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Hypertensive Management for African American Patients

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Hypertensive Management for African American Patients

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Abstract

Background: The rates of angioedema amongst African American patients using angiotensin-converting-enzyme-inhibitors (ACE-I) are five times greater than non-African American counterparts (01.-07 percent vs. 0.5-3.5 percent). Although ACE-I agents are widely prescribed, they have less therapeutic control in hypertension amongst this group of patients and high incidences of life threatening side effects.

Methods: The purpose of this quality improvement (QI) project was to assess provider knowledge related to established guidelines from the Joint National Committee (JNC) on hypertension management, as well as their knowledge of the side effects of ACE-I for African American patients. A pre interventions survey was conducted to assess knowledge of established guidelines for hypertension management and risks associated with use of ACE-I in African American patients. The staff was then educated on current guidelines as well as where to access them, and also on the risks of ACE-I and alternative options for African American patients and a post intervention survey was issued to assess knowledge gained from the intervention.

Results: Following the educational intervention, all participants were able to identify resources related to guidelines for hypertensive management. However, only 75% of staff were able to recall potential adverse side effects of ACE-I use in African American patients.

Conclusion: The results of this QI project support the effectiveness of an educational program addressing ethnic considerations in the prescribing of ACE-I for African American patients.

Keywords: *African American, angioedema, hypertension, ACE-I*

Hypertensive Management for African American Patients

Introduction

Hypertension among African Americans is proportionately higher than other races. By the age of sixty-five, African American patients are 65% more likely to have developed hypertension (Ferdinand, 2003) (see Appendix A for hypertension demographic bar graph). Many genetic, cultural, pathological and even geographical components make this population susceptible to hypertension (Ferdinand, 2003; Ogedegbe, 2015).

Background

Although well recognized institutions such as the American Society of Hypertension have developed effective hypertension management; leading institutions such as the American College of Cardiology (ACC) and the American Heart Association (AHA) have limited research regarding ethnic considerations for hypertension. The need for ethnic based hypertension management is needed and proper pharmaceutical drug selection must be tailored to patient needs. For example, the use of angiotensin converting enzyme inhibitors (ACE-I) amongst African American patients has shown decreased effectiveness and increased morbidity and mortality (Ferdinand, 2003). Despite the evidence, many providers still prescribe ACE-I as first line management with this population. The gap in evidence vs. practice can be attributed to the lack of representation in hypertensive studies amongst African Americans (Ogedegbe, 2015).

Problem Statement

Due to genetic makeup and ethnic components, African Americans respond differently to the treatment of hypertension with ACE-I (Ogedegbe, 2015). Appropriate education on current guidelines and recommendations is necessary to ensure proper prescription thus decreasing adverse reactions. The increased risk of angioedema in African Americans prescribed ACE-I for hypertension requires a need for culturally appropriate guidelines and education for prescribing providers. Providing the current published guidelines on hypertensive management and evaluating the competency of local providers, will help reiterate the importance of ethnic consideration in hypertensive management. Furthermore, decreases in adverse reaction and better therapeutic control will be evident.

Organizational “gap” Analysis of Project Site

The proposed site is a primary care facility. The site has no clear guidelines for the management of hypertension and their reference resources are outdated. Although this capstone project does focus on African American patients, the established guidelines consist of best practice for all patients including those with chronic illnesses (James et al., 2014). The providers will be given these resource to improve their practice and prescribing methods. The purpose of the capstone project is to ensure that 100% of staff know how to access the current guidelines on hypertension management to adequately prescribe medication for African American patients. This will consequently decrease the high prescriptions of ACE-I amongst this population as first line management which has

proven to be less effective in controlling hypertension along with carrying life threatening side effects (angioedema).

Review of the Literature

A comprehensive review was conducted using CINAHL complete, PubMed and UpToDate. The following Medical Subject Headings (MeSH) terms were used for CINAHL: African American and/or blacks, hypertension, ACE and angioedema. UpToDate search consisted of MeSH terms of angioedema and ACE inhibitor. The MeSH terms used on PubMed included use of angioedema and African Americans.

The CINAHL search resulted in 55,575 articles. This was reduced by selecting academic journals and eliminating the MeSH term “black” resulting in four articles. UpToDate resulted in 52 articles and was further reduced by using specific inclusion criteria terms such as “African Americans” which resulted in four articles. PubMed originally produced 24 articles and was further narrowed by reducing the publication date to the last 10 years resulting in nine articles. Boolean phrases of angioedema AND ACE AND African Americans OR Blacks resulted in a total of 17 possible articles. Due to the limited research amongst African Americans and hypertension, reducing the article to the standard last five years produced limited valid research to form a proper review of the data. A total of eight articles were selected to review the literature. The articles chosen consist of peer review, medical journals, nursing journals and practice guidelines.

