Controlling Blood Pressure During a Pandemic: The Impact of Telepharmacy for Primary Care Patients

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Abstract

Introduction: Studies have shown positive clinical outcomes in chronic conditions, such as hypertension, through pharmacist-delivered medication therapy management and medication adherence services. Given the need for social distancing during the COVID-19 pandemic, increased utilization of telepharmacy strategies has been employed for managing blood pressure control.

Methods: A retrospective single-center cohort study that compared in-person pharmacist visits and telepharmacy visits in primary care patients with hypertension via electronic chart review from January 2018 to July 2022. Subjects were included who were at least 18 years of age with hypertension. Comparator groups were patients who underwent an in-person pharmacy (pre-COVID-19) visit vs a telepharmacy visit (post-COVID-19). The primary outcome was the number of patients with controlled blood pressure based on a blood pressure goal of less than or equal to 130/80 following telepharmacy visit vs in-person visit. Medication adherence, pharmacist intervention, incidence of antihypertensive side-effects, and blood pressure maintenance based on a goal of ≤140/90 were also evaluated.

Results: A total of 77 patients were included. There was no difference in the primary outcome following in person pharmacy visits compared to telepharmacy visits (P = .690). There was also no difference found for the secondary endpoints of blood pressure goal less than or equal to 140/90 mmHg (P = .481), medication adherence (P = 1.00), or antihypertensive adverse events (P = .344).

Conclusion: Telepharmacy visits had a nonsignificant change in blood pressure control when compared to in-person visits. Results suggest that the utilization of either in-person or telepharmacy strategies benefit the management of hypertension.

Keywords

telepharmacy, hypertension, telehealth, COVID-19

Introduction

SARS-CoV-2, the virus that causes coronavirus disease 2019 (COVID-19), remains an ever-changing health concern in today's world.[1] Although individuals of all ages are at risk of infection, those within the geriatric population and individuals with underlying conditions have an increased risk of having severe or critical illness.[1,2] More specifically, a meta-analysis has observed that mortality risk increases steadily in hypertensive patients who are positive for SARS-CoV-2 following infection.[3] Not only was the pandemic a time of fear and isolation, it was also when high-risk patients (i.e., individuals with cardiovascular [CV] conditions) could not visit primary care physician's offices because of social distancing as the risk of COVID-19 infection outweighed the necessity to meet in-person for those with chronic conditions. Because hypertension is an asymptomatic and lifelong disease that must be treated, and due to COVID-19 staff shortages of physicians and nurses in health systems, the responsibility of adherence and medication management during the pandemic was placed on pharmacists via telehealth strategies.[4]

Years of investigation have proven that the health outcomes of patients with chronic disease state management such as hypertension are improved using face-to-face medication therapy management and other pharmacist-delivered interventions.[5] In-person pharmacist involvement has led to

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increased medication adherence, improved quality of life, and an overall decrease in healthcare costs.[5] According to the *World Health Organization's Adherence to Long-Term Therapies* medication adherence can have more of a direct impact on patient outcomes than the specific treatment itself.[5] Additionally, the most important cause of uncontrolled blood pressure is poor adherence to treatment.[5] Repeatedly, the literature has demonstrated that having pharmacists participating in a multidisciplinary healthcare team using medication adherence interviews, transitions of care, and medication reconciliation caused superior health outcomes for patients.[6] Pharmacists can counsel the patients properly about their medications, including the correct drug, route, strength, frequency, indication, cost-saving, and the importance of being **adherent.** Current literature has shown that a patient with hypertension can be well controlled if he/she **remains adherent** to their medication regimens through medication therapy management.[4]

Telehealth has become a revolutionary form of patient management utilizing technology such as mobile phones or other smart devices for audiovisual conferencing to remotely deliver healthcare and clinical services.[4] Although this is not a **novel** medical intervention, pharmacist-delivered telehealth intervention, also known as telepharmacy, is more commonplace since the COVID-19 pandemic, but the impact on clinical outcomes are less elucidated.[4] Due to gaps in evidence during this new era of health, this report evaluated the clinical impact of controlling high blood pressure by comparing in-person pharmacist visits to telepharmacy visits in patients with hypertension.

