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Louden, Lauren Marie, "Evaluation of Provider Use of the 2017 American College of Cardiology/American Heart Association Guidelines for Diagnosis and Management of White Coat Hypertension" (2019). *DNP Projects*. 290.

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WHITE COAT HYPERTENSION IN THE PRIMARY CARE SETTING

Evaluation of Provider Use of the 2017 American College of Cardiology/American Heart
Association Guidelines for Diagnosis and Management of White Coat Hypertension

Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Nursing
Practice at the University of Kentucky

By

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Louisville, KY

2019

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Abstract

BACKGROUND: White coat hypertension (WCH) is described as an anxiety-provoked, elevated in-office blood pressure reading, combined with a normal blood pressure reading outside of the clinic setting. This condition is often misdiagnosed as hypertension and can result in unnecessary antihypertensive treatment. **PURPOSE:** The purpose of this project was to determine provider adherence to the 2017 American College of Cardiology/American Heart Association hypertension guidelines for appropriate diagnosis and treatment of patients with white coat hypertension. **METHODS:** A retrospective chart review was performed on 100 randomly selected medical records of patients from an urban primary care practice diagnosed with an elevated blood pressure from January 1, 2018 to November 30, 2018. The use of blood pressure logs was evaluated before a diagnosis of hypertension was made. Overall blood pressure management was also evaluated. **RESULTS:** In this sample blood pressure logs were requested 50% of the time and 24% were then diagnosed with hypertension. Of the 24% of patients who were diagnosed with hypertension, no logs were used for the diagnosis. Medication was prescribed in 13% who had an elevated blood pressure without a diagnosis of hypertension. Nonpharmacologic management was documented in 56% of the sample. **CONCLUSION:** In this study, providers did not consistently adhere to the guideline for prescribing antihypertensive medication and nonpharmacologic management for elevated blood pressure. Findings did not indicate that home blood pressure monitoring was used for decision-making related to white coat hypertension. Home blood pressure monitoring is underutilized, and medications may be prescribed unnecessarily.

Acknowledgements

I would like to thank, first and foremost, my advisor Dr. Lock who has remained patient with me and has given me great support and advice. I also extend gratitude to Dr. Daniels who inspired the topic of my project by recommending that I delve into the topic of white coat hypertension. I would also like to thank Dr. Wiggins for assisting with the statistical analysis portion of my project. Dr. Pendleton, I thank you for helping me early on in the process and navigating me in the right direction. Thank you again for all of the help you have provided; I could not have done this without any of you.

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Introduction

White coat hypertension (WCH), also referred to as white coat syndrome, affects approximately one-third of the adult population (Cobos, Haskard-Zolnierrek, & Howard, 2015). It is best described as an anxiety-provoked, elevated in-office blood pressure reading, combined with a normal blood pressure reading outside of the clinic setting (Cobos, Haskard-Zolnierrek, & Howard, 2015). When this condition is misdiagnosed as hypertension, it results in subsequent prescribing of unnecessary antihypertensives (Donofrio Angelucci, 2012; Grossman, 2013). The use of home blood pressure monitoring (HBPM) to correctly identify WCH can prevent unnecessary medication prescribing, as well as a foreseeable 14% reduction in medical costs (Whelton et al., 2017). The purpose of this project was to determine if providers were following the 2017 American College of Cardiology/American Heart Association (ACC/AHA) hypertension guidelines, for appropriate diagnosis and treatment of patients with WCH.

Background

WCH is defined as an elevated in-office blood pressure reading that exceeds 130/80 mmHg, but less than 160/100 mmHg. It is accompanied by ambulatory blood pressure readings of less than 130/80 mmHg (Whelton, et al., 2017). Approximately 33% of adult patients have WCH (Cobos, Haskard-Zolnierrek, & Howard, 2015). This can result in prescribing unnecessary antihypertensive medications which can cause hypotension, syncopal episodes, falls, as well as the risk of medication side effects (Whelton et al., 2017). This condition can be correctly identified through either ambulatory blood pressure monitoring (ABPM) or HBPM. This can

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prevent unnecessary medication prescribing and reduce medical costs by 14%. Not only are costs to the healthcare system decreased but blood pressure values from the home setting may result in fewer visits to the provider, a cost savings for those with high deductibles (Wang et al., 2013).