ACE-I Prescription in African Americans

Ogedegbe (2015) proposes that the large disparity between hypertension management and African Americans, is the lack of research focused around their unique medical needs. The continued prescription of ACE-I for management of African Americans not only has adverse consequences, such as angioedema, but the therapeutic effects have proven to be futile (Ogedegbe, 2015). Kupfer, Ramachadran and Tessler (2010) conducted extensive research and case studies of African Americans who developed angioedema after ACE-I use. The studies demonstrated severe angioedema which resulted in tracheostomies and acute, long term level care (Kupfer et al., 2010). The research further identified extreme risk factors in ACE-inhibitor induced angioedema due to the swelling not being preceded by general warning signs (urticaria, rash) and the presence of normal C4 and C1 inhibitor levels (Kupfer et al., 2010). Kupfer et al. (2010) discussed that genetic factors such as vasoactive peptide bradykinin may play a role in the susceptibility to ACE-I induced angioedema in African Americans. The bradykinin enzyme can cause vasodilation and capillary leakage which can cause angioedema (Kupfer et al., 2010). Furthermore, evidence-based treatment for reactions such as use of “corticosteroids, antihistamines and catecholamine’s have no proven efficacy in the treatment of ACE inhibitor-induced angioedema” (Kupfer et al., 2010). Ferdinand (2003) conducted further research which concluded that other first line options, such as thiazide-type diuretics and calcium channel blockers not only decreased the occurrence of angioedema, but provided better blood pressure control in African Americans. Ferdinand (2003) also reviewed one of the very few studies that included African Americans. This study was called the Antihypertensive and Lipid Lowering Treatment to Prevent Heart Attack Trial (ALLHAT). This trial further confirmed the need for changes in first line

treatment for African Americans by demonstrating increased stroke risk with ACE-I use compared to non-African American groups (Ferdinand, 2003).

Angioedema and ACE-Inhibiter Frequency

Morimoto et al. (2003) explored ways to eliminate the use of ACE-I because of the increase of adverse drug side effects. Not only was an increased risk for angioedema apparent with African Americans but also East Asians developed cough and hyperkalemia (Morimoto et al., 2003). This study went a step beyond angioedema and explored the other comorbidities associated with ACE-I use which further proved ethnic based selection for antihypertensive would be beneficial. Guyer and Banerji (2015) as well as Lin and Shah (2008) found that ACE-I use was the leading cause of drug induced angioedema in the United States (see Appendix B for angioedema plot chart).

The rate of emergency room visits due to angioedema from ACE-I, is reported to be as high as 40% (Guyer & Banerji, 2015). With over 40 million patients in the United States prescribed ACE-I for hypertension, myocardial infarction, heart failure, diabetes and chronic kidney disease; the risk for adverse effects is exponentially elevated (Guyer & Banerji, 2015). Two reported studies examined the rates of angioedema in patients taking ACE-Is: OCTAVE trial and ONTARGET trail (Guyer & Banerji, 2015). The later demonstrated a rate of 68% in developing angioedema within six months with the use of enalapril, an ACE-I (Guyer & Banerji, 2015). These results were five times greater in African American patients (Flattery, 2011). A multicenter study of the ER revealed that the most common presenting symptoms were shortness of breath, dyspnea, tongue and lip

swelling (Flattery, 2011). Twenty percent of these patients developed life threatening airway obstruction (Flattery, 2011).

Evidence-Based Practice: Verification of Chosen Option

The current developed guidelines through the JNC-8 outline a stepwise approach in managing hypertensive patients, decreasing adverse drug effects and promoting therapeutic control (James et al., 2014). These guidelines are supported by clinical evidence that have been developed for use by providers in all settings. However, current research and literature has shown a disconnect in the published practices and clinical guidelines which demonstrates a need for practice evaluation and interventions.

Theoretical Framework

Campinha-Bacote (2002) developed a theoretical framework surrounding the idea of cultural competence in healthcare. Her model focuses on the patients as the teachers and providers as continually tailoring and changing their care to fit the patient (students) (Campinha-Bacote, 2002). Her framework of cultural competence, requires that the provider continually learn and strive to become cultural competent. This entails tailoring medications and teachings to fit our patients specific need. In the case of ACE-I use and African American patients; the framework would urge providers to recognize the negative benefits in this population and use this knowledge to change prescription protocols to meet the patients' needs.

