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Assessment of an Intervention to Improve Clinical Inertia in Patients with Uncontrolled Hypertension in a Primary Care Setting

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Assessment of an Intervention to Improve Clinical Inertia in Patients with Uncontrolled
Hypertension in a Primary Care Setting

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Abstract

Purpose: A quality improvement project was undertaken in an internal medicine clinic to evaluate provider adherence with the Eighth Joint National Committee (JNC 8) hypertension (HTN) medication management guidelines for adult patients diagnosed with HTN, evaluate characteristics associated with clinical inertia (CI) in patients with uncontrolled HTN, and evaluate the utility of a brief educational intervention to decrease CI.

Methods: The project used the plan-do-study-act method to assess JNC 8 prescribing guideline adherence by consenting providers. Medical records were randomly selected from patients with HTN seen at provider visits 10 days before (January 31-February 13, 2017) and 10 days after (February 15-28, 2017) a brief provider intervention. A random sample of 100 patient records from each time point were reviewed. Records were examined for demographic data, antihypertensive medications, blood pressure measurements, and documentation of distribution of patient hypertension (HTN) education handouts. Blood pressure readings at the most recent visit were examined for evidence of HTN control per JNC 8. Patients with lack of HTN control had their record further examined for documentation of interventions to determine CI.

Results: There was no significant difference between the demographics of the pre-intervention and post-intervention groups. HTN control was 65% in the pre-intervention group and 64% post-intervention group ($p > .05$). The percent CI was 23.5% pre-intervention group and 45.7% post-intervention group ($p > .05$).

Conclusion: A quality improvement project using a brief educational intervention in an internal medicine clinic showed no effect, but improvements were seen when comparing HTN control and CI to past observations. Suggestions for clinical improvement are to address HTN at acute

visits, increase use and documentation of non-pharmacological interventions, documenting formal HTN patient education handouts, multi-stage quality improvement projects for greater impact, increased use of patient adherence assessments, or larger implementations such as team based care models.

Assessment of an Intervention to Improve Clinical Inertia in Patients with Uncontrolled Hypertension in a Primary Care Setting

Background

Hypertension (HTN) is the medical condition of heightened blood pressure where the systolic blood pressure (SBP) is greater than 140 mmHg or the diastolic blood pressure (DBP) is greater than 90 mmHg on two or more occasions in one week or further apart (James et al., 2014). According to the most currently published National Health and Nutrition Examination Survey (NHANES) in 2011-2012, the prevalence of HTN in the United States is 29.1% with 52% of those persons controlled (Nwankwo, Yoon, Burt & Gu, 2013). Despite improvements in HTN control, uncontrolled HTN rates in the United States remain higher among treated older persons, non-Hispanic blacks, and persons with diabetes or chronic kidney disease; while younger adults and Mexican-Americans were found to be undertreated (Gu, Burt, Dillon & Yoon, 2012).

The death rate in the United States in 2010 due to complications of HTN was 18.8 per 100,000; with direct and indirect costs of high blood pressure in 2010 alone totaling \$46.4 billion (Go et al., 2014). Reduction of HTN has been associated with declines in stroke incidence, myocardial infarction, heart failure and death (Farley, Dalal, Mostashari & Frieden, 2010). Farley et al. (2010) developed a mathematical model to estimate the number of HTN related deaths that could be prevented by greater use of clinical preventive services. The authors found that an additional 14,000 deaths per year of adults under 80 years old could be prevented for every 10% increase in HTN treatment. Public health initiatives place high priority on increasing HTN control in Americans, with a goal for Healthy People 2020 to increase the proportion of adults with controlled HTN from 43.7% to 61.2% (United States Department of Health and

Human Services (USDHHS), 2013). Additionally, the Physician Quality Reporting System (PQRS) includes HTN control as one of the reportable quality measures to the Centers for Medicare and Medicaid Services (CMS) that must be reported yearly to document effective care or providers will face a negative adjustment in reimbursements (CMS, 2016).

The Guideline for Management of High Blood Pressure in Adults: Report from the Panel Members Appointed to the Eighth Joint National Committee (JNC 8) (James et al., 2014) recommends initiation of drug therapy for adults 18 to 59 years old with blood pressures greater than 140/90 mmHg and adults over 60 years old with blood pressures over 150/90 mmHg. In addition, drug therapy is recommended for adults of all ages with diabetes and/or chronic kidney disease (CKD) and blood pressures above 140/90 mmHg. JNC 8 also recommends an algorithm for antihypertensive treatment with specific classes of medication for certain races or disease states.

