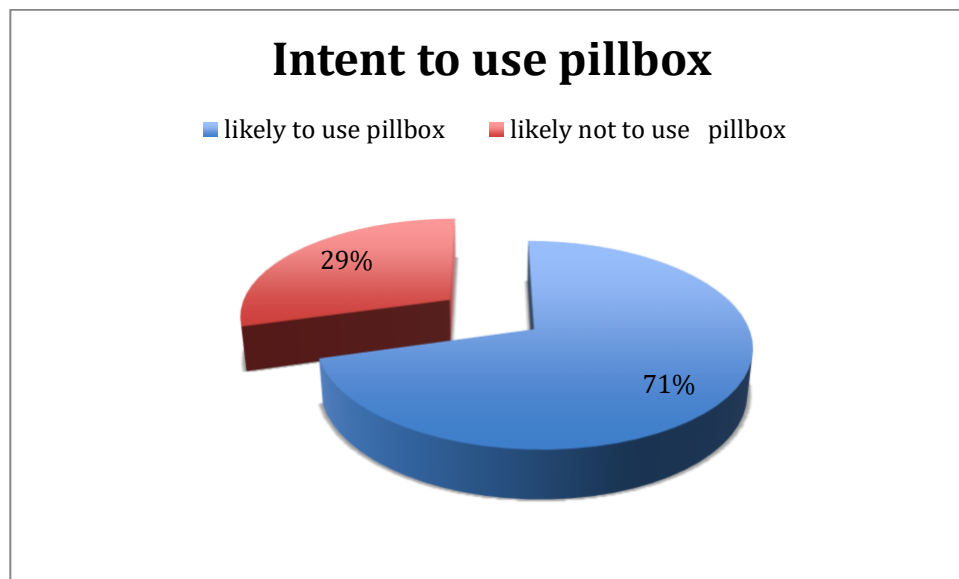




Appendix: H –Hypothesis table

Question	hypothesis	Accept or reject	Z- score	Probability
1	A toolkit will impact health outcomes	ACCEPT	-2.841591389	99.7756%
2		ACCEPT	-1.704954833	95.5899%
3		REJECT	-0.671648874	74.9096%
4		REJECT	-0.706092406	75.9935%
5		REJECT	-0.51665298	69.7301%
6		REJECT	-0.809423002	79.0864%
7		ACCEPT	-1.377741279	91.5858%
8		ACCEPT	-1.601624237	94.5381%
9		ACCEPT	-2.566043133	99.4857%
10		ACCEPT	-2.393825473	99.1663%
11		ACCEPT	-2.169942515	98.4994%
12		REJECT	-0.895531832	81.4749%
13		REJECT	0	50.0000%
14		ACCEPT	-1.859950727	96.8554%

## Appendix : I



## Appendix: J



**RUTGERS**  
School of Nursing

## Do you sometimes forget to take your blood pressure medication?

Learn about medication adherence tool kit and receive a toolkit to help you remember when to take you blood pressure medication

You can participate in this research study that will help you learn more about medication adherence and ways to improve adherence

Join me for one 15-minute educational session

November 4<sup>th</sup>, 8<sup>th</sup>, and the 11<sup>th</sup>

By Gladwin Omare, BSN, RN,

Primary Investigator for the study is

Suzanne Willard, PhD, APN, FAAN she can be reached by email or mail at

Ackerson Hall  
180 University Ave. Newark, NJ 07102

This is a voluntary research study -

Benefits include: no cost pill box, blood pressure check, and medication log sheet.

Study will include a short educational session followed by a pre-study questionnaire that will take 5 min, you will then be provided with a pillbox and log sheet to use for next 4 weeks, after 4 weeks you will return log sheet and fill out a post study questionnaire

Refreshments will be provided

To participate you must:

Be African American aged between 20- 85 y/old

Be prescribed blood pressure medication

Be able to sign a consent form

## Appendix: K

**INFORMED CONSENT FORM**

**Title of Study:** Utilization of a toolkit to improve control of hypertension in a black urban population

**Principal Investigator:** Suzanne Willard, PhD, APN, FAAN

**Co- investigator:** Gladwin Omare, BSN, RN

**STUDY SUMMARY:** This consent form is part of an informed consent process for a research study, and it will provide information that will help you decide whether you want to take part in this study. It is your choice to take part or not.

**The purpose of the research** is to utilize a toolkit to help improve medication adherence. If you take part in the study, you will need to answer a pre and posttest questionnaire that has 14 questions and attend a 15-minute PowerPoint presentation. If you agree to participate in the study, it will take 20-30 min on the first day of study and four weeks period for the whole study to be complete.

**Possible harm or burdens:** There is no potential harm if you participate in this research study and the possible benefits of taking part in the study include having better management of your blood pressure and receives a pillbox.