Campinha-Bacote's (2002) theory encompasses a continuum of care model. It is projected that cultural competency is attained along a continuum and that we are forever

learning new ways to treat our patients and achieve cultural competence. This model assumes that cultural competence is achieved through five distinct steps: cultural awareness, cultural knowledge, cultural skills, cultural encounters and last, cultural desire. If we do not have a desire to be culturally inclined, we will not take considerations of culture into our practice.

Understanding that culture, ethnicity, and medication continue to change and improve; can better allow the provider to maintain an open mind and understand that all treatment options are not the same. Furthermore, Campinha-Bacote ascertains that there is a direct correlation in provider competence level and their ability to provide ethnic care. Providers who are more competent, through education, training and literature; for example, tend to have greater understanding and acceptability of cultural considerations in patient management. This is a key component in ensuring specific, attainable goals in managing patients of all ethnicities.

Methods

Project Design

This QI project provided education to healthcare providers and essential staff to ensure evidence-based prescribing practices in the management of hypertension in African Americans. A pre-assessment questionnaire was administered to assess the staff's current knowledge on prescribing of anti-hypertensive medication (see Appendix H for the pre-assessment questionnaire). Following the pre-assessment, the DNP student reviewed established hypertension guidelines and reviewed pre-designed pamphlets with providers and staff (see Appendix D for current JNC 8 guidelines). Following a period of

two weeks, a post intervention assessment was administered which included both the questions in the original questionnaire as well as open-ended questions where providers were able to note any potential barriers to implementation of the new evidence- based standards (See Appendix I for post intervention survey).

Implementation Plan/Procedures

Education was provided in the form of verbal presentation by the DNP student during individual meetings. Initially, the education was to be conducted as a group setting during staff meetings. However, due to the complexity and staffing of the office a group training was not possible. The presentation reviewed existing guidelines by the Joint National Committee (JNC) and handouts that included information related to ethnic considerations in hypertension management (see Appendix E for DNP developed flyer). During time with staff, the DNP student assisted in clarifying educational material in regards to hypertension management with African American patients. The implementation lasted two weeks after receiving the educational materials. During this time the DNP student acted as a resource in obtaining additional information on established guidelines for clinical practice.

Goals /Objectives

The goals and objectives of this project was to ensure that 100% of prescribing staff and essential administration receive the published guidelines and understand the risk factors in prescribing ACE-I for African American patients. A post intervention survey was conducted after two weeks to review any barriers to implementation. Opportunities

for learning and dialogue was available by the DNP student to assist in clarification of current guidelines throughout implementation.

Data Analysis

Descriptive statistics were used to compare the results of the pre and post implementation survey.

Description of the Medical Group and Patient Population

The project took place in a primary care setting in the southwest. The demographics of the staff consisted of one medical doctor (MD), two Nurse practitioners (NP), one licensed vocational nurse (LVN) and 4 medical assistants (MA's). The electronic charting system provides patient resources through Lippincott, Epocrates and Medscape. The policies and procedure guidelines are developed by the managing physician who references Lippincott.

The facility has an average patient census of 30 patients per day, 50% of which are state funded or government funded insurance and the additional 50% consisting of cash payment and PPO groups. The average population serviced at the clinical site consists of middle income households. The average patient age is 54 years old. The patient demographics are approximately 50% Hispanic, 30% African American, and 20% mixed race and other.

Ethics and Human Subjects Protection

Prior to the project being initiated, it was reviewed by the University of Massachusetts Amherst Institutional Review Board (IRB) and was determined to not meet criteria for requiring IRB approval. The project was classified as a QI project.

Results

The pre intervention survey demonstrated that 100% ($n=8$) of staff acknowledged that ethnic based consideration should be considered when prescribing medications. Seventy- five percent ($n=5$) of the staff were aware that published guidelines for African American patient and hypertension existed however none were able to state which organization published these guidelines. Twenty-five percent ($n=2$) were able to cite a resource available to access prescribing information. Seventy-five percent($n=5$) of staff agreed that it is very important for providers to consider a holistic approach when prescribing medications.

After educating the providers with the published information, three of the eight staff had additional questions regarding the project information. Further resources were provided on hypertension management from the American Heart Association (See the appendix I for AHA). Following the educational intervention, all participants ($n=8$) were able to identify resources related to guidelines for hypertensive management. However, only 75% ($n=5$) of staff was able to recall potential adverse side effects of ACE-I use in African American patients. Overall, the quality improvement project demonstrated a 25% ($n=2$) increase from the pre intervention survey (See Appendix J for charts).

