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Improving Medication Adherence in Hypertensive African American Patients at a South Florida Clinic. A Quality Improvement Project.

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Improving Medication Adherence in Hypertensive African American Patients at a South Florida Clinic. A Quality Improvement Project.

A Scholarly Project Presented to the Faculty of the Nicole Wertheim College of Nursing and Health Sciences

Florida International University

In partial fulfillment of the requirements For the Degree of Doctor of Nursing Practice

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NONCOMPLIANCE TO HYPERTENSIVE TREATMENT

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## NONCOMPLIANCE TO HYPERTENSIVE TREATMENT

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Hypertension is a chronic condition that requires long-term management. Though medication adherence is a significant factor in managing the condition, compliance to treatment has been considered a challenge among African Americans. Non-compliance to antihypertensive as led to a high prevalence of hypertension among this population; however, there is limited data to support this observation.

This project targeted 20 patients from a South Florida primary care practice, identified by the primary care provider as being non-compliant to their medication and treatment plans. The project consisted of an educational approach to text those patients daily, reminding them to take their medication along with educational information. All communication and teaching was done remotely via email and text messages.

This study aims to identify if a daily reminder to patients to take their blood pressure medication in the form of a text message along with daily lifestyle modifications and education can improve blood pressure control after four weeks. Participants completed a pretest and a posttest to assess their knowledge of medication adherence and disease management. A daily text reminder to take medications along with a piece of lifestyle modification advice was sent to the patients. The intervention assessment was divided into two categories: the impact on medication adherence and the effect on hypertension management skills.

The posttest results confirmed that participants showed an improved ability to adhere to the medication regimen after the intervention. Before the self-management education intervention, 35% of the participants remembered the name of the medication they were taking to stabilize their blood pressure. After the Education intervention, 90% of the respondents recalled their medication’s name. The findings confirmed that self-management education improved participants’ medication memory, thus potentially improved their compliance levels. The
findings also confirmed that self-management education can improve medication compliance, and, consequently, lower the cost of healthcare in hypertensive African Americans.

*Keywords*: medication, adherence, drugs, hypertension, African Americans, noncompliance
Improving Medication Adherence in Hypertensive African American Patients at a South Florida Clinic. A Quality Improvement Project

Problem Statement.

Non-compliance to antihypertensive treatment contributes to uncontrolled hypertension, decreased life expectancy, chronic kidney diseases, stroke, thyroid disease, diabetes mellitus, dyslipidemia, and cardiovascular diseases (Noh et al., 2016). Studies have shown that health disparities in African Americans often relate to multiple factors, namely physical, behavioral, and socioeconomic. Moreover, African Americans’ nonadherence to antihypertensive treatment is often associated with the failure to implement self-management education (Ndumele et al., 2010). This health disparity is frequently observed at the chosen South Florida clinic, where patients often come to the clinic in a state of hypertensive urgency. Patients often report having a severe headache, sometimes accompanied by blurred vision, shortness of breath, nausea, and anxiety. These patients are usually treated with oral antihypertensives, such as hydralazine or clonidine depending on the patient’s history and overall health condition. These patients are usually required to stay at the clinic for monitoring until their blood pressure reaches an acceptable range. Many patients report that they take their medications either when their blood pressure is out of the acceptable range, when they remember, or when they do not feel good.

Medications are a significant part of patient care when managing chronic illnesses, as they can improve patients’ outcomes. Once a health condition has been diagnosed, specific therapies, including medications, are prescribed. The medications must be taken as prescribed to enhance patients’ comfort and cure illnesses. Once patients are discharged from the hospitals or leave the providers’ office, caregivers have no control over their medication intake. One option that has been proven to help patients adhere to their treatment regimens is patient education.
Hypertension is one of the chronic illnesses that require long-term management, including medication compliance. Mohamed et al. (2018) stated that 24% of the global population has hypertension. This number accounts for 1.13 billion people, and it has risen from 594 million in 1975 to over one billion in 2015 (World Health Organization, n. d.). The prevalence of hypertension the African American population is rising, and they experience at least 8,000 deaths annually (Grant et al., 2015). If no proper treatment measures are taken, such as patients’ education, the prevalence will continue to rise. Thus, educational intervention should be implemented to improve medication adherence among hypertensive patients. However, there is limited evidence on self-management education regarding medication adherence among African Americans, hence, a need to improve educational methods and adherence in hypertensive African Americans.

Medication non-adherence is the primary cause of multiple complications, especially the advancement of preventable conditions, disease complications, poor quality of life, and premature death. On the contrary, proper medication adherence in chronic conditions is directly associated with achieving optimal levels of health and a lower mortality rate. There is a vast scope of comprehensive and practical interventions taken to improve medication adherence in patients suffering from hypertension, including cognitive-behavioral counseling, medication therapy management (MTM), regular home visits or telephone calls, reminder devices, and patient education. Scholarly literature sheds light on marked and meaningful correlations between appropriate patient education and treatment of hypertensive patients (CDC, 2017).

Several authors, including Gupta et al. (2018) and Pamala et al. (2019), provide evidence that hypertension is one of the most widespread causes of cardiovascular diseases. They suggest that education regarding self-management ameliorates medication compliance by creating
awareness about the chosen health condition and its comprehensive treatment alongside regular medical check-ups (Gupta et al., 2018; Pamala et al., 2019). Gupta et al. (2018) stated that medication non-adherence in patients with hypertension is one of the most significant barriers minority groups, including African Americans, Latinos, Native Americans, and Pacific Islanders, face in pursuing and achieving optimal health. The authors claim that five major dimensions are affecting and shaping medication non-adherence, namely social, economic, therapy-related factors, patient-related pressures, numerous condition-related factors, system-related, as well as team-related factors (Gupta et al., 2018).

**Current State of Compliance and Reasons for Non-Compliance**

Researchers agree that non-compliance with antihypertensive therapy is one of the major factors hindering health promotion on a global scale. Burnier and Egan (2019) estimate that patient adherence to antihypertensive drugs in the first year of therapy does not even reach 50 percent, suggesting that less than half of patients with hypertension continue their treatment. However, data on compliance varies from country to country. For example, more than 85 percent of patients in Canada demonstrate excellent compliance with antihypertensive drugs, with their blood pressure maintained at less than 140/90 mmHg (Burnier & Egan, 2019). In contrast, less than 70 percent of patients achieve these long-term results in the United States, (Burnier & Egan, 2019). This evidence suggests that individuals with hypertension face barriers to long-term adherence, and better awareness of these factors could facilitate the provision of therapy in this population group.

