Pharmacist-Led Transitions of Care Reduced Hospital Readmission Rates for Medicare and Medicaid Patients

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Abstract:
Introduction: A patient's understanding, implementation of, and adherence to hospital discharge instructions are important in keeping them from being readmitted to the hospital within 30 days of discharge. The understanding of and ability to follow these instructions after the transition from hospital to home may be significantly supported by additional follow-up interactions by healthcare professionals. Programs supporting this crucial time in a patient's health outcomes have been described as Transition of Care Management (TCM). This study evaluated the impact of pharmacist-led TCM on all-cause 30-day readmission rates among Medicare and Medicaid (CMS) patients.
Methods: This retrospective chart review included adult CMS patients from a family medicine residency's primary outpatient clinic who were admitted to area hospitals between August 2021 and December 2022. The pharmacy team attempted to provide TCM services 292 times. The team (pharmacist, pharmacy residents, and students) phoned the discharged patients within 48 hours to discuss discharge instructions and assistance needs, and to schedule a TCM appointment with the patient's physician. The pharmacy team notified the interdisciplinary care team members to ensure comprehensive services would be provided. Data analysis examined three cohorts: those who were contacted and who received TCM, those who could not be reached, and those who were contacted but refused TCM services. The interventions were tracked and assessed together with patient readmissions. Subsequent evaluation compared those who received services to those who did not. Chi-square and descriptive statistics were applied to determine the result's significance ($p < .05$). Logistic regression was conducted to investigate associations between receiving TCM and 30-day readmission while controlling for demographic variables.
Results: Patients who received pharmacy-led TCM were less likely to be readmitted within 30 days of discharge (16.9%) than those who did not (34.7%, $p = 0.008$). The most common pharmacist interventions were medication reconciliations (98.5%, n = 140), medication education (80.3%, n = 114), and disease state education (43.6%, n = 62) During the medication reconciliation there were discrepancies noted among 79.6% of the encounters in the intervention group.
Conclusion: Pharmacist-led TCM interventions and follow-up appointments significantly reduced 30-day readmission rates for adult CMS patients.

Keywords: Transitions of care, pharmacist, medication reconciliation

Introduction

Readmission to the hospital is a concern for health care systems,[1,2] which loses money due to reduced or no reimbursement by insurance companies when patients are readmitted to the hospital within 30 days of hospital discharge. To remain financially viable, health care systems must account for these costs in other areas. Transition of care programs identify and address preventable readmissions, while other programs incentivize readmission reductions.[3]

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Medicare, for example, has created two billing codes that are reimbursable when 1) non-face-to-face contact is made within two business days of discharge and 2) a face-to-face office visit is completed within seven to fourteen business days, depending on medical complexity.[4]

Post-discharge services have been collectively termed Transition of Care Management (TCM) visits.[5] These may encompass a variety of activities, from reiteration of discharge instructions to assistance obtaining medications or follow-up appointments with the patient's primary care physician. Previous studies have demonstrated the impact on readmission rates of a pharmacist-led transition of care programs and medication reviews.[6] However, the specifics of the pharmacist's activities during these interventions and of each activity's impact on readmission rates have yet to be clearly delineated in the literature.[7]

A meta-analysis demonstrated a 19% reduction in hospital readmissions when a pharmacist made interventions during

TCM.[8] Studies also found a correlation between the number of minutes spent on intervention by the pharmacy team, an increase in the number of discharge medications, the number of comorbid conditions, and the risk of patient being readmitted.[9,10] The most common interventions made by the pharmacy team were medication reconciliations and patient education. A study by Shauffer et al. found that the most common discrepancies during medication reconciliations were missing medications, extra medications, and dose adjustments.[11] A study by Spawlski showed that completing the medication reconciliation prior to the TCM appointment allowed for the majority of these discrepancies to be addressed and resolved at the TCM appointment.[12] Medication reconciliations were more accurate when completed by a pharmacy team member rather than by other members of the healthcare team.[13] Medication reconciliation completed by pharmacists were found to report more medication errors and identify a significantly higher number of medications taken by the patient, including over-the counter medications and herbal supplements.[14]

Considering the positive outcomes for patients and the healthcare systems when pharmacist-involved TCM visits are performed, our family medicine residency's leadership made starting a TCM program a priority. Due to the unusual nature of the residency program's clinic, it was difficult to predict the true impact of this program. Located in the downtown of a mid-sized American city, this safety-net clinic is a patient-centered medical home (PCMH), as recognized by the National Committee for Quality Assurance. The clinic serves as the primary outpatient clinic for a community family medicine residency program, and over 80% of its patients are on either Medicaid or Medicare. Prescribers in the clinic include 24 physician residents and seven attending physician faculty, with a mix of allopathic and osteopathic physicians; there are no nurse practitioners, physician assistants, or other prescribing providers. The pharmacist's role as a faculty member creates a different relationship with the physicians than that found in a traditional outpatient clinic. Approximately one-third of the clinic's patients are refugees with a substantial social determinant of health, translation service needs, and health literacy considerations. Finally, there are multiple large hospitals in the area that patients may use, so patients encounter a wide variety of discharge procedures.