Discussion/Interpretation

The intervention improved staff knowledge of published hypertensive guidelines issued through the JNC. The initial pre intervention survey demonstrated a lack of knowledge related to where the published guidelines could be accessed, although all staff agreed that ethnic based guidelines should exist. Furthermore, providers were able to identify that potentially harmful side effects from pharmaceuticals can effect certain ethnic groups.

Although published guidelines do exist, they may not be disseminated well throughout medical clinics due to a lack of accessibility or provider knowledge on how to access this resource. Many patients may not be receiving best practices related to prescribing of antihypertensive medications, which can ultimately effect their safety. Further clinical studies on African American patients need to be conducted to help understand ethnicity and pharmacopeia.

Campinha-Bacote's theoretical framework stresses the importance of utilizing the patient response to make culturally competent decisions in healthcare. The theory stresses the importance of treating the patient, not the disease, and learning to tailor our medical practices towards patient response. In regards to hypertensive management, we should be aware that there are increased risks in African American patients with use of ACE-I. Although this medication is affordable, highly prescribed, and generally well tolerated in others; it is imperative that we take time to assess our patient fully and review evidence-based research and guidelines which support alternative options.

When we incorporate ethnicity into the complexities of genetics and pharmacopeia, we need to consider patient response and patient trends. African Americans have specific needs due to their genetic makeup. Many medications will not work the same as their counterparts. Therefore, taking an individualized approach to prescribing all medications, not just antihypertensive, should encourage ethnic considerations.

Facilitators and barriers. Educating the staff as a group, as originally planned proved to be difficult due to the staffing patterns at the office and the need for staff to attend patient care responsibilities.

Conclusion

The results of this QI project support the effectiveness of an educational program in addressing ethnic considerations in the prescribing of ACE-I for African American patients. This QI project demonstrated that there is a need for education and resources regarding the use of ACE-I in this population. Evidence-based practices related to the prescription of ACE-I need to be more widely disseminated. In addition, the use of Angiotensin II receptor blockers (ARB) should be further studied in African American patients as some studies suggest these should also be avoided. Further research in regards to ethnicity and response to hypertension treatment should be conducted.

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Appendix A

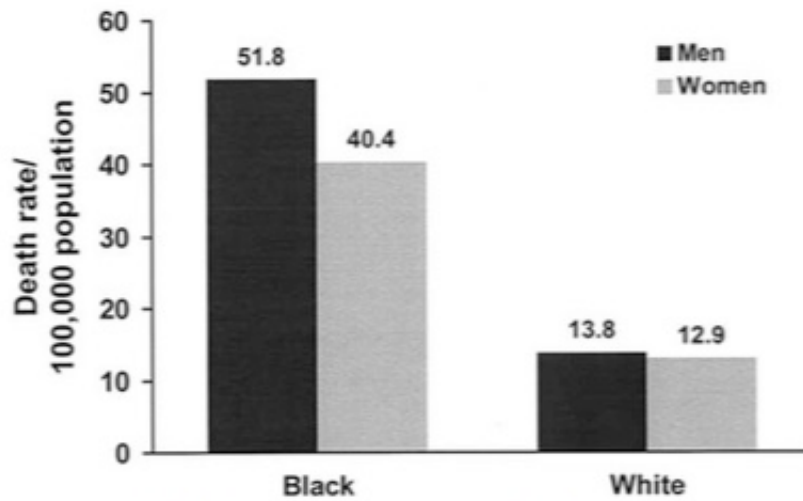


FIG. 1. Deaths from hypertension in both men and women are much greater for African American patients than for white patients according to the Third National Health and Nutrition Examination Survey.¹

