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The impact of a community pharmacist conducted comprehensive medication review (CMR) on 30-day re-admission rates and increased patient satisfaction scores: A pilot study

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Abstract

Objective: To determine the impact of pharmacist conducted Comprehensive Medication Review (CMR) follow-up within seven days after discharge on (1) readmission rates, (2) detection of drug related problems, (3) and changes in Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) scores. **Design:** Rates of re-admission for pneumonia, congestive heart failure (CHF), or myocardial infarction (MI), within 30 days of discharge are compared between patients receiving a CMR from the pharmacist to a historical control group not receiving the service. The CMR documentation is reviewed to classify any detected drug related problems. Overall HCAHPS scores for the hospital are compared for the three months prior to instituting this service and the three months during the service. **Setting:** Patients were discharged from a 101-bed acute care hospital located in rural West Virginia. The community pharmacist worked with the hospital to contact patients after discharge to demonstrate a partnership between inpatient and outpatient care. **Patients:** Patients were included if they had a discharge diagnosis of pneumonia, congestive heart failure (CHF), or myocardial infarction (MI), and were returning to self-care or family-care. If discharged between 10/12/2012 and 12/11/2012 they were included in the historical control group. If discharged between 12/12/2012 and 2/12/2012 they were offered the CMR service and included in the intervention group. **Intervention:** Patients received a telephone call two to seven days following discharge from a pharmacist who conducted the Comprehensive Medication Review (CMR). **Results:** Patients who participated in a CMR via the telephone had decreased 30-day readmission rates compared to the historical control group (16% v 33%). Overall 22 significant drug therapy problems were identified among patients. HCAHPS scores for the questions "Did you receive communication regarding your medications" increased during the study time period (65% vs 72%). **Conclusion:** The mixed results of available data from previous studies on pharmacist inclusion in the discharge process focuses heavily on counseling before the patient is discharged. Results of this study show community pharmacist partnership in discharge follow-up can also assist in decreasing readmissions, detecting drug related problems, and increasing patient satisfaction.

Introduction

According to the Centers for Medicare and Medicaid Services (CMS), approximately 20% of Medicare patients are readmitted within 30 days. (1) Patients admitted to a hospital due to pneumonia, myocardial infarction, or congestive heart failure have been identified by CMS as high risk populations for readmission. In an effort to improve overall health management for these high-risk groups, CMS has announced decreases in reimbursement rates for hospitals in the event that a patient is re-admitted for the same diagnosis within 30 days of discharge. CMS now also promotes prompt follow-up visits after a patient is discharged, by increasing the reimbursement rate for an outpatient evaluation and

management visit if its (a) coupled with verbal patient contact within 48 hours of discharge, and (b) the provider visit is held within 7 to 14 days of discharge.

It has been found that 20% of patients experience an adverse event (ADE) following discharge, with 66% of those being medication related (2). Among these, six medication classes were implicated as causative agents of the ADEs in 87% of cases. These included anti-infectives, corticosteroids, cardiovascular medications, analgesics, anticoagulants and antiepileptics. The most common reasons for ADEs included the lack of appropriate drug monitoring and the lack of evaluation of predictable medication side effects. (3)

Recently, there has been great attention on methods to reduce readmissions, decrease adverse drug events, and increase patient understanding of their medications upon discharge. Programs like Project RED (Re-engineered Discharge) (4) the Care Transitions Program (5) and Project

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BOOST (Better outcomes for older adults through safe transitions) (6) have all demonstrated methods that are successful in reducing readmissions.

