# IMPROVING PROVIDER UTILIZATION OF MEDICATION ADHERENCE SCREENING TOOLS IN ADULTS WITH HYPERTENSION IN PRIMARY CARE

by

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# ABSTRACT

KIA COLLETON-LIVINGSTON. Improving utilization of medication adherence screening tools in adults with hypertension in primary care (Under the direction of DR. TERESA CATING)

In the United States according to Centers for Disease Control (2019), nearly half of adults, 108 million (45%) have hypertension defined as having a systolic blood pressure greater than 130 or diastolic blood pressure greater than 80. The influence of non-adherence to antihypertensive medications is the most important cause of uncontrolled blood pressure (Abegaz et al., 2016). Medication non-adherence causes 30-50% of treatment failures and results in approximately 125,000 preventable deaths per year (American Health Association, 2013). Medication adherence screening tools are reliable, valid instruments to identify patients at risk for non-adherence; however, many providers are unaware of these readily available screening tools to assess for adherence. The purpose of this quality improvement study was to determine the impact of the Hill-Bone Compliance to High Blood Pressure Therapy scale (HB-HBP) educational intervention on healthcare professionals' knowledge and utilization of the HB-HBP scale in adults with hypertension in primary care. A pre and post-test quality improvement study was conducted with 12 healthcare professionals at an outpatient clinical facility. The Medication Adherence Screening Tool Assessment (MASTA) questionnaire was used to evaluate the participants' knowledge of medication adherence screening tools. A HB-HBP educational training intervention was implemented over three months and changes in the participants' utilization of the HB-HBP scales were evaluated. A paired sample t-test showed a statistical difference in healthcare professionals' knowledge of the

HB-HBP scale and ability to utilize and interpret the scale following the learning session improved. The HB-HBP screening tool allows providers to identify barriers to adherence and serves as resource for interventions to reduce barriers and risk factors.

# DEDICATION

First and foremost, giving honor to God for granting me the knowledge, strength and grace; with him all things are possible. This Doctoral Scholarly Project is dedicated to my parents, your prayers, words of encouragement and support have made this dream a reality. Second, to my brother, for always lending a listening ear and endless support. Third, to my children, for your sweet hugs and kisses while sacrificing precious mommy and me time. Last but most definitely not least, to my husband, your patience, selflessness, encouragement, support and most importantly love has not gone unnoticed. Thank you and love you all.

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TABLE OF CONTENTS

# LIST OF TABLES

# LIST OF ABBREVIATIONS

| | |
|---|---|
| ANP | Adult Nurse Practitioner |
| CMA | Certified Medical Assistant |
| DO | Doctor of Osteopathic Medicine |
| FNP | Family Nurse Practitioner |
| MD | Doctor of Medicine |
| MASTA | Medication Adherence Screening Tool Assessment |
| HB-HBP | Hill-Bone Compliance to High Blood Pressure Therapy Scale |
| IRB | Institutional Review Board |
| LPN | License Practical Nurse |
| PA | Physician Assistant |
| RN | Registered Nurse |
| SPSS | Statistical Package for the Social Sciences |

# Chapter 1: Introduction

## 1.1 Background

With our aging population rapidly increasing, healthcare providers are spending more time managing multiple complex chronic diseases. Multiple comorbidity often leads to non-adherence to medications, increased hospitalization and acute exacerbations of chronic diseases. The World Health Organization (2003) defines adherence as the extent to which a person's behavior taking medications, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a healthcare professional. Medication non-adherence causes 30-50% of treatment failures and results in approximately 125,000 preventable deaths per year (American Health Association, 2013).

Medication non-adherence not only affects patient outcomes, it impacts direct healthcare costs. Non-adherence to medications has cost the United States approximately $100-$300 billion dollars annually (Neiman et al., 2017). Medication adherence screening tools are reliable, valid instruments for identifying patients at risk for non-adherence. However, many providers are unaware of these readily available screening tools for adherence. Educating providers on these screening tools is an important aspect of improving utilization of screening tools in primary care to address adherence to antihypertensive medications.

## 1.2 Problem Statement

In the United States according to Centers for Disease Control (2019), nearly half of adults, 108 million (45%) have hypertension defined as having a systolic blood pressure

greater than130 or diastolic blood pressure greater than 80. Non-adherence to antihypertensive medications is the most important cause of uncontrolled blood pressure (Abegaz et al., 2016). How often do advance practice providers evaluate patients' reasons for being non-adherent with medications? In primary care, the demands of healthcare providers having to deliver care to a specific number of patients per day are increasingly affecting patient-provider interaction. Time constraints and lack of knowledge of available screening tools are often contributing factors for underutilization of medication adherence screening tools in primary care.

## 1.3 Purpose of the Project

According to the United States Department of Agriculture Economic Research Service (2017), nearly 50 million individuals are reported to live in rural settings across the United States. Patients living in rural areas have socioeconomic risk factors that contribute to poor health outcomes. Increased poverty rates, reduced insurance coverage related to low household incomes, in addition to limited access to healthcare services, are major factors for medication non-adherence. Arbuckle et al. (2018) reported that development of screening tools may increase the success of adherence interventions particularly in adults living in rural populations. The aim of this project was to provide education of the Hill Bone Compliance to High Blood Pressure Therapy scale (HB-HBP) to healthcare professionals, and to determine its impact on provider utilization of medication adherence screening tools on adults with hypertension in primary care.

## 1.4 Clinical Question

In healthcare professionals (P), does education of the Hill-Bone Medication Adherence Scale (I), measured by pre-and post-tests (C), improve utilization of medication-adherence screening tools in adults with hypertension (O)?

## 1.5 Project Objectives

Desired outcomes were for healthcare providers to become proficient in assessing for non-adherence of antihypertensive medications and increase utilization of medication adherence screening tools. Another desired outcome was implementation of a valid, reliable medication adherence screening tool into clinical practice.

Marketing strategies were the method of introducing the new screening tool. To attain buy-in, a proposal was presented at a meeting with key stakeholders, flyers and posters were placed at each clinical site, and recruitment emails (Appendix A) were sent. A provider information session was held with all prospective participants at the proposed clinical site. Prior to the presentation, a pre-questionnaire was given to assess knowledge and awareness of medication adherence screening tools. All interested participants completed informed consent (Appendix B) and were trained on how to use and interpret the HB-HBP. Pocket cards (Appendix C) were distributed to all participants for quick reference.