ABPM is defined as an electronic blood pressure monitoring device that the patient wears to measure blood pressure at designated intervals during daily activities and at rest (CDC, 2017; Whelton et al., 2017). Home blood pressure monitoring, also known as self-measured blood pressure monitoring, is defined as a blood pressure reading which is taken at home or elsewhere outside of the clinic setting. While ABPM is considered the best out of office measurement, HBPM is a more practical method (CDC, 2017; Whelton et al., 2017). The anticipated success of HBPM is to capture an accurate blood pressure that is not falsely elevated, and to thus properly identify normotensive versus hypertensive patients. The benefit of HBPM is that the patient is in a less tense and more comfortable environment, allowing a more accurate blood pressure reading to be captured (Donofrio Angelucci, 2012).

The success of home blood pressure monitoring is integral in determining white coat hypertension. Patients need to be instructed on how and when to record a home blood pressure. Using the CDC, 2017 recommendations patients should take their blood pressure at the same time every day with feet flat on the floor. Additionally, the arm should be at heart level with an adequately sized cuff (CDC, 2017).

Home blood pressure monitoring documented in a patient-kept blood pressure log has been shown to properly identify white coat syndrome. Readings outside an office setting allow for a less stressful physiological response (Whelton et al., 2017). Patient-kept blood pressure logs detailing their home blood pressure readings have also been shown to be a more reliable

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indicator of cardiovascular outcomes (Wang et al., 2013). To date, no other reliable screening tool exists to accurately identify white coat syndrome (Piper, Evans, Burda, et al., 2014).

For providers, a number of options can be used to document the patients home blood pressure readings. There is now technology available for providers to upload patients home blood pressure logs into an electronic health record for their review. If this is not available, providers can simply document a patient's home blood pressures in a communication encounter via an email, telephone call, or through the electronic health record.

Purpose and Objectives

The purpose of this project was to determine if providers were following the 2017 ACC/AHA hypertension guidelines, for appropriate diagnosis and treatment of patients with WCH. More specifically, this project aimed to determine the percentage of:

1. Patients with an elevated blood pressure diagnosis that were instructed to complete a home blood pressure log documented in the electronic health record,
2. Patients with an elevated blood pressure diagnosis who had completed home blood pressure logs on a subsequent encounter
3. Primary care providers who used home blood pressure logs for prescribing an antihypertensive, and
4. Providers who followed the 2017 ACC/AHA guidelines for the appropriate diagnosis and management of hypertension.

Methods

The setting of this project was in a large Kentucky urban healthcare organization where there are multiple primary care practices. The population that is served within the primary care

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clinics is across the lifespan with varying disease processes and diagnoses. For this project, only adults were included and subsequently receiving care at any one of the primary care practices. A retrospective design was used to determine provider adherence to the ACC/AHA 2017 hypertension guidelines for appropriate diagnosis and treatment of patients with WCH.

Sample

The inclusion criteria for the sample were: 1) all patients over the age of 18 years, 2) established patients in one of the primary care clinics, 3) a blood pressure reading greater than or equal to 130/80, 4) a diagnosis of an elevated blood pressure reading without a diagnosis of hypertension, and 5) an encounter in one of the clinics between January 1, 2018 and November 30, 2018. The ICD-10 diagnostic code for an elevated blood pressure without a diagnosis of hypertension is R03 and was used as a proxy for a diagnosis of WCH. Exclusion criteria for the sample consisted of an existing hypertension diagnosis, not seen within the past 6 months at the primary care clinic, presence of chronic kidney disease, and presence of congestive heart failure.

A total of 51,000 patients were identified from the healthcare system as having any diagnosis of elevated blood pressures which included hypertension. From that list, 100 charts were randomly selected that met the inclusion criteria with the diagnostic code of R03. Charts were reviewed for the following: a) documentation in the plan that the provider requested the patient keep a blood pressure log, b) documentation that a patient-kept home blood pressure log was kept, c) documentation that the log was used in a subsequent visit to determine hypertension, d) documentation of pharmacological and nonpharmacological measures per the 2017 ACC/AHA guidelines. Data were also collected on demographics of age, gender and race.

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Informed Consent

A waiver of informed consent was requested from the University of Kentucky Institutional Review Board as there was minimal risk and no direct contact with patients. The waiver was approved by the University of Kentucky Institutional Review Board. The evaluation was reviewed and approved by the healthcare organization's office of research.

Procedures

The healthcare organization's information technology department assisted in retrieval of electronic health records from the EPIC electronic health record software. The first encounter where the diagnosis of elevated blood pressure without a diagnosis of hypertension was the starting point for the chart review. One subsequent visit was then explored to evaluate how blood pressure logs were used to diagnose hypertension. If there was no subsequent visit the chart was examined for follow-up of those who were instructed to keep a blood pressure log. The collected data was stored on a secure and encrypted H drive. The computer storing the collected data was password protected, which ensured patient confidentiality.