These three projects target reducing readmissions by focusing on steps in a patient's transition from one setting of care to another, known as "transitions of care" (TOC). One of the frequently studied areas includes patients discharged from hospital to home. Pharmacist involvement in the transitions from hospital to home has been shown to be beneficial at various points during the discharge process. (7) According to the PILL-CVD study, pharmacist medication reconciliation and discharge counseling was shown not to be beneficial in reducing clinically important medication errors in the 30 days following discharge. It is important to note while this study focused on patients with heart failure and acute coronary syndromes, they were of a low health literacy level. (8) In contrast, Schnipper, et al. found that providing pharmacist discharge counseling and follow-up 3 to 5 days post-discharge was associated with a decreased rate of preventable ADEs following discharge. (9)

Previous literature regarding pharmacist involvement has focused on discharge counseling on medications provided by the pharmacist at the bedside. (7) A recent systematic review of medication reconciliation identified pharmacists as key players in discharge processes. (10) Overall, the most frequently studied post-discharge interventions are follow-up calls with patients. All of these included medication reconciliation.

Three studies have measured post-discharge follow-up calls with medication reconciliation and a review of follow-up instructions provided by different members of the healthcare team. (7) Two studies found no effect on the rate of 30-day readmission, while one showed an effect with follow-up calls completed by pharmacists on detection of preventable adverse drug events (ADEs) and decreased visits to the Emergency Department. (11) This mixed result from the performance of medication reconciliation introduces a question of the utility of an accurate medication list versus the same list compounded by pharmacist counseling.

A closer look at the definitions of medication reconciliation and CMR help identify the difference that may be introduced by having a pharmacist perform medication reconciliation and discharge follow-up. According to CMS, medication reconciliation is defined as the process of identifying the most accurate list of all medications that the patient is taking, including name, dosage, frequency, and route, by comparing the medical record to an external list of medications obtained from a patient, hospital, or other provider. (12) The National Medication Therapy Management Advisory Board defines a

CMR as: a systematic process of collecting patient-specific information, assessing medication therapies to identify medication-related problems, developing a prioritized list of medication-related problems, and creating a plan to resolve them with the patient, caregiver and/or prescriber. (13) Inherent in this definition is that a CMR includes medication reconciliation, but is augmented by the professional expertise of a pharmacist.

A CMR is an interactive person-to-person consultation conducted between the patient and/or caregiver and the pharmacist designed to improve patients' knowledge of their prescription, over-the-counter (OTC) medications, herbal therapies and dietary supplements, identify and address problems or concerns that patients may have, and empower patients to self-manage their medications and their health condition(s). (13) CMRs are frequently conducted by community pharmacists, but most of the literature focuses on interventions that align with the definition of medication reconciliation rather than a CMR. (12)

Currently, there are few studies highlighting the use of a community pharmacist in this realm. For example, Walgreens is promoting their WellTransitions® program which incorporates bedside delivery of medications, follow-up with the patient at 9 and 25 days post-discharge by a pharmacist, and connections with their primary care providers. (14) Based on the minimal amount of evidence of community pharmacist involvement in the discharge follow-up process, the objective of this study was to determine the impact of a pharmacist conducted CMR via telephone within 7 days post-discharge on readmission rates, detection of drug related problems, and patient satisfaction scores through HCAHPS.

Methods

This pilot was approved by the University of Charleston Institutional Review Board and representatives of the study hospital and conducted from December 12, 2012 through March 12, 2013 at the study hospital. Patients were identified by a nurse case manager and invited to participate in the study if they had a diagnosis of congestive heart failure (CHF), pneumonia, or myocardial infarction (MI) and gave informed consent. Those included must also be 18 years or older, have access to a telephone, and speak English. Patients were identified and contacted during the first three months of the study (December 12, 2012 through February 12, 2013), while the remaining month was left for 30-day follow-up on readmission status with those patients called within the final month (March 2013).

The pharmacist with training and experience in performing a CMR reviewed discharge medication records and instructions prior to calling patients. Participating patients were

contacted between two and seven days post-discharge. The pharmacist attempted to call patients three times before excluding them from the study.