# CHAPTER 2: LITERATURE REVIEW

## 2.1 Search Terms

A comprehensive literature review was performed to provide supporting evidence for this project. Searches were performed using CINAHL, PubMed, Cochrane, EBSCO and Google Scholar. Keywords used while researching the literature included: medication adherence, screening tools, adherence scales, hypertension, barriers, adults, primary care. The articles searched covered a 19-year period, from 1999 to 2018. Older articles were reviewed for historical original content. A total of 108 articles were reviewed, of which 32 met criteria. Inclusion criteria included peer-reviewed articles supporting utilization of reliable and valid medication adherence screening tools in adults with hypertension.

## 2.2 Barriers to Medication Non-adherence

Non-adherence to antihypertensive medications is very common and is a major contributing factor to an increase in cardiovascular diseases in the adult population. Several studies support the use of medication adherence screening tools to identify barriers to medication adherence. The Rapid Estimate of Adult Literacy in Medications (REALM) word recognition pronunciation test predicted the intent of seniors to correctly take their own medications; assessment of health literacy, cognition, and polypharmacy were identified as important factors when screening for medication adherence in older adults (Raehl, Bond, Woods, Patry & Sleeper, 2006). Variables such as age, educational level, and family support were statistically significant in explaining the adherence rates using the Hill-Bone Compliance therapy scales (Uchmaniwiez, Chudiak, Uchmaniwiez, Rosinczuk, & Froelicher, 2018). The Morisky Medication Adherence Scale examined the relation of psychological and tangible barriers to self-reported adherence among older

adults in community in nonmedical settings; results utilizing the scale indicated nonadherence to medication was associated with both tangible and psychological barriers, thus suggesting adherence interventions should address the multilevel barriers to adherence among older adults (Sirey, Greenfield, Weinberger, & Bruce, 2013).

### 2.3 Reliability and Validity of Medication Adherence Screening Tools

Several studies examined the reliability and validity of available medication adherence screening tools. In a systematic review conducted by Kim et al. (2016), 44 studies were reviewed; however, 14 utilized self-reported medication adherence screening tools. The Morisky Medication Adherence Scale's eight items (MMAS-8) and the Hill-Bone Scale were frequently used; results indicated both screening tools were valid, with strong evidence for internal consistency and reliability. The Hill-Bone Scale was translated multiple times to test reliability and validity. In a Polish version of the Hill-Bone Compliance scale, results proved to be suitable for use in the population, thus supporting reliability and validity of the Hill-Bone Compliance Scale (Uchmaniwiez et al., 2016). In a Turkish version, findings indicated the revised Turkish scale was consistent with the original scales, had a high level of internal consistency, and was also found to be reliable and valid (Karademir, Koseoglu, Vateansever & Akker, 2009).

Medication adherence screening tools have been found to identify barriers to non-adherence, and are reliable and valid; however, these screening tools are under-utilized in the primary care setting. Under-utilization is often attributed to lack of awareness of available screening tools and lack of time to perform due to high demands of productivity. Many of the available screening tools are concise and easy to incorporate into routine assessments. In a qualitative study conducted by Miyong, Hill, Lee and

Levine (2000), the Hill-Bone Scale was found to be reliable, valid and succinct; the scale was completed in less than ten minutes, was found to be useful in diagnosing nonadherence, and allowed time for adjusting treatment plans during the assessment. The Medication Adherence Individual Review-Screening Tool (MedSdhIR-ST) assessed medication adherence in community-dwelling elderly adults, results appeared to be reliable and valid, and was also completed in less than ten minutes. The Hill-Bone Compliance Scale validated high compliance scores that were associated with blood pressure control at baseline and follow-up in two independent samples, thus supporting the rationale that screening tools are useful in assessing for adherence, and for guiding plans of care for hypertension.

## 2.4 Gaps in the Literature

Despite supporting evidence of medication adherence screening tools being a reliable and valid intervention for measuring adherence, there appears to be a gap in the literature regarding studies evaluating healthcare providers' knowledge and use of available screening tools. The use of medication adherence screening tools improves patient-centered care, provider-patient communication, and trust. Nurse practitioner communication and treatment adherence in hypertensive patients were evaluated to determine the relationship between patient-centered education and patient adherence to hypertension treatment. Patient-centered care in hypertensive patients indicated significant positive outcomes such as increased self-efficacy and overcoming barriers, thus leading to improved treatment plans, greater adherence, and improved blood pressure (Hartley & Repede, 2011).

Patient-provider trust is another major factor in addressing medication adherence. Patients' lack of trust in their providers often leads to miscommunication, dishonesty, and

lack of self-reporting of medication adherence. Abel & Efird (2013) examined the association between trust in health care providers and medication adherence among black women with hypertension; findings utilizing the HB-HBP scale concluded that increasing levels of trust in the healthcare provider were independently associated with greater medication adherence.

Limitations to using the Hill-Bone Medication Scale were lack of generalizability to hypertensive adults' population (Miyong et al., 2000) and exclusion of elderly patients possibly due to their reluctance to self-report non-adherent behaviors (Raehl et al., 2006). There are many studies evaluating medication adherence screening tools; however, very few of the evidence-based findings are being translated into clinical practice. To implement these available screening tools in clinical practice, it is imperative to bring awareness and to educate healthcare providers on the use of medication adherence screening tools.

## 2.5 Conceptual/ Theoretical Framework

To implement this evidence-based practice change, Rogers' Diffusion of Innovation change theory was utilized. Diffusion of Innovation theory explains how an idea is diffused into a specific population with the end result of adoption of the new idea or behavior. Diffusions spread through social systems in diverse fields (Dingfelder & Mandell, 2011). Diffusion of Innovation consists of 4 stages: dissemination, adoption, implementation and maintenance.

