PRIMARY CARE PHARMACIST IMPACT ON HEALTHCARE UTILIZATION

by

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2 PROJECT SUMMARY (ABSTRACT)

Key Words: Ambulatory Care, Accountable Care, Inter-professional, Pharmacy, Primary Care

Purpose: To implement a pharmacy service in a primary care practice designed to improve patient quality of care demonstrated by decreased rate of 30-day healthcare utilization.

Summary: In response to the lack of literature describing pharmacist impact on healthcare utilization, University of Houston and the pharmacy department at Houston Methodist Hospital (HMH) studied the effect of clinical services provided by a pharmacist to 484 patients seen in a medical resident ambulatory clinic (pilot population). The pilot population was evaluated and compared to 407 patients not receiving these services (pre-pilot population). Results show a significant decline ($P = 0.03$) in hospitalizations, with patients having a 62% reduction in the risk of hospitalization in the pilot population, and an increase ($P < 0.001$) in number of uncontrolled hypertensive patients receiving hypertension medication interventions. The percent of patients with a diagnosis of hypertension ($P= 0.03$) was higher in the pre-pilot population 41.5% (169/407) when compared to 35% (170/484) in the pilot population. Key components of the model include (1) pharmacist-driven medication reconciliation and patient education (2) pharmacist participation in multidisciplinary clinic rounds and (3) targeted uncontrolled disease state medication interventions. The ultimate goal is enhanced patient-driven inter-professional collaboration to decrease healthcare utilization.

Conclusion: Pharmacy services in primary care are beneficial as shown by decreased hospital utilization and pharmacists should become involved in long-term outpatient care given to primary care patients.

Introduction: Approximately 65 million Americans live in areas with a primary care physician shortage.[1] A survey found that only 27 percent of U.S. adults can easily reach their primary care physician by telephone, obtain after-hours care or advice, and schedule timely office visits[2]. Legislation to expand the role of the pharmacist has also been proposed under H.R. 592/ S.314 entitled the *Medically Underserved Areas Enhancement Act*. Under this legislation, pharmacists would be established as health care providers and enable coverage of pharmacists' services through Medicare Part B.[3,4] This legislation aligns with the U.S. Department of Veterans Affairs (VA) practice model, which gives clinical pharmacy specialists an expanded scope of practice with independent prescribing privileges since 1995.[5] Incorporating a pharmacist into primary care clinics can also expand the role of the pharmacist as a central component of the primary care transformation.[6]

A recent meta-analysis analyzing pharmacist-led care on clinical outcomes and harms concluded that evidence of pharmacists driving clinical outcomes for chronic disease states is lacking. Greer and colleagues concluded that pharmacist-lead chronic disease management was associated with effects similar to those of usual care for resource utilization and may improve physiologic goal attainment. Additional studies are needed to evaluate the effect of pharmacist-led care on clinical or resource-use outcomes including patient satisfaction, and to determine if goal attainment improves clinical outcomes.[7]

Clinical pharmacy services are heavily incorporated into inpatient care, but ambulatory care pharmacy services are underutilized. One study conducted within the Iowa Family Medicine Program showed that a pharmacist can improve blood pressure control of patients ($p<0.05$), however the study population was small ($n=3$).[8] Another study conducted at a VA Primary

Care Clinic showed that a PGY2 ambulatory pharmacy resident can improve therapeutic outcomes of patients, however the sample size studied was also small (n=24).[9] These studies show that pharmacists in ambulatory care primary care practice can optimize therapy and prevent avoidable adverse events through interventions by increasing patient adherence, optimizing medication regimens, preventing medication related-complications, and preventing readmissions due to medication-related events.[,10,11,12,13,14] In addition to improved patient care, pharmacists can also improve quality metrics required by the Centers of Medicare and Medicaid Services (CMS).[15] While there are descriptive accounts of pharmacist involvement in medical resident clinics, there is a lack of data describing their collaborative impact on healthcare utilization.[16] The incorporation of a new clinical pharmacy service at a medical resident primary care clinic provides a unique opportunity to provide data in this area.