The current state of research lists the following factors that may hinder medication compliance or increase the risks of non-compliance with antihypertensive drugs: age, dosing regimen, polypharmacy, individual cognitive status, costs of treatment, and the quality of patient-
provider relationships (Burnier & Egan, 2019; Cho et al., 2018; Benkeser et al., 2017; Vrijens et al., 2017). Elderly patients are at higher risk of non-compliance with their antihypertensive therapy, either because of cognitive decline or because of numerous other medications that they must take to manage multiple chronic conditions (Cho et al., 2018; Khwaja et al., 2017; Benkeser et al., 2017). Socioeconomic factors may also contribute to non-adherence. Burnier and Egan (2019) and Benkeser et al. (2017) cite copayments and poverty as the two barriers to antihypertensive treatment adherence in patients. The researchers also emphasize the significance of the patient-provider relationship in achieving optimal compliance with antihypertensive drugs (Burnier & Egan, 2019; Benkeser et al., 2017). Drawing from this evidence, it is possible to conclude that providers play a pivotal role in promoting patient’ involvement in antihypertensive therapies, particularly when it comes to long-term compliance. Vrijens et al. (2017) highlight that initiation is not a problem as significant as persistence and long-term compliance. Therefore, the role of the healthcare provider is to facilitate the initiation and encourage adherence, using evidence-based interventions and technology means to improve compliance.
Literature Related to the Problem

Literature Search

Articles used to answer this question were obtained from the following databases: PubMed, CINAHL, MEDLINE, as well as Cochrane. The key terms that were used to search for the articles were “medication,” “education,” “compliance,” “patient,” and “hypertension.” These terms were combined by Boolean terms “AND” and “OR.” The search was limited to the past five years, and the initial focus was to find empirical articles. The search process in all the databases led to the identification of 52 articles; however, only three of them discussed drug compliance among African Americans. The three articles could not provide sufficient evidence. Thus, other articles such as systematic reviews and articles that focused on other populations were considered from another search using the following key words and phrases, “hypertension,” “high blood pressure,” “antihypertensive,” adherence,* “comply,” “compliant,” “compliance,” “nonadherence,” “noncompliant,” “African American,” “self-manage,*” “Black,” “medication,” “drug,” “pharm,” “lisinopril,” “labetalol,” “amlodipine,” “metoprolol,” “beta blocker,” “ace inhibitor,” “angiotensin converting enzyme inhibitor,” “calcium channel blocker,” and “diuretics.” The search process led to the identification of 87 articles. Three other articles were recorded from other sources. Duplicates were removed, and those that did not discuss hypertension and drug compliance were excluded. In the end, only eleven articles were chosen for analysis.
Figure 1

**PRISMA Flow Diagram**

Records identified through database searching (n = 87)

Additional records identified through other sources (n = 3)

Records after duplicates removed (n = 32)

Records screened (n = 32) → Records excluded (n = 8)

Full-text articles assessed for eligibility (n = 15) → Full-text articles excluded, with reasons (n = 3)

Studies included in qualitative synthesis (n = 11)
Literature Review

The primary issue of concern is medication adherence, which is necessary for improving the outcomes of patients with hypertension. The various researchers have examined this issue and recommended medication compliance as a useful approach to managing illnesses. For instance, Grant et al. (2015) suggest that drug adherence can control the symptoms from which patients are suffering. One of the symptoms of hypertension is a headache. When people take antihypertensive medications as prescribed, they can prevent this symptom and experience comfort. Apart from preventing symptoms and experiencing comfort, medication adherence can be used to reduce the severity of illnesses as well as to reduce the overall cost of care (Lee et al., 2018). For instance, patients with poorly managed hypertension can suffer from cardiac failure and metabolic syndrome as complications. Such complications can increase the rate of readmissions and eventually increase the costs of care. Therefore, taking medications as required can prevent not only complications, but also associated costs of care. According to Grant et al. (2015), medication compliance has always been a challenge, especially for African American patients with cardiovascular problems. African American patients are educated on the importance of complying with hypertensive treatment, however, they often fail to adhere to their treatment plans, which puts them at a higher risk for frequent readmissions. Their non-compliance justifies the need to reinforce patient education on medication adherence among African American patients to prevent symptoms, experience comfort, reduce the severity of illness, decrease the rate of readmissions, and eventually decrease the costs of care.
The effects of self-management education on medication adherence and blood pressure control

Poor adherence to antihypertensive medication has been attributed to inadequate health literacy and uncontrolled primary hypertension among African Americans. Many studies have reported that self-management education such as adequate health literacy and controlled primary hypertension can reverse this phenomenon. This study established that self-management education has significantly improved antihypertensive medication adherence. The study recommended tailored patient education to promote adherence to antihypertensive medications as part of health literacy.

The researchers conducted a quantitative study using clinical trial. The study included 118 participants. The participants were selected based on inadequate health literacy, uncontrolled primary hypertension, and ages. All 118 participants were older than sixty years of age. The researcher then used the health literacy index to develop self-management education. A mercury blood pressure meter was used to measure blood pressure and medication adherence. Each participant was given eight questions that were divided in two parts with a possible one point per question for a total of eight possible points. The first part was comprised of seven yes or no questions and the second part included one question with a four-point Likert scale as follow: one point for “always,” one point for “Usually,” zero points for “Sometimes,” and zero points for “Rarely/Never.” A score of eight indicated good medication adherence, from six to 7.99 moderate medication adherence, and less than six indicated poor medication adherences. The education materials used were based on existing literature and were tailored to participants’ health literacy. The instructional materials were deemed very well suited to participants’ health literacy based on the mean and standard deviation of 84,12 and 12.72 respectively. The materials
were focused on defining hypertension, its risk factors, and its complications. Part of the materials also focused on medications, their side effects, the management of side effects, medication adherence, and the importance of adhering to medication regimen and regular blood pressure monitoring visits. The length of education was one year (2018) and included both face-to-face and telephone-based sessions. For instance, participants’ blood pressure was measured twice within a ten-minute interval. Participants were instructed to not smoke or consume caffeinated drinks 30 minutes prior to blood pressure measurements. A mercury sphygmomanometer and the Morisky Medication Adherence Scale were used to take measurements of the factors and variables of the study. Antihypertensive medication and management education were administered in healthcare facilities. Public healthcare facilities were preferred for self-management education.

Other researchers also conducted a quantitative study. They measured sociodemographic factors from participants and followed up assessments on health-related indicators to expand patient knowledge about Chronic Disease Self-Management Program CDSMP), a program that has been proven to be effective in improving medication adherence. The program has been implemented among many populations in various settings. The CDSMP is a 15-hour program that is divided into six sessions. It covers many subjects, such as nutrition, proper use of medication, exercise, new treatments, to name a few. The study used secondary data to obtain the health indicators comprising the study variables. The sample comprised participants above the age of 65, having been diagnosed with at least one chronic condition, agreeing to complete a baseline assessment, participating in a CDSMP workshop in English or Spanish, and agreeing to participate in the CDSMP evaluation. The researchers used linear mixed models to determine the effect of management education on medication adherence. They did so in short-term education of
6 months and long-term education of 1 year. The researchers used statistical tools such as MS Excel and SPSS to analyze the data.

There is limited evidence from the analyzed resources as to the effectiveness of education methods in medication adherence. These studies have shown that patient education has positive association with medication adherence. It is to this regard that Hypertensive Self-Management Programs need to be introduced to increase the effectiveness of management education. The study provided sufficient evidence to suggest that self-management in older adults improves adherence to antihypertensive medication. The study recommended that programs such as the Hypertensive Self-management Programs can supplement other management education and improve medication adherence.

In another study, the researchers conducted a two-arm cluster randomized controlled trial. To investigate medication adherence regarding self-management education, this study used a sample of 442 African Americans diagnosed with hypertension. Other factors affecting medication adherence such as education, insurance status, employment, education, income, diabetes, hypertension knowledge, social support, and hypertension care were also studied with data from CAATCTH (Counseling African Americans to Control Hypertension) using a two-arm cluster randomized controlled trial. The length of the education was 5 years (2004-2008).

Trained research assistants used BPTru, an automated blood pressure device, to deliver the education and measure blood pressure. The patients interacted face to face with the research assistants as they were physically visited to assist with the blood pressure measuring technology. The researchers used sphygmomanometers and blood pressure meters to monitor and measure blood pressure. The research assistants in the study used individuals self-identified as black or African Americans with a history of hypertension. There were no points of care for this study as
research assistants collected data based on participants' history of hypertension. For those in hospitals or under medical care, data was obtained from the respective facility databases. No workshop was applicable as data was majorly historical.