The first step in the diffusion of innovation process is dissemination. Key stakeholders and administrators become aware of the need for assessment of medication adherence screening in adults in primary care and the availability of reliable valid medication adherence screening tools. It is vital for key stakeholders to understand the

concept of the proposed evidence-based practice clinical intervention, and advantages of implementing into clinical practice, mainly because they can influence and encourage adoption of the new intervention to the clinical staff.

Adoption is the second step in the change theory; is the commitment to initiate the proposed innovation (Dingfelder & Mandell, 2011). Adoption of the medication adherence screening tool is dependent on the stakeholders' attitudes towards the intervention and commitment to initiating. Increasing medication adherence will not only assist in improving patient outcomes, it will also help reduce unnecessary healthcare costs; most stakeholders will have a positive attitude towards implementing medication adherence screening tools into routine assessment, and therefore will be motivated to adopt and influence clinical providers to participate.

After dissemination of information and adoption of the proposed innovation, the third step is implementation of the evidence-based intervention into clinical practice. Providers participated in a lunch-and-learn series about the selected medication adherence screening tool, including the evidence to support the use of a reliable, valid screening tool, how to interpret scores, and how to adjust treatment plans to improve medication adherence in older adults with hypertension. Implementation is an important step in the diffusion of innovation because the results of the study will influence sustainability of the intervention into clinical practice thus leading to the final step of maintenance.

The final step, maintenance, is defined as the degree to which an innovation is continued over time (Dingfelder & Mandell, 2011, p. 599). In fact, "the more an innovation can integrate or coexist with existing values, past experiences and the needs of

potential adopters, the greater its prospects for diffusion and adoption." (Zhang, Yu, Yan, & Spil, 2015, p. 3). To ensure sustainability, successful implementation is vital. Implementation of medication adherence screening tools can lead to improved blood pressure control and adherence to antihypertensive medications.

# CHAPTER 3: METHODS

## 3.1 Project Design

A descriptive quality improvement project design implementing an education and practice intervention was used in this project. Upon IRB approval (Appendix D), a pretest intervention was used during the Lunch and Learn session to assess the participants' knowledge on available adherence screening tools. The posttest intervention and focus group discussion were completed 60 days post education.

## 3.2 Sample and Subjects

The sample population was obtained through convenience sampling at the selected primary care clinical sites. The sample size consisted of 12 healthcare professionals and 200 patients. Inclusion criteria required participants to be licensed primary care providers (MD, DO, FNP, ANP, PA), healthcare professionals (LPN, RN), or employees of the participating clinical sites with prescribing authority within the scope of their practice. Pediatricians or Pediatric Nurse Practitioners were excluded. Key stakeholders include the clinical site medical director, administrator, financial officers/accountant, providers, healthcare professionals (CMA, LPN, RN), clinical pharmacists, and adult patients with a diagnosis of hypertension and caregivers. Participants were recruited from a federally qualified healthcare center with five family medicine care clinical sites. The Lunch and Learn session took place at one of the clinical sites located in South Carolina. The patient sample represented rural and underserved populations with diverse socioeconomic backgrounds.

### 3.3 Measurement Tools

The Medication Adherence Screening Tool Awareness (MASTA) Questionnaire (Appendix E)was an investigator developed tool to assess healthcare professionals' knowledge of the Hill Bone Compliance to High Blood Pressure Therapy Scale (HB-HBP) tool. This tool was tested for content validity by three content experts. Content experts determined the MASTA questionnaire was clear, concise and appropriately designed to measure knowledge. This seven-item Likert questionnaire was given a unique identification number to compare pre and post MASTA scores and to access participants' attitudes, knowledge and perceptions related to adherence to antihypertensive medications in adults in primary care. The MASTA questionnaire also evaluated participants' characteristics to include gender, age, race, specialty/certifications, title, education level, and years of experience practicing in primary care.

The Hill-Bone Compliance to High Blood Pressure Therapy Scale (HB-HBP) Scale (Appendix F) was the tool used to measure medication adherence in adults with hypertension in primary care. Permission to use the HB-HBP scale was tool was obtained (Appendix G).The HB-HBP scale is a 14-item Likert scale developed to assess patients' self-reported adherence to antihypertensive therapy; the HB-HBP scale is concise and can be administered in five minutes or less (Kim et al., 2000). In the review of literature, several studies evaluated the validity and reliability of the HB-HBP and determined this tool to be beneficial as an intervention to guide patient education that would eventually lead to improved blood pressure control and medication adherence.

### 3.4 Intervention/Data Collection

Data was collected through quantitative questionnaires which are useful in data collection for projects that involve implementing and evaluating a new protocol (Bonnel & Smith, 2018). Qualitative data was collected through a focus group during the post-MASTA evaluation. Participants completed the pre-Medication Adherence Screening Tool Awareness (MASTA) questionnaire to collect baseline data. The HB-HBP was administered during scheduled routine visits or acute walk-in visits by the healthcare professionals (CMA, LPN or RN) during triage of patients with a diagnosis of hypertension. The HB-HBP was scored and given to the provider for interpretation using the HB-HBP pocket card. The provider utilized the information collected to guide treatment and patient education. Data was collected over three months during normal business hours; Upon completion of the three-month data collection period, all participants completed the post-MASTA questionnaire and focus group discussion.

### 3.5 Project Analysis

Descriptive analysis included participants' characteristics such as gender, age, education level, specialties, title and years of experience practicing in primary care. Analysis also described how many healthcare professionals participated in the project, and mean scores of pre- and post-MASTA questionnaires. Quantitative data analysis was completed with descriptive statistics utilizing SPSS version 25. Interval data was measured using the paired t-test. Qualitative data analysis was obtained through focus group discussions (Appendix C) and the post-MASTA questionnaire.

Translation of the Hill-Bone compliance to high blood pressure scale into clinical practice will allow for health care providers to identify patients with high risk for non-adherence to blood pressure therapy, provide appropriate education and interventions in the clinical setting and improve patient outcomes. Early identification of non-adherence

to high blood pressure therapy not only improves patients' outcomes, it will reduce health care costs. Patient nonadherence to prescribed medications is associated with poor therapeutic outcomes, progression of disease, and an estimated burden of billions of dollars per year in avoidable direct health care costs (Luga & McGuire, 2014). Utilization of medication adherence screening tools can directly impact health care costs by reducing unnecessary hospitalization related to uncontrolled hypertension.

