INNOVATIONS in pharmacy Iip

5-2-2017

Collaboration between Hospital and Community Pharmacists to Improve Medication Management from Hospital to Home

Judith Kristeller
Wilkes University, judith.kristeller@wilkes.edu

Felicia Snyder
Wilkes University, felicia.snyder@wilkes.edu

Fanhui Kong
Wilkes University, fanhui.kong@wilkes.edu

Michele Musheno
Moses Taylor Hospital, mmusheno@mth.org

Follow this and additional works at: http://pubs.lib.umn.edu/innovations

Recommended Citation

LIBRARIES
PUBLISHING

INNOVATIONS in pharmacy is published by the University of Minnesota Libraries Publishing.

Collaboration between Hospital and Community Pharmacists to Improve Medication Management from Hospital to Home

Judith Kristeller[1]; Felicia Snyder[1]; Fanhui Kong[1]; Michele Musheno[2]
[1]Wilkes University and [2]Moses Taylor Hospital

Abstract

Objective: The objective of this study is to determine if a model for patient-centered care that integrates medication management between hospital and community pharmacists is feasible and can improve medication adherence. Design: This was a randomized, non-blinded, interventional study of 69 patients discharged from a hospital to home. Process measures include the number and type of medication-related discrepancies or problems identified, patient willingness to participate, the quality and quantity of interactions with community pharmacists, hospital readmissions, and medication adherence. Setting: A 214-bed acute care hospital in Northeastern Pennsylvania and seventeen regional community pharmacies. Patients: Enrolled patients were hospitalized with a primary or secondary diagnosis of heart failure or COPD, had a planned discharge to home, and agreed to speak to one of seventeen community pharmacists within the study network (i.e., a network community pharmacist) following hospital discharge. Intervention: Information about a comprehensive medication review completed by the hospital pharmacist was communicated with the network community pharmacist to assist with providing medication therapy management following hospital discharge. Results: Of 180 patients eligible for the study, 111 declined to participate. Many patients were reluctant to talk to an additional pharmacist, however if the patient's pharmacist was already within the network of 17 pharmacies, they usually agreed to participate. The study enrolled 35 patients in the intervention group and 34 in the control group. An average of 6 medication-related problems per patient were communicated to the patient's network community pharmacist after discharge. In the treatment group, 44% of patients had at least one conversation with the network community pharmacist following hospital discharge. There was no difference in post-discharge adherence between the groups (Proportion of Days Covered 0.76 treatment group vs. 0.73 control group, p=0.69), but there was a reduction in hospital readmissions (43% treatment group vs. 62% control group). Conclusion: The feasibility of this model can be improved by integrating medication management with the patient's existing community pharmacist, rather than an additional network community pharmacist. While there was no difference in medication adherence, collaboration between the hospital and community pharmacists can potentially reduce hospital readmissions, improve medication safety, and facilitate medication therapy management across care transitions.

Keywords: Transition of care, medication reconciliation, medication safety, medication therapy management

Introduction

The transition of care from hospital to home is susceptible to a lack of coordination and continuity especially related to medication management. This is particularly problematic for patients with comorbidities such as heart failure and chronic obstructive pulmonary disease (COPD) where medication management is essential for improved health outcomes. Heart failure medications known to improve mortality are under-prescribed with less than 60% of eligible Medicare patients prescribed an angiotensin converting enzyme inhibitor (ACEI) or angiotensin receptor blocker (ARB) and less than 40% prescribed a beta-blocker.[1,2] Similarly, about half of patients diagnosed with COPD are not receiving evidence-based treatment despite evidence of reduced hospitalization and healthcare costs.[3,4] This presents an opportunity for pharmacists to promote the appropriate use of medications using evidence-based guidelines as patients transition across healthcare settings.

Medication non-adherence is one factor that can contribute to the need for a transition to a higher intensity of care. Adherence to medications is poor; it is estimated that approximately half of medications for chronic disease are not taken as prescribed.[5,6] Non-adherence is related to increased hospitalization, morbidity, and mortality[7,8] and is estimated to cause at least half of all medication-related hospital admissions.[9] There are several complex reasons for non-adherence including cost, forgetfulness, complexity of the regimen, adverse effects, health literacy, emotional factors, and the patient's own understanding of the risks and benefits of the medication.[9] Improved medication adherence can improve patient outcomes and reduce unnecessary healthcare spending.[1,3,4,10] A model that facilitates the patient-pharmacist relationship could identify and address factors leading to non-adherence.