Hypertension has its highest prevalence among African Americans and contributes to at least 100 deaths each day in what has become a major public health concern. This can help explain the major gaps between African Americans and whites regarding morbidity and mortality. It is well documented from research and studies that self-management education can increase adherence to antihypertensive medication which in turn can reduce cardiovascular-related mortality. Self-management education provides significant cardiovascular benefits. The study established that there was a positive correlation between medication adherence and greater expectation of care. Hypertension knowledge and expectation of care were the main self-management education under study. In relation to medication adherence and control of hypertension, the study recommended that further research should factor in self-efficacy, blood pressure treatment, and patients’ perceptions of hypertension.

In this study, the researchers did a systematic review. They used resources from previous studies using filtered and systematic searches in online databases. For relevance, the study was on African Americans with a particular focus on primary and secondary outcome variables. The length of the education was not applicable as the study was a review of literature. Delivery was not applicable as data for the study was based on computer searches. The data was based on studies whereby medication adherence was measured using self-reporting, therefore ruling out face-to-face interaction. Point of care and workshops were not applicable for a qualitative study since data was obtained from systematic computer searches and filters.
A critical way of controlling blood pressure in hypertensive African Americans is strict adherence to antihypertensive medication; however, data has revealed unacceptably low rates of adherence to antihypertensive medication among African Americans. Self-management education that most studies have focused on include patient knowledge of hypertension, self-efficacy, and healthcare system factors. As in many other studies, self-management education have shown the ability to improve medication compliance. The study established that poor adherence in antihypertensive medication among African Americans is a multi-factorial problem that poses challenges in enhancing medication adherence. Patient and clinical factors are some of the management educations that most studies have focused on. Depression and self-efficacy were the clinical factors in patients established to be consistently linked with medication adherence. Depression has a negative correlation with antihypertensive adherence while the studies established a positive correlation between self-efficacy and medication adherence. The authors recommended that self-efficacy is the most effective management education that should be targeted to increase medication adherence among African Americans suffering from hypertension, as education increases patients’ level of confidence giving a sense of empowerment. They further recommended that healthcare providers screen patients for depression and treat the condition if present before administering antihypertensive medication to increase adherence.

This quantitative study was conducted using a meta-analytic approach. The authors used a systematic review mechanism to measure adherence to antihypertensive medications. The sample was comprised of adult African Americans with a history of hypertension. The researchers then coded education characteristics, study design, and sample then analyzed the data using random effect models. The length of the education was not applicable as data was obtained
from meta-analyses of previous studies. Delivery was not applicable to the study utilized secondary data. No face-to-face interaction with patients was required as the study utilized secondary data.

Online search engines with custom fields and term lists were used to filter and track quantitative data on antihypertensive medication adherence. A bibliographic software was used to identify potentially eligible studies through tailored search methods. For the estimation of effect sizes, the study utilized a single-group pre-post. No point of care was applicable as the research relied on secondary data. Workshops were not applicable in the location of a large sample of studies as the study employed multiple online search strategies.

Chronic heart failure, cerebrovascular disease, and coronary diseases are some of the risks facing patients with poor adherence to antihypertensive medication. Non-adherence to antihypertensive medication constitutes a significant impediment to reducing cardiovascular mortality as it is associated with higher nondrug medical costs. Investigators and researchers have embarked on clinical trials to evaluate self-management education to improve medication adherence prompted by the problem of poor medication adherence, especially among African Americans. The study established that among moderate- or high-income earners, older, and female participants, management education to improve antihypertensive medication adherence was effective. The researchers established that health care providers give top priority to management education that is delivered over a long period and incorporate multiple components. The researchers recommended that future studies should avoid self-reported adherence measures and strive to incorporate fewer threats of bias.

This study is a systematic review aimed at synthesizing medication adherence interventions among hypertensive patients using meta-analytic procedures. This study is based
on previous reviews that attempted to assess interventions that can improve medication in hypertensive patients. Those studies were focused on testing intervention aiming at increasing medication adherence among hypertensive patients. The primary emphasis for this project was to assess how patients followed a prescribed regimen. The study included small sample sizes and published or unpublished studies, as meta-analysis does not rely on p values to establish effect sizes. However, it excluded studies with human or animal subjects completed by the authors of this meta-analysis study with the same authors. To avoid bias from a narrow search, the researchers used an expert health science librarian to conduct searches in many different databases using different search terms and phrases. They also assessed the abstract from 48 conferences to consider eligibility, and the final eligibility would be determined by two investigators. To collect data, a coding frame was created and tested on 20 studies prior to implementing it in a larger study. The coding frame assisted in capturing report level features, characteristics of interventions, study design, participants’ demographics, and data to evaluate adherence effect sizes. The report level features included the year of distribution, the publication status, and the funding. The subjects of the studies surveyed were chosen based on age, ethnicity, gender, their economic status, the number of prescribed medications, and their adherence level. The studies included in this review were based on interventions that focused on medication adherence behavior and health behavior with their content coded in detail. The design of the study varies from random to non-random groups, percent attrition, comparison group management, data collector masking, and allocation concealment. Adherence was measured by self-report, pill count, pharmacy refill, and electronic medication event monitoring. Intervention like self-monitoring blood pressure, self-management education, and counseling were implemented. Some interventions were analyzed, and the sample size was found to have no
effect on patients’ outcome. The study revealed that interventions delivered directly to the subjects were more effective than those given to healthcare professionals to pass on to the subjects.

This study is a systematic review designed to assess the efficacy of education interventions on medication adherence on chronic diseases, such as diabetes, hyperlipidemia, and hypertension. As multimorbidity increases, so does the importance of medication adherence among African Americans. Therefore, it is crucial to cultivate health literacy through self-management education. Self-management is defined as teaching, behavior modification, and counseling targeting the improvement of patients’ knowledge about their medication and health. To guide the results of this review, the authors used the Preferred Reporting Items for Systematic reviews, also known as PRISMA. The review started with all studies written between 2003 and 2016, however it was narrowed down to 18 studies. The authors used the same method used in the Cochrane Handbook to assess 18 randomized controlled trials from seven electronic databases. The inclusion criteria included a diagnosis of diabetes, hyperlipidemia, or hypertension, participants under pharmaceutical treatment for at least one of the listed chronic illnesses, participants being 18 years of age or older, face-to-face educational interventions centered around perceived barriers and benefits, perceived susceptibility, and perceived severity. The exclusion criteria included participant with mental conditions like depression and schizophrenia, educational interventions focusing on prevention of chronic diseases, interventions using a web-based, messaging, or telephone system, a comparator group receiving another intervention or the absence of a control group, and non-validated methods for measuring medication adherence.
For the studies in which the duplicity was not able to be determined using the above factors, the authors were contacted for clarifications. The methodology of the studies was reviewed by two reviewers prior to being included in the review. The first reviewer obtained the data and abridged the details of the retrieved information using the Cochrane Handbook for Systematic reviews of interventions, which was later reviewed by a second reviewer. If the opinions of the reviewers differed, a resolution was sought through discussion. The titles were also screened to ensure that they fit the eligibility criteria. They also registered the protocol of the study with the International Prospective Register for Systematic Reviews. The levels of quality of evidence for the outcomes of the studies were tabulated in the summary of findings using the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) system. The researchers anticipated that this systematic review would result in improvement in medication adherence in the management of chronic illnesses. However, some of the interventions did not show any improvement, while some orders show low to moderate quality evidence on the improvements of medication adherence on hypertension.