# 4: DATA ANALYSIS

## 4.1 Sample Size and Demographics

A Lunch and Learn session on the Hill-Bone Compliance to High Blood Pressure (HB-HBP) scale was conducted with participants at a rural primary care clinic in South Carolina. The learning session included a Power Point on the HB-HBP scale which lasted approximately one hour. A total of 12 healthcare professionals (N=12) participated in the study and completed the Pre-Medication Adherence Screening Tool Assessment (MASTA) survey and demographics. The sample population was primarily African Americans (75%) with average age between 31-40 (50%). Providers made up 50% of the sample group (n=6), with the other 50% nurses (n=6). Approximately 80% (n=10) of participants had greater than five years of experience as a healthcare professional. Upon completion of the Pre-MASTA, participants were given an opportunity over a three-month time frame to implement the HB-HBP scale into clinical practice at each of the five clinical sites. At the end of the three-month period, approximately 200 patients were screened through convenience sampling. Table 1 represents the demographic information of the participants.

Table 1. Demographic Information of Healthcare Professionals (N=12)

| | N (%) |
|---|---|
| **Age** | |
| 18-30 years | 1 (8.33) |
| 31-40 years | 6 (50) |
| 41-50 years | 2 (16.67) |
| 51 and over | 3 (25) |
| **Race** | |
| Black | 9 (75) |
| Caucasian | 3 (25) |
| Other | 0 |
| **Gender** | |
| Female | 11 (92) |
| Male | 1 (8) |
| **Degree Type** | |
| Associate | 6 (50) |
| Bachelor | 0 (0) |
| Master | 5 (41.67) |
| Doctorate | 1 (8.33) |
| **Professional Title** | |
| Medical Doctor | 1 (8.33) |
| Nurse Practitioner | 5 (41.67) |
| Physician Assistant | 0 (0) |
| Nurse | 6 (50) |
| **Years of Experience** | |
| <1 | 1 (8.33) |
| 1-5 | 1 (8.33) |
| 5-10 | 5 (41.67) |
| 10+ | 5 (41.67) |

4.2 Project Findings/Results

The primary objective of this project was to determine if the educational session of the HB-HBP scale would enhance healthcare professionals' knowledge of the HB-HBP scale, and if there was an impact on utilization and implementation of the HB-HBP screening tool into clinical practice. A paired sample t-test using SPSS version 25 was used to evaluate statistical significance between the Pre- and Post-MASTA results of the

total participants. Pre-test mean was 2.86, post-test mean was 3.73 (t= 4.503(11), P = 0.001). P-value was less than alpha (0.05); therefore, we rejected the null hypothesis and concluded there was a statistical difference pre and post-test score in healthcare professionals' knowledge of the HB-HBP scale and ability to utilize and interpret the scale following the learning session.

A univariate analysis of variance (ANOVA) test was used to determine if there was a statistically significant difference between dependent variables. Levene's test of equality of error variance indicated there was homogeneity of variances in all groups. Age, race, provider type and years of experience had a p-value > 0.05 which indicated there was no statistically significant difference between the dependent variables; however, education was a statistically significant factor (P=0.001). The sample population consisted primarily of Associate degree prepared Registered Nurses (n=6) and master's degree prepared Nurse Practitioners (n=5). Table 2 presents the pre- and post-MASTA mean scores for each participant. The Medication Adherence Screening Tool Assessment (MASTA) questionnaire used a seven-item Likert scale ranging from one (strongly disagree) to five (strongly agree) to assess participants' knowledge, comfort level, and use of medication adherence screening tools.

Table 2. Pre and Post-MASTA mean scores

| Participants ID | Pre-test Mean | Post-test Mean |
|---|---|---|
| 1 | 2.74 | 4.14 |
| 2 | 3 | 4 |
| 3 | 2.42 | 4 |
| 4 | 2.28 | 3.85 |
| 5 | 2.85 | 4 |
| 6 | 2.71 | 3 |
| 7 | 3.14 | 4 |
| 8 | 2.42 | 3.57 |
| 9 | 2.85 | 3.42 |
| 10 | 3.71 | 3 |
| 11 | 3.71 | 4 |
| 12 | 2.57 | 3.85 |

4.3 Discussion of Results

Pre- and post-test MASTA scores demonstrated there was an increase in healthcare professionals' knowledge of the HB-HBP scale and ability to implement and interpret scales into clinical assessment. Cut off scores were established to measure knowledge, scores ranged from seven to thirty-five. A score of 7 indicated no knowledge and a score of 35 implied very good knowledge. Pre-test scores indicated the participants had no knowledge of available medication adherence screening tools and that providers were not using screening tools in clinical practice. Post-test scores demonstrated that the learning session had a positive impact on utilization of the HB-HBP scales; participants were motivated and willing to utilize the scales, hence the patient sample size (N=200). Post-test mean scores implied that there was an increase in providers' use of HB-HBP scores to guide patient education and interventions for non-adherence to antihypertension therapy. In addition, participants' perceptions of medication adherence screening tools as

reliable, valid tools to identify potential barriers to non-adherence increased post-test. Surprisingly, compared to the pre-test scores, post-test results indicated most participants agreed that appointments allowed enough time to screen for medication adherence and to provide patient education.

Common themes from a qualitative focus discussion (Appendix H) concluded that the HB-HBP scale was helpful in regard to identifying patients at risk for non-adherence to hypertension therapy. Patient-centered care was a common theme; patients were given the opportunity to participate in the decision-making process thus improved patient-provider communication regarding patient education and interventions. Self-efficacy in patients improved; healthcare professionals indicated patients were actively participating by bringing their medications and blood pressure reading logs, as well as communicating with providers regarding medication administration and indications for use. Interdisciplinary collaboration was another common theme; non-providers believed they contributed to improving patient care by initiating the HB-HBP scales during triage on adults with hypertension. Participants were also interested in incorporating a medication adherence screening tool in the electronic medical record.

