

Effect of Pharmacist Interventions on Hospital Readmissions for Home-Based Primary Care Veterans

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Background: Several studies indicate that when patients transition from one level of care to another, errors may occur. Pharmacists can play an integral role in the transitions of care process. At Michael E. DeBakey Veteran Affairs Medical Center, the Home-Based Primary Care (HBPC) service has implemented a streamlined hospital discharge plan to improve 30-day readmission rates after 1 year of HBPC enrollment.

Methods: Our aim was to identify specific pharmacist interventions to improve the HBPC discharge process and ultimately, improve hospital readmission rates. A Plan-Do-Study-Act quality improvement project was initiated. We conducted a review of

veterans enrolled in HBPC from October 2019 to March 2020.

Results: Of 175 patients assessed postdischarge, a medication reconciliation was completed by an HBPC pharmacist in 118 (67.4%) patients. Of the 118 medication reconciliations completed, 92 (78%) interventions were made by HBPC pharmacists. During the 6-month study period, 30-day hospital readmission rates decreased from 19% to 13%.

Conclusions: This study demonstrates several opportunities for interventions to lower readmission rates. Using the results from this study, education has been provided for the HBPC service and its readmission committee.

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Following hospital discharge, patients are often in a vulnerable state due to new medical diagnoses, changes in medications, lack of understanding, and concerns for medical costs. In addition, the discharge process is complex and encompasses decisions regarding the postdischarge site of care, conveying patient instructions, and obtaining supplies and medications. There are several disciplines involved in the transitions of care process that are all essential for ensuring a successful transition and reducing the risk of hospital readmissions. Pharmacists play an integral role in the process.

When pharmacists are provided the opportunity to make therapeutic interventions, medication errors and hospital readmissions decrease and quality of life improves.¹ Studies have shown that many older patients return home from the hospital with a limited understanding of their discharge instructions and oftentimes are unable to recall their discharge diagnoses and treatment plan, leaving opportunities for error when patients transition from one level of care to another.^{2,3} Additionally, high-quality transitional care is especially important for older adults with multiple comorbidities and complex therapeutic regimens as well as for their families and caregivers.⁴ To prevent hospital readmissions, pharmacists and other health care professionals (HCPs) should work diligently to

prevent gaps in care as patients transition between settings. Common factors that lead to increased readmissions include premature discharge, inadequate follow-up, therapeutic errors, and medication-related problems. Furthermore, unintended hospital readmissions are common within the first 30 days following hospital discharge and lead to increased health care costs.² For these reasons, many health care institutions have developed comprehensive models to improve the discharge process, decrease hospital readmissions, and reduce incidence of adverse events in general medical patients and high-risk populations.⁵

A study evaluating 693 hospital discharges found that 27.6% of patients were recommended for outpatient workups; however only 9% were actually completed.⁶ Due to lack of communication regarding discharge summaries, primary care practitioners (PCPs) were unaware of the need for outpatient workups; thus, these patients were lost to follow-up, and appropriate care was not received. Future studies should focus on interventions to improve the quality and dissemination of discharge information to PCPs.⁶ Fosnight and colleagues assessed a new transitions process focusing on the role of pharmacists. They evaluated medication reconciliations performed and discussed medication adherence barriers, medication

recommendations, and time spent performing the interventions.⁷ After patients received a pharmacy intervention, Fosnight and colleagues reported that readmission rates decreased from 21.0% to 15.3% and mean length of stay decreased from 5.3 to 4.4 days. They also observed greater improvements in patients who received the full pharmacy intervention vs those receiving only parts of the intervention. This study concluded that adding a comprehensive pharmacy intervention to transitions of care resulted in an average of nearly 10 medication recommendations per patient, improved length of stay, and reduced readmission rates. After a review of similar studies, we concluded that a comprehensive discharge model is imperative to improve patient outcomes, along with HCP monitoring of the process to ensure appropriate follow-up.⁸

At Michael E. DeBakey Veteran Affairs Medical Center (MEDVAMC) in Houston, Texas, 30-day readmissions data were reviewed for veterans 6 months before and 12 months after enrollment in the Home-Based Primary Care (HBPC) service. HBPC is an in-home health care service provided to home-bound veterans with complex health care needs or when routine clinic-based care is not feasible. HBPC programs may differ among various US Department of Veterans Affairs (VA) medical centers. Currently, there are 9 HBPC teams at MEDVAMC and nearly 540 veterans are enrolled in the program. HBPC teams typically consist of PCPs, pharmacists, nurses, psychologists, occupational/physical therapists, social workers, medical support assistants, and dietitians.