**Telecommunication system effect on medication adherence among hypertensive African Americans**

The researchers conducted a quantitative, two-armed randomized control trial. They designed an eight-month education only control or multi-behavior education and subjected 337 randomized hypertensive African Americans to primary care. After every four months, for one year, the researchers assessed at baseline the following factors: blood pressure, physical activity, diet, and medication adherence. They used statistical methods of longitudinal to analyze the data. To help hypertensive African Americans improve their adherence to antihypertensive medication, the researchers considered an automated, culturally adaptive telephone system. The
subjects comprised African Americans of low socioeconomic backgrounds. There was no face-to-face interaction between the researchers and the patients. The researchers opted for telephone-linked care, interactive telephone counseling systems, and computer-based data collection as the education was totally automated. The automated systems regularly provided summary data on the patient's primary care. The education was implemented through telephone systems, while adherence to medication was computer-based as the points of care had databases recording self-management education.

More African Americans than whites suffer severe cases of hypertension. This is attributed to lacking culturally accessible, and effective sensible education that target multiple behaviors regardless of the several health behaviors that influence hypertension. Adherence to antihypertensive medication regimens can be improved by individual lifestyle education as multiple well-designed studies have established. Therefore, the points of care in this study were both surface and deep structure adaptations. These points of care were equipped with education messages and materials to observable features of the target population. Due to constraints in materials, facilities, personnel, and costs, the researchers opted to use a public health scale for this study. This was easier for data collection as many African Americans attend multiple counseling sessions in public healthcare facilities.

There was a significant improvement in medication adherence with an increase in self-management education in African Americans suffering from hypertension. Energy expenditure and overall diet quality improved with self-management education. Moreover, increased patient education triggered a significant decrease in the level of systolic blood pressure among the observed patients. As such, there was sufficient evidence to suggest that self-management education had an impact on medication adherence. The researchers recommended the use of
computerized technology on the deliverance of behavioral change programs of hypertensive African Americans as they are relatively cheaper and increase medication adherence.

**Impact of awareness about hypertension on compliance with antihypertensive medication.**

This study was designed to assess the effect of creating awareness about hypertension on patients’ compliance to antihypertensive medications with the use of education. The researchers designed closed-ended questionnaires that were used to collect data from individual patients. The questionnaires were designed with questions that captured all variables necessary to measure education methods and adherence. The study was initiated after receiving clearance from the institutional Ethics Committee. Consents were obtained in participants’ own language. The study lasted eight weeks. The initial number of subjects was 40, however only 32 completed the study. The researchers used pre-designed, pre-tested, self-administered, and closed-ended questionnaire to interview the subjects individually. They used age, diagnosis of primary hypertension, being on blood pressure medication for at least three months, and being able to self-medicate as inclusion criteria. They also used pregnancy, lactation, secondary hypertension, taking medication for other chronic diseases, and unwillingness to participate in the study as exclusion criteria. Patient blood pressure was measured after five minutes of rest from their arrival to the point of care before labelling them of having uncontrolled hypertension. Once the diagnosis was confirmed, patient compliance was measured based on their report due to convenience and financial constraints. The variables under study were sociodemographic factors, knowledge of hypertension, frequency of administration, number of antihypertensive drugs being used, and knowledge of compliance. Healthcare professionals at the various healthcare facilities attending to the patients delivered the medication. Researchers interacted with patients during the collection of data. Statistical tools, such as t-tests were used to compare and analyze the data.
before and after the awareness education. Shimla Referral Hospital (Cardiology Department), an outpatient clinic, doubled as the point of care and the workshop.

Non-adherence to antihypertensive medication accounts for 20-50% of deaths resulting from cases of hypertension. Studies have shown that this phenomenon can be mitigated through self-management education. Regular medical check-ups, effective treatment, and creating awareness are some of the management educations that reduce the risk of uncontrolled hypertension. The study recorded an increase in medication adherence following the creation of hypertension awareness after eight weeks of self-management education. The research recommended that to achieve effective therapeutic results in hypertensive patients, there must be persistence and improvement in patient education and the creation of awareness.

**Effect of a Community-Based Intervention on Improving Medication Adherence**

For this study, the researchers adopted a controlled group design. The study aimed to improve patients’ adherence to prescribed antihypertensive medications through a community-based program, in Korea. The researchers assessed patients with hypertension using a non-equivalent control group design. 2685 subjects living in the study area for five years were selected. The subjects were between 65 and 85 years of age diagnosed with hypertension. The study was conducted in communities whereby the non-equivalent control group design was used to measure the implementation of community-based intervention or lack of it. The researchers selected a cohort design at the beginning of the study to arrange and track the study sample. The program included patient education, reduction of out-of-pocket expenses and recall and reminder service. The program started in July 2012 in 2 clinics, and 7 subhealth centers. By 2019, the points of care increased to 22 clinics, and 7 subhealth centers serving as study workshops and 17 pharmacies had been included as partners. Patient adherence to antihypertensive medications was
measured directly through observed therapy, metabolite, blood, and urine concentrations and indirectly through medication possession ratio (MPR) and proportion of days covered (PDC). The two indirect measures were measured based on pharmacy insurance claims information. Patients were prescribed antihypertensive medications on the day they visited the institution and self-management education, and counseling was provided to them as well. However, the frequency of patients’ visits was not documented. The study was conducted over a period of two years, which includes six months before and six months after the interventions were implemented to compare the pre- and post-intervention periods. The result showed significant improvement in the post-intervention period.

Nonadherence rates range from 25-50% varied by insurance coverage, patient characteristic, and disease as the issue of medication nonadherence becomes widespread. Studies indicate a high rate of medication non-adherence in elderly patients of hypertension. It is critical for healthcare professionals to analyze, understand, and arrest the causes of medication nonadherence in hypertensive patients. The study established that medication adherence is of critical importance in hypertensive patients. An effective means of ensuring medication adherence as this study established is participation in community-based healthcare programs. Future studies should design a sophisticated theoretical model in addition to a well-designed research methodology tracking longitudinally to evaluate the effectiveness of the community-based intervention programs.

The identified articles justify the need for patient education on drug compliance, as it can promote drug adherence. The study that was implemented by Delavar et al. (2019) is highly relevant for this project, as it discusses drug compliance among patients with hypertension. Delavar et al. (2019) sought to examine how self-management education would enhance drug
adherence. The researchers selected elderly patients who are appropriate for this project. Although the scholars realized no effect on blood pressure, self-management education promoted drug adherence. The findings of this research are also evident in a study that Migneault et al. (2012) implemented. The authors focused on culturally adapted interventions that included the encouragement of drug adherence. In the end, the researchers noticed that the interventions not only promoted drug adherence, but also enhanced other lifestyle behaviors. According to Lee et al. (2018), older adults may fail to adhere to medications without proper encouragement. Thus, Lee et al. (2018) educated older adults with chronic diseases on drug adherence. The researchers noticed that the implemented targeted interventions improved drug adherence. Grant et al. (2015) argue that expectations of care, which included encouragement on drug adherence, ensured drug compliance. Conn et al. (2015) support the need to provide targeted education, as it can ensure compliance with medications, especially for patients with hypertension. The evidence presented in the above studies is confirmed by Lewis et al. (2012). Overall, healthcare providers should assess patients, identify their barriers to drug adherence, and carry out targeted interventions, which include self-management education to promote drug adherence.