Clinical guidelines do not necessarily translate to provider practice (Cushman & Basile, 2007; Khatib et al., 2014; Koti & Roetzheim, 2015). Studies show a gap between HTN guideline recommendations and clinician behavior as much as 63% of the time (Ardery et al., 2007; Sutton, Wilson, Kaboli & Carter, 2010). Lack of achievement of BP goals has been attributed to clinical inertia (CI) (Al-Anjawi & Al-Baharna, 2014; Cushman & Basile, 2007; Whitford, Machado-Duque, Ramírez-Valencia, Medina-Morales & Machado-Alba, 2015). Clinical inertia (CI) is defined as no change in treatment by the provider when change was indicated (Redón et al., 2010). One retrospective study of 3125 patients found that patients who experienced CI were nearly 3 times as likely to lack HTN control (Harle, Harman, & Yang, S., 2013). Studies of patient characteristics in HTN treatment have shown a correlation between CI and male gender, older age, treatment with more than one antihypertensive, treatment with specific

antihypertensives, borderline high BP values, and presence of comorbidities such as diabetes (Gil-Guillén et al., 2010; Harle et al, 2013; Machado-Duque et al., 2015; Redon et al., 2010). However, these characteristics were not consistent between studies.

Prince (2016) assessed blood pressure control in an internal medicine practice finding blood pressure control in 44% of the patients studied. Up to 50% of the time a change in HTN treatment was indicated, but no change in treatment was documented. These findings were an improvement on an evaluation in the same practice where HTN control at three separate visits was only 24% (Guiliani, 2014). Both the Prince (2016) and Guiliani (2014) evaluations are indicative of sustained CI. Reassessing CI in this same practice and evaluating the utility of a brief intervention to decrease CI in HTN treatment could improve the quality of patient outcomes in the practice.

Purpose

Given the clinical importance of improving blood pressure control, and the previously demonstrated provider evaluations, a quality improvement project was created to take place in the same internal medicine clinic previously studied. There were three primary objectives.

- 1) Evaluate provider adherence with JNC 8 HTN medication management guidelines for adult patients diagnosed with HTN.
- 2) Evaluate characteristics associated with CI in patients with uncontrolled HTN.
- 3) Evaluate the utility of a brief provider educational intervention to decrease CI in HTN management in the internal medicine clinic.

Methods

Permission to conduct study

Permission to conduct the study was granted from the University of Kentucky (UK) Institutional Review Board (IRB). Since the method of data collection from patient records was retrospective and deidentified, a waiver of consent was granted. All prescribing medical providers were consented at a routine staff meeting for providers where they were given an informed consent and asked to participate in the study.

Design

This quality improvement project used the plan-do-study-act method to assess JNC 8 prescribing guideline adherence by consenting providers. Medical records were randomly selected from a list of electronic medical record numbers with ICD-10 codes for HTN (I10, I11.9 and I13.10) that were seen at provider visits 10 days before (January 31-February 13, 2017) and 10 days after (February 15-28, 2017) a brief provider intervention.

Study Population

The project took place in an internal medicine clinic within a large academic medical center. Providers in this study were licensed healthcare providers employed by the clinic who see adult patients and consented to participate. A random sample of 100 patients from each time point were taken that had at least one visit in the period ten clinic days before (January 31, 2017-February 13, 2017) or ten clinic days after (February 15, 2017- February 28, 2017) the brief provider intervention was performed. Other inclusion criteria were patients seen by any of the consenting health care providers who 1) were greater than 18 years of age; 2) had at least one visit during the time point; 3) had a diagnosis of HTN; and 4) were prescribed at least one

antihypertensive medication. Exclusion criteria were patients who 1) were less than 18 years old, 2) were identified as participants of other ongoing research; 3) were prisoners during their medical care; 4) were pregnant women at the time of their medical care; and 5) were palliative patients at the time of their medical care.

Provider Intervention

After provider consent was obtained, consenting providers were given a brief 15-minute educational presentation regarding prior outcomes of studies at their clinic, JNC 8 HTN guidelines, and notified that a JNC 8 HTN guideline management algorithm would be hung in the work room. Providers were reminded that a patient HTN education document can be ordered through the electronic health record, encouraged to give them to all patients being treated for HTN, and document it in their patient encounter. The 15-minute intervention took place at a regularly scheduled staff meeting February 14, 2017.