Methods

Study Population

For this pilot, retrospective single-centered cohort study, inclusion criteria were subjects at least 18 years of age diagnosed with and referred to the pharmacist's team for hypertension by a primary care provider. The subjects had to have met in-person with the pharmacy team at least once prior to the COVID-19 pandemic and at least once via telepharmacy since the start of the COVID-19 pandemic. **Of note, study subjects were previously established patients as no new patients were added for management during the pandemic.** In-person pharmacist visits for patients with hypertension consisted of either a pharmacist, pharmacy resident, and/or pharmacy student conducting a medication adherence assessment and reconciliation and reviewing past and current at home and in-office blood pressure (BP) and heart rate readings. **A BP goal of less than or equal to 130/80 was targeted for all study subjects.** Discussing non-pharmacological treatment strategies including diet, exercise, alcohol consumption and smoking status, presence of allergies, adverse events, or symptoms, and providing pharmacotherapeutic recommendations to the healthcare team was also performed as needed. Telepharmacy visits were performed telephonically following the same protocol except obtainment of in-person vital readings. **Patients were previously educated on and used automated BP devices at home.**

Data Collection

Data were extracted electronically via chart review, evaluating records from January 2018 to June 2022 from a primary care office. Pre-COVID-19 pandemic was considered January 2018 through February 2020, while post-COVID-19 pandemic was considered March 2020 to June 2022.

Demographic data consisted of age at the time of in-person pharmacist visit, race, and gender. Pre-COVID-19 pandemic data consisted of information related to the last in-person pharmacist visit including the date of last in-person pharmacist visit, BP reading following last in-person visit, medication adherence, pharmacist's interventions and recommendations, and antihypertensive adverse events reported. **During pharmacist visits open-ended questions were utilized to assess medication adherence (e.g., how often do you forget to take your medication?) and presence of adverse events (e.g., how often do you feel dizzy or light-headed?).** Post-COVID pandemic data consisted of the date of the first telepharmacy visit, BP reading following the first telepharmacy visit, medication adherence, pharmacist's interventions and recommendations, and antihypertensive adverse events reported.

Study Outcomes

The primary outcome was the number of patients achieving goal BP of less than or equal to 130/80 following in-person pharmacist visit pre-COVID-19 pandemic compared to telepharmacy visits post-COVID-19. In-person BP readings used for comparison were based on the BP reading after the last in-person pharmacy visit. Telepharmacy BP readings used for comparison were based on the BP reading after the first telepharmacy visit. Secondary outcomes were medication adherence, number of antihypertensive adverse events, and achieving a BP goal of less than or equal to 140/90 pre-COVID-19 during in-person pharmacist visit compared to post-COVID-19 telepharmacy visit. The type of pharmacist intervention and recommendations were also **reported/accepted** for pre- and post-COVID-19 time periods.

Statistical Analysis

Statistical analysis of data was performed using Statistical Package for Social Sciences (SPSS) version 25.[7] Chi-squared, Fisher's exact, and McNemar tests were utilized for nominal data as appropriate. Descriptive statistics were also reported. This study was approved by the institutional review board of Nova Southeastern University.

Results

Patient demographic information and baseline clinical findings can be found in Table 1. A total of 78 patients met study

Table 1. Baseline Characteristics (n = 77).

Age (years), mean ± SD	77.5 ± 26
Female, n (%)	48 (62.3)
Ethnicity, n (%)	
Caucasian	55 (71.4)
Latino	13 (16.9)
African american	8 (10.4)
Other	1 (1.3)

inclusion consisting of elderly (mean age of 77 years), Caucasian (71.4%) female (62.3%) patients. **All patients had at least 1 comorbid condition (i.e., diabetes mellitus type 2, hyperlipidemia).** As shown in Table 2, no statistically significant difference was found in the primary outcome of BP control, defined as a goal of less than or equal to 130/80 mmHg, following in-person pharmacy visits compared to telepharmacy visits (*P* = .690). **However, this BP goal was achieved among over 50% of the participants in each group.** Similarly no difference between groups was revealed for secondary outcomes of BP control with a goal of less than or equal to 140/90 mmHg as utilized in CMS quality metrics (*P* = .481), medication adherence (*P* = 1.00), or antihypertensive adverse events (*P* = .344).[8] Lastly, a subgroup analysis of thirteen subjects who were controlled at the time of the in-person pharmacy visits and uncontrolled at the telepharmacy visits demonstrated that all subjects had 3 or more CV comorbidities (100%) with 5 not adherent to their antihypertensive medications (38.4%). (Table 3)

The pharmacy team reviewed lifestyle modifications and medication adherence for all patients whether in-person or during telepharmacy visits. Common pharmacotherapeutic recommendations **provided/accepted** in-person and at telepharmacy appointments included initiation of an antihypertensive agent ([11] 45.8% vs [7] 53.8%), **increasing dosage of current antihypertensive therapy ([5] 20.8% vs [3] 23.1%), decreasing dosage ([3] 12.5% vs [3] 23.1%), or discontinuation of antihypertensive therapy due to adverse reactions or drug interactions ([5] 20.8% vs 0).**

Discussion

This pilot study revealed a nonsignificant change in BP control via pharmacist-led interventions for ambulatory patients with hypertension pre- and post-COVID-19 pandemic. These results suggest that telepharmacy visits yield a similar impact compared to in-person visits. As such, this report supports the utilization of either in-person or telepharmacy strategies to benefit the management of hypertension.