Further evidence confirms that self-management education can be a useful approach to facilitating drug compliance. For instance, Gupta et al. (2018) focused on the awareness of drug compliance among patients with hypertension. The researchers selected only patients with hypertension. Thus, the article is highly relevant to the current project. The study confirms that the increased awareness promotes drug compliance, especially among patients with hypertension. These findings are identical to the ones in the study that was conducted by Conn et al. (2015). The researchers sought to study a community-based intervention and its effect on drug adherence. The intervention included patient education, which promotes drug compliance and
encourages continuity of care. Self-management education is also evident in a study that Patel et al. (2019) implemented. The efficacy of this intervention can be determined by looking at other illnesses. For instance, Patel et al. (2019) focused on patients who had a headache. The scholars assessed if self-management education could promote drug compliance and enhance patient comfort. The researchers noticed that the intervention was feasible to deliver. Most importantly, Tan et al. (2019) did a systematic review of drug adherence to understand how self-management education affects it. The researchers noticed that the educational intervention was efficacious. Overall, there is sufficient research to support the need for self-management education in all patients with hypertension.
PICO Clinical Question

Will a daily reminder in the form of a text message along with a daily lifestyle modification education improve blood pressure control in 20 non-compliant African American patients after four weeks?

Purpose/ PICO Clinical Question/Objective

P – Twenty non-compliant adult African American hypertensive patients with uncontrolled hypertension from eighteen years of age and older.

I – A daily reminder in the form of text along with a lifestyle modification education will be sent to the patients. The text will include the office’s phone number as a reference for the participants to call in case of any questions or concerns.

C – Patients' compliance before texting and patients’ compliance after four weeks of daily text reminders.

O – Compliance improvement and improvement of blood pressure control.
Primary DNP Project Goal

The goal of this project is to improve compliance in adult African American hypertensive patients. The project will take place at a South Florida clinic. The clinic specializes in health promotion and disease prevention. Notably, caregivers are committed to providing excellent services to the community. However, some of the patients do not comply with their antihypertensive treatments. This project will strive to enhance compliance in adult African American hypertensive patients and improve blood pressure management. The research design will be quasi-experimental, as it tests the effect of a daily reminder on non-compliant African American hypertensive patients and participants are chosen based on their compliance status.

Due to the pandemic, the clinic has limited face-to-face interactions with patients and has switched to telehealth, unless offline interaction is necessary. Therefore, an invitation and an informational letter about the project was sent to the participants electronically. The patients' knowledge was tested regarding compliance with a questionnaire. Next, a daily text reminder will be sent to the subjects along with a daily lifestyle modification education. At the end of the four weeks, patients' compliance will be reassessed using the same questionnaire. One of the anticipated risks for this project is patients' credibility. Some of the benefits of this project are compliance improvement, enhancement of blood pressure control, prevention of other cardiovascular diseases, premature death, and decreased healthcare costs. The project is expected to empower participants to be more engaged in self-care. Notably, knowledge gained during this educational intervention will be the core value of the project. It will help providers to understand how to help patients comply with treatment, which, in turn, will enhance the suitability of treatment options to patients' needs.

This quality improvement project will focus on ensuring patients understand that high blood pressure does not usually exert symptoms, which, over time, might provoke such health
complications such as kidney failure, stroke, blindness, and heart attacks. Moreover, the intervention will ensure that patients realize they may become critically ill or die if they do not follow their treatment plans. Patients will be educated on the importance of a healthy diet, physical activity, and medication compliance to control their blood pressure. The project will expand over four weeks. A daily reminder to take their blood pressure medication in the form of text along with a daily lifestyle modification education will be sent to the participants. This project is expected to encourage participants to comply with their treatment. It will also help them understand the need to take medication even when their blood pressure is within normal limits. Participants will also be reminded of the most common side effects of blood pressure medications, such as dizziness, headaches, upset stomach, and so forth. However, these side effects are insignificant compared to the potential adverse reactions of medication non-compliance. Participants will receive educational flyers to remind themselves to take their blood pressure medications. At the end of four weeks, patients’ adherence will be reassessed, and the results will be compared to the data gathered before the intervention to determine its efficiency.

**Definition of Terms**

The project comprises six terms that must be considered when studying literature on medication compliance.

**Drug**: It can be used synonymously with medication. In this context, medication is a substance used to prevent, cure, cure a disease. In the case of hypertension, it is used to reduce symptoms, prevent organ damage, and lower the adverse effects associated with high blood pressure.

**Adherence**: It can be used interchangeably with compliance. It is defined as doing what is required. For this project, it means taking medications as prescribed (Grant et al., 2015). The term indicates the need to understand and follow orders on medication intake.
**Patient.** An individual receiving medical treatment. It refers to all patients with hypertension. Notably, a patient must undergo an assessment to be diagnosed with hypertension.

**Hypertension.** It refers to having two consecutive blood pressure readings of above 120/80mmHg in two sequential visits.

**African American:** An American of African descent.

**Noncompliance:** The state of not acting in accordance with a command.

**Defining Compliance**

Despite an extensive body of literature on antihypertensive drugs, terms “compliance” and “adherence” remain ambiguous. Though used interchangeably, these terms differ in meaning. According to the National Stroke Association (2012), adherence refers to filling or refilling one’s prescription on time. In parallel, compliance is the act of taking one’s prescribed medication on schedule. When it comes to hypertensive drugs, compliance means the extent to which the patient with hypertension follows and adheres to the prescribed therapy (Burnier & Egan, 2019). Vrijens et al. (2017) list three components of medication compliance: initiation, use, and persistence. In other words, compliance means that the patient acknowledges the recommended drug therapy, takes medication in a dose prescribed by the healthcare provider, and persists with treatment if needed to achieve the expected treatment results (Vrijens et al., 2017). This definition is particularly relevant in the context of antihypertensive treatment and blood pressure control, as patients should not only start taking medications but should also continue with the therapy. For many of them, it will mean taking prescribed medications daily throughout their lives.
**Theoretical Framework**

The theoretical framework used in this project is the self-care deficit theory. Dorothea Orem formulated this theory and indicated that it could assist patients in becoming self-reliant (Borji et al., 2017). According to the theorist, the patients are willing to participate in self-care, however, they are not aware of beneficial healthcare interventions. For this reason, providers must help patients to understand what measures can be implemented to improve their health. For example, patients with hypertension may recognize the need to take medications without acknowledging the significance of compliance strategies. Hence, providers must assist patients in identifying measures to minimize non-compliance. By doing so, providers can promote self-care and drug adherence among African Americans with hypertension.

Dorothea Orem devised four concepts that align with the metaparadigm of nursing. For instance, the theorist recognized nursing as specialized assistance to patients unable to care for themselves (Borji et al., 2017). The first concept indicates that nurses must be qualified to care for patients while providing specific guidance on medication intake. For example, they can inform a patient about how to take a particular medication. The patient concept refers to all people in need of health services (Borji et al., 2017). In this case, the patients with hypertension need information on how to comply with medications. The environment concept refers to all factors, including family and community, which improve medication adherence (Borji et al., 2017). In the context of this project, social support from family members should be featured in the self-management education plan to facilitate drug compliance. Finally, health refers to physical and physiological well-being (Borji et al., 2017). Having complied with medications, patients can prevent disease symptoms, mitigate the severity of illness, decrease the rate of readmissions, and eventually reduce care costs.
Interventions and Media/Texting Approaches to Enhance Compliance

A myriad of interventions has been proposed to ensure optimal compliance with antihypertensive therapies. Peacock and Krousel-Wood (2017) divide them into several categories, namely behavioral, informational, social, and combined. The type of intervention used by providers will depend on the barrier that patients need to overcome to manage their blood pressure. For instance, informational interventions might improve patients’ health literacy and strengthen their awareness of antihypertensive therapies, thus changing their behavior and improving compliance (Peacock & Krousel-Wood, 2017). Behavioral interventions can benefit patients as well. Those interventions include reducing the number of pills and readjusting the dose to make therapeutic compliance easier and achievable in the long term (Burnier & Egan, 2019). Notably, using a daily text reminder as a form of communication helped providers develop better rapport with their patients, which is a successful instrument in achieving better adherence to antihypertensive therapy (Burnier & Egan, 2019; Benkeser et al., 2017).