Appendix B

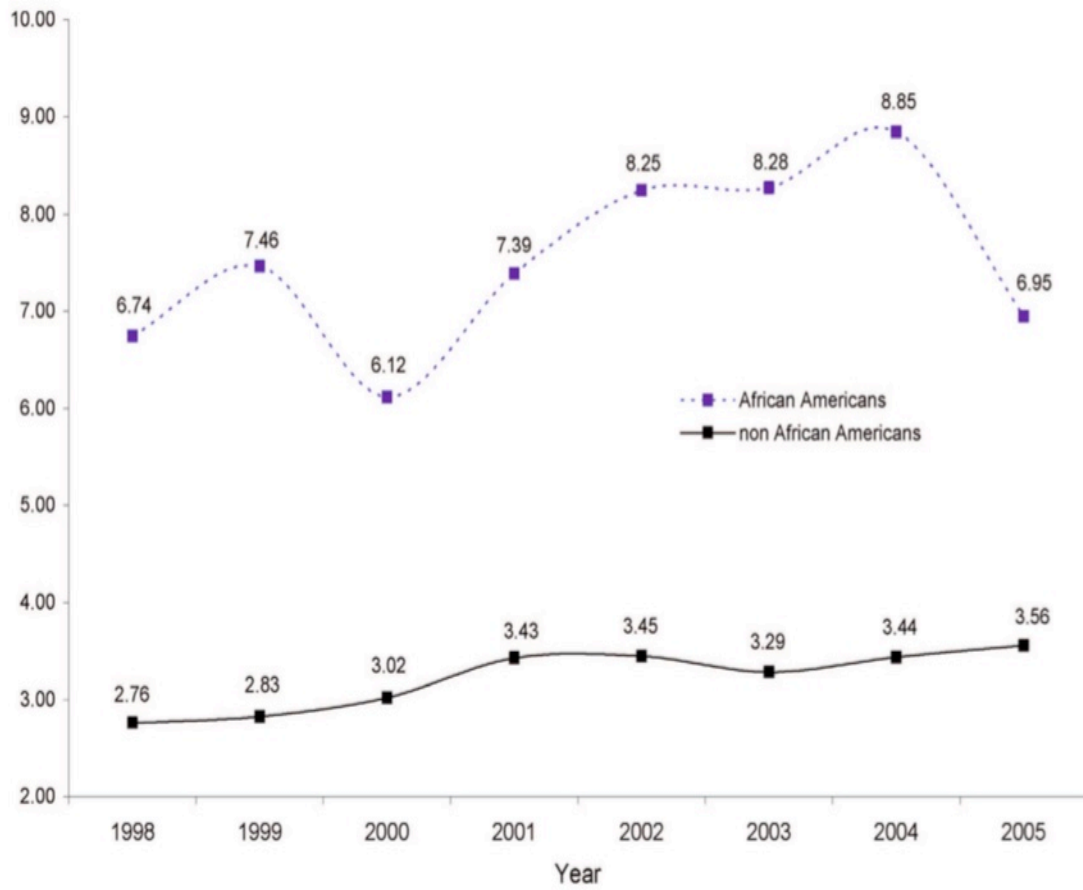


Figure 2. Angioedema hospitalization rates in African American vs non-African American patients.

Appendix C**JNC 8 Recommendations (continued)**

- General nonblack population
 - Thiazides, CCB, ACEI, or ARB initially
- General black population
 - Thiazides or CCB initially
- CKD
 - Treatment should include ACEI or ARB
- Up-titrate or add therapy after 1 mo if BP goal not achieved
 - Don't use ACEI and ARB together
 - If > 3 drugs needed, refer to hypertension specialist

James PA, et al. *JAMA*. 2013 Dec 18. [Epub ahead of print]

Appendix D



Culturally Competent Care

Providers must use the research and data to tailor their practice to meet the patients needs. All patients have unique considerations stemming from ethnic, cultural and personal preferences. It is the job of the provider to learn from the patients and implement practice in a safe and considerate manner (Campinha-Bacote, 2002).

Case study

45 yr. old African American female present to the clinic with blood pressure of 152/91. She has been going to nursing visits the past 2 weeks monitoring her blood pressure with results from systolic 149-160 and diastolic 82-91 consistently. Today she will be started on antihypertensive therapy. Which first line pharmaceutical treatment will you assign her? Why?

Quick guide

African American Patients have a five times risk of developing life threatening angioedema with use of Ace-I. Other first line pharmaceutical management such as thiazide type diuretics and calcium channel blockers have better outcomes and less risk factors (Hamilton, 2017).

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Images from Google Image search, 2017

JNC 8 Recommendations (continued)

- General nonblack population
 - Thiazides, CCB, ACEI, or ARB initially
- General black population
 - Thiazides or CCB initially
- CKD
 - Treatment should include ACEI or ARB
- Up-titrate or add therapy after 1 mo if BP goal not achieved
 - Don't use ACEI and ARB together
 - If a drug needed, refer to hypertension specialist

Key points

You might want to mention a few of your most impressive clients here:

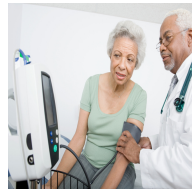
- Limited research has been conducted in hypertension management amongst African Americans
- Use of ACE-I as first line management carry a 68% risk of life threatening angioedema in the first 6 months (Chandler & Banerjo, 2015)
- Use of thiazide diuretics and calcium channel blockers show improved blood pressure control with less side effects

Ethnic considerations in the management of hypertension amongst African Americans can aid in decreased mortality and morbidity. The Use of ACE-I, although popular, have detrimental side effects in African Americans and show poor management of cardiovascular control (Ogedegbe, 2015).

