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Assessment of the Impact of Pharmacist-led Transitions of Care Services in a Primary Health Center

Gaelle Njonkou[1], Kikelola Gbadamosi[1], Sheheryar Muhammad[1], Imran Chughtai[1], Giang Le[1], Adenrele Fabayo[1], Haijing Tran[1], Beatrix Lam[1], Meriam Senay[1], Letitia DeLaine[1], Chelsea McSwain[1], and DeAngelo Price[1]

Abstract

Background: The impact of pharmacist-led transition of care services with collaborative drug therapy management has shown to improve patients' outcomes and decrease health costs. Compelling statistics show higher readmission rates for under-insured patients compared with insured patients at primary health care clinics. **Methods:** This is a single center, prospective, cohort study designed to examine team-based collaborative drug therapy management and its effect on therapeutic outcomes of under-insured patients with target chronic diseases managed in a primary health center. Targeted chronic diseases included dyslipidemia, diabetes, hypertension, anticoagulation disorders, chronic obstructive pulmonary disease, and heart failure. The primary outcome measures included percentage of time in therapeutic international normalized ratio (INR) and percentage of patients at targeted goals of blood pressure, lipids, and hemoglobin A1c (HbA1c). Secondary outcomes included reduced emergency department visits, number of patient encounters, hospital readmissions within 30 days of discharge, and disease exacerbation rates. **Results:** Patients were at INR goal 58% of the time compared with 52% at baseline ($P = .66$). There was a 9% improvement in mean HbA1c in the intervention group when compared with baseline (9.6% vs 10.9%, $P = .03$). With pharmacist intervention, 73.8% of the patients had their blood pressure at goal compared with 50% at baseline ($P = .14$). A limited number of patients were readmitted for different reasons, including uncontrolled disease states. **Conclusions:** The pharmacist-physician collaborative drug therapy management led to improved blood pressure control, average HbA1c, and time in therapeutic INR range. A decrease in health care utilization was also identified.

Keywords
ambulatory services, cardiovascular, clinical services, disease management, medication therapy management (MTM), monitoring drug therapy, anticoagulants

Introduction

The impact of a pharmacist in a physician-pharmacist collaborative practice agreement (CPA) has shown to improve patients' outcomes and health care costs in the transition of care process and reduce readmission rates.[1] Nearly 1 in 5 patients experience adverse drug events and hospital-related complications weeks after hospitalization.[2] Approximately 20% of 30-day readmissions could be prevented and are predominantly affected by poor social support, poverty, and access to outpatient care.[2] Ensuring a safe, holistic, and effective transition of care is necessary to reconcile gaps between health care settings. Efficient transitions of care could be accomplished through CPAs. The pharmacist-physician collaborative drug therapy management (CDTM) has shown to improve continuum of care, access to care, medication adherence, therapeutic outcomes, and prevention of medication-related problems and errors.[3,4]

Holy Cross Health (HCH) aims to improve clinical outcomes and access to care through primary care health centers. Holy Cross Health Center at Aspen Hill is a comprehensive primary care clinic for the under-insured with approximately 10 000 patient visits each year. Primary care services at HCH under CDTM have been expanded to the Gaithersburg, Silver Spring, and Germantown health centers. Identified readmission rates

[1]Holy Cross Hospital, Silver Spring, MD, USA

Corresponding Author:
Gaelle Njonkou, Holy Cross Hospital, 1500 Forest Glen Road, Silver Spring, MD 20910, USA.
Email: gaelle.njonkou@holycrosshealth.org

were 13% for under-insured compared with 8% for insured patients. Furthermore, the Centers for Medicare and Medicaid Services (CMS) imposes reductions in reimbursement rates for hospitals with high readmission rates.[5] As a result, readmission rates could be improved by targeting therapeutic outcomes. Also, readmissions and gaps in care could affect patient satisfaction.