At this point, technology and media applications can be used to facilitate patient-provider communication by sending reminders to patients or identifying red flags that require immediate attention or professional care. Contreras et al. (2019) tested the efficacy of a mobile application installed on patients’ cell phones. The application provided information about hypertensive drugs and informed about antihypertensive therapy and physician appointments (Contreras et al., 2019). As a result, daily adherence to antihypertensive medication was 93 percent in the intervention group, compared to 70 percent in the control group. This result suggested that such applications can improve the quality and continuity of antihypertensive therapies (Contreras et al., 2019). While more research is needed to evaluate the appropriateness of such applications, it
is evident that such application and texting as a form of communication can improve adherence to antihypertensive treatment, hence improve overall patient outcome.

Methodology

The project was implemented at a local clinic in South Florida. Twenty patients were recruited. Due to Covid-19, no physical consents were obtained. However, an informational letter was sent electronically to each participant by their primary care provider from the office.

The primary provider assisted with the recruitment of 20 hypertensive patients that were non-compliant to treatment and were willing to participate in the project. The primary investigator was responsible to text the patients daily to remind them to take their blood pressure medication and to educate them on a specific subject that can help them improve the management of their blood pressure.

Due to Covid-19, all communication and teaching were completed remotely via email and text messages. The primary care providers recruited the participants and contacted them via email to invite them to participate in the project.
**Table 1**

**SWOT Analysis**

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<td>• Sample size.</td>
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<td>• Depends on technology.</td>
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<td>• Patients’ comfort.</td>
<td>• Yes or No questions</td>
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<td>• Patients’ blood pressure not being able to be assessed pre and post intervention.</td>
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<td>• Gives patients a sense of self-control.</td>
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Discussion

Risks and Benefits

The subjects were recruited by their primary care providers online. Due to Covid-19, the caregivers were unable to obtain physical consent from the participants. Therefore, health professionals sent an invitation and an informational letter about the project. In those letters, patients received information that participation in the project would not entail any financial incentives. Participants were also informed of the two primary benefits of the project: improvement of blood pressure management and compliance to treatment. Some other benefits of this project include reduction of health care cost, target organ damage, and mortality rate. It was also mentioned that the project will not cause any psychological, physical, legal, social, or financial risks, except for complications associated with prescribed blood pressure medication. The participants received information about how to address the side effects of treatment. They were also directed to their primary care provider for any questions or clinical concerns. Participants were not required to share any personal information with the investigators. All information shared with the investigators remained confidential.

IRB Protocol Exemption

The primary investigator submitted the project to the Florida International University (FIU) Institutional Review Board (IRB) human protocol for review. After a careful evaluation of the project, the FIU IRB approved the project for implementation. See the IRB approval in Appendix F.
Tools and Data Analysis

Daily Text Reminders. The project’s primary investigator sent participants daily text reminders to take blood pressure medication. The investigator also sent information about a specific lifestyle change for four weeks. Admittedly, all participants remained adherent to the plan for the entire project.

Daily Texts

Week 1

Day 1

Good morning, remember to take your blood pressure medication today.

**Taking your medication as prescribed** can decrease your blood pressure. If you have any questions or concerns, feel free to contact me at (305) 835-9264. I will be at the office until 4:30 in the afternoon to address any questions or concerns. Have a wonderful day!”

Day 2

Good morning, remember to take your blood pressure medication today.

**Exercise** can decrease your blood pressure. Walking 4 to 5 times a week for 30 minutes can decrease your blood pressure. If you have any questions or concerns, feel free to contact me at (305) 835-9264. I will be at the office until 4:30 in the afternoon to address any questions or concerns. Have a wonderful day!”

Day 3

Good morning, remember to take your blood pressure medication today.

**Decrease salt in your diet.** A diet high in salt can increase your blood pressure. Examples of foods high in salt: Canned food, bacon, sausage, cold cuts, frozen dinners, pizza, salted nuts, chips, ketchup, processed cheese. If you have any questions or concerns, feel free to contact me
at (305) 835-9264. I will be at the office until 4:30 in the afternoon to address any questions or concerns. Have a wonderful day!”

Day 4

Good morning, remember to take your blood pressure medication today.

**Drinking alcohol** can raise blood pressure. Men, no more than 2 drinks per day. Women, no more than 1 drink per day. If you have any questions or concerns, feel free to contact me at (305) 835-9264. I will be at the office until 4:30 in the afternoon to address any questions or concerns. Have a wonderful day!”

Day 5

Good morning, remember to take your blood pressure medication today.

**A DASH** diet can improve your blood pressure.

Examples, fruits, vegetables, whole grains, poultry, fish, and low-fat dairy foods. Potassium can be found in bananas, cantaloupe, potatoes, oranges, honeydew, apricots, grapefruits, some dried fruits such as prunes, raisins, and dates, cooked spinach, cooked broccoli, mushrooms, peas, cucumbers. Eat less red meat and fatty foods. If you have any questions or concerns, feel free to contact me at (305) 835-9264. I will be at the office until 4:30 in the afternoon to address any questions or concerns. Have a wonderful day!”

Day 6

Good morning, remember to take your blood pressure medication today.

**Smoking** can increase your blood pressure. If you need help to quit smoking, go to [https://tobaccofreeflorida.com/](https://tobaccofreeflorida.com/) or call 1-877-822-6669. If you have any questions or concerns, feel free to contact me at (305) 835-9264. I will be at the office until 4:30 in the afternoon to address any questions or concerns. Have a wonderful day!”
Day 7

Good morning, remember to take your blood pressure medication today.

Weight loss can decrease your blood pressure. You can reduce your blood pressure by 1 mm Hg with each kilogram (2.2 pounds) of weight you lose. If you have any questions or concerns, feel free to contact me at (305) 835-9264. I will be at the office until 4:30 in the afternoon to address any questions or concerns. Have a wonderful day!”

Week 2

The daily text will be repeated from day one to day seven.

Week 3

The daily text will be repeated from day one to day seven.

Week 4

The daily text will be repeated from day one to day seven.
Findings

Respondents were asked a series of questions before and after the intervention. The purpose was to assess the impact of an educational intervention on hypertension management skills and medication adherence. As shown in Figure 1, participants’ skills in terms of hypertension management and medication adherence improved after the intervention. The results were consistent with the findings obtained by Ozoemena et al. (2019). Figure 1 shows that the number of “no” responses reduced significantly while the number of “yes” responses increased after the intervention for all the twelve questions asked. Overall, data in Figure 1 suggests that self-management education significantly improved participants’ level of hypertension management skills and medication adherence.

Figure 2

Overall Pre-and post-test responses

![Pre-test and Post-test Comparison](image-url)
## Table 2

### Pre-test

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Figure 3

Medication memory

![Medication memory chart]

Figure 4

Adherence to prescription

![Adherence to prescription chart]
Table 4

Free Medications

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<th>Do you know that some blood pressure medications are available for free at some retail stores?</th>
<th>Pre-test</th>
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<td>No</td>
<td>85.0%</td>
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<td>Yes</td>
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Figure 5

Confidence with HBP medication
Results

Adherence to medication prescription improved for every participant after the four weeks of self-management education using text messages as the primary source of communication. The results show that before the education intervention and daily reminder 40% of the respondents took their medication according to their prescriptions. However, after the intervention, the proportion of participants who strictly complied with providers prescriptions increased to 100%. The present findings regarding the impact of an education intervention on adherence mirror the results obtained by Bible et al. (2017) and Scalzi et al. (2018). Similarly, according to data shown in Table 1, before the daily text reminder 15% of the participants were aware of free BP medications at retail stores. After the four weeks of using text messages as the primary source of communication to educate the participants that proportion increased to 100% since every individual was informed about free medications available at certain retail stores.
Apart from data on medication adherence, the findings showed significant improvement in respondents’ disease management skills and awareness. Based on the data in Figure 3, the proportion of respondents who felt confident that their medication helped maintain blood pressure under control was 60% prior to the intervention. After the intervention, the proportion increased to 100%. The results implied that the project improved the respondents’ knowledge and confidence by 40%. In terms of resources available for the hypertensive population, 60% of the subjects were aware of free services available to check their blood pressure. Participation in the project enhanced their awareness about the resources in the other 40% of the chosen population. The results in Figure 4 confirmed that, after the intervention, all the respondents knew about such free services available at the retail stores. As mentioned by Liu et al. (2020) and Boger et al. (2015), the project was fundamental in imparting knowledge and increasing awareness regarding potential areas where hypertensive patients can access services to manage their health conditions, using text messages as the primary source of communication. Thus, self-management education can enhance the quality of life for the African American hypertensive population.

