



Thiazide Diuretic as First-Line Treatment for Effective Blood Pressure Management



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Introduction

Hypertension (HTN) affects one billion individuals worldwide. HTN is projected to increase to 1.56 billion by 2025. Since 2015, HTN has been identified as the leading contributor to premature death, including 10 million deaths and 200 million disability-adjusted life years (Williams et al., 2018). Early detection and management of BP are essential to reduce the risk of developing CV disease.

Thiazide diuretics reduce fluid retention and treat salt-sensitive HTN in most adults, including African Americans, the elderly, and those diagnosed with metabolic syndrome (Roush et al., 2015). Over the years, many researchers have argued that HCTZ and CTND can be used interchangeably (Cooney et al., 2015). Both drugs target the sodium chloride symporter in the distal convoluted tubule of the kidney. However, while the half-life of HCTZ is 6.5 to 9 hours, the half-life of CTND is 25 to 55 hours (Liang et al., 2017). Thus, CTND is a superior diuretic as the first line of treatment for HTN.

Problem Description: Providence Medical Partners is an ambulatory clinic on the west side of El Paso, Texas that provides primary medical care for ambulatory adults. The current practice that was not effective was to use HCTZ, losartan, or lisinopril as initial treatment for uncontrolled blood pressure (BP). The evidence base intervention produced by the literature review was to initiate CTND 25mg per day as the first line of treatment in adults 18 to 73 years of age.

Abstract

Background: Thiazide diuretics are currently the first-line treatment for hypertension (HTN). This class of drugs includes hydrochlorothiazide (HCTZ) and the thiazide-like diuretic, chlorthalidone (CTDN). The quality improvement project began in the fall semester with a 10-day reflective practice log to assess my current practice. A review of the clinical practice log allowed me to evaluate my current practice and identify three opportunities to improve my practice. I developed three potential PICOT questions and selected one for the QI project with the guidance of my Doctor of Nursing Practice (DNP) chairperson. I performed a literature review to gather the best evidence-based intervention to improve my practice. My current practice was to use HCTZ, losartan, or lisinopril as initial treatment for uncontrolled blood pressure (BP). The literature review's new evidence-based intervention was to initiate CTND 25mg per day as the first line of treatment for HTN in adults 18 to 73 years of age. I presented the QI proposal of the evidence-based intervention to the IRB at The University of Texas at El Paso (UTEP) and my worksite supervisor. Approval from the IRB at UTEP and work supervisor were obtained in letter form before initiation of the QI project. I implemented the evidence-based QI project for six weeks in the Spring semester.

Purpose:

This Quality Improvement (QI) project aims to use CTND 25mg as a first-line treatment to achieve effective BP control in patients 18 to 73 years of age within 4 weeks.

Context:

The QI project aims to lower BP using evidence-based treatment with CTND 25mg as first-line treatment. The QI project was implemented at Providence Medical Partners in an ambulatory clinic on the west side of El Paso, Texas, that provides primary medical care to adults and the local geriatric population. The QI project commenced on September 3, 2021, with CITI training for IRB human research, HIPAA, research populations, ethical considerations, and regulations.

Description of Intervention(s)

On September 7, 2021, I conducted a needs assessment using a 10-day reflective practice log to identify three opportunities to improve my current practice at Providence Medical Partners Clinic (Resler location, El Paso, Texas). Data collected in the needs assessment included the age and gender of each patient, chief complaint, diagnosis, assessment tools, Current Procedural Terminology (CPT) codes, International Classification of Disease (ICD)-10 codes, interventions, and documentation of the need for follow-up visits. The inclusion criteria were adult patients 18 to 73 years of age.

Review of patients.

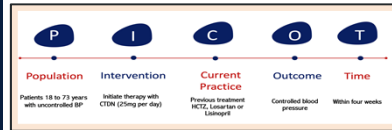
Ninety-three patient visits were recorded in the 10-day reflective practice log. Thirty-two percent (32%) of these encounters involved a diagnosis of HTN. Patients were categorized based on demographic data, diagnosis, treatment, and tools used for each patient visit.

Insight gained.

After reviewing my 10-day reflective practice, I identified three potential opportunities to improve the care that I presently provide my patients. Three potential PICOT questions were developed. I met with my Doctor of Nursing Practice (DNP) chairperson, and one PICOT question was selected for the quality improvement project and began my literature review.

PICOT question.

This DNP QI Project aims to use evidence-based data to improve BP control among adults 18-73 years of age seen at Providence Medical Partners ambulatory primary care clinic.



DNP QI proposal.