Inpatient and emergency department readmissions remain a challenge for patients with hypertension, anticoagulation disorders, diabetes, dyslipidemia, chronic obstructive pulmonary disease (COPD), and heart failure. In addition, follow-up care is a concern for patients with these conditions. Through collaborations with other health care providers, pharmacists can efficiently and effectively manage patients' chronic disease states, medications, and follow-up care.[3,6-8]

The Maryland Board of Pharmacy approved the CPA among physicians, mid-level practitioners, and pharmacists at Aspen Hill Health Center in May 2017. The CPA between pharmacists, physicians, and nurse practitioners enabled the implementation of protocols for pharmacists to care for patients. The pharmacists can perform medication dose titrations, pharmacotherapy optimization, medication reconciliation, disease state counseling, and screening for medication-related problems following evidence-based protocols. A pharmacist is present at the health center from Monday to Friday and is directly involved in patient care. The objective of the study was to evaluate the impact of pharmacist collaborative drug therapy services on therapeutic outcomes of under-insured patients with targeted chronic conditions managed within a primary health center. The study was approved by the local Institutional Review Board.

Methods

Study Design

The study was designed as a single-centered, prospective, cohort study and approved by the Institutional Review Board. The study was established at the Aspen Hill Health Center, and expanded to the other health centers in 2018. Patients diagnosed with chronic diseases or at risk of complications were referred for team-based disease management with the pharmacist. Therapeutic outcomes were monitored by pharmacists with follow-up with physicians and nurse practitioners. Targeted chronic disease states included dyslipidemia, diabetes, hypertension, anticoagulation disorders, COPD, and heart failure. Inclusion criteria for this study specified that participants must be at least 18 years of age with a minimum of 1 targeted chronic disease state, took at least 5 medications, or had emergency department visits secondary to an uncontrolled disease. Patients were excluded if discharged from the hospital or emergency department to a skilled nursing facility or hospice, or unable to follow-up at the health centers. In addition, signed informed consent forms were obtained from study participants prior to enrollment into the study.

Outcome Measures

The primary outcomes of the study were percent time in therapeutic international normalized ratio (INR), percentage of patients at blood pressure goal, and percentage hemoglobin A1c (HbA1c) at goal. Patients were at therapeutic goals per protocol if their blood pressure was less than 140/90 mm Hg or less than 150/90 mm Hg if 60 years or older, HbA1c was $<$7%, and INR 2-3 or 2.5-3.5 for patients with mechanical heart valves. Secondary outcome measures were emergency department visits, number of patient encounters, hospital readmissions within 30 days of discharge, and disease exacerbation rates.

Statistical Analysis

An unpaired *t*-test analysis was conducted to determine the difference in pharmacist intervention on time in therapeutic range of INRs and HbA1c goals compared with baseline. A chi-square test was used to identify changes in goal blood pressure associated to pharmacist interventions.

Results

From July 2017 to April 2019, 167 patients were enrolled in the study (Table 1). Most participants were men (67.1%). Diabetes was the most commonly encountered disease state, followed by hypertension, 53.3% and 44.3%, respectively. Most patients were on anticoagulation for atrial fibrillation (81.3%). Patients followed at the health centers could have more than 1 targeted chronic disease. During the study, there was a 9% difference in mean HbA1c (9.6% vs 10.9%, P = .03). Of the patients at goal HbA1c, 14% versus 4.5% were at goal (Table 2). Patients were at INR goal 58% of the time, compared with 52.3% prior to intervention ($P = .66$) (Table 3). An improvement in percentage of patients at blood pressure goal in the pharmacist arm was also observed (73.8% vs 50%, $P = .14$) (Table 4). Furthermore, a total of 649 patient encounters was achieved during the study period, the majority being attributed to diabetes (49.8%) and anticoagulation (38.1%) (Table 5). Also, 5 patients had emergency room visits and 4 were readmitted to the hospital for other health conditions during the study period (Table 6). After discharge from the hospital or emergency department and follow-up at the health centers, there was a 0% all-cause 30-day hospital readmission rate compared with 13.3% at baseline (Table 7).

Discussion

During the study, more patients were at INR and blood pressure goals, and had improvement in mean HbA1c in the

Table 1. Patient Demographics.