Data Extraction Procedures

The Center for Clinical and Translational Science (CCTS) at the University of Kentucky (UK) compiled a list of medical record numbers of patients in the AEHR database that were seen by consented providers 10 clinic days before (pre-intervention) and 10 clinic days after (post-intervention) the brief intervention in the Internal Medicine clinic with a diagnosis of HTN (ICD-10 codes: I10, I11.9 and I13.10) and met the inclusion criteria. The clinical documentation was examined for evidence that the patient was on at least one antihypertensive medication at the time of their visit.

The following data was extracted from the record: Patient demographic data (age, gender, race), diagnosis of diabetes, diagnosis of CKD, number and types of antihypertensive agents,

blood pressure at the most recent visit, and documentation of distribution of patient HTN education. Blood pressure readings at the most recent visit were examined for evidence of HTN control. HTN control was defined for patients 18 to 59 years old or those of any age with diabetes or CKD as less than 140/90 mmHg and adults over 60 years old with no diabetes or CKD as less than 150/90 mmHg (see Table 1). CI for the purposes of this project is defined as no intervention when the patient lacks HTN control. Patients with lack of HTN control had their record further examined for documentation of: discussion of adherence (defined as medication adherence or blood pressure monitoring adherence) at the most recent visit, medication changes (an increase in dosage, additional medication, or attempt to intensify medication with concurrent patient refusal), counseling regarding lifestyle modification (diet or weight loss), a scheduled follow up visit for blood pressure management in less than 6 weeks, or referral to a specialist for blood pressure control. Lastly the record was examined for evidence of HTN education handouts being given to the patient.

Data Analysis

Descriptive statistics (means and standard deviations and frequencies) were used to summarize the overall sample. Bivariate statistics, including the two-sample t-test or chi-square test of association, were used to compare demographic characteristics between the groups at each time point. Chi-square tests were also used to compare the percent at goal between the two time points and compare documentation of provider intervention at pre-intervention and post-intervention. All data analysis was conducted using SPSS version 22; an alpha level of .05 was used to determine statistical significance.

Results

Seven providers were consented. There were 101 unique records that met pre-intervention criteria and 119 unique records that met post-intervention criteria. Records were randomly selected so that there were 100 records in the pre-intervention group and 100 records in the post-intervention group. Of the 100 pre-intervention records, the average age was 60.8 years. Of the pre-intervention subjects, 46% were male, 54% were female. The majority of patients in the prevention group were Caucasian (69%), 31% were African American; 38% had a diagnosis of diabetes, while 17% had a diagnosis of CKD. The average number of antihypertensive medications prescribed to each patient in the pre-intervention group was 2.13 (+/- 1.2).

Of the 100 post-intervention records, the average age was 62.3 years. The majority of patients in the post-intervention group were female (57%), 43% were male, 57% were female, 76% were Caucasian, 23% African American, and 1% other. As in the pre-intervention group, 38% of the post-intervention group had a diagnosis of diabetes, while 17% had a diagnosis of CKD. The average number of antihypertensive medications prescribed to each post-intervention patient was 2.06 (+/- 1.1). Bivariate statistics showed no significant difference between the demographics of the pre-intervention and post-intervention groups (see Table 2).

The majority of records reviewed documented controlled HTN as defined by JNC 8: 65% in the pre-intervention group and 64% in the post-intervention group. There was no significant difference in documented HTN between the groups (see Table 3; $p > .05$). It was noted in multiple visit records that in cases of an initial elevated measurement the provider took a second measurement of the blood pressure further into the appointment. There was no evidence of a

HTN education handout being given to the patient in the pre-intervention or post-intervention group.

Of the persons who were uncontrolled among the project population in each time point, evidence of documentation for discussion of treatment adherence, diet counseling, changes to medications, follow-up within 6 weeks, referral to specialist or no evidence of any intervention were recorded. In the pre-intervention group the provider had documented some discussion of treatment adherence for 17 patients, diet counseling for 5 patients, medication changes (or patient refusal to intensify medication) in 15 patients, a follow-up within 6 weeks for 4 patients, and specialist referral in 5 patients (see Table 4). In the post-intervention group the provider had documented some discussion of treatment adherence for 9 patients, diet counseling for 2 patients, medication changes (or patient refusal to intensify medication) in 13 patients, a follow-up within 6 weeks for 3 patients, and specialist referral in 1 patients (see Table 3). There were no significant differences between groups for any of these measures.