This study was completed 1) to assess patient 30-day healthcare utilization rate before and after incorporation of a pharmacist into a medical-resident primary care clinic, 2) to assess the need for clinical pharmacy services, and 3) to measure type and percent of pharmacist interventions accepted.

Methods: The study was conducted with a select population of patients seen in the Houston Methodist Medical Resident Primary Care Clinic. All patients seen in the clinic from June 1st 2016 to February 28th 2017 were included. The pre-pilot population includes patients seen in the clinic from June 1, 2016 to September 30, 2016. The pilot population includes patients seen in the clinic from November 1, 2016 to February 28, 2017. A one-month wash out period was included to account for the start of pharmacist services on October 1st, 2016, thus all patients seen from October 1st to October 31st, 2016 were excluded. Patients admitted to the hospital on the same day as the clinic encounter (n=42) and patients admitted for a planned procedure (n=12) were not counted and left out of the analysis as they did not fit the definition of hospitalization.

A quasi-experimental study design was used to test the specific aims associated with the new pharmacist clinical services. The clinic was open Monday-Friday 08:00 to 17:00, except for Tuesday mornings and Friday afternoons. There was an Internal Medicine Clinical pharmacist and PGY1 Pharmacy Resident in the clinic full time during all hours of operation. Of note, both the clinical pharmacist and pharmacy resident were present from November 1st, 2016 to February 28th 2017. In addition, a PGY2 Internal Medicine Resident rotated through the clinic on Wednesday afternoons. Within the clinic there are 44 medical residents that rotate through one morning or evening per week, and 5 attending physicians who also rotate daily. The study was granted exempt status by the Houston Methodist and University of Houston IRB as QA/QI, Non-Human Subjects Research. The primary endpoint composite of 30-day healthcare utilization rates, defined as number of hospital admissions and emergency department (ED) visits within the Houston Methodist System, was assessed comparing the pre-pilot and pilot populations using chi-square. Secondary endpoints were also compared including number of ED visits defined as an index visit to a Houston Methodist ED within 30 days of the clinic encounter and hospitalizations defined as an index admission to a Houston Methodist System Hospital that is not on the same day as the clinic encounter or a planned procedure within 30 days of the clinic encounter. Logistic regression was performed for patients with a hospitalization within 30 days of the clinic encounter to identify variables truly contributing to the end point of healthcare utilization. To identify unmet medical need and the effectiveness of a pharmacist to meet this need, encounter interventions for uncontrolled hypertensive and diabetic patients were collected and analyzed using chi-square. Uncontrolled hypertensive patients were defined as patients with a blood pressure value classified as uncontrolled per JNC8 guidelines. Uncontrolled diabetic was classified as a patient with hemoglobin A1c greater than 7%. Lastly, the type and percent of pharmacist interventions accepted were evaluated using descriptive statistics. An intervention is defined as either a therapeutic modification in medication therapy and/or an action performed to improve patient care.

Figure 1 displays the pharmacist clinic workflow which consists of four steps 1) pre-appointment assessment, 2) patient interaction, 3) handoff to resident, and 4) discussion with the attending physician. The pre-appointment assessment includes the pharmacist gathering the patient’s history from the electronic health record (EHR), assessing records, compiling a comprehensive medication list, and ensuring all medications have valid indications. Once the patient is roomed in the clinic, the pharmacist utilizes motivational interviewing to obtain and document the current medication list in the EHR. The pharmacist then educates the patient based on identified knowledge gaps. During the resident handoff, the pharmacist summarizes their interaction with the patient to the medical resident and makes recommendations based on their conversation with the patient. Examples of recommendations include titrating blood pressure medications, switching the patient to a more affordable medication therapy, offering solutions to minimize/avoid side effects, and communicating medication contraindications and drug interactions. Lastly, once the medical resident has seen the patient, the pharmacist participates in the interdisciplinary discussion with the attending physician. During the discussion with the attending physician, the pharmacist provides medication education to the physicians when needed, makes additional recommendations based on the discussion, documents all activities within the EHR outpatient encounter, and communicates with the patient’s outpatient pharmacy if necessary.