Readmissions data are reviewed quarterly by fiscal year (FY) (Table 1). In FY 2019 quarter (Q) 2, the readmission rate before HBPC enrollment was 31% and decreased to 20% after enrollment. In FY 2019 Q3, the readmission rate was 29% before enrollment and decreased to 16% afterward. In FY 2019 Q4, the readmission rate before HBPC enrollment was 28% and decreased to 19% afterward. Although the readmission rates appeared to be decreasing overall, improvements were needed to decrease these rates further and to ensure readmissions were not rising as there was a slight increase in Q4. After reviewing these data, the HBPC service implemented a streamlined hospital dis-

TABLE 1 30-Day Readmissions Data

Fiscal year quarter	Readmission rates		Study/ baseline ratio
	Baseline, %	Study, %	
2019			
1	34	20	0.61
2	31	20	0.66
3	29	16	0.53
4	28	19	0.70
2020			
1 ^a	30	15	0.51
2 ^a	31	13	0.42
3	32	12	0.37
4	30	7	0.23
2021			
1	23	3	0.14
2	25	6	0.24

^aStudy period: fiscal year 2020 first and second quarter (October 2019 to March 2020).

charge process to lower readmission rates and improve patient outcomes.

HBPC at MEDVAMC incorporates a team-based approach and the new streamlined discharge process implemented in 2019 highlights the role of each team member (Figure). Medical support assistants send daily emails of hospital discharges occurring in the last 7 days. Registered nurses are responsible for postdischarge calls within 2 days and home visits within 5 days. Pharmacists perform medication reconciliation within 14 days of discharge, review and/or educate on new medications, and change medications. The PCP is responsible for posthospital calls within 2 days and conducts a home visit within 5 days. Because HBPC programs vary among VA medical centers, the streamlined discharge process discussed may be applicable only to MEDVAMC. The primary objective of this quality improvement project was to identify specific pharmacist interventions to improve the HBPC discharge process and improve hospital readmission rates.

METHODS

We conducted a Plan-Do-Study-Act quality improvement project. The first step was to conduct a review of veterans enrolled in HBPC at MEDVAMC.⁹ Patients included were enrolled in HBPC at MEDVAMC from October 2019 to March 2020 (FY 2020 Q1 and Q2). The Computerized Patient Record System was used to access the patients' electronic health records. Patient information collected included race, age, sex, admission diagnosis, date of discharge, HBPC pharmacist name,

TABLE 2 Home-Based Primary Care Baseline Patient Demographics (N = 175)

Characteristics	Patients
Age, mean (range), y	76 (30-100)
Sex, No. (%)	
Male	167 (95.4)
Female	8 (4.6)
Race and ethnicity, No. (%)	
Black non-Hispanic	76 (43.4)
Hispanic	29 (16.6)
White non-Hispanic	68 (38.9)

TABLE 3 Pharmacist Interventions (n = 118)

Interventions	No. (%)
New medication education	34 (19.4)
Laboratory recommendations	16 (9.1)
Medication discontinuation	14 (8.0)
Additional drug therapy recommendations	7 (4.0)
Medication/formulation change	7 (4.0)
Incorrect dose	6 (3.4)
Discharged with incorrect medications/supplies	5 (2.9)
Maintenance medications not restarted	3 (1.7)

PCP notification on the discharge summary, and 30-day readmission rates. Unplanned return to the hospital within 30 days, which was counted as a readmission, was defined as any admission for acute clinical events that required urgent hospital management.¹⁰

Next, we identified specific pharmacist interventions, including medication reconciliation completed by an HBPC pharmacist postdischarge; mean time to contact patients postdischarge; correct medications and supplies on discharge; incorrect dose; incorrect medication frequency or route of administration; therapeutic duplications; discontinuation of medications; additional drug therapy recommendations; laboratory test recommendations; maintenance medications not restarted or omitted; new medication education; and medication or formulation changes.