The pharmacist used a standardized CMR questionnaire form to document the encounter. (Appendix A) The CMR included indication for therapy, dosing/duration, side effects, adherence or access to medications, drug/drug interactions, and drug/food interactions for each medication, self-monitoring for the admitting/discharge diagnosis, self-monitoring for medication side effects, immunization record evaluation, and specific questions related to disease states of CHF and COPD. Questions related to COPD were included because the diagnosis of pneumonia leads to a high-incidence of re-admission among COPD patients. All patients were asked about any difficulty filling prescriptions following discharge. Drug therapy problems and discrepancies were documented using the Coleman Medication Discrepancy Tool[®] (MDT) for community dwelling adults. (5) After the call, a second clinical pharmacist was consulted to confirm evaluation and documentation of drug related problems. Patients were then mailed a reconciled list of their medications with self-monitoring guidance. At least 30 days following discharge, the patient's EHR was reviewed for any readmissions. Patients were called at this point to review readmission status to other facilities such as the ER, urgent care, or unscheduled physician visits.

The historical control group consisted of patients discharged with one of the target diagnoses in the three months prior to the study period during the dates October 12, 2012 through December 11, 2012. These patients received the standard discharge medication counseling from nursing staff and did not receive a telephone follow-up call at the 30 day mark to determine readmission status. The pharmacist reviewed patient records to detect any readmissions within 30 days of discharge

Results

During the three month study period, 25 patients met the inclusion criteria (Figure 1). Of these, 7 were lost due to inability to contact within the designated time frame (Figure 1). A total of 18 patients received the CMR service. In the intervention group there were three (16%) patients readmitted within 30 days of discharge, however only two of these readmissions were related to the initial diagnosis (11%), while one (5%) was not. (Table 2) These re-admissions were to the study hospital and were detected by the record review process.

The historical control group consisted of 24 community dwelling patients discharged with one of the diagnoses listed (Table 1). Of these, eight (33%) were readmitted to the study

hospital with the same diagnosis (Table 2). Since these patients received no 30-day follow-up call for readmission status, there is potential for higher readmission rates for the control group to other facilities, which would be unaccounted for in our study.

Hospital Consumer Assessment of Health Care Providers and Services (HCAHPS) scores were compared for the control and intervention groups. HCAHPS is a survey sent to all patients following their hospital stay. One of the main focuses of HCAHPS is on the importance of communication about medications. When those in the control group were asked if they received communication about their medications, 65% answered yes. During the three month study period, 72% of patients answered yes to this question, showing an improvement in patient satisfaction for this domain. These results for HCAHPS scores included all patients surveyed by the hospital, and not just those included in the study. There were 22 significant drug therapy problems detected in the intervention group. Several patients experienced more than 1 drug therapy problem (Table 3). The most common problems identified were needs additional therapy (9), adverse drug reactions (3), and patient non-adherence (3). Often when patients were called, it was found they had not picked up their new discharge medications from the pharmacy or were non-adherent with other medications at home. This may have potentially led to their admission or a future re-admission. Not all drug therapy problems were related to a patient's admitting diagnosis; however, any problem may have led to additional physician visits or hospital admissions in the future. This demonstrates the importance of reviewing all medications with a patient following discharge, and not only their new or altered regimen.

Discussion

Pharmacist involvement in transitions of care elements has been continually shown to be beneficial at various points in the healthcare spectrum a patient may access. A recent systematic review of medication reconciliation identified pharmacists as key players in discharge process. (10) Previous literature focused on pharmacist involvement at pre-discharge counseling (7). The most frequently studied post-discharge interventions are follow-up calls, but these were rarely studied in isolation.

As a community pharmacist serving as a liaison between the inpatient and outpatient setting, there were barriers to initially be recognized as a contributor to preventing readmissions within the acute care setting. When presenting the concept of this project to hospital administration and staff, a lot of initial groundwork had to be done. Most

hospital employees were unfamiliar with the concept of a CMR and that CMRs are provided at their local pharmacy. Inpatient medications change too rapidly to conduct a CMR versus traditional medication reconciliation in the institutional setting. CMRs target self-care patients with a variety of disease states, which puts community pharmacists in an ideal position to provide these important services.