The pharmacist-led TCM program was designed to be as comprehensive as possible, so it included a full medication reconciliation, patient education (both disease state and medication related), and adherence assessment. The primary objective of this study was to evaluate the change in readmission rates for vulnerable adult patient populations who received TCM services at a family medicine residency's safety-net clinic.

Methods

Human Subjects

The study population for this project included patients from the Family Medicine Center (FMC) outpatient clinic who were discharged from multiple hospitals in the area. Patients were included if they had Medicaid and/or Medicare insurance, were over 18 years of age, and were admitted between August 2021 and December 2022. Patients were excluded if they did not meet the inclusion criteria, were pregnant and admitted for delivery, or had an emergency department (ED) visit without being admitted. Since the focus was adult Medicare and Medicaid patients from the FMC, purposive sampling was used for this study, with an anticipated 400 eligible entries given the study timeframe. This study was approved by the Community Health Systems (CHS) Institutional Review Board (IRB) in May 2023.

Data collection

Data was collected through a retrospective chart review of TCM documentation from August 2021 to December 2022. Study results were divided between Medicare and Medicaid patients, and each group was split further into three cohorts: 1) patients who were contacted and received TCM services, 2) patients who could not be reached after three attempts, and 3) patients who were contacted but refused participation in the TCM program's services.

TCM Interventions

The TCM interventions were performed as follows. The pharmacist or pharmacy team member (pharmacy student or resident) phoned the discharged patient within 48 hours to discuss their discharge instructions, medication reconciliation, and assistance needs. The medication reconciliation involved compiling a comprehensive list of all medications the patient was taking and documenting appropriate dose, route, and frequency. The medications from the inpatient discharge medication list and the outpatient setting were reconciled to obtain an accurate medication list, which was printed at the follow-up office visit. For this study, medications were defined as prescription medications, herbal/nutritional supplements, vitamins, non-prescription therapeutics, vaccines, parenteral nutrition, blood derivatives, and injectable medications. Since patients were called at home, they often were asked if they had the pill bottles in front of them to get a more accurate review. The medication reconciliation also involved identifying medications that needed to be adjusted, removed, or added based on the discharge medication list.

The pharmacist or pharmacy team member also reviewed the medication profile for financial concerns, renal/hepatic dose adjustments, drug interactions, contraindications, medication optimization, or de-escalation. After speaking to the patient and determining their needs, the pharmacist or team member scheduled the patient's follow-up visit, preferably within 7–14 days of discharge, with the primary care physician (PCP), and

notified the interdisciplinary care team members to ensure comprehensive services would be provided (e.g., social worker, behavioral health team, diabetes educator). The specific interventions or discrepancies noted by the pharmacy team were documented in the electronic medical record (EMR) so the PCP could review before the follow-up appointment. If there were discharge instructions the patient wasn't following or if a major safety concern was noted, it was addressed during the phone call. Documentation was kept of each intervention or recommendation.

Data Analysis

The primary end point of this study was the change in readmission rate attributed to pharmacist-led TCM interventions across the three cohorts. Secondary end points were readmission rates, TCM interventions, and medication reconciliation discrepancies. Data collection was performed by the project lead and pharmacy resident. Data oversight to ensure that the correct measures were collected and accounted for was performed by the FMC pharmacist.

Binary outcomes were assessed with a chi-square analysis, and descriptive statistics were also included as appropriate. The alpha was set a priori at 0.05 or less for significance. Binary logistic regression was conducted to evaluate the association between TCM interventions and all-cause 30-day readmission, while controlling for potential confounding demographic variables such as age, gender, race, and Medicaid status. We considered an a priori p-value of ≤0.05 to be statistically significant.