Two additional factors contributing to worse outcomes during transitions of care are a lack of communication and inadequate patient education.[11] Communication and collaboration between inpatient and outpatient healthcare providers during care transitions is often lacking, leading to fragmented patient care. Patient education about medications on the day of discharge is often rushed and overwhelming for the patient. In

Corresponding author: Judith Kristeller, PharmD
Professor, Wilkes University, 84 W South Street
Wilkes-Barre, PA 18766; Email: judith.kristeller@wilkes.edu

many cases, this lack of coordination between the hospital and community settings as well as the rushed environment on the day of discharge results in patients that are not prepared to manage their medications once transitioned to home.   Most transitional care programs are primarily limited to inpatient settings, have a short duration (e.g., less than 1 month), and target short term outcomes such as 30-day readmissions. A potent stimulus for reducing 30-day readmission stems from a financial penalties for hospitals with high readmission rates. A disadvantage of programs that primarily target this outcome is that they may only delay rather than reduce hospitalization.

The Care Transitions Intervention is one strategy that has been shown to consistently reduce 30-day hospital readmissions by about 30% in several settings.[11-13] In this intervention, patients at high risk of readmissions are assigned a dedicated transition provider, usually with a background in nursing or social work, who coaches patients to take a more active role in their healthcare and communicate effectively with their providers. The interventions occur within 30 days following hospital admission and include a hospital visit, home visit, and 2 follow-up telephone calls. This model encourages patients to keep an accurate health and medication history, and communicate their concerns with their providers.   Based on evidence showing a reduction in hospital readmissions, many healthcare systems and physician groups have incorporated a care-transition manager to target patients at increased risk of readmissions. While this program provides meaningful face-to-face interactions and has evidence of reducing 30-day readmissions, it does not insure comprehensive medication management during care transitions.

Two other projects have shown a reduction in hospital utilization through improved transitional care models. The Reengineered Hospital Discharge (RED) model incorporates nurse discharge advocates that coordinate the discharge plan, medications, and any patient education related to medications.[14] A hospital pharmacist speaks to the patient by phone within 2 days of discharge. While this model has been shown to reduce hospital utilization by 30% and healthcare spending, a more longitudinal approach to medication management across the care transition may improve outcomes further.   Another transitional care model using advanced practice nurses to complete discharge planning and frequent home follow-up visits for a 3-month period has been shown to reduce hospital readmissions and healthcare costs.[15] It is widely recognized that inter-professional collaboration is an important factor in the quality of care provided. Therefore programs that facilitate collaboration between healthcare providers during hospitalization as well as following hospital discharge could further improve patient outcomes at a reduced cost.

An accurate medication list is necessary for effective coordination of care across transitions.   While hospitals

routinely complete medication reconciliation on all patients, that information is often inaccurate and rarely shared beyond the hospital system. The goal of medication reconciliation is to "obtain and maintain accurate and complete medication information for a patient and use this information within and across the continuum of care to ensure safe and effective medication use."[16] Errors that occur during the admission medication reconciliation can contribute to medication errors during hospitalization and at discharge. It is estimated that 60% of medication errors occur during care transitions. Subsequently, medication errors are associated with approximately 1.5 million preventable adverse drug events annually.[17]   Communicating accurate information about medication reconciliation to the patient's community pharmacist is an effort to improve medication management across care transitions.   Facilitating the community pharmacist's role in preventing medication-related problems that commonly occur during the transition from hospital to home can improve the quality of care.

The quality of healthcare during care transitions has significant room for improvement and community pharmacists are uniquely positioned to collaborate with other practitioners and provide patient and caregiver education to improve medication management.   Pharmacists can improve the transition of care by preventing medication-related problems, encouraging the appropriate use of medications, and facilitating communication with other healthcare providers. Pharmacists can educate patients and caregivers about their medications, healthy lifestyles, recommended self-care, and disease state management. This can only happen, however if the community pharmacists have current information about their patients such as medication indications and reasons for any medication changes at hospital discharge. We hypothesize that communication between the hospital and community pharmacist can prevent medication-related problems including non-adherence in patients at increased risk for medication-related problems and hospitalization.   This approach would facilitate comprehensive medication management across care transitions.   Patients with heart failure and COPD are being targeted for medication management during the transition of care from hospital to home because they require multiple medications, are at increased risk of hospitalization, and usually have modifiable risk factors.[18,19]   Through their relationship with patients, community pharmacists have the potential to provide medication management on a regular and long-term basis and collaborate with the patient's other healthcare providers to prevent medication-related problems. Our goal is to improve the community pharmacist's role in identifying and preventing medication-related problems that commonly occur during the transition from hospital to home in patients with heart failure or COPD.