In the third step, we reviewed discharge summaries and clinical pharmacy notes to collect pharmacist intervention data. These data were analyzed to develop a standardized discharge process. Descriptive statistics were used to represent the results of the study.

RESULTS

Medication reconciliation was completed postdischarge by an HBPC pharmacist in 118 of 175 study patients (67.4%). The mean age of patients was 76 years, about 95% were male (Table 2). There was a wide variety of admission diagnoses but sepsis, chronic obstructive pulmonary disease, and chronic kidney disease were most common. The PCP was notified on the discharge note for 68 (38.9%) patients. The mean time for HBPC pharmacists to contact patients postdischarge was about 3 days, which was much less than the 14 days allowed in the streamlined discharge process.

Pharmacists made the following interventions during medication reconciliation: New medication education was provided for 34 (19.4%) patients and was the largest intervention completed by HBPC pharmacists. Laboratory tests were recommended for 16 (9.1%) patients, medications were discontinued in 14 (8.0%) patients, and additional drug therapy recommendations were made for 7 (4.0%) patients. Medication or formulation changes were completed in 7 (4.0%) patients, incorrect doses were identified in 6 (3.4%) patients, 5 (2.9%) patients were not discharged with the correct medications or supplies, maintenance medications were not restarted in 3 (1.7%) patients, and there were no therapeutic duplications identified. In total, there were 92 (77.9%) patients with interventions compared with the 118 medication reconciliations completed (Table 3).

Process Improvement

As this was a new streamlined discharge process, it was important to assess the progress of the pharmacist role over time. We evaluated the number of medication reconciliations completed by quarter to determine whether more interventions were completed as the streamlined discharge process was being fully implemented. In FY 2020 Q1, medication reconciliation was completed by an HBPC pharmacist at a rate of 35%, and in FY 2020 Q2, at a rate of 65%.

In addition to assessing interventions completed by an HBPC pharmacist, we noted how many medication reconciliations were completed by an inpatient pharmacist as this may have impacted the results of this study. Of the 175 patients in this study, 49 (28%)

received a medication reconciliation by an inpatient clinical pharmacy specialist before discharge. Last, when reviewing the readmissions data for the study period, it was evident that the streamlined discharge process was improving. In FY 2020 Q1, the readmissions rate prior to HBPC enrollment was 30% and decreased to 15% after and in FY 2020 Q2 was 31% before and decreased to 13% after HBPC enrollment. Before the study period in FY 2019 Q4, the readmissions rate after HBPC enrollment was 19%. Therefore, the readmissions rate decreased from 19% before the study period to 13% by the end of the study period.

DISCUSSION

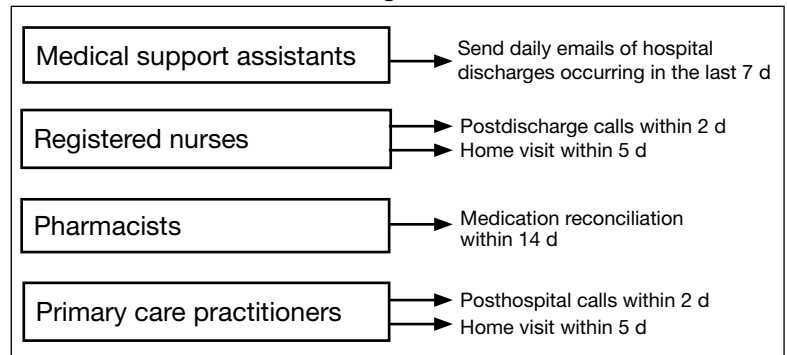
A comparison of the readmissions data from FYs 2019, 2020, and 2021 revealed that the newly implemented discharge process at MEDVAMC had been more effective. Our study suggests several opportunities for interventions to lower readmission rates. HBPC pharmacists completed a medication reconciliation for 118 of the 175 HBPC patients in this study. Of note this process did not exist before October 2019; overall, there has been a 67% increase in medication reconciliations completed by pharmacists.