In the pre-intervention group 8 out of 34 (23.5%) patients with uncontrolled HTN had no interventions, which is the percent CI. In the post-intervention group 16 out of 35 (45.7%) uncontrolled patients had no interventions, which is the percent CI. There was no significant difference in CI between the groups (see Table 4; $p > .05$). Among both time-point groups 24 patients out of the 70 (34%) had no intervention recorded by the provider, which is considered the total percent of CI. Of these patients without intervention, 4 patients in the pre-intervention group and 5 patients in the post-intervention group were noted to be attending an acute visit. There was no evidence of provider comment on their blood pressure being above goal, with an additional patient in the post-intervention group having notation that the elevated blood pressure could be secondary to the acute illness. Three patients with no intervention were noted to have

not taken their antihypertensive medications prior to coming to their appointment. Five of these patients were noted to be at goal at visit, 4 of which were isolated diastolic above goal, and one whom was noted to be appropriate at goal for age, but was above goal when consideration of comorbidities was factored.

Discussion

HTN is a disease with considerable morbidity and mortality (Go et al., 2014; Farley et al., 2010). Lack of HTN control remains prevalent and primary care providers have an opportunity to treat uncontrolled HTN at each office visit. Documentation of HTN control occurred in 65% of the visits that were examined in this project. This is above the healthy people 2020 goal of 61.2% and a considerable improvement from both previous evaluations in this same clinic at 44% and 24% controlled (Prince, 2016; Guiliani, 2014). Of the 70 occurrences where there was lack of HTN control, only 34% had no documented evidence of provider intervention which is an improvement from the Prince (2016) evaluation where in three separate visits without HTN control no interventions were performed up to 50% of the time. Thus, HTN related CI appears to have improved in this clinic.

Two major factors in lack of HTN control in patients who are currently treated for HTN are provider CI and lack patient adherence (Ogedegbe, 2008). One aim of this project was to evaluate the utility of a brief provider intervention on CI. There were no significant differences between HTN control percentages or CI in pre-intervention and post-intervention time points, additionally there was no evidence that HTN education handouts were given to patients. This is indicative that the brief provider intervention delivered was not effective in changing provider behavior.

For patients in both groups who did not receive a provider intervention, the noted acute visits without any reference to HTN control are missed opportunities. Lebeau et al. (2014) proposed utilizing the term appropriate inaction with regards to avoiding intensification of treatment with such justifications for doing so, in lieu of true therapeutic inertia. Several of these cases represent appropriate inaction with regards to medication changes, however, in this project discussions with the patient about adherence would have prevented these cases from being considered CI.

While it may be appropriate not to intensify medication under certain considerations, other interventions such as discussion of medication and treatment adherence, lifestyle modifications or scheduling a follow-up to reassess blood pressure could be of benefit to the patient. Similarly, patients who were noted to not have taken their medications prior to their appointment may not be candidates for intensification of their therapy, but could be counseled regarding adherence. Ogedegbe (2008) considers patient excuses such as missing doses as “soft reasons” to sidestep therapeutic changes that encourage a wait and see approach that encourages continued inertia.

In cases where there is lack of control, but notation that the patient is controlled, it is important to note that PQRS measurements consider hypertensive patients lacking control if systolic blood pressure is greater than 140 and diastolic blood pressure is greater than 90 mm Hg. This distinction could demonstrate the suggested provider belief that intensification of medication therapy should not necessarily be at the guideline determined threshold (Khatib et al., 2014; Ogedegbe, 2008).

Limitations

There was apparent limited utility of a brief provider-only intervention in this practice. Pre-intervention HTN control rates showed improvement prior to this intervention. Only 7 providers were consented limiting the pool of patient records. Two of the providers were not present for the entire discussion which was limited to 15 minutes due to a different primary focus of the meeting that day. Handouts were given that reflected both the clinical guideline and patient education expectations, but might not have been read by providers or sustained after subsequent presentations at that meeting. Copies of the informed consent were given to each consenting provider that detailed project goals, but no follow up verbal discussions were undertaken. Additionally, resident physicians are heavily utilized in this clinic. They were not educated, leaving responsibility of ordering and noting the sought patient education to the attending physician without additional reminders to do so. The only information obtained to evaluate CI was the electronic medical record, so it is possible that other interventions were performed that were not noted in the record. Comparisons between prior studies and the current project are limited as both prior evaluations examined records from three separate visits, whereas this project looked at a single visit. Lastly, the small power of 100 records at each time point is not enough to detect small changes.