# Chapter 5: Discussion

## 5.1 Significance

The Hill Bone Compliance to High Blood Pressure Therapy scale (HB-HBP) provided healthcare professionals a screening tool with which they could identify adult patients with hypertension that were high risk for non-adherence to antihypertensive therapy, therefore improving patient outcomes. Over a three-month period of implementing the Hill Bone Compliance to High Blood Pressure Therapy (HB-HBP) screening tool, mean total scores indicated the overall response improved from pre- to post MASTA. The mean total scores individually increased from 2.86 to 3.73, with a maximum score of 4 points. This is a clinically significant finding because participants' knowledge and utilization of the HB-HBP scale improved. Healthcare professionals (HCP) became proficient in screening for patients at risk for non-adherence. Knowledge of medication adherence screenings tools and comfort levels performing HB-HBP scales increased approximately 72% post-MASTA. Education of the HB-HBP scale had a significant impact on the utilization and comfort level of implementing the HB-HBP tool in clinical practice. Pre-MASTA participants were not utilizing medication adherence screening tools primarily due to lack of knowledge; utilization and comfort levels performing the HB-HBP were evident in the patient population (N=200). Overall response indicated the participants were persistent in completing the HB-HBP tool during routine visits.

Providers' overall response regarding their comfort level in interpreting scores from the HB-HBP improved significantly. Participants assenting that they were comfortable interpreting scores to determine medication adherence and to guide

interventions improved from 8.33% to 25%. In addition to the educational session, participants were given pocket cards of the HB-HBP scale. Accessibility of the pocket cards allowed providers to immediately interpret scores, adjust interventions and provide education to the patients during the clinical assessment. Improved utilization of the HB-HBP screening tool had a significant impact on provider-patient communication. Pre-MASTA scores improved from 25% to 67%; qualitative data indicated patients were asking more questions in regard to medication indications and dosage. Another participant noted that patients were calling the nurse triage during the day if they had additional questions regarding their medications or if they had problems receiving refills of their medications. In the past, patients would wait until their follow-up appointment, thus not taking their medications as prescribed.

The HB-HBP scale was determined to be a reliable and valid screening tool to identify risk for medication adherence. Perceptions of reliability and validity improved 25%. Qualitative data from the focus group discussion confirmed that the HB-HBP scale was reliable in identifying barriers to medication adherence and patients at high risk for nonadherence. Participants reported the screening tools were concise, which allowed time to incorporate into clinical assessment. Pre-MASTA, 8.33% of the participants agreed that appointment times allowed enough time to screen for medication adherence and provider patient education. Post-MASTA scores improved to 86%, thus confirming the HB-HBP scale is concise and can be completed in less than 10 minutes. A contributing factor to this finding was nurses completing the scales during triage and scoring for the provider. The provider's time was spent interpreting the scores and having an open

discussion with the patient regarding barriers and risk for non-adherence to antihypertensive therapy thus improving provider-patient communication.

## 5.2 Summary

Key findings indicated there is a need for utilization of medication adherence screening tools, particularly in adults with hypertension in rural underserved populations. The HB-HBP screening tool allows providers to identify barriers to adherence and provide resources and interventions to reduce barriers and risk factors. Utilization of medication adherence screening tools improves patient-centered care by allowing patients to identify goals to achieve positive outcomes, become accountable for actions while obtaining goals, and develop trusting relationships with healthcare professionals and providers.

A strength of this quality improvement project was the availability of five clinical sites, all located in rural underserved communities; patients living in rural populations are at a higher risk for nonadherence to medications due to limited access to care and resources. Qualitative data from the focus group discussion confirmed patients were interested in patient-centered care. Utilization of the HB-HBP scales allows the opportunity for open discussions between the patient and the providers. Another strength of this project was utilization of the multidisciplinary team. Nurses are often the initial point of contact; the nurses were able to complete the screening tools in a timely manner to assist the provider. Providers have limited appointment times due to increased demands of productivity; completing the initial screenings of the HB-HBP allowed providers more time to discuss barriers and risk factors, and to adjust treatment interventions to improve patient outcomes. There were no identifiable failures or harm to participants, no missing data or breaches of confidentially among participants.

## 5.3 Limitations

Several limitations to this quality improvement project were identified. Despite 100% participation there was a significantly limited sample size (N=12). A power analysis was not performed to determine an effective sample size, due to this being a quality improvement project. A larger sample size would provide stronger evidence to support the findings. The primary aim of this evidence-based project was to improve utilization of medication adherence screening tools in primary care, and opportunities for future implementation into clinical practices. Despite completing the project at five clinical sites, most of the providers were excluded from the sample population due to being pediatricians or pediatric nurse practitioners. A second limitation was lack of follow-up to determine if utilization of the HB-HBP scale had an impact on patients' overall blood pressure readings, improvement in adherence and patient-provider communication. Given a three-month time frame to implement, follow-up care was not evaluated post utilization of the HB-HBP.

## 5.4 Implications for Future Practice

Implications for future practice aligns with the limitations of the project. Implementing a reliable, valid medication adherence screening tool into clinical practice identifies barriers to nonadherence, reduces cost of unnecessary antihypertensives and hospitalization related to uncontrolled hypertension. Another implication for future practice would be to monitor the effectiveness of HB-HBP by measuring pre and post blood pressure readings post- implementation of the HB-HBP. Evaluating blood pressures could determine the effectiveness of providers utilizing medication adherence screening tools to guide treatment interventions for hypertension in nonadherent patients.

The HB-HBP is available to providers at no cost, therefore the HB-HBP can be a cost-effective resource to fill the knowledge gap of utilization and availability of medication adherence screening tools. Translating knowledge of the HB-HBP scale into clinical practice allows providers to increase utilization and to provide continuing education to other members of the interdisciplinary team. Finally, implementing a reliable and valid medication adherence scale into the electronic medical record would ensure provider utilization of the screening tool.

### 5.5 Sustainability

Recommendations for maintaining and sustaining change in clinical practice would be to incorporate the HB-HBP scale into routine visits to ensure providers are utilizing the HB-HBP scale to identify patients at risk for medication nonadherence. Providing annual continuing education and incorporating it as a factor in performance evaluations can be an effective strategy to sustain implementation. Utilization of an interdisciplinary team approach can improve utilization, allowing other members of the healthcare team to provide interventions and resources for the patient to achieve the overall goal of improve patient outcomes.