There were 92 interventions made during the study period, which is about 78% of all medication reconciliations completed. Medication doses were changed based on patients' renal function. Additional laboratory tests were recommended after discharge to ensure safety of therapy. Medications were discontinued if inappropriate or if patients were no longer on them to simplify their medication list and limit polypharmacy. New medication education was provided, including drug name, dose, route of administration, time of administration, frequency, indication, mechanism of action, adverse effect profile, monitoring parameters, and more. The HBPC pharmacists were able to make suitable interventions in a timely fashion as the average time to contact patients postdischarge was 3 days.

Areas for Improvement

The PCP was notified on the discharge note only in 68 (38.9%) patients. This could lead to gaps in care if other mechanisms are not in place to notify the PCP of the patient's discharge. For this reason, it is imperative

FIGURE Streamlined Discharge Process



not only to implement a streamlined discharge process, but to review it and determine methods for continued improvement.⁹ The streamlined discharge process implemented by the HBPC team highlights when each team member should contact the patient postdischarge. However, it may be beneficial for each team member to have a list of vital information that should be communicated to the patient postdischarge and to other HCPs. For pharmacists, a standardized discharge note template may aid in the consistency of the medication reconciliation process postdischarge and may also increase interventions from pharmacists. For example, only some HBPC pharmacists inserted a new medication template in their discharge follow-up note. In addition, 23 (13.1%) patients were unreachable, and although a complete medication reconciliation was not feasible, a standardized note to review inpatient and outpatient medications along with the discharge plan may still serve as an asset for HCPs.

As the HBPC team continues to improve the discharge process, it is also important to highlight roles of the inpatient team who may assist with a smoother transition. For example, discharge summaries should be clear, complete, and concise, incorporating key elements from the hospital visit. Methods of communication on discharge should be efficient and understood by both inpatient and outpatient teams. Patients' health literacy status should be considered when providing discharge instructions. Finally, patients should have a clear understanding of who is included in their primary care team should any questions arise. The potential interventions for HCPs highlighted in this study are

critical for preventing adverse outcomes, improving patients' quality of life, and decreasing hospital readmissions. However, implementing the streamlined discharge process was only step 1. Areas of improvement still exist to provide exceptional patient care.

Our goal is to increase pharmacist-led medication reconciliation after discharge to $\geq 80\%$. This will be assessed monthly after providing education to the HBPC team regarding the study results. The second goal is to maintain hospital readmission rates to $\leq 10\%$, which will be assessed with each quarterly review.

Strengths and Limitations

This study was one of the first to evaluate the impact of pharmacist intervention on improving patient outcomes in HBPC veterans. Additionally, only 1 investigator conducted the data collection, which decreased the opportunity for errors.

A notable limitation of this study is that the discharge processes may not be able to be duplicated in other HBPC settings due to variability in programs. Additionally, as this was a new discharge process, there were a few aspects that needed to be worked out in the beginning as it was established. Furthermore, this study did not clarify whether a medication reconciliation was conducted by a physician or nurse after discharge; therefore, this study cannot conclude that the medication interventions were solely attributed to pharmacists. Also this study did not assess readmissions for recurrent events only, which may have impacted the results in a different way from the current results that assessed readmission rates for any hospitalization. Other limitations include the retrospective study design at a single center.

CONCLUSIONS

This study outlines several opportunities for interventions to improve patient outcomes and aid in decreasing hospital readmission rates. Using the results from this study, education has been provided for the HBPC Service and its readmission committee. Additionally, the safety concerns identified have been addressed with inpatient and outpatient pharmacy leadership to improve the practices in both settings, prevent delays in patient care,

and avoid future adverse outcomes. This project highlights the advantages of having pharmacists involved in transitions of care and demonstrates the benefit of HBPC pharmacists' role in the streamlined discharge process. This project will be reviewed biannually to further improve the discharge process and quality of care for our veterans.

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Disclaimer

The opinions expressed herein are those of the authors and do not necessarily reflect those of *Federal Practitioner*, Frontline Medical Communications Inc., the US Government, or any of its agencies.

Ethics and consent

This research was approved as a quality improvement project by the Director of Quality Improvement, Research at Michael E. DeBakey Veterans Affairs Medical Center.

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