Objectives

The objective of this pilot study was to assess the feasibility of an innovative pharmacy practice model that integrates medication therapy management between hospital and community pharmacists during the transition from hospital to home and determine if this model improves medication adherence.

Methods

This was a randomized non-blinded interventional study of patients admitted to Moses Taylor Hospital with a primary or secondary diagnosis of heart failure or COPD and had a planned discharge to home. Exclusion criteria included the presence of cognitive impairment that prevented effective patient education and counseling. Other exclusion criteria were non-English-speaking patients, those with anticipated discharge to a long-term care or skilled nursing facility, patients admitted for elective surgery, and hospice patients.

Eligible patients were randomized into a treatment and control group. Sequentially numbered, opaque, sealed envelopes were used to allocate the treatment and control groups and each envelope contained a random assignment to either group. Patients agreeing to participate signed an authorization for the release of health information and an informed consent. The study procedures were followed in accord with the ethical standards of the institutional investigational review board.

A network of seventeen community pharmacies located throughout the region agreed to participate in this study. Hospital and community pharmacists who participated in the study completed an 8-hour training program designed by pharmacy faculty at Wilkes University. This included recorded online learning as well as face-to-face programming. Topics covered included disease state management, medication reconciliation, motivational interviewing, and approaches to patient-centered care.

Patients were enrolled from January 2014 through October 2014. Prior to randomization, a pharmacist collected data about eligible patients from the electronic health record in preparation for meeting with the patients. Each meeting between the hospital pharmacist and patient lasted for an average of 10-20 minutes and was focused on verifying the medication reconciliation completed during hospital admission, assessing the patient's understanding of their home medications, determining the patient's preferences, goals and concerns, and identifying any actual or potential medication-related problems through a comprehensive medication review. During verification of the medication reconciliation, the pharmacist identified and corrected errors from the admission medication reconciliation that had been completed usually by a nurse or physician. While it is not standard of care for a pharmacist to meet with each patient in the hospital, for the purpose of this study, a pharmacist met with patients who were eligible for this study. In reviewing the patient's electronic health record and meeting with the patient, if a medication-related problem was identified that required immediate attention, the pharmacist would work to resolve the problem regardless of study enrollment or study group assignment. Acute care issues were discussed with the inpatient prescribers and issues related to chronic medications were discussed with the patient's primary care physician.

Patients randomized into the intervention group chose from a list of network community pharmacies where they would meet with a pharmacist in person or by phone to discuss their medications on a monthly basis for six months. Patients were not required to obtain their prescription medications from the network pharmacies. The network community pharmacists received a written summary from the hospital pharmacist of medication management that included the reconciled medication list at discharge, reasons for medication changes at discharge, medication indications, and suggested clinical issues and patient education for follow-up. In addition, a phone conversation between the hospital and community pharmacist occurred prior to the community pharmacist's first meeting with the patient to discuss an overview of the patient and any medication-related problems. The network community pharmacist was then asked to provide medication therapy management including patient counseling and education monthly for six months following hospital discharge. Using the summary of medication management provided by the hospital pharmacist, the community pharmacist had more context than they normally have to assess the safety and efficacy of medications and identify opportunities for improvement. This could include but is not limited to issues related to evidence-based disease-state management, medication monitoring, and follow-up on patient education that had been discussed during hospitalization. The community pharmacists were also encouraged to discuss issues with the patient's primary care provider if needed to resolve medication-related problems. The pharmacies were compensated for the clinical service provided to each patient. The primary care physician also received a faxed summary from the hospital pharmacist of medication-related problems and recommendations.

Patients in the control group received no additional communication between the hospital and community pharmacist besides the standard of care. For example, if clarification was needed on a home medication, the hospital pharmacist would contact the community pharmacist. However, for the control group there was no written or verbal summary of medication management developed for the community pharmacist. The patients were not asked to visit a participating network community pharmacist.