Data Analysis

Descriptive statistics were used to describe the demographics of the sample. Frequencies were used to determine whether 1) there was documentation in the plan that a blood pressure log had been requested, 2) a blood pressure log was uploaded in the electronic health record, 3) a diagnosis of hypertension was documented at a subsequent visit 4) a follow-up blood pressure reading occurred after the initial elevated blood pressure encounter and 5) an antihypertensive medication was prescribed for patients with a diagnosis of elevated blood pressure without a diagnosis of hypertension, (R03).

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Results

A total of 100 medical records were randomly selected from a total of 51,000 patients with either a diagnosis of hypertension or an elevated blood pressure without a diagnosis of hypertension. The majority of patients in the sample were female (53%) and 84% were over the age of 35. Those aged 55 or older encompassed 24% of the sample. Over half were Caucasian (58%) and almost a fourth (24%) were African American (see Table1).

The diagnosis of an elevated blood pressure without a diagnosis of hypertension was recorded in 76% of the sample and 24% were diagnosed with hypertension at the initial visit. Providers documented that a blood pressure log was requested in 55% of those who had a diagnosis of an elevated blood pressure without a diagnosis of hypertension. Since 24% were seen later in the chart review time frame, no subsequent visits were evaluated for those patients. A few patients (3%) did not keep their follow-up appointment. Among those who had a subsequent visit (73%) and were instructed to keep the log, only one-third had documentation of HBPM log in the EHR.

At the initial visit, blood pressure medication was prescribed for 3% of those with an elevated blood pressure who had a reading greater than 160/100 mmHg. Antihypertensive medication was prescribed to 10% who were diagnosed with an elevated blood pressure without a diagnosis of hypertension (R03) at the initial visit. Their blood pressure readings were greater than 130/80 but less than 160/100 mmHg. Those who had a subsequent visit (n=73), 61% did not have an elevated blood pressure above 130/80 mmHg from either the blood pressure log or the in-office reading. The HBPM confirmed a normal pressure for 88% of those who kept the log.

Those who were assigned a diagnosis of hypertension (24%), versus an elevated blood pressure reading without a diagnosis of hypertension, all had a follow-up appointment within the

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study period. There were no requests for HBPM within this group. Approximately half were prescribed (n=10) an antihypertensive medication despite blood pressures that were less than 160/100. The remaining patients (n=14) who were given the diagnosis of hypertension were instructed by the provider to implement nonpharmacological interventions as an attempt to lower blood pressure.

Nonpharmacologic management for blood pressure was documented at the first visit for approximately 65% of the total sample. The most common recommendations were for weight loss, adhering to the DASH diet, increasing physical activity, and decreasing or stopping alcohol intake. This was documented through the use of an electronic handout that is printed out and given upon discharge of the patient.

Discussion

A retrospective chart review was performed to determine provider adherence to the 2017 ACC/AHA hypertension guidelines for appropriate diagnosis and treatment of patients with WCH. WCH is a common problem amongst those in the middle age group which was reflected in the sample. The frequency of WCH hypertension increases with age and is most common in middle-aged and older adults.(Cobos, Haskard-Zolnierrek, & Howard, 2015). In this sample group ethnicity was not reflective of the epidemiology of the disease, however there was no attempt to compare ethnic groups. Aronow et al, (2019) described the demographic findings of the Dallas Study as such: 63% of the WCH population and 69% of the hypertension population were black.

In this project, providers adhered to the guideline in over half of the patients initially seen with an elevated blood pressure. Though HBPM readings were not uniformly requested by

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the providers the majority (73%) had a follow-up appointment and were treated appropriately according to the guideline recommendations based upon either the blood pressure log or the in-office reading. Blood pressure logs, when used, did confirm WCH. These findings are similar to Burnier and Eganfrom (2019) who found hypertension and WCH was treated appropriately 70% of the time.

It is unclear why blood pressure logs were not requested by the providers. Reasons identified in the literature for not using HBPM include concern about the accuracy of the blood pressure measurement, as well as the cost incurred to the patient (George, & McDonald, 2015) Yet Whelton et al. (2017) state that the HBPM reading mirrors the in-office reading and insurance companies will pay for a cuff. In addition, there are readily available community resources where blood pressures can be obtained such as pharmacies, and fire stations. Further, providers may be hesitant as they feel it will be an additional burden placed on the patient or they don't feel that patients will comply.