Results

A total of 378 hospital admissions were reviewed for this study. Eighty-six admissions were excluded due to age, lack of insurance, insurance coverage other than Medicare/Medicaid, and ED visits without admission, resulting in 292 admissions that met the inclusion criteria and were evaluated; these admissions were from 192 unique patients. Patient demographic characteristics, broken down by cohort for the study's Medicare and Medicaid patients, can be found in Table 1, while readmission results are described in Table 2.

As shown in Table 1, the 192 patients were split among the Medicaid and Medicare populations, with more female patients on Medicaid than on Medicare.

Table 2 demonstrates differences in readmission rates between those who did and did not receive the TCM interventions, with data for Medicaid patients, Medicare patients, and the two groups combined. The 192 patients from Table 1 account for the 292 readmissions used for Table 2's results. The aggregate final panel of Table 2 combines patients who refused TCM with those who could not be reached, since both of those groups did not receive TCM services.

Table 1: Demographic and TCM participation data for Medicare & Medicaid patients

Medicare Patients		Medicaid Patients	
Patient Received TCM	n= 51	*Patient Received TCM*	n= 61
Age (SD)	*67.0 (12.5)*	*Age (SD)*	50.0 (14.7)
Female (n)	*58.8% (30)*	*Female (n)*	75.4% (46)
Race	*n=*	*Race*	*n=*
Asian	*1*	*Asian*	7
Black	9	Black	17
White	40	White	37
Unknown	1	*Unknown*	0
Patient Unable to be Reached For TCM	n= 20	*Patient Unable to be Reached For TCM*	n= 41
Age (SD)	*68.6 (13.1)*	*Age (SD)*	46.1 (12.9)
Female (n)	*60% (12)*	*Female (n)*	48.8% (20)
Race	*n=*	*Race*	*n=*
Asian	*0*	*Asian*	1
Black	3	Black	17
White	17	White	22
Unknown	0	*Unknown*	1
Patiend Reached but Refused TCM	n=7	*Patiend Reached but Refused TCM*	n= 12
Age (SD)	*72.6 (12.7)*	*Age (SD)*	55.5 (18.8)
Female (n)	*42.9% (3)*	*Female (n)*	58.3% (7)
Race	*n=*	*Race*	*n=*
Asian	0	*Asian*	1
Black	0	Black	3
White	7	White	7
Unknown	0	*Unknown*	1

Among the 112 patients who received a pharmacist intervention, there were 24 readmissions (16.9%) within 30 days, 12 in the Medicare group and 12 in the Medicaid group. In comparison, the group that did not receive TCM services (because they refused or could not be reached) had a significantly greater readmission rate of 52/150 (34.7%). This finding resulted in a significant reduction in the number of readmissions for the patients who received the TCM ($p = 0.0005$).

To investigate whether the findings were confounded by demographic variables, the all-cause 30-day readmittance status was modeled using multivariable logistic regression based on the following variables: TCM cohort, age in years, gender (female vs. male), race (non-White vs. White), and insurance status (Medicare vs. Medicaid). Table 3 gives the adjusted odds ratios (AOR) and associated 95% confidence intervals and p-values for each variable in the model. Compared to the TCM intervention group, the AOR for those not receiving TCM because they could not be reached (Cohort 2) was 1.64, which aligns with an increased odds of readmittance when TCM is not received. Similarly, for those who refused to participate (Cohort 3), the AOR was 1.96. However, neither of these was statistically significant at the a priori 0.05 level of significance ($p = 0.23$ and 0.26, respectively). The logistic regression analysis also indicated

none of the other demographic variables had a significant association with 30-day readmittance.

Table 2: Readmission Data for Medicare versus Medicaid

Medicare Readmissions*			
Patient Received TCM		n	% Readmitted
Readmitted	Yes	12	17.1%
	No	58	
Patient Unable to be Reached For TCM			
Readmitted	Yes	16	39.0%
	No	25	
Patiend Reached but Refused TCM			
Readmitted	Yes	6	66.7%
	No	9	
Medicaid Readmissions**			
Patient Received TCM		n	% Readmitted
Readmitted	Yes	12	16.7%
	No	60	
Patient Unable to be Reached For TCM			
Readmitted	Yes	24	32.0%
	No	51	
Patiend Reached but Refused TCM			
Readmitted	Yes	6	31.6%
	No	13	
Aggregate CMS Readmissions***			
Patient Received TCM		n	% Readmitted
Readmitted	Yes	24	16.9%
	No	118	
Total who did not Receive TCM			
Readmitted	Yes	52	34.7%
	No	98	

*X^2; p= 0.021. **X^2; p= 0.081. ***X^2; p= 0.0005

As shown in Figure 1, the most common pharmacist interventions made during TCM encounters were medication reconciliations (98.5%, n = 140), medication education (80.3%, n = 114), and disease state education (43.6%, n = 62).