### 5.6 Conclusion

Multiple studies indicated medication adherence screening tools were reliable, valid interventions to measure medication adherence, however, there were gaps in implementing these available screening tools into clinical practice. The clinical significance of this quality improvement project determined increased knowledge of the HB-HBP therapy scale could lead to improved utilization among providers and better patient outcomes. The learning session successfully educated health care professionals on the indication, screening process, and how to interpret the HB-HBP scale. Overall, this

project established there is a need for education of medication adherence screening tools among healthcare professionals to increase awareness and to identify potential barriers to medication adherence particularly in adults living in rural underserved populations.

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# APPENDIX A: RECRUITMENT EMAIL

Dear Healthcare Professional:

I am a Doctor of Nursing Practice student at the University of North Carolina at Charlotte. As part of the degree requirements, I am required to complete an evidence-based project in my field. The title of my project is "Improving Provider Utilization of Medication Adherence Screening Tools in Adults with Hypertension in Primary Care."

The aim of the study is to provide education to healthcare professionals on the use of the Hill-Bone Medication Adherence screening tool to identify medication compliance in adults with hypertension living in rural areas and to determine if utilization of medication adherence screening tool improves patient outcomes. A pre-questionnaire will be given prior to a Lunch and Learn Session to evaluate knowledge of the Hill-Bone scale and to provide education on the use of the scale. This project will be completed within a 3-month time frame. Evaluation of the project will be based on a post-test questionnaire which will be completed online that should take 5 minutes or less to complete. All information and findings from this research project will be treated strictly as confidential and solely for academic purposes.

Your participation in this research study is completely voluntary. By participating in this project, you may enter to win two (2) $50 Amazon gift cards upon completion. Your responses will remain anonymous and participation in this survey is completely voluntary. You may opt to quit the survey at any time. Consent for this study will be given when you begin the survey. Information gathered in this survey will be shared by me only with my project faculty advisors at UNCC and not disseminated outside of UNCC. A summary of the data will be presented in a public presentation conducted on the UNCC campus as partial requirement for the completion of their DNP program, and potentially as part of a publication at a later date.

Please direct all questions or concerns related to this project to:
Principal Investigator: kcolleto@uncc.edu
Faculty Advisor: Dr. Teresa Cating Teresa.Cating@uncc.edu

Thank you for your time,

Kia Colleton-Livingston, MSN ANP-C

APPENDIX B: PARTICIPANT CONSENT


Department of Nursing
9201 University City Boulevard, Charlotte, NC 28223-0001

**Consent to Participate in a Research Study**

Title of the Project: Improving Provider Utilization of Medication Adherence Screening Tools in Adults with Hypertension in Primary Care
Principal Investigator: Kia Colleton-Livingston, MSN, ANP-C, RN
Faculty Chair: Teresa Cating, DNP , AGNP-C

You are invited to participate in a research study. Participation in this research study is voluntary. The information provided is to help you decide whether or not to participate. If you have any questions, please ask.

**Important Information You Need to Know**

- The purpose of this study is to determine if provider education of the Hill-Bone Compliance to High Blood Pressure Therapy Scale ( HB-HBP) will increase provider utilization of medication adherence screening tools in adults with hypertension in primary care.

- We are asking health care providers and health care professionals to complete the Medical Adherence Screening Tool Assessment (MASTA) questionnaires about knowledge and utilization of medication adherence screening tools in primary care. This is a two (2) part study. We'll ask you to come to Lunch and Learn session on the Hill-Bone Compliance to High Blood Pressure Therapy Scale (HB-HBP) at your clinical site and complete a written questionnaire that will take about 30 minutes. Providers and healthcare professionals will have the

opportunity to administer the HB-HBP scale to adult patients with a diagnosis of hypertension during triage to access for medication adherence. Then, 3 months later, we'll invite you to complete a post MASTA questionnaires and participate in a focus group discussion that will also take about 20 minutes. We'll provide you with a link to click on to access the questionnaires online. After you complete the online questionnaires, participants may choose to be entered into a gift card drawing for two (2) Amazon gift card valued at $50 each.

- You may choose to skip a question you do not want to answer. You will not personally benefit from taking part in this research, but our study results may help us better understand how providers can better access for barriers to medication adherence in adults with hypertension.

- Please read this form and ask any questions you may have before you decide whether to participate in this research study.

**Why are we doing this study?**
The purpose of this study is to determine provider knowledge of Medication Adherence screening tools and to evaluate if provider education will improve provider utilization of medication adherence screening tools in primary care.

**Why are you being asked to be in this research study.**
You are being asked to be in this study because you are a healthcare provider (MD, DO, NP, PA) providing primary care to adults 18 and older in a rural healthcare center.

**What will happen if I take part in this study?**
If you choose to participate you will complete questionnaires twice. Once during a Lunch and learn session and the second time, online. For the first part of this study, I will come to your clinical site and complete written questionnaires, the questionnaires will ask questions about your background (age, education, specialty, gender, etc.), and knowledge of medication adherence screening tools. Then three (3) months later, you'll receive an URL link to click to complete the post online questionnaires. You'll be asked to complete the same questionnaires again.

**What benefits might I experience?**
Provider will gain knowledge and education on available screening tools to access for medication adherence in adults in primary care.

**What risks might I experience?**
There are minimal risks in participating in this study. If you become tired, you can stop at any time. If you do not want to answer any question, you can skip it. Your name will not be on your survey and I will keep all the materials confidential and protected in a secure locked box and computer database. The information from my project will only be shared as a summary, your responses will not be shared with anyone except my faculty advisor. Your participation of the study is strictly voluntary, and your decision to participate will not be recorded or reported.

**How will my information be protected?**
To protect your privacy (identity), no personal identifiers will be used to link your pre/ post questionnaires and focus group responses. While the study is active, all data will be stored in a password-protected data base that can be accessed by the primary researcher. Only the research team will have routine access to the study data. Other people with approval from the Investigator, may need to see the information we collect about you. Including people who work for UNC Charlotte and other agencies as required by law or allowed by federal regulations.