In this study, the institution granted the pharmacist access to the electronic health record (EHR). However, the lack of access to this critical information is often a significant barrier to communication in the community pharmacy setting. The lack of access for hospitals, physicians, and pharmacies to patient health information could be easily remedied by the implementation of a universal EHR. There is very little literature discussing the role of community pharmacists participating in these interventions. This pilot study demonstrates that a community pharmacist can serve as a connection for patients in the outpatient setting in conjunction with their physician(s) and hospital. It offers patients another piece to a support system in medication management at home. Future research may include having follow-up visits with patients in a community pharmacy setting to review medication issues prior to a follow-up visit with their physician to determine the impact of face to face contact versus telephone contact.

Through the phone call, the pharmacist was able to answer questions the patient had regarding their medications, refer patients to their physician when appropriate, and even assist patients with getting their new medications through pharmacy delivery services. Not all drug therapy problems were related to a patient's admitting diagnosis, but any problem may have led to additional physician visits or hospital admissions in the future. This demonstrates the importance of reviewing all medications with a patient following discharge, and not only their new or altered regimen.

The decreased number of readmissions in the intervention group may have been related to the detection of drug related problems, reinforcement of self-monitoring principles, counseling received on previous home medications, or the positive impact of the contact.

Limitations

The small sample size of this pilot study does not provide enough power to report statistically significant conclusions. In the future, including patients with additional diagnoses targeted by CMS for readmission reduction, or extending the time frame for data collection may result in a larger sample size. The sample size was also limited by the difficulty contacting patients via phone within the time frame

required. This might have been improved if patients had been given a specific appointment time for the phone CMR session, or if multiple pharmacists were offering the service at various times. Completing a CMR is a time consuming process and requires additional staffing resources to continue as a mainstay of pharmacist involvement in discharge interventions. One addition to improve the efficiency of the pharmacist would be using pharmacy technicians to arrange the phone appointments, and secure commitment from the patient for the appointment time.

A variety of communication challenges existed during the study. Patients could not always be contacted at home during the study time frame of two to seven days post-discharge. When using one pharmacist with multiple other responsibilities to make all follow-up calls, this presents a challenge. No analysis was conducted to determine the best time frame for contacting patients.

Readmissions were categorized based on admitting diagnosis. While this is appropriate to measure the ultimate financial impact on the hospital secondary to financial penalties imposed by CMS for readmissions, this method did not discern whether readmissions were medication related, due to another disease, or medication injury.

Finally, although a standard CMR form was used for all patients, due to variability in their medications and disease states, the call could have proceeded in various directions. If multiple pharmacists were conducting this service in the future, a more standardized script for each disease state would need to be implemented.

Conclusion

The burden for patients following discharge and reducing readmissions is a key area of practice and current research, especially concerning the financial penalties associated with readmissions. This pilot study demonstrates that pharmacist involvement in discharge follow-up can be important to reducing readmissions and detecting drug related problems at the study hospital. This reinforces the value of using a medication specialist to improve the quality of transitions of care. To conduct successful research in the future and to increase the volume of patients contacted, institutions should use more than one pharmacist to provide such services. This would allow for a greater number of patients to be reached in a specific time frame. Enlisting the help of technician staff, or finding a more efficient way of scheduling appointments would lessen the burden of the process, allowing the pharmacist to more correctly focus their time on the patient.