Outcomes

Medication adherence, as measured by the Proportion of Days Covered (PDC), was calculated over a six-month time period following hospital discharge by dividing the total days supply dispensed by 180 days.[20] Chronic scheduled medications used to measure adherence included those used for the treatment of cardiovascular or pulmonary disease. Patient pharmacies were contacted to obtain information related to medication refills that was used to calculate adherence. Adherence was calculated for patients in the intervention group regardless of whether they met with the community pharmacist or not. The Wilcoxon rank sum test was used to assess differences between groups for the calculated average PDC. Readmissions for any cause were assessed for six months following hospital discharge using hospital electronic health records. Medication discrepancies were defined as any correction or clarification made to the previously completed admission medication reconciliation. Actual or potential medication-related problems identified by the hospital pharmacist were quantified and categorized using a classification tool and included recommendations related to medication monitoring, suboptimal drug or regimen prescribed, disease state under treatment, need for patient education, and medication non-adherence.[21] Data related to patient interactions and interventions involving the network pharmacists were documented and collected. At the completion of the study, a qualitative pharmacist survey was completed during an oral interview between the primary investigator and network community pharmacists.

Results

Three hundred eighty-seven patients were screened for the study. Of these, 137 were excluded because of permanent or planned residence in a long-term care facility; 41 were excluded for cognitive impairment; and 29 were excluded because of elective surgery, hospice, or non-English speaking patients. Of the 180 eligible patients, 111 declined to participate. Of the 69 patients enrolled, 35 were in the intervention group, and 34 were in the control group.

The baseline characteristics were similar between the two groups (Table 1). There was no difference in adherence following hospital discharge between the groups (PDC 0.76 treatment group vs. 0.73 control group, p=0.69; Table 2). Forty three percent of patients in the intervention group were readmitted to the hospital within six months compared to 62% in the control group. During verification of the admission medication reconciliation, the hospital pharmacist identified an average of 5.5 medication discrepancies per patient. Discrepancies were categorized and quantified as follows: change or clarification of dose, frequency, or formulation (31%); patient not taking medication (11%); medication omission (34%); add over-the counter medications (6%); and clarify allergy (8%). Nearly half (47%) of the medication discrepancies involved a cardiovascular (19%), pulmonary

(17%), or psychiatric medication (11%). In the intervention group, 206 medication-related problems (mean six per patient) were communicated to the network community pharmacists for follow-up. These were categorized as: medication monitoring recommended for assessing efficacy and/or safety issues (37%), suboptimal drug prescribed (22%), under-treatment (15%), patient education needed (12%), non-adherence (10%), and suboptimal dose/duration/frequency/administration (4%).

Network community pharmacist communication with study patients in the treatment group varied. Of the 35 patients in the treatment group, 16 (44%) had at least one interaction with the network community pharmacist following hospital discharge. Of these, three patients had one conversation, four patients had two to three conversations, and nine patients had four to six conversations over six months. The network community pharmacists unsuccessfully attempted to contact 11 of 36 (31%) patients in the treatment group (i.e., left message, no call back). Nine patients (25%) in the treatment group were never contacted by the network community pharmacist after hospital discharge. Reasons for this lack of follow-up included patient death (two patients), or the community pharmacist forgot or was too busy. A pharmacist from each network community pharmacy was interviewed and the themes of this qualitative assessment are discussed below.

Discussion

This pharmacy model fills a gap in care that is focused on providing comprehensive medication management through collaboration between the patient's healthcare providers. Our goals for this study were to assess the feasibility of this innovative clinical model and determine if adherence was improved. We found no significant difference between the two groups with medication adherence, largely due to a higher-than expected baseline adherence based on previous evidence that approximately half of medications for chronic disease are not taken as prescribed.[5,6] This study was highly informative in assessing the feasibility of the clinical model which will be divided into three factors involving the hospital pharmacist, community pharmacist, and patient.