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Fall 2017

Ethnic based considerations in managing African Americans and Hypertension

Why the use of ACE-I as first line management is controversial in African Americans



Appendix E

Table 1

Budget analysis		
<u>Items</u>	<u>Price</u>	<u>Total</u>
Copies/ Materials	\$0.50 X 30=\$15.00	
	\$5.50 poster board	
Time	\$55 X 10= \$550	
Transportation/fuel	\$2.80 X 18 gallons=	
	\$50.40	\$620.90

Appendix F*Table 2**Timeline*

<u>Week</u>	<u>Objective</u>	<u>Follow up</u>
1-2	Assessment of current staff knowledge Administer pre assessment	Gather materials and organize time with medical director to approve and introduce material
2-4	Provide established JNC guidelines and DNP developed handout	Answer and clarify any questions from providers Provide additional established guidelines as needed
1 month	Administer post assessment	Address any concerns and/or barriers Provide resources and guidelines
2 months	Quantify data and analyze results	Provide any additional resources to ensure longevity of guidelines

Appendix G

Pre-intervention survey for hypertensive management in African Americans

- 1) Were you aware that guidelines exist to help prescribe anti hypertensive for patients?

Yes or No

- 2) Do the published guidelines and handouts provide the tools needed to prescribe medication for this population?

Strongly agree/ agree/ undecided/ disagree/ strongly disagree

- 3) How likely will this capstone project help you to consider ethnicity in prescribing and diagnosing for future patient populations?

Very frequently/ frequently/occasionally/ rarely/never

- 4) How important is it for providers to consider a holistic approach (considering patients social, economical, cultural, ethnicity and religious backgrounds) in prescribing care and medications?

Very important/ important/ moderately important/ of little importance/ unimportant

Appendix H

Post intervention survey for hypertensive management in African Americans

- 1) Were you aware that guidelines exist to help prescribe anti hypertensive for patients?

Yes or No

- 2) Do the published guidelines and handouts provide the tools needed to prescribe medication for this population?

Strongly agree/ agree/ undecided/ disagree/ strongly disagree

- 3) How likely will this capstone project help you to consider ethnicity in prescribing and diagnosing for future patient populations?

Very frequently/ frequently/occasionally/ rarely/never

- 4) How important is it for providers to consider a holistic approach (considering patients social, economical, cultural, ethnicity and religious backgrounds) in prescribing care and medications?

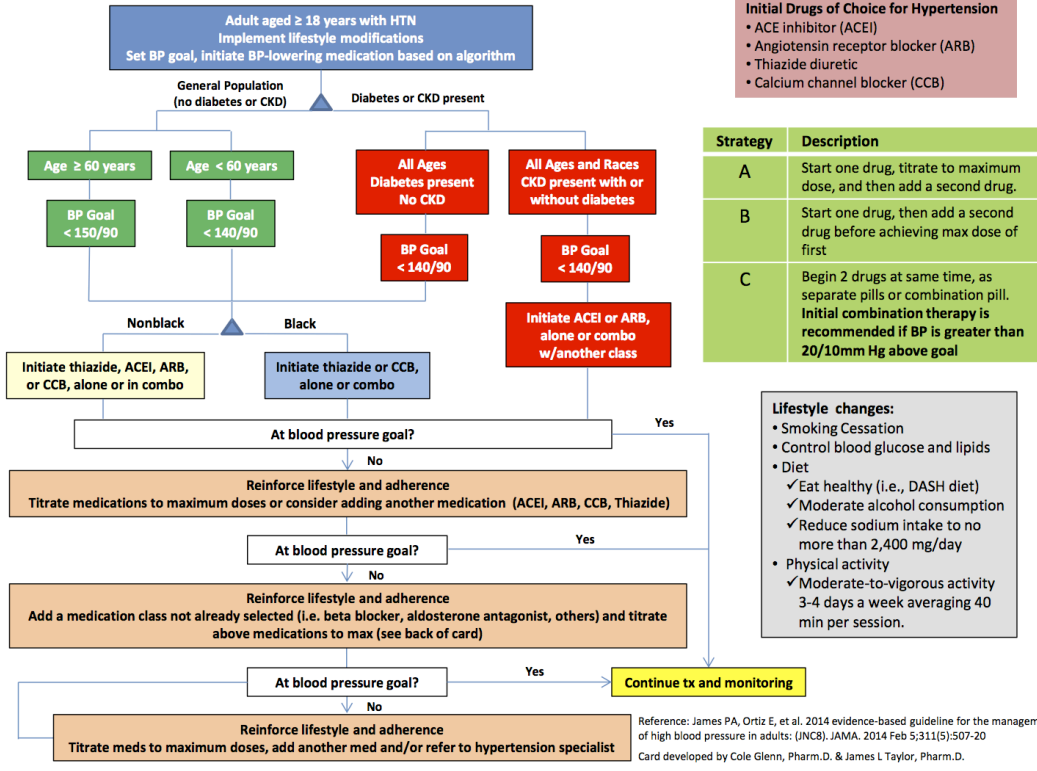
Very important/ important/ moderately important/ of little importance/ unimportant