**Potential Strengths and Weaknesses**

**Strengths**

The current results confirmed significant improvement in medication adherence, basic hypertension management skills, and awareness about services after four weeks of self-management education. The results confirm that self-management education is a sustainable and efficient intervention that can improve medication adherence and other fundamental hypertension management skills within the African American population. Moreover, self-management enables patients to understand their conditions, thus empowering them to improve
their communication with their providers. Many studies identify financial burdens associated with medications and unfamiliar symptoms as the most common sources of anxiety or stress within the African American population. This project demonstrated that self-management education can also improve such psychological health complications as anxiety, since it imparts crucial knowledge regarding symptoms and diagnosis while saving patients time and money (Lian et al., 2017).

**Weaknesses**

The main weakness of the project relates to the credibility of data used to evaluate the efficacy of the intervention. Primarily, the size of the sample population was limited (N=20). The primary provider assisted in recruiting 20 hypertensive patients that were non-compliant to treatment and were willing to participate in the project. Due to Covid-19, physical consents were not obtained. However, the primary care provider sent an informational e-letter to participants from the office. Hence, there was lower generalizability, as the small sample size might not have represented the population effectively. Second, the survey collected categorical information in the form of ‘yes’ and ‘no’ responses. Such non-quantitative data limited the scope of statistical examination since rigorous analyses could not be performed. Thus, the study was confined to percentage comparisons. In this case, apart from changes in the proportions, no hypothesis could be tested using parametric criteria.

**Implications for Advanced Practice**

The presented evidence contains strategies that advanced practice nurses can use to ensure drug adherence among African American patients with hypertension. The advanced practice nurses should understand how to conduct patient assessments, which can lead to a
proper diagnosis (Woo et al., 2017). In this way, providers must do a subjective assessment to understand the risks to which patients are exposed to, their previous illnesses, and therapies that they received before. By doing so, they can determine if the patients are at risk of hypertension, have the disease, and how it was managed. Providers should also conduct an objective assessment that includes the assessment of physical status. The measurement of hypertension is necessary for understanding the stage of the condition.

Once the assessment is completed and the stage of the disease is identified, providers should consider relevant and therapeutic drugs. The evidence shows that self-management education can promote adherence (Delavar et al., 2019; Lee et al., 2018). Thus, providers should teach patients on the importance of adhering to medications. However, Migneault et al. (2012) argue that various factors, such as personal beliefs, can affect adherence. Therefore, providers should ask patients to narrate any issue that may impede the efforts to adhere to medications. By doing so, they can know how to tailor their education to facilitate patient care. Thus, they must properly assess patients and reinforce the self-management education process to improve patient compliance. As this project shows that self-management education using a daily text reminder significantly improved participants’ level of hypertension management skills and medication adherence, providers should also adopt this education tool as a form of communication to help improve patient compliance.

**Conclusion**

Self-management education is one of the most significant interventions that can promote drug adherence among African Americans with hypertension. Evidence regarding drug adherence among African American patients with hypertension is limited. This population is at risk for complications, which can necessitate additional care and increase the costs of healthcare.
African Americans suffer more from hypertension due to medication nonadherence. Studies also show that this population is not consistent with recommended self-management education. (Ndumele, Shaykevich, Williams, & Hicks, 2010). Consequently, ensuring proper drug compliance can improve their health as well as reduce healthcare costs. Studies also revealed if African Americans embrace education to create awareness, treatment of depression, physical activity, and consistent visits to healthcare facilities and physicians, they will improve their medication adherence, thus reducing disparities in mortality and morbidity. The most appropriate framework to use is the self-care deficit theory by Dorothea Orem. It identifies a nurse as a useful agent in the changing of patients’ behavior. Patients must have a need that nurses have to address. In this case, patients with hypertension must be aware of medication adherence, and nurses should understand the importance of this issue. Providers must assess various factors, such as costs and cultural barriers, before doing patient education. Evidence indicates that it can promote drug adherence. Advanced practice nurses can enhance their care strategies if they comply with this evidence. The results of this project confirmed that self-management education can improve medication adherence and disease management skills in the African American hypertensive population. All targeted aspects of medication adherence and disease management showed improvement after the four weeks of intervention. The findings suggested that hypertensive African Americans can leverage on self-management education to improve their medication compliance, lower cost of healthcare, and improve their health standards. Although patient education regarding the importance of medications can be a useful intervention to promote drug adherence, several factors determine drug compliance. Patients may not tolerate such the prescribed therapy. Therefore, before healthcare providers order any antihypertensive medication, they must assess the side effects and the potentiality of the medications to cause
harm. By doing so, providers can determine the safety of medications, recommend, and educate patients on safe hypertensive medications.

References


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https://doi.org/10.1161/CIRCRESAHA.118.313220


https://www.nature.com/articles/s41598-018-29974-7


https://doi.org/10.1080/03007995.2018.1549026


**Appendix A**

**Invitation Letter**

*FIU FLORIDA INTERNATIONAL UNIVERSITY*

Improving Medication Compliance in Hypertensive African American Patients at a South Florida Clinic. A Quality Improvement project.

We are looking for volunteers 18 and older who are diagnosed with hypertension. The purpose of this study is to assess the effectiveness of patient education on patients’ compliance to antihypertensive treatment. Participants will get a daily text reminder to take their medication, as well as information regarding:

- The use of technology
- Food choices
- Weight management
- Exercise
- Alcohol consumption
- Smoking
- Stress management

**Location:**
All information will be sent to the participants from I&B Associates via email.
Participants will not receive any compensation.

Eligibility will be based on:
- Age: 18 years or older
- Diagnosis of hypertension
- Patients who have high BP and may not take their medication as prescribed.

If you are interested in learning more about the project, please email:
Darlyla A. Naissance, ARNP, FNP-BC, NP-C at dalti003@fiu.edu or call 561-572-7606.

Team members:
- Darlyla A. Naissance, ARNP, FNP-BC, NP-C
- Dr. Dana Sherman
- Dr. Alande Brezauld

Appendix B

Flyer
Improving Medication Compliance in Hypertensive African American Patients at a South Florida Clinic, a Quality Improvement project.

MUST

Medication Use Safety Training
There are many things you can do to get organized and remind yourself to take their blood pressure medications at the right time and in the right amount (dose).

1. Set a daily routine.

Humans are creatures of habit, so use it to your advantage. Try to take your medications at the same time and place every day (for example, before or after a meal, at bedtime, etc.).

2. Place sticky note reminders to yourself where you will see them.

3. Count your pills.

If you know how many pills you have left, it will be easier to figure out if you have missed a dose or already taken one.

6. Set an alarm.

Set the alarm on your clock radio or cell phone as a reminder.