Demographics	n = 167
Age (y), mean ± standard deviation (range)	52.6 ± 13 (23-88)
Sex, no. (%)	
Male	112 (67.1)
Female	55 (32.9)
Ethnicity, no. (%)	
African American	15 (9.0)
Hispanic/Latino	126 (75.4)
White	4 (2.4)
Undisclosed	22 (13.2)
Comorbidities, no. (%)	
Anticoagulation	16 (9.6)
Atrial fibrillation	13 (81.3)
Deep vein thrombosis	2 (12.5)
Pulmonary embolism	1 (6.3)
Diabetes	89 (53.3)
Hypertension	74 (44.3)
Hyperlipidemia	56 (1.8)
COPD	3 (1.8)
Heart failure	4 (2.4)

Note. n = total number of patients; COPD = chronic obstructive pulmonary disease.

Table 2. Primary Outcome Results—Diabetes.

Diabetes	Baseline (n = 22)	Pharmacist (n = 35)	*P* value
Patient with goal hemoglobin A1c, no. (%)	1 (4.5)	5 (14)	
Mean A1c ± standard deviation (SD)	10.9% ± 2.3	9.6% ± 2.3	.03

Note. n = total number of patients.

Table 3. Primary Outcome Results—Anticoagulation.

Anticoagulation	Baseline (n = 15)	Pharmacist (n = 53)	*P* value
Average time in therapeutic INR range (%)	52.3	58	.66

Note. n = total number of patients; INR = international normalized ratio.

pharmacist arm. However, many of the patients were still due for HbA1c testing at the time of data collection. Pharmacist interventions that contributed to improvements in health outcomes included medication dose titrations, pharmacotherapy optimization, medication reconciliation, disease state counseling, nutrition and lifestyle counseling, and screens for medication-related problems. Patients were also provided with self-monitoring devices if they were Montgomery County residents. With expansions of primary care services under CPA to other health centers, there has been an increase in number of patient encounters conducted by pharmacists.

Table 4. Primary Outcome Results—Hypertension.

Hypertension	Baseline (n = 25)	Pharmacist (n = 61)	*P* value
Patients with blood pressure at goal (%)	50	73.8	.14

Note. n = total number of patients.

Table 5. Secondary Outcome Results—Patient Encounters.

Number of patient encounters, no. (%)	n = 649
Anticoagulation	247 (38.1)
Diabetes	323 (49.8)
Hypertension	75 (11.6)
Dyslipidemia	3 (0.5)
COPD	0 (0)
Chronic heart failure	1 (0.2)

Note. n = total number of patient encounters; COPD = chronic obstructive pulmonary disease.

Table 6. Secondary Outcome Results—Emergency Room Visits and Hospital Readmissions.

Health care utilization, no. of patients (%)	n = 167
Emergency rooms visits	5 (3)
Hospital readmissions	4 (2.4)

Note. n = total number of patients.

Table 7. Secondary Outcome Results—All-Cause 30-day Hospital Readmission Rate.

Health care utilization, percentage (%)	Baseline (n = 60)	Pharmacist (n = 167)
All-cause 30-day hospital readmission rate	13.3	0

Note. n = total number of patients.

The study also demonstrated an improvement in the percentage of patients at goal blood pressure. On the contrary, a small percentage of patient encounters was specifically associated to dyslipidemia, COPD, and chronic heart failure management. Chronic heart failure was recently added to the CPA, which could explain its low number of patient encounters. A reduction in overall health care utilization by patients enrolled in the study was also identified. However, only readmissions and emergency room visits at HCH were assessed. Other limitations included the relatively small sample size of both the interventional and control groups, limited recognition of service opportunities by patient to increase patient access capacity, providers buy-in, restrictions to provide self-monitoring supplies only to patients living in Montgomery County, and patient no show rate of 33% at the

Aspen Hill health center and 47% at the Silver Spring health center from December 2018 to April 2019.

Conclusions

The pharmacist-physician CDTM led to improved blood pressure control, average HbA1c, and time in therapeutic INR range of patients managed at the health centers. Very few patients were readmitted for different reasons, including uncontrolled diseases. Future directions include continuation of data collection and analysis, telehealth initiation for efficient management of continuity of care, incorporation of patient satisfaction surveys, expansion of services and health center days for pharmacists and residents, improved access to self-management resources, recognition of service opportunities to increase patient access capacity, and efficient identification of patients to follow-up prior to hospital discharge.

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Declaration of Conflicting Interests

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ORCID iD

Gaelle Njonkou https://orcid.org/0000-0001-9207-5162

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