- 5) What is one risk involved with ACE-I?

- 6) Describe one reason why African American patients should avoid **first line treatment** with ACE-I?

Appendix I

JNC 8 Hypertension Guideline Algorithm



Initial Drugs of Choice for Hypertension

- ACE inhibitor (ACEI)
- Angiotensin receptor blocker (ARB)
- Thiazide diuretic
- Calcium channel blocker (CCB)

Strategy	Description
A	Start one drug, titrate to maximum dose, and then add a second drug.
B	Start one drug, then add a second drug before achieving max dose of first
C	Begin 2 drugs at same time, as separate pills or combination pill. Initial combination therapy is recommended if BP is greater than 20/10mm Hg above goal

Lifestyle changes:

- Smoking Cessation
- Control blood glucose and lipids
- Diet
 - ✓ Eat healthy (i.e., DASH diet)
 - ✓ Moderate alcohol consumption
 - ✓ Reduce sodium intake to no more than 2,400 mg/day
- Physical activity
 - ✓ Moderate-to-vigorous activity 3-4 days a week averaging 40 min per session.

Reference: James PA, Ortiz E, et al. 2014 evidence-based guideline for the management of high blood pressure in adults: (JNC8). JAMA. 2014 Feb 5;311(5):507-20
Card developed by Cole Glenn, Pharm.D. & James L Taylor, Pharm.D.

Compelling Indications	
Indication	Treatment Choice
Heart Failure	ACEI/ARB + BB + diuretic + spironolactone
Post-MI/Clinical CAD	ACEI/ARB AND BB
CAD	ACEI, BB, diuretic, CCB
Diabetes	ACEI/ARB, CCB, diuretic
CKD	ACEI/ARB
Recurrent stroke prevention	ACEI, diuretic
Pregnancy	labetolol (first line), nifedipine, methyldopa

Hypertension Treatment

Beta-1 Selective Beta-blockers – possibly safer in patients with COPD, asthma, diabetes, and peripheral vascular disease:

- metoprolol
- bisoprolol
- betaxolol
- acebutolol

Drug Class	Agents of Choice	Comments
Diuretics	HCTZ 12.5-50mg, chlorthalidone 12.5-25mg, indapamide 1.25-2.5mg, triamterene 100mg <i>K⁺ sparing</i> – spironolactone 25-50mg, amiloride 5-10mg, triamterene 100mg furosemide 20-80mg twice daily, torsemide 10-40mg	Monitor for hypokalemia Most SE are metabolic in nature Most effective when combined w/ ACEI Stronger clinical evidence w/chlorthalidone Spironolactone – gynecomastia and hyperkalemia Loop diuretics may be needed when GFR <40mL/min
ACEI/ARB	<i>ACEI</i> : lisinopril, benazepril, fosinopril and quinapril 10-40mg, ramipril 5-10mg, trandolapril 2-8mg <i>ARB</i> : candesartan 8-32mg, valsartan 80-320mg, losartan 50-100mg, olmesartan 20-40mg, telmisartan 20-80mg	SE: Cough (ACEI only), angioedema (more with ACEI), hyperkalemia Losartan lowers uric acid levels; candesartan may prevent migraine headaches
Beta-Blockers	metoprolol succinate 50-100mg and tartrate 50-100mg twice daily, nebivolol 5-10mg, propranolol 40-120mg twice daily, carvedilol 6.25-25mg twice daily, bisoprolol 5-10mg, labetalol 100-300mg twice daily,	Not first line agents – reserve for post-MI/CHF Cause fatigue and decreased heart rate Adversely affect glucose; mask hypoglycemic awareness
Calcium channel blockers	<i>Dihydropyridines</i> : amlodipine 5-10mg, nifedipine ER 30-90mg, <i>Non-dihydropyridines</i> : diltiazem ER 180-360 mg, verapamil 80-120mg 3 times daily or ER 240-480mg	Cause edema; dihydropyridines may be safely combined w/ B-blocker Non-dihydropyridines reduce heart rate and proteinuria
Vasodilators	hydralazine 25-100mg twice daily, minoxidil 5-10mg terazosin 1-5mg, doxazosin 1-4mg given at bedtime	Hydralazine and minoxidil may cause reflex tachycardia and fluid retention – usually require diuretic + B-blocker Alpha-blockers may cause orthostatic hypotension
Centrally-acting Agents	clonidine 0.1-0.2mg twice daily, methyldopa 250-500mg twice daily guanfacine 1-3mg	Clonidine available in weekly patch formulation for resistant hypertension