The Plan-Do-Study-Act (PDSA) cycle guided the QI project. According to the IHI (2020), the PDSA cycle is used in the QI project to test the change (i. e., Plan), carry out the test (i. e., Do), observe the consequences and learn from them (i. e., Study), and determine what modifications if any should be made (i. e., Act).

The QI project focused on using CTND 25mg daily as a first-line treatment for hypertensive patients who receive care at the Providence Medical Partners/Resler clinic. The following is an outline of the different components of the PDSA cycle:

Methods

Frameworks

PDSA Cycle



Plan: I identified uncontrolled hypertensive patients ages 18-73 years of age.

Do: I documented a baseline BP on the initial visit before initiating CTND 25mg daily. I then scheduled patients for follow-up 2-3 weeks after record a post-intervention BP.

Study: I compared BP measurements taken before and after evidence-based treatment for each patient.

Act: Based on an analysis of the BP results, I determined the evidence base efficacy of CTND for reducing BP in 18-73-year-old adults at my clinic

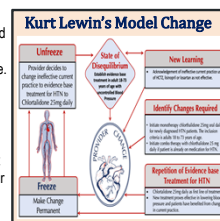
IRB application and work supervisor letter of approval

The QI project used evidence-based literature and methodologies and complied fully with the federal regulations and requirements regarding the rights and welfare of the human participants. These requirements included: 1) A work letter from my work site supervisor providing approval to perform a QI project. 2) Submission of QI project proposal and application to the University of Texas at El Paso Institutional Review Board (IRB). On November 8, 2021, UTEP IRB letter of approval was obtained for this QI project entitled "Thiazide Diuretic as First-line Treatment for Effective Blood Pressure Management" [QI ref. 1811282-1]. On October 29, 2021, I was granted permission by the worksite supervisor at Providence Medical Partners to conduct the QI project titled "Thiazide-like Diuretic as First-line Treatment to Improve Blood Pressure Management."

Interventions

Implemented the QI project over a six-week timeline on January 18, 2022. I performed BP measurements using a manual BP cuff to confirm uncontrolled HTN. The criteria for enrollment in the QI project included patients 18-59 years of age with a BP $\geq 140/90$ mmHg and patients ≥ 60 years of age with BP $\geq 150/90$ mmHg. Monotherapy (CTDN; 25mg daily) was initiated in newly diagnosed hypertensive patients. The same dose (CTDN; 25 mg per day) was provided to patients who remained hypertensive on a pre-existing anti-hypertensive medication regimen. Patients who accepted the new evidence-base treatment were instructed to keep a home diary and bring it to the clinic on the next patient visit. I recorded a baseline BP at the first and follow-up visit. The QI project intervention incorporated the PDSA cycle consistent with its goal.

Kurt Lewin's Model of Change (Lewin, 1958) provided the theoretical framework to introduce research into practice. This model included a three-step process (i. e., unfreezing, changing, and refreezing). The theory explains the three-step interventions the provider must accomplish to establish in order to make the new evidence based treatment permanent.



Outcomes

Measures

Quantitative patterns in pre-intervention and post-intervention BP measurements were taken by averaging SBP and DBP to calculate pre- and post-intervention BPs. Evaluation of data is presented on two separate line graphs for SBP and DBP (figure 1). Twenty-seven patients (eight males and 19 females) met the criteria for the QI project. Seventeen patients were < 60 years of age and 10 were ≥ 60 years of age.

Conclusions

The QI project aimed to improve BP control in at Providence Medical Partners clinic. By initiating evidence-base first line treatment CTND daily. This evidence-based QI project demonstrated the effectiveness of CTND as an antihypertensive agent that is an effective treatment in reducing BP.

Ethical considerations

Patient Inclusion criteria for the QI project required hypertensive adults 18-73 years of age with uncontrolled BP. Patients were consulted regarding the decision to initiate new treatment. Side effects as listed by the drug manufacturer, goal of treatment, and evidence-based treatment for HTN were discussed with the patient. Patients were allowed to make an informed decision regarding the new treatment. All patients were provided with an opportunity to refuse treatment and were provided with an alternative treatment strategy, as necessary.

Results

Twenty-seven patients (age 18-73) met the inclusion criteria of the evidence-base QI project and were treated with CTDN. Of these, 27 patients (100%) responded with a reduction in SBP; 22 of the 27 (81%) exhibited reductions in DBP. The average pre-intervention SBP was 155 mmHg, and the post-intervention average was 130 mmHg. The average DBP pre-intervention was 85 mmHg and 78 mmHg post-intervention. I performed all the measurements included in this study to maintain the reliability of the data (Figure 1).