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Figure 1: Patient Inclusion and Exclusion

Total Patients Discharged from Hospital with an index diagnosis of PNA, MI, or CHF N=42
Eligible patients lost to exclusion criteria/no informed consent N=17
Patients unable to reach in 7 days N=7
Patients contacted with CMR N=18

Table 1: Characteristics and Diagnoses of Population

Characteristic	Intervention Group	Control Group
N	18	24
Age range	49-82	45-92
Diagnosis of CHF	11	17
Diagnosis of PNA	8	5
Diagnosis of MI	1	2
>1 Inclusion Diagnosis	4	3

CHF=Congestive Heart Failure, PNA=Pneumonia, MI=Myocardial Infarction

Table 2: 30-day Readmission Rates

	Intervention Group	Historic Control Group
N	18	24
Index diagnosis at discharge (some patients had more than 1 diagnosis)		
PNA	8	12
MI	1	2
CHF	11	10
30-day readmissions	3 (16%)	8 (33%)
Index diagnosis readmission	2	5
Readmission unrelated to initial diagnosis	1	3

CHF=Congestive Heart Failure, PNA=Pneumonia, MI=Myocardial Infarction

Table 3: Shows the frequency of drug related problems in the intervention group.

Number of Drug Therapy Problems Detected	Number of Patients
0	2
1-3	14
3-6	2
>6	0

Table 4: Examples of medication discrepancies detected

Problem	Evaluation
Communication/Documentation Failure (An example of an issue detected outside the normal scope of drug therapy problems due to system failure)	The patient's discharge medication records indicated rosuvastatin, but the follow-up call found the patient was taking lovastatin. This system level issue of conflicting information between sources is easily clarified for the primary care provider on the CMR documents.
Adverse Drug Reaction	A patient was discharged with an antibiotic and steroids for pneumonia. During the follow-up call she described symptoms similar to thrush. The pharmacist referred the patient to her physician for evaluation and treatment. This is a patient level event.
Dose too high	A patient was taking 80 mg of citalopram daily. The maximum recommended dose is 40 mg daily.
Needs Additional Drug Therapy	Patients with a diagnosis of CHF were missing key drug therapies such as ACE-Inhibition or Beta Blockade.

Appendix A:

**Impact of Complete Medication Review (CMR) telephone discharge follow-up
to Reduce Readmissions and Drug Related Problems**

<i>Name/Study Number</i>	
<i>Discharge Date:</i>	
<i>Date of Follow-Up Call</i>	
<i>Prepared to discuss all medications?</i>	Yes No
<i>What pharmacy do you use to fill your medications? (verify compliance)</i>	
<i>Did you have trouble getting your prescriptions filled after discharge?</i>	Yes No

Patient Disease States: (circle all that apply)—PNA

Asthma/COPD	Depression	Heart Failure	Mental Health	OA/RA
Cardiovascular	Diabetes	Hyperlipidemia	Fluid Retention	Osteoporosis
GERD/PUD	Hypertension	Migraine Headaches	Thyroid Disorders	
Seizures	Chronic Pain	Stroke	Other-neuropathy	

Readmission Category: (circle all that apply)

Post MI	Pneumonia	Heart Failure	>5 medications
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Disease State Specific Questions:

Current Medications	Indication	Dosing	Duration	Comments

Asthma/COPD:

Question	Yes	No	Contraindicated	Not Relevant
Are you using a short-acting β_2 -agonist (SABA)/"rescue inhaler" more than 2 days a week (not including pre-exercise dose)?				
Based on review and standards of care, is the patient's medication therapy for asthma appropriate?				
Do you understand the purpose of each medication used to treat asthma (rescue vs. controller, scheduled vs. as needed dosing)?				

Heart Failure:

Question	Yes	No	Contraindicated	Not Relevant
Is the patient currently taking a beta blocker?				
Is the patient currently taking a diuretic?				
Based on review and standards of care, is current medication therapy for Heart Failure appropriate?				
Are you weighing yourself daily?				
Does patient know to call his/her physician when weight gain of 2 lbs. or greater occurs overnight or 5 lbs. or greater occurs in one week?				
Are you experiencing symptoms of possible worsening of heart failure (weight gain, fluid retention, dry cough, increased shortness of breath, elevating the head with pillow(s) to sleep or sleeping sitting up)?				