Figure 1: Discrepancies in discharge medication reconciliation

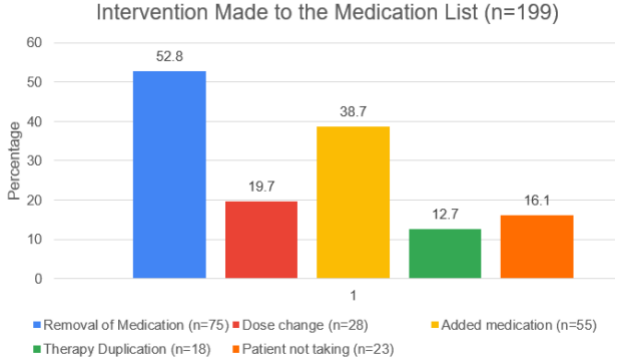

Table 3. Adjusted odds ratios of patient variables and 30-day readmission

Variable	Odds Ratio	95% Confidence Interval	p-value
TCM Cohort			
1	Reference	Reference	Reference
2	1.64	(0.72, 3.68)	0.23
3	1.96	(0.56, 6.05)	0.26
Gender			
Female	Reference	Reference	Reference
Male	1.12	(0.51, 2.41)	0.77
Race			
Non-White	Reference	Reference	Reference
White	0.67	(0.30, 1.51)	0.32
Insurance Status			
Medicare	Reference	Reference	Reference
Medicaid	1.03	(0.41, 2.60)	0.96
Age	1.01	(0.98, 1.03)	0.70

The TCM interventions worked to reconcile patients' medications and address their understanding of their medications after discharge from the hospital, as many patients could not recall what medication changes were made at discharge. Figure 1 shows a summary of these discrepancies. Notably, removal of a medication from the patient's list occurred 75 times, while there were 55 instances of medications that needed be added by the hospital team but weren't.

The comprehensive evaluation of the patients' therapeutic regimens resulted in numerous alterations that needed to be made by the PCP to optimize care (Table 4). The TCM program's pharmacist made a total of 404 recommendations

Table 4: Interventions sent to resident physicians to meet standard of care

Interventions to the Physician (n = 404)	n
Appointment changes for convenience or concern	15
Blood glucose checks	32
Change to current regimen	48
Diet recommendations	23
Discontinuation of medications	26
Filled pillbox	3
Initiate new medications	12
Insulin changes	12
Insurance/financial concerns	20
Labs needed	31
Provide refills	30
Referrals to other providers (ie specialists)	17
Renal dose adjustments	7
Restart medications	13

Screenings	44
Simplify regimen	22
Smoking cessation	14
Testing	17
Vaccinations	18

Discussion

The objective of this study was to determine if a pharmacist-led TCM services program would reduce 30-day hospital readmissions among Medicaid and Medicare patients. Our study showed a 30-day readmission of 16.7% in patients receiving TCM services, compared to 34.7% among those who not receiving these services. And when the pharmacy team was involved in the patients' TCM care, other significant interventions were made as well.

This retrospective study had several limitations. A prospective approach with a true control group would have been ideal, but the need to keep as many patients from being readmitted to the hospital as possible outweighed an ideal study design. Tracking the cost savings to the patient and healthcare system was attempted but unsuccessful, since the patients went to multiple different hospitals in multiple health systems, and the compliance departments of those health systems were unwilling to share financial information. An assessment of the TCM program's reduction in acute visits would have also strengthened this project.[16,17] For this pilot program, the study was performed by a single family medicine residency clinic with no advanced practice providers. In addition, the clinical pharmacist is a faculty member, which has hierarchical considerations for the resident physicians, and may create a different pharmacist-physician relationship than that found at other family medicine ambulatory care sites. Finally, the Agency for Healthcare Research and Quality estimates 30-day-all-cause readmission rates for all hospital stays to be 13.9 per 100 index admissions.[15] It's unclear why the patients in this study had readmission rates that were substantially greater than the national average. Although the TCM program described in this manuscript reduced readmissions significantly, it only brought them in line with national rates. Additional inter-organizational efforts are required to elucidate why the readmission rates for this population in this region is so high.

Conclusions

This study's results demonstrated that pharmacist-led TCM interventions in a community family medicine residency's outpatient clinic were associated with significant reductions in 30-day hospital readmissions among adult Medicare and Medicaid patients.

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