The conversation between the hospital pharmacist and patient is a crucial step in completing a comprehensive medication review and considering opportunities for improved medication management that is consistent with the patient's goals and preferences (i.e., patient-centered). A medication expert can ask follow-up questions based on the patient's verbal and nonverbal responses to probe for additional information. Through this process, not only are discrepancies in the admission home medication list identified, but an accurate medication list can then be used to identify medication-related problems, assess the appropriateness of medication management, and consider opportunities for improvement. Interestingly, the pharmacist identified an

average of 5.5 discrepancies in the home medication list after an admission medication reconciliation had already been completed by a nurse or physician, highlighting errors in the medication reconciliation process and the possibility of leading to medication errors during hospitalization and at discharge. While many medication-related problems were identified and resolved during hospitalization, an average of 6 actual or potential problems per patient were communicated to the network community pharmacist for follow-up. Overall, we believe that the investment in a hospital pharmacist's time to devote to medication reconciliation and a comprehensive medication review that includes a conversation with the patient is an effective way to provide patient-centered care, prevent medication-related problems and improve medication safety.

The role of the network community pharmacists is highly dependent on their work-flow and other responsibilities. For the sixteen patients who had at least one interaction with the network pharmacist, several important medication-related topics were addressed. Most pharmacists discussed an overview of the medication list and why each medication was prescribed. Pharmacists also encouraged patients to talk with their physicians about important issues such as blood glucose control, the need for acid-suppressing medications, and options for less expensive medications. One pharmacist worked with a care manager to arrange for the patient to obtain samples of maintenance inhalers, leading to improved adherence and reduced use of a rescue inhaler. Patient education was provided on topics such as patient assistance programs, the importance of inhalers, recommended use of maintenance and rescue inhalers, smoking cessation, warfarin education, medications that increase fall risk, and the benefits and risks of calcium and vitamin D supplementation. The network community pharmacists also contacted the primary care physicians when needed to resolve medication related problems. When a long-acting maintenance inhaler was inadvertently discontinued during hospital discharge, the pharmacist intervened to get it resumed. A pharmacist also called a primary care physician to discuss reducing the dose of aspirin from 325mg to 81mg and adding a statin for secondary cardiovascular prevention. These examples illustrate how collaboration between hospital pharmacists, community pharmacists, and physicians can prevent medication-related problems throughout care transitions.

Several themes emerged from the qualitative survey of the community pharmacists. The pharmacists stressed that it was easier to engage patients if they were an existing customer of the pharmacy. Sometimes the pharmacists felt intrusive when contacting a patient that was not their existing customer. Having an established relationship can help both the pharmacist and patient feel more comfortable discussing health-related information. Another advantage for working with their own patients is having more information about the patient's prescribed medications and refill history to assess adherence.

Most pharmacists agreed that participating in the study helped improve their clinical skills specifically with medication therapy management and patient education. They appreciated the medication information faxed from the hospital pharmacist because it was helpful knowing how to start the conversation with the patient and how to prioritize medication related problems. They suggested regular reminders from the study investigator to remember to follow-up with patients. Telephonic communication was acceptable, but most agreed that seeing the patient in person is better in developing a rapport and facilitating open communication.

One hundred eleven eligible patients declined to participate with the most common reason being talking to a different pharmacist. Patients who had an existing relationship with their community pharmacist were frequently not interested in meeting with an additional pharmacist. Another reason for declining to participate was the patient's perception of a lack of benefit from talking with a pharmacist, elucidating an opportunity to educate patients about how talking with pharmacists can improve their health. Other patients found the study process to be inconvenient and did not want an additional appointment, find additional transportation for the appointment, and/or burden their caregivers to arrange an appointment. Lastly, several patients were reluctant to participate in a research study.

To overcome these barriers, an ongoing modified version of this study model is focused on the communication between the hospital pharmacist and the patient's existing community pharmacist, regardless of whether they are a network community pharmacist or not. We have also expanded our inclusion criteria to identify additional patients at increased risk of medication-related problems and hospital readmissions. Likewise, we have expanded our outreach to community pharmacists and primary care physicians to identify opportunities to collaborate on patient care activities during care transitions.

While other studies of various interventions have demonstrated a reduction in 30-day hospital readmissions, they do not insure a comprehensive medication review throughout care transitions.[11-15] Our approach can potentially fill a gap by facilitating collaboration between hospital pharmacists, community pharmacists, and physicians to provide comprehensive medication management as patients transition from hospital to home. This approach could lead to a reduction in medication-related hospitalizations and errors.

Limitations
This pilot study is limited by a small sample size, although the size was sufficient to assess feasibility of the model. Other

limitations include slow patient recruitment, inconsistent follow-up by the network community pharmacists, and a limited network of community pharmacists. The inconsistent follow-up by the network community pharmacists created a further limitation in interpreting the impact of the pharmacy practice model on medication adherence as it was calculated for patients in the intervention group regardless of whether they met with the community pharmacist or not. Another confounding variable is the possibility that patients received medication therapy management from other sources unrelated to this study, which could have influenced medication adherence. Additionally, readmissions were determined using the study hospital site, so readmissions to other hospitals were not included.