Nonpharmacologic interventions are supported by the guideline. The ACC/AHA guideline recommends a three-month trial of lifestyle modification and ABPM or HBPM with follow-up before prescribing medications (Whelton et al., 2017). In two-thirds of the sample the providers did document lifestyle interventions to control blood pressure. Support from the EHR that details lifestyle behaviors that contribute to hypertension is readily available. Though the EHR provides access to patient education, it is unclear whether the education is patient specific, or the amount of attention and emphasis is placed on lifestyle. This may explain in part why one-third of the providers did not include patient education. The other consideration is that it was discussed but not documented.

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Providers often underutilized the many capabilities imbedded within the EHR. For example, the system may offer an alert that the blood pressure reading is elevated and link the provider to the appropriate management guideline. The EHR could also be used to alert staff for follow-up on those patients requested to complete HBPM. In this project, one-third of the patients who were instructed to complete HBPM did not have follow-up documentation of its completion. This could have been just a documentation issue. Liability for lack of follow-up on an elevated blood pressure reading cannot be minimized. Patient's may be unsure of what all HBPM entails and the provider is responsible for providing the necessary information from a liability standpoint (Shore, 2007).

Limitations

There are several limitations noted in this project. The sample size was small and without meaningful diversity. An additional limitation is that the RO3 proxy code was not uniformly utilized and therefore patients were missed who could have met the inclusion criteria. Neither providers' nor patients' input was solicited. They could have provided insight on the burden of completing HBPM. Since 24 patients were seen later in the chart review time frame, no subsequent visits were evaluated. In addition, the guidelines being relatively new may not have been adopted by the providers which would have been forthcoming in a provider interview.

Implications for Practice

The use of electronic health record alerts can improve adherence to guidelines (Sroujeh, Monroy, & Warren, 2016). An alert can serve as a prompt to the provider regarding new evidence-based guidelines such as ordering ABPM or HBPM. The EHR could also be used to

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improve communication with patients to remind or follow-up on the for HBPM. Providers need continuous in-services on the EMR capabilities, including how to upload a patient log.

Providers may find patients are unaware of community resources for blood pressure readings. A simple list could be constructed and given to the patient detailing where community blood pressures are available. For those who have a home blood pressure cuff, it would be helpful if patients brought the HBPM device and their readings to the office for verification of their technique.

Finally, most important, providers need to be made aware of the 2017 guidelines with appropriate follow-up on their adherence. The role of the medical assistant could be used to assist providers in identifying WCH. It would be helpful to standardize how patients are being roomed with a trigger to repeat blood pressures if they are elevated.

Implications for education and further study

It would be important to do a needs assessment to determine provider knowledge of the 2017 ACC/AHA blood pressure guidelines with a larger sample size. If providers are not aware of the revisions regarding WCH treatment, this could be an opportunity to provide education on the details of the guidelines. Patients also need education on the new recommendations for blood pressure management. Many may still think that a reading of 140/90 mmHg is the treatment goal, which does not match that of the 2017 guidelines.

Conclusion

In this study, providers did not consistently adhere to the 2017 ACC/AHA guideline for the diagnosis and treatment of WCH. Findings did not indicate that home blood pressure monitoring was used for decision-making related to white coat hypertension. In today's

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healthcare environment every opportunity must be made to encourage patient's involvement in their overall health. Encouraging patients to monitor their home blood pressure may engage them in taking an active role. Providers should stay apprised of ACC/AHA guidelines and use EHR's to their full potential in order to provide appropriate management of WCH.

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Table 1. Demographics (N=100)

Demographics	Frequency	Percentage
Gender		
Male	47	47%
Female	53	53%
Age		
18-24	6	6%
25-34	10	10%
35-44	13	13%
45-54	15	15%
55-65	24	24%
>65	32	32%
Race		
American Indian	1	1%
Asian	6	6%
Black	24	24%
Hispanic	11	11%
White	58	58%

Table 2. Visit characteristics following initial elevated BP reading encounter (N=100)

Characteristics	Frequency	Percentage
Blood pressure log requested		
Yes	55	55%
No	45	45%
Blood pressure log uploaded		
Yes	34	34%
No	66	66%
Follow-up blood pressure reading		
Yes	55	55%
No	45	45%
Hypertension Diagnosis		
Yes	24	24%
No	76	76%
Medication Prescribed		
Yes	13	13%
No	87	87%
Guidelines Adherence		
Yes	58	58%
No	42	42%