**An alternative to taking part in the research study** Your alternative to taking part in the research study is not to take part in it

The information in this consent form will provide more details about the research study and what will be asked of you if you choose to take part in it. If you have any questions now or during the study, if you choose to take part, you should feel free to ask them and should expect to be given answers you completely understand. After all of your questions have been answered and you wish to take part in the research study, you will be asked to sign this consent form. You are not giving up any of your legal rights by agreeing to take part in this research or by signing this consent form.

**Who is conducting this study?**

Suzanne Willard is the Principal Investigator of this research study.

Suzanne Willard, PhD, APN, FAAN may be reached at [REDACTED], or 973.353-

5877

Gladwin Omare, BSN, RN is the co- investigator

Gladwin Omare *may* be reached at [REDACTED].

The Principal investigator or another member of the study team will also be asked to sign this informed consent. You will be given a copy of the signed consent form to keep.

**Why is this study being done?**

To aid improve medication adherence in-patient with hypertension.

**Who may take part in this study and who may not?**

Patients that can participate include:

- Blacks aged between 20-85 y/old.
- Participants with high blood pressure
- Participants on high blood pressure medication
- Participants who can sign a consent form
- Participants must be fluency in English

Patients who cannot participate

- Participant with uncontrolled blood pressure caused by other diseases such as diabetes or kidney disease

**Why have I been asked to take part in this study?**

To help understand reasons why patient do not take their medication as prescribed by the physicians

**How long will the study take and how many subjects will take part?**

You will be to answer a pre-and as post questionnaire that has 14 questions. You will be given a medication log sheet to take home with you, you will be asked to fill the form with your medication, time and dosage, you will be provided a 1-week pill box that you will be required to fill in your daily medication and use it daily to help you remember to take your medication.

The study will take place for a 4 weeks period. The study will have a proposed sample of 50 people

.

**What will I be asked to do if I take part in this study?**

Study will include a 15-minute PPT presentation followed by a pre-study questionnaire that will take about 5 min, you will then be provided with a pillbox and log sheet to take home,



you will use for next 4 weeks, to log in your medication and pill box to help you arrange your weeks medication to help you remember, after 4 weeks you will return log sheet and fill out a post study questionnaire to assess the effectiveness of the study

<i>STEPS</i>	<i>TOOL</i>	<i>WHY</i>
1	<i>Consent form</i>	<i>To agree to take part in the study</i>
2	<i>Blood pressure check</i>	<i>To establish your baseline blood pressure</i>
3	<i>Pre-test questionnaire</i>	<i>To assess your knowledge of medication adherence</i>
4	<i>Educational session</i>	<i>To educate you on importance of medication adherence and ways to improve medication adherence</i>
5	<i>Medication log</i>	<i>To track your medication, dosage and schedule</i>
6	<i>Pill box</i>	<i>To help organize your medication</i>
7	<i>Post –test questionnaire</i>	<i>To test knowledge after the educational session</i>
8	<i>Blood pressure check</i>	<i>To compare with beginning blood pressure, and assess how well the interventions worked</i>

**What are the risks of harm or discomforts I might experience if I take part in this study?**

**Loss of confidentiality:**

There is no risk in confidentiality if you choose to participate in this study.

**Protection against risks**

The pre-post data collected will be stored in the co-investigator's password-protected laptop that is authenticated through the rutgers IT system and will not be shared with anyone outside the research team. The pre-post tests will be assigned unique identifiers in order to protect patient identification.

**Are there any benefits to me if I choose to take part in this study?**

The benefits of taking part in this study may be *having a better management in your blood pressure*. However, it is possible that you may not receive any direct benefit from taking part in this study.

**What are my alternatives if I do not want to take part in this study?**

There are no alternative treatments available. Your alternative is not to take part in this study.

**How will I know if new information is learned that may affect whether I am willing to stay in the study?**

During the course of the study, you will be updated about any new information that may affect whether you are willing to continue taking part in the study. If new information is learned that may affect you after the study or your follow-up is completed, you will be contacted.

**Will I receive the results of the research?**

In general, we will not give you any individual results from the study. If we find something of urgent medical importance to you, we will inform you, although we expect that this will be a very rare occurrence.

**Will there be any cost to me to take part in this study?**

*There will be no cost to participate in the study*

**Will I be paid to take part in this study?**

You will not be paid to take part in this study. A no cost pillbox will be given during the study. Light refreshments will be provided.

**How will information about me be kept private or confidential?**

All efforts will be made to keep your personal information in your research record confidential, but total confidentiality cannot be guaranteed. All participant information will be kept in a locked safe at Rutgers University School of Nursing building, 65 Bergen St Newark, NJ 07107. Only the PI and co-investigator will have access to the information.