A population-based analysis found that the mean monthly BP increased modestly after the COVID-19 pandemic, despite the expanded use of home BP monitoring.[9] When the COVID-19 pandemic began, many patients deferred care due to fear of viral exposure and clinics closing.[10] This rise in BP could be explained by several social and physical factors, including but not limited to, increased work from home and sedentary behavior, pandemic-related stress, and changes in personal lifestyle.[9] These components that disrupted routine in-person visits made it difficult for patients to seek medical care, a vital aspect of treating chronic conditions like hypertension.[10] However, individuals were more engaged with checking their home BP than ever before.

In a retrospective cohort study, investigators examined the impact of telemedicine visits on quality measures for controlling high BP since the advent of the COVID-19 pandemic. Results concluded that telemedicine use was associated with poor benchmark performance. These findings conversely found that BP readings were not as commonly recorded.[11] These articles emphasize the need for home BP monitoring, especially when employing telehealth strategies. Moreover, a subgroup analysis of the current study suggests that CV comorbidities and non-adherence play a pivotal role in BP control, no matter how visits were maintained. As highlighted in current literature, adherence to treatment and lifestyle modifications have been associated with improved BP control and reduced complications.[5]

Hypertension remains a critical, modifiable risk factor in preventing CV disease, however, many patients do not achieve their therapeutic goals for numerous reasons.[12] Several factors contribute to poor outcomes, such as nonadherence, lack of patient engagement, and poor disease comprehension.[12] Despite the large availability of effective treatments, studies have shown that less than 25% of patients treated for hypertension achieve optimal BP control.[5] Pharmacists are considered the most accessible healthcare team member that can play a vital role in managing CV diseases, either in person or through telehealth services.[6] Their medication knowledge and patient counseling skills contribute to hypertension management in various ways, including home BP monitoring, education, identifying and resolving nonadherence, and titrating antihypertensive therapy to achieve BP control.[12,13]

Limitations to this report include the retrospective nature of its design, a small sample size consisting of mostly female and Caucasian subjects. It is also important to mention that all in-person visits were conducted with the patient, pharmacist, pharmacist student and/or pharmacy resident in the same room. Conversely, telepharmacy visits were performed remotely by a pharmacy student or resident while a pharmacist supervised the call in the background. This difference could have led to patients omitting complete medical information and not following the suggestions as closely as they would have at an in-person visit. **Lastly, as emphasized in the literature regarding BP self-monitoring, patients might not have correctly performed BP measurements techniques, might not have taken the required number of readings, and/or might have reported only selected readings from home.**[14]

Table 2. Primary and Secondary Outcomes.

Primary outcome	Pre-COVID-19 in-person	Post-COVID-19 telepharmacy	P-value
BP goal ≤130/80 mmHg, n (%)	43 (55.84)	40 (51.94)	.690
Secondary outcomes			
Medication adherence, n (%)	60 (77.9)	61 (79.2)	1.000
Antihypertensive adverse events, n (%)	5 (6.5)	9 (11.7)	.344
BP Goal ≤140/90 mmHg, n (%)	62 (80.5)	58 (75.3)	.481

Table 3. Pharmacist's interventions.[a]

Interventions	Pre-COVID-19 In-Person Visit n = 24	Post-COVID-19 Telepharmacy n = 13
Initiate antihypertensive agent, n (%)	11 (45.8)	7 (53.8)
Decrease dose of antihypertensive, n (%)	3 (12.5)	3 (23.1)
Increase dose of antihypertensive, n (%)	5 (20.8)	3 (23.1)
Discontinue medication due to possible antihypertensive side effects or drug interactions, n (%)	5 (20.8)	0 (0)

[a]Pharmacy team discussed lifestyle modifications and adherence to all patients whether in-person or during telepharmacy visits; on several occasions, more than 1 pharmacotherapeutic intervention was recommended to a single patient. **All interventions listed were accepted**.

Despite these limitations, this hypothesis-generating investigation assists in filling a gap in evidence evaluating the clinical impact of controlling BP through pharmacist-led interventions in-person compared to telepharmacy visits during the COVID-19 pandemic.

Conclusion

Telepharmacy visits had a nonsignificant change in BP control when compared to in-person visits. These findings suggest that the utilization of either in-person or telepharmacy modalities benefit the pharmacotherapeutic management of hypertension. Future studies are needed with larger sample sizes and more diverse populations.

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