**How will my information be used after the study is over?**
After this study is complete, study data may be shared with other researchers for use in other studies without asking for your consent again or as may be needed as part of publishing our results. The data we share will NOT include information that could identify you.

**Will I receive an incentive for taking part in this study?**
A catered lunch will be provided during the Lunch and Learn Session. After you complete the online questionnaire (part 2), you'll be entered into a drawing for two (2) Amazon gift cards with a $50 value
Incentive payments are considered taxable income. Therefore, we are required to give the University's Financial Services division a log/tracking sheet with the names of all individuals who received a gift card. This sheet is for tax purposes only and is separate from the research data, which means the names will not be linked to (survey or interview) responses.

**What other choices do I have if I don't take part in this study?**
There are no other alternatives if participants don't take part in this study.

**What are my rights if I take part in this study?**
It is up to you to decide to be in this research study. Participating in this study is voluntary. Even if you decide to be part of the study now, you may change your mind and stop at any time. You do not have to answer any questions you do not want to answer.

**Who can answer my questions about this study and my rights as a participant?**
For questions about this research, you may contact Kia Colleton-Livingston, kcolleto@uncc.edu, 336-408-5630 and Dr. Teresa Cating, Teresa.Cating@uncc.edu, 704-687-7992.

If you have questions about your rights as a research participant, or wish to obtain information, ask questions, or discuss any concerns about this study with someone other than the researcher(s), please contact the Office of Research Compliance at 704-687-1871 or uncc-irb@uncc.edu.

**Consent to Participate**

By signing this document, you are agreeing to be in this study. Make sure you understand what the study is about before you sign. You will receive a copy of this document for your records. If you have any questions about the study after you sign this document, you can contact the study team using the information provided above.

I understand what the study is about, and my questions so far have been answered. I agree to take part in this study.

_____
Name (PRINT)

_____
Signature Date

_____
Name & Signature of person obtaining consent Date

# APPENDIX C: POCKET CARD SCORING GUIDE

| | None of the Time | Some of the Time | Most of the Time | All of the Time |
|---|---|---|---|---|
| 1.How often do you forget to take your HBP medicine? | 1 | 2 | 3 | 4 |
| 2. How often do you decided not to take your HBP medicine? | 1 | 2 | 3 | 4 |
| 3. How often do you eat salty food? | 1 | 2 | 3 | 4 |
| 4. How often do you shake salt on your food before you eat it? | 1 | 2 | 3 | 4 |
| 5. How often do you eat fast food? | 1 | 2 | 3 | 4 |
| 6. How often do you forget to make the next appointment before you leave the doctor's office? | 1 | 2 | 3 | 4 |
| 7. How often do you miss scheduled appointments? | 1 | 2 | 3 | 4 |
| 8. How often do you forget your prescription filled? | 1 | 2 | 3 | 4 |
| 9. How often do you run out of HBP pills? | 1 | 2 | 3 | 4 |
| 10. How often do you skip your HBP medicine before you go the doctor? | 1 | 2 | 3 | 4 |
| 11. How often do you miss taking your HBP pills when you feel better? | 1 | 2 | 3 | 4 |
| 12. How often do you miss taking your HBP pills when you feel sick? | 1 | 2 | 3 | 4 |
| 13.How often do you take someone else's HBP pills? | 1 | 2 | 3 | 4 |
| 14. How often do you miss taking your HBP pills when you are careless? | 1 | 2 | 3 | 4 |
| TOTAL= | | | | |

Reference:

Kim, M.T., Hill, M.N., Bone, L.R., Levine, D.M. Development and testing of the Hill-Bone
compliance to high blood pressure therapy scale. Progress in Cardiovascular Nursing Summer
2000, 90-96. https://www.ncbi.nlm.nih.gov/pubmed/10951950

Lambert EV, Steyn K, Stender S, Everage N, Fourie JM, Hill M. Cross-cultural validation of the
Hill-Bone compliance to high blood pressure therapy scale in a South African, Primary Health
Care Setting. Ethnicity & Disease 2006; 16:286-291.

https://www.ncbi.nlm.nih.gov/pubmed/16599385

Scores range: 14-56
14: Perfect score- Adherent to high blood pressure therapy

56: High Score- Non-adherent to high blood pressure therapy.

** Lower the score higher adherence to high Blood pressure therapy
** Higher the score low adherence to high Blood Pressure Therapy

# APPENDIX D: IRB APPROVAL


OFFICE OF RESEARCH COMPLIANCE
9201 University City Boulevard
319 Cameron Hall
Charlotte NC 28223-0001
(704)-687-1871
Web site: http://research.uncc.edu/
Federalwide Assurance (FWA) #00000649

**To**: Kia Colleton-Livings

**From**: IRB

**Approval Date**: 12/03/2019
**RE**: Notice of IRB Approval by Expedited Review (under 45 CFR 46.110)
**Submission Type**: Modification
**Expedited Category**: 6.Voice/image research recordings,7.Surveys/interviews/focus groups,Minor Change to Previously Approved Research
**Study #:** 19-0191

**Study Title**: Improving provider Utilization of Medication Adherence Screening Tools in Adults with Hypertension in Primary Care.

This submission has been approved by the IRB. It has been determined that the risk involved in this modification is no more than minimal. Unless otherwise noted, regulatory and other findings made previously for this study continue to be applicable.

**Submission Description:**

addition of A focus group along with the Post- MASTA questionniare will be utilized at the end of the implementation phase to obtain qualitative data, feedback and recommendations from participants.

**Investigator's Responsibilities:**

If applicable, your approved consent forms and other documents are available online at http://uncc.myresearchonline.org/irb/index.cfm?event=home.dashboard.irbStudyManagement&irb_id=19-0191.

Data security procedures must follow procedures as approved in the protocol and in accordance with ITS Guidelines for Data Handling.

This study was reviewed in accordance with federal regulations governing human subjects research, including those found at 45 CFR 46 (Common Rule) and 21 CFR 50 & 56 (FDA), where applicable.