**Your responses will be kept strictly confidential.** The paper/digital data will be stored in secure computer and/or a hard copy will be stored in a locked filing cabinet after it is entered. Data will be kept in a locked safe at Rutgers University School of Nursing building, 65 Bergen St Newark, NJ 07107. No personal identifiers will be stored from your demographics survey. Instead, you will be assigned a participant number. The researchers will see your individual survey responses and the results. We will not collect any personal identifying information about you and all answers will be confidential.

**What will happen to my information or biospecimens collected for this research after the study is over?**

- The information collected about you for this research will not be used by or distributed to investigators for other research.

**What will happen if I do not wish to take part in the study or if I later decide not to stay in the study?**

It is your choice whether to take part in the research. You may choose to take part, not to take part or you may change your mind and withdraw from the study at any time.

If you do not want to enter the study or decide to stop taking part, your relationship with the [REDACTED] and [REDACTED] will not change, and you may do so without penalty and without loss of benefits to which you are otherwise entitled.

**Who can I contact if I have questions?**

If you have questions about taking part in this study or if you feel you may have suffered a research related injury, you can call the study nurse: *Gladwin omare*, [REDACTED]

If you have questions about your rights as a research subject, you can call the IRB Director at: *Newark Health Science (973)-972-3608*.

**AGREEMENT TO PARTICIPATE****Subject Consent:**

I have read this entire consent form, or it has been read to me, and I believe that I understand what has been discussed. All of my questions about this form and this study have been answered. I agree to take part in this study.

Subject Name (Print): \_\_\_\_\_

Subject Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Signature of Investigator/Individual Obtaining Consent:**

To the best of my ability, I have explained and discussed all the important details about the study including all of the information contained in this consent form.

Investigator/Person Obtaining Consent (Print): \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

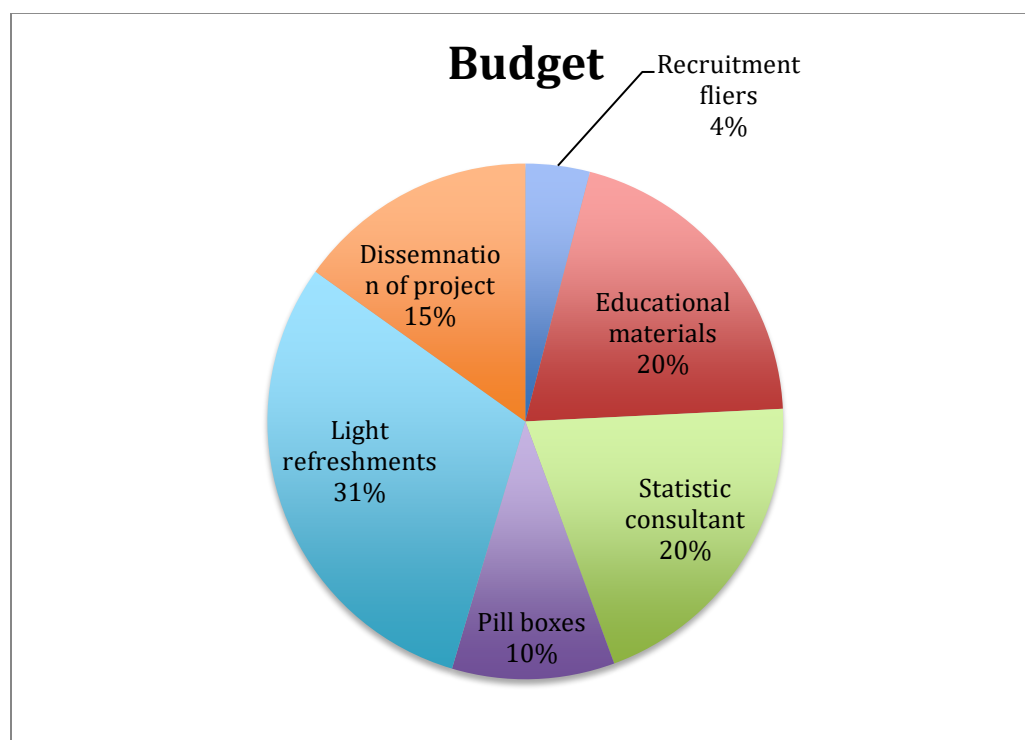
## Appendix: L

Activity	Start	Duration	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
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## Appendix: M- Project Budget

Expenses	Cost	Total Cost
Recruitment Fliers	10 @\$1/flier	\$10
Educational material	\$150	\$150
Statistic consultant	\$50 per hr. x2 hrs.	\$100
Pill box	50 @ \$1.15 each	\$50.50
Light refreshments	\$50 per section	\$150
Dissemination of project	\$75	\$75
<b>TOTAL BUDGET</b>		<b>\$595.50</b>







## References

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