3 Results

The baseline characteristics of the study populations are represented in Table 1. The majority of baseline characteristics showed no statistical difference between the pre-pilot and pilot populations. However, the percent of hypertensive patients was higher (P=0.03) in the pre-pilot population (41.5%, n=169) when compared to the pilot population (35%, n=170).

The healthcare utilization of the pre-pilot and pilot populations was compared and results are depicted in Figure 2. Healthcare utilization declined from 10% (n=39) in the pre-pilot population to 6% (n=29) in the pilot population (P=0.05). There was no statistically significant change in ED visits between the pre-pilot population (2%, n=8) and the pilot population (3%, n=14) (P=0.28). There was a statistically significant decline in hospitalizations between the pre-pilot population (8%, n=31), and the pilot population (3%, n=15) (P=0.003).

Table 2 represents the logistic regression performed for the patients with a hospitalization and shows that patients in the pilot population were 62% less likely to be hospitalized within 30 days of the clinic encounter compared with those seen in the pre-pilot period. The odds ratio for patients included in the pilot population is 0.38 with a p-value of <0.001. Patients who had private insurance compared to Medicare/Medicaid were also more likely to be hospitalized with an odds ratio of 1.99 and a p-value of 0.04. Additionally, for every additional medications a patient is on, their risk of being hospitalized increase by 4% with an odds ratio of 1.04 and a p-value of 0.02. The Hosmer-Lemeshow (HL) Test for the logistic regression model was 0.46 showing the strength of the goodness of fit of the model, and the c-statistic was 0.75, displaying the models good level of discrimination.

The results also reveal an increase in the percent of interventions made on uncontrolled hypertensive patients when a pharmacist was present during the pilot period (Figure 3). There was a statistically significant increase in uncontrolled hypertensive interventions made during an encounter between the pre-pilot population (6.6%, n=4) vs. pilot population (40.2%, n=27) (P=<0.001). The interventions for uncontrolled diabetics also moved between the pre-pilot population (23%, n=15) and the pilot population (39%, n=25) (P=0.05).

The types and percentages of accepted pharmacist medication interventions are displayed in Table 3 and Figure 4. The disease state with the highest amount of interventions (67%) was cardiovascular. Cardiovascular interventions included hypertension, dyslipidemia, coronary artery disease, and anticoagulant medication optimization. The second highest disease state type (19%) of interventions was endocrine, specifically diabetes mellitus type 2 medication optimization interventions.

4 Discussion

Overall, the pharmacist had a significant impact on healthcare utilizations specifically hospitalizations and increased the percent of interventions made for uncontrolled hypertensive patients. The wide variety of types of pharmacist interventions made represents the multifaceted role that the pharmacist can play on the primary care team. The amount and type of potential medication-related issues within primary care is vast and spans across many disease states. The ways in which a pharmacist can impact patient care within a primary care practice are endless.

Results of this study also help hypothesize the role the pharmacist can play in future value-based purchasing payment models. The passing of the Medicare Chip and Reauthorization Act (MACRA) in January of 2015 changed the way in which primary care physicians are reimbursed.[18,19] MACRA shifted reimbursement from a fee for service to a fee for performance model in which pharmacists can help manage performance measure outcomes. Additionally, many alternate payment model (APM) performance measures match interventions that were made by the pharmacist in the clinic, further justifying the pivotal role pharmacists can play in primary care and population health management.

There are many limitations to consider. After launching the pharmacy pilot in the medical resident clinic, the pharmacist quickly realized that the clinic functions as a minor emergency center and walk-ins are welcome. Being a minor emergency center made it difficult for the pharmacist to help manage chronic disease states because only the minor emergent issues were addressed during the clinic encounter. Accepting walk-ins also did not allow time for the pharmacist to complete the pre-appointment assessment before seeing the patient, which may have impacted the type and rate of interventions made.