Conclusion

The quality of health care during care transitions has significant room for improvement and community pharmacists are uniquely positioned to collaborate with other healthcare providers to provide patient-centered care and improve medication management. Pharmacists can improve the transition of care by preventing medication-related problems, encouraging the appropriate use of medications, and facilitating communication with other healthcare providers. Pharmacists can educate patients about their medications, lifestyle modifications, appropriate self-care, and disease state management. This can only happen, however if the community pharmacists have current and accurate information about their patients such as an accurate medication list, medication indications, and reasons for medication changes at hospital discharge. In addition, this process needs to be integrated into the pharmacist workflow in both the hospital and community settings. We believe that collaboration between the hospital and community pharmacist can improve medication management in patients at increased risk for medication-related problems. This approach would facilitate comprehensive medication management across care transitions.

References

1. Lopert R, Shoemaker JS, Davidoff A, et al. Medication adherence and Medicare expenditure among beneficiaries with heart failure. Am J Manag Care. 2012;18(9):556-63.
2. Fonarow GC, Albert NM, Curtis AB, et al. Incremental Reduction in Risk of Death Associated With Use of Guideline-Recommended Therapies in Patients With Heart Failure: A Nested Case-Control Analysis of IMPROVE HF. J Am Heart Assoc. 2012;1(1):16-26.
3. Simoni-Wastila L, Wei YJ, Qian J, et al. Association of chronic obstructive pulmonary disease maintenance medication adherence with all-cause hospitalization and spending in a Medicare population. Am J Geriatr Pharmacother. 2012;10(3):201-10.
4. Stuart BC, Simoni-Wastila L, Zuckerman IH, et al. Impact of maintenance therapy on hospitalization and expenditures for Medicare beneficiaries with chronic obstructive pulmonary disease. Am J Geriatr Pharmacother. 2010;8(5):441-53.
5. Peterson AM, Takiya L, Finley R. Meta-analysis of trials of interventions to improve medication adherence. Am J Health-Syst Pharm. 2003;60:657-665.
6. Haynes RB, Ackloo E, Sahota N, et al. Interventions for enhancing medication adherence. Cochrane Database Syst Rev. 2008;(2):CD000011.
7. Viswanathan M, Golin CE, Jones CD, et al. Interventions to improve adherence to self-administered medications for chronic diseases in the United States: a systematic review. Ann Intern Med. 2012;157:785-795.
8. Simoni-Wastila L, Wei YJ, Qian J, Zuckerman IH, et al. Association of chronic obstructive pulmonary disease maintenance medication adherence with all-cause hospitalization and spending in a Medicare population. Am J Geriatr Pharmacother. 2012;10:201-210.
9. Osterberg L, Blaschke T. Adherence to medication. N Engl J Med. 2005;353:487-497.
10. Raebel MA, Carroll NM, Ellis JL, et al. Importance of including early nonadherence in estimations of medication adherence. Ann Pharmacother. 2011;45(9):1053-60.
11. Rennke S, Nguyen OK, Shoeb MH, et al. Hospital-initiated transitional care interventions as a patient safety strategy: a systematic review. Ann Intern Med. 2013;158:433-440.
12. Coleman EA, Parry C, Chalmers S, Min SJ. The care transitions intervention: results of a randomized controlled trial. Arch Intern Med. 2006;166(17):1822-8.
13. Voss R, Gardner R, Baier R, et al. The care transitions intervention: translating from efficacy to effectiveness. Arch Intern Med. 201;171(14):1232-7.

14. Jack BW, Chetty VK, Anthony D, et al. A reengineered hospital discharge program to decrease rehospitalization: a randomized trial. Ann Intern Med. 2009;150(3):178-87.

15. Naylor MD, Brooten DA, Campbell RL, et al. Transitional care of older adults hospitalized with heart failure: a randomized, controlled trial. J Am Geriatr Soc. 2004;52(5):675-84.

16. Agency for Healthcare Research and Quality. Improving Care Transitions: Optimizing medication reconciliation(2012). https://psnet.ahrq.gov/resources/resource/24915/improving-care-transitions-optimizing