Implications for Clinical Practice

Improvements in HTN control should be aimed at providers and patients. Past quality improvement studies in other chronic diseases have found provider only interventions are only helpful if baseline control is poor (Triccio et al., 2012). In the case of this clinic, the HTN control rates continued to improve prior to intervention, so best practices may be to focus on missed opportunities like acute appointments and patients for whom titration of medication

might be held until further visits. The effectiveness of nonpharmacological interventions directed at patients such as encouraging adoption of the DASH diet, increased physical activity, and weight loss could be valuable and should not be overlooked when medication interventions are not appropriate (He, Whelton, Appel, Charleston & Klag, 2000; Hinderliter et al., 2014; Vamvakis, Gkaliagkousi, Triantafyllou, Gavrilaki, & Douma, 2017).

Future quality improvement study could be inclusive of providers, or both patients and providers. Interventions that include patient education have shown better blood pressure control compared with provider education alone (Roumie et al., 2006; Wright-Nunes, Luther, Ikizler & Cavanaugh, 2012). Providers in this clinic could improve on documenting HTN education in a systematic and formal way. From the present project, the brevity of the intervention did not produce an effect on this parameter. A multi-stage quality improvement study utilizing 45 minute sessions for education and peer case review has shown effect on provider prescribing behavior on acute illnesses (Korom, Onguka, Halestrap, McAlhaney, & Adam, 2015). A multi-stage project could be undertaken in this clinic which may have a more substantial impact on provider behavior, and could be helpful in chronic disease management. A study that informs the provider of patient therapy adherence has been shown to improve CI and patient satisfaction with HTN control (Kronish et al., 2016). While electronic adherence measurements can be costly, even pharmacy reports on refill history or patient self-reports of adherence, if included in medication reconciliation procedures done in this clinic by medical technicians, could improve provider decision making.

One area of research that shows promise in chronic disease management is team based care, where personnel such as medical assistants, nurses, and pharmacists participate in team management of a population of patients along with providers. Improvements in HTN control

have been shown using a team based care model where the provider directs care but patient interaction with other personnel provide access to medication titration and nonpharmacological interventions on a more frequent basis (Chuang, Ganti, Alvi, Yandrapu. & Dalal, 2014; Kravetz & Walsh, 2016). While this would be a considerable effort to implement, it may be worthwhile to consider use of this model with the population of HTN patients. If successful in HTN patients, team based care could be applied to other diseases as outcomes in disease management becomes the focus of CMS reimbursement considerations.

Summary

HTN is a significant contributor of morbidity and mortality in the United States. A quality improvement project using a brief educational intervention in an internal medicine clinic showed no effect, but improvements were seen when comparing HTN control and CI to past observations. While improvements have been made and the clinic has met population goals set forward by Healthy People 2020, continuous quality improvement is a shifting focus utilizing PQRS reporting and CMS reimbursement. Possible suggestions for clinical improvement are to address HTN at acute visits, increase use and documentation of non-pharmacological interventions when medication changes are not indicated, providing and documenting formal HTN patient education handouts, multi-stage quality improvement projects for greater impact, increased use of patient adherence assessments, or larger implementations such as team based care models.

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Table 1. JNC 8 Blood Pressure Goal Recommendations

Patient Group	Goal Blood pressure
Age < 60 years	<140/90 mm Hg
Age > 60 years	<150/90 mm Hg
Any age with CKD or Diabetes	<140/90 mm Hg

Table 2. Demographic summary of pre- and post-intervention samples (N=200)

	Pre (n=100)	Post (n=100)	Total sample	p
Age, Mean (SD)	60.8 (12.9)	62.3 (11.6)	61.6	.40
Gender, %				
Male	46%	43%	44.5%	.78
Female	54%	57%	55.5%	
Race, %				
White	69%	76%	72.5%	.27
African American	31%	23%	27%	
Other	-	1%	0.5%	
Diabetes, %	38 %	38 %	38 %	.91
CKD, %	17 %	17 %	17 %	.92
Number of antihypertensives, Mean (SD)	2.13 (1.2)	2.06 (1.1)	2.10 (1.1)	.66

Table 3. Hypertension control

	Pre (n=100)	Post (n=100)	Total (n=200)	p
Controlled, %				
Yes	66	64	65	.88
No	34	36	35	

Table 4. Provider intervention frequencies for uncontrolled hypertension

	Pre (n=34)	Post (n=36)	Total (n=70)	p
Adherence counseling	17	9	26	.05
Diet counseling	5	2	7	.67
Change to medications	15	13	28	.26
Follow-up within 6 weeks	4	3	7	.63
Referral to specialist	5	1	6	.71
No intervention	8	16	24	.19