Appendix J

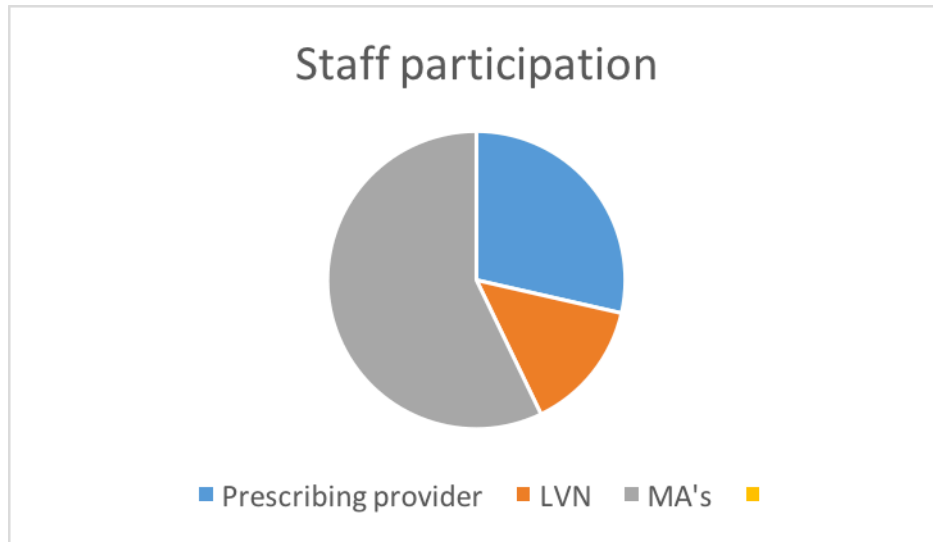


Figure 1. Staff demographics of capstone project

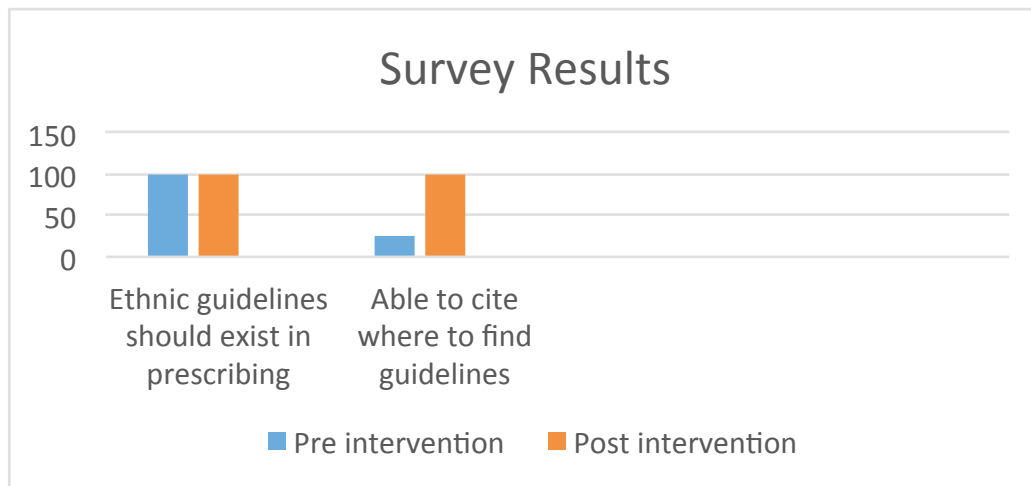


Figure 2. Pre intervention and post intervention survey comparison