# APPENDIX E: MEDICATION ADHERENCE SCREENING TOOL ASSESSMENT QUESTIONNAIRE

| Demographics<br>Age:<br>Race:<br>Gender:<br>Education level:<br>Provider Title/specialty3<br>Years of experience: | Response<br>1= Strongly disagree<br>2= disagree<br>3=neither agree/disagree<br>4= agree<br>5= Strongly agree |
|---|---|

| No. | Item |
|---|---|
| 1 | I currently use Medication Adherence Screening Tools to access for medication adherence in adults with hypertension<br>1 2 3 4 5 |
| 2 | I am knowledgeable about medication adherence screening tools<br>1 2 3 4 5 |
| 3 | I am comfortable performing medication adherence screening tools<br>1 2 3 4 5 |
| 4 | I am comfortable interpreting scores to determine medication adherence and to guide treatment<br>1 2 3 4 5 |
| 5 | Medication Adherence screening tools are reliable and valid tools to identify potential barriers to non -adherence<br>1 2 3 4 5 |
| 6 | Medication Adherence screening tools improves provider-patient communication<br>1 2 3 4 5 |
| 7 | Appointment times allow enough time to screen for medication adherence and provide patient education<br>1 2 3 4 5 |
| Additional comments/feedback: | |

# APPENDIX F: HILL-BONE COMPLIANCE TO HIGH BLOOD PRESSURE THERAPY SCALE

| | None of the Time | Some of the Time | Most of the Time | All of the Time |
|---|---|---|---|---|
| 1.How often do you forget to take your HBP medicine? | 1 | 2 | 3 | 4 |
| 2. How often do you decided not to take your HBP medicine? | 1 | 2 | 3 | 4 |
| 3. How often do you eat salty food? | 1 | 2 | 3 | 4 |
| 4. How often do you shake salt on your food before you eat it? | 1 | 2 | 3 | 4 |
| 5. How often do you eat fast food? | 1 | 2 | 3 | 4 |
| 6. How often do you forget to make the next appointment before you leave the doctor's office? | 1 | 2 | 3 | 4 |
| 7. How often do you miss scheduled appointments? | 1 | 2 | 3 | 4 |
| 8. How often do you forget your prescription filled? | 1 | 2 | 3 | 4 |
| 9. How often do you run out of HBP pills? | 1 | 2 | 3 | 4 |
| 10. How often do you skip your HBP medicine before you go the doctor? | 1 | 2 | 3 | 4 |
| 11. How often do you miss taking your HBP pills when you feel better? | 1 | 2 | 3 | 4 |
| 12. How often do you miss taking your HBP pills when you feel sick? | 1 | 2 | 3 | 4 |
| 13.How often do you take someone else's HBP pills? | 1 | 2 | 3 | 4 |
| 14. How often do you miss taking your HBP pills when you are careless? | 1 | 2 | 3 | 4 |
| TOTAL= | | | | |
| | | | | |

APPENDIX G: PERMISSION TO USE HB-HBP TOOL

# The Hill-Bone Scales Confirmation

## THANK YOU FOR YOUR INTEREST IN USING THE HILL-BONE SCALE.

## *SCORING GUIDE*

SCORING GUIDE FOR THE HILL-BONE SCALES

Please consider this as permission to use the Hill-Bone Scale. *

Below are links to the Hill-Bone Scales along with several relevant articles reporting on the validation and use of the scale. We would like to request that you cite the scale using the references provided. We would appreciate you sharing the findings of your research with us.

Please don't hesitate to reach out to us at SON-HillBone@jhu.edu if you have any follow-up questions.

Best,

The Hill-Bone Scales team

** Note: Please do not share these documents with anyone else outside your project. We ask that anyone who wishes to use the scale should submit a formal request using the link provided for proper authorization.*

# APPENDIX H: FOCUS GROUP DISCUSSION SCRIPT

## Introduction

*Good Morning, I would like to thank everyone for returning to complete the final stage of my project. In addition to completing the post medication adherence screening tool awareness questionnaire a brief focus group discussion will also take place. A focus group is a relaxed discussion to obtain qualitative data, feedback and recommendations in regard to my project. Consent will be required for participation in the focus group.*

## Present the purpose

*We are here today to talk about your experiences since you participated in my DNP scholarly project . The purpose is to get your perceptions of how the education of Hill- Bone screening tool have affected your clinical practice. I am not here to share information, or to give you my opinions. Your perceptions are what matter. There are no right or wrong or desirable or undesirable answers. You can disagree with each other, and you can change your mind. I would like you to feel comfortable saying what you really think and how you really feel.*

## Discuss procedure

*Dr. _____ will be taking notes during the discussion so that I do not miss anything you have to say. As you know everything is confidential. No one will know who said what. I want this to be a group discussion, so feel free to respond to me and to other members in the group without waiting to be called on. However, I would appreciate it if only one person did talk at a time. The discussion will last approximately 30 minutes.*

## Rapport building

*I want each of you to think of an adjective that best described your knowledge of medication adherence screening tools prior to the workshop experience and one that describes it following the experience. If you do not think your knowledge has changed, you may select one adjective. We're going to go around the room so you can share your choices. Please briefly explain why you selected the adjective(s) you did.*

Interview

1. ***Would you have utilized medication adherence screening tools in adults with hypertension in your clinical practices if you had not participated in the study?***

   Probes: If so, *where would you have gotten this information? How would the information have been different?*

2. ***Of the education introduced to you through the Breakfast and learn, what***

   **Information** ***has been most effective? Least effective?***

   Probes: *Tell me why you think they have been effective.*

3. ***Describe for me any changes you noticed in your patients since your participation in the study.***

   Probes: *Have their adherence levels increased? How do you know that? Why do you think that is? How have your changes affected their active participation in their health care and being adherent to antihypertension therapy? What about their knowledge base?*

4. ***If you were implementing this study in the future, how would you improve them?***

   Probes: *Any ideas of how to best do that?*

5. ***How likely are you to continue using medication adherence screening tools in your clinical practice?***

Closure

*Though there were many different opinions about _____, it appears unanimous that _____. Does anyone see it differently? It seems most of you agree _____, but some think that _____. Does anyone want to add or clarify an opinion on this?*

*Is there any other information regarding your experience with or following the study that you think would be useful for me to know?*

*Thank you very much for coming this morning. Your time is very much appreciated, and your comments have been very helpful.*