7. Use technology.

I will be sending you a daily text reminder to help you keep track of your medication schedule.

9. Mark it on your calendar.

Write the date you are due for your next refill or follow-up appointment on your calendar.

Appendix C

Lifestyle Modifications
Lifestyle changes can also help you control and prevent high blood pressure, even if you are taking blood pressure medication. Here is what you can do:

- **Eat healthy foods.** Eat a heart-healthy diet. Try the Dietary Approaches to Stop Hypertension (DASH) diet, which emphasizes fruits, vegetables, whole grains, poultry, fish and low-fat dairy foods. Get plenty of potassium, which can help prevent and control high blood pressure. Eat less saturated fat and transfat.

- **Decrease the salt in your diet.** Aim to limit sodium to less than 2,300 milligrams (mg) a day or less. However, a lower sodium intake — 1,500 mg a day or less — is ideal for most adults.

  While you can reduce the amount of salt you eat by putting down the saltshaker, you generally should also pay attention to the amount of salt that's in the processed foods you eat, such as canned soups or frozen dinners.

- **Maintain a healthy weight.** Keeping a healthy weight, or losing weight if you're overweight or obese, can help you control your high blood pressure and lower your risk of related health problems. In general, you may reduce your blood pressure by about 1 mm Hg with each kilogram (about 2.2 pounds) of weight you lose.

- **Increase physical activity.** Regular physical activity can help lower your blood pressure, manage stress, and reduce your risk of many health conditions. If you have high blood pressure, consistent moderate- to high-intensity workouts can lower your blood pressure. Aim for at least 150 minutes a week of moderate aerobic
activity or 75 minutes a week of vigorous aerobic activity, or a combination of moderate and vigorous activity.

- **Limit alcohol.** Alcohol can raise your blood pressure. Therefore, limit your alcohol intake to one drink a day for women, and up to two drinks a day for men. One drink equals 12 ounces of beer, 5 ounces of wine or 1.5 ounces of 80-proof liquor.

- **Don't smoke.** Tobacco can injure blood vessel walls and speed up the process of buildup of plaque in the arteries. If you smoke, ask your doctor to help you quit.

- **Manage stress. Reduce stress as much as possible.** Practice healthy coping techniques, such as muscle relaxation, deep breathing or mindfulness. Practice taking deep, slow breaths to help relax.

- **Monitor your blood pressure at home.** Home blood pressure monitoring allows you to keep a daily log of blood pressure measurements. Your doctor can review the information to determine if your medication is working or if you're having complications. Home blood pressure monitoring isn't a substitute for visits to your doctor. Even if you get normal readings, don't stop or change your medications or alter your diet without talking to your doctor first.
Appendix D

Knowledge of Hypertension Questionnaire

Please answer Yes or No to answer the following questions.

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<tr>
<td>2. Do you take your blood pressure medication the way your provider prescribes it?</td>
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<td>3. Does your blood pressure make you feel weak, dizzy, decrease your sex drive, or affect your ability to maintain an erection?</td>
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<td>4. Do you have a family member or a friend to remind to take your blood pressure medication on time?</td>
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<tr>
<td>5. Do you feel confident that your blood pressure medication helps keep your blood pressure under control?</td>
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<td>6. Do you think that taking your blood pressure medication is worth the cost?</td>
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<td>7. Do you have insurance or money to pay for your medications and refills when you need them?</td>
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<tr>
<td>8. Do have transportation to buy your blood pressure medication?</td>
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<td>9. Do you think it is not healthy for your body to take drugs daily?</td>
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<td>10. Do you know that some blood pressure medications are available for free at some retail stores?</td>
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<td>11. Do you know that you can check your blood pressure at some retail stores for free?</td>
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<td>12. Do you know that uncontrolled hypertension can cause heart attack, stroke, other life-threatening diseases, and even death?</td>
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Appendix E
Informational Letter

Hello, my name is Darlyla A. Naissance ARNP, MSN, DNP student. You have been chosen at random to be in a research study about improving medication compliance in hypertensive African American patients. The purpose of the study is to establish whether self-management education can improve medication adherence in hypertensive African Americans, using a daily reminder in the form of text. If you decide to be in this study, you will be one of twenty people in this research study. Participation in this study will take four weeks of your time. If you agree to be in the study, I will ask you to do the following things:

1. Patients' knowledge will be assessed with a pre-test. A daily reminder will be texted to the patients, reminding them to take their blood pressure medication. Each day text will include education information about hypertension management. At the end of the four weeks, patients' compliance to blood pressure medication will be reassessed with a post-test.

2. The survey questions will be administered via Qualtrics. It is a data company that is used to design, send, and analyze surveys. The survey questions will be uploaded into Qualtrics. Qualtrics will generate a QR code that will be sent to the participants via email. Participant will be instructed to answer the survey questions and submit them back to the researcher.

There are no foreseeable risks or benefits to you for participating in this study. It is expected that this study will benefit society by encouraging them to comply with their blood pressure medication. It is also expected to help patients control their hypertension. All clinical issues or questions should continue to be directed to your treating physician.

There is no cost or payment to you. If you have questions while taking part, please stop me and ask. You will remain anonymous.

If you have questions for one of the researchers conducting this study, you may contact the primary investigator Dana Sherman, DNP, ARNP, ANP-BC at (305) 348-2247, FNP-BC or Darlyla A. Naissance ARNP, MSN, DNP student at (561) 572-7606.

If you would like to talk with someone about your rights of being a subject in this research study or about ethical issues with this research study, you may contact the FIU Office of Research Integrity by phone at 305-348-2494 or by email at ori@fiu.edu or by mail at 11200 SW 8th Street, AH3-522, Miami, Florida 33199.
Your participation in this research is voluntary, and you will not be penalized or lose benefits if you refuse to participate or decide to stop. You may keep a copy of this form for your records. However, all clinical issues or questions should continue to be directed to your treating physician.
Qualtrics link: https://fiu.qualtrics.com/jfe/form/SV_8cSM7QDzKk4gjmC
Appendix F

IRB Approval Letter

MEMORANDUM

To: Dr. Dana Sherman
CC: Darlyla Naissance

From: Maria Melendez-Vargas, MIBA, IRB Coordinator

Date: June 30, 2021

Protocol Title: "Improving medication compliance in hypertensive African American patients at a South Florida clinic. A quality improvement project."

The Social and Behavioral Institutional Review Board of Florida International University has approved your study for the use of human subjects via the Expedited Review process. Your study was found to be in compliance with this institution’s Federal Wide Assurance (00000060).

IRB Protocol Approval #: IRB-21-0280 IRB Approval Date: 06/02/21
TOPAZ Reference #: 108608 IRB Expiration Date: 06/02/24

As a requirement of IRB Approval you are required to:

1) Submit an IRB Amendment Form for all proposed additions or changes in the procedures involving human subjects. All additions and changes must be reviewed and approved by the IRB prior to implementation.
2) Promptly submit an IRB Event Report Form for every serious or unusual or unanticipated adverse event, problems with the rights or welfare of the human subjects, and/or deviations from the approved protocol.
3) Utilize copies of the date stamped consent document(s) for obtaining consent from subjects (unless waived by the IRB). Signed consent documents must be retained for at least three years after the completion of the study.
4) Receive annual review and re-approval of your study prior to your IRB expiration date. Submit the IRB Renewal Form at least 30 days in advance of the study’s expiration date.
5) Submit an IRB Project Completion Report Form when the study is finished or discontinued.

HIPAA Privacy Rule: N/A
Special Conditions: N/A

For further information, you may visit the IRB website at http://research.fiu.edu/irb.

MMV/em