Providers were also less inclined to manage complex disease states if patients were being followed by a specialist for that disease state, which decreased the rate of interventions accepted. The clinic scheduling also was set up where multiple patients to be scheduled at the same time which made it difficult for the pharmacist to see all patients, potentially decreasing the amount of possible interactions and pharmacy impact. The pharmacist coverage was provided by a core group of clinical pharmacy staff, which can decrease the external validity of the results. Of note, there were variables that were not considered including; previous readmission, severity of disease states, health literacy, and adherence. Access to data was another limitation, healthcare utilization outside of the Houston Methodist health system was unavailable and not assessed. Pharmacists also did not have the ability to prescribe, unlike other primary care pharmacy practices within the VA health system.[17] Additionally, the culture of the clinic is an unpredictable study limitation.[17]

5 CONCLUSIONS

In conclusion, pharmacy services in an internal medicine resident primary care clinic were beneficial as shown by a statistically significant decrease in hospitalizations within 30 days after the clinic appointment. Uncontrolled hypertensive and diabetic patients also had higher rates of interventions during the clinic encounter with a pharmacist, showing that a pharmacist's presence impacts rates and types of medication therapy interventions made. The pilot represents the first primary care clinical pharmacy activity for the Houston Methodist System. The future of pharmacy practice in primary care is going to be dependent on the ability of key stakeholders to recognize the value pharmacists play in reducing the total cost of care per patient across the care continuum.

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7 Appendices

N/A

8 Tables

Table 1: Baseline Characteristics, PowerPoint Slide 2

Table 2: Logistic Regression Results for Hospitalized Patients

Variable	Odds Ratio	95% Confidence Interval	Chi-Square P Value
Pilot	0.38	0.19 – 0.73	<0.01
Age	1.02	0.99 – 1.05	0.08
Female	0.84	0.45 – 1.56	0.58
White vs. Other	1.64	0.36 – 7.43	0.52
Black vs. Other	0.83	0.17 – 4.00	0.82
Hypertension Diagnosis	0.78	0.40 – 1.55	0.47
Diabetes Diagnosis	1.83	0.88 – 3.80	0.10
Chronic Kidney Disease Diagnosis	1.21	0.39 – 3.77	0.74
Insurance	1.99	1.03 – 3.88	0.04
Med Count	1.04	1.01 – 1.07	0.02

Table 3: Pharmacist Interventions by Type

	Intervention	**Total (n)**	**Accepted (n,%)**
Cardiovascular	Hypertension Medication Optimization	62	49, 79%
	Dyslipidemia Medication Optimization	23	19, 82.6%
	Coronary Artery Disease Medication Optimization	11	7, 63.6%
	Anticoagulant Optimization	7	6, 85.7%
Endocrine	Diabetes Mellitus Medication Optimization	61	47, 77%
Miscellaneous	Lab Monitoring Recommendation	40	33, 82.5%
	Over the Counter Medication Recommendation		
	Alternate Therapy Recommendation		
	Immunization Recommendation		
	Alternate Dose Recommendation		
	Medication Discontinuation Recommendation		
Infectious Diseases	Antibiotic Optimization	14	13, 92.8%

Pulmonary	Asthma/COPD Medication Optimization	13	11, 84.6%
Other	Adherence/ Adverse Drug Reactions	85	71, 83.5%
	Allergies		
	Anxiety		
	Benign Peristatic Hyperplasia		
	Depression		
	Gastro Esophageal Reflux Disease		
	Gastrointestinal		
	Pain		
	Psychiatric		
	Renal		
	Insomnia		
	Smoking Cessation		
	Thyroid		
	Transplant		
	Vitamin		
Total		316	257, 81.3%

9 Figures

Figure 1: Pharmacist Clinic Workflow, PowerPoint Slide 9

Figure 2: Healthcare Utilization, PowerPoint Slide 21

Figure 3: Needs Assessment, PowerPoint Slide 18

Figure 4: Pharmacist Interventions by Type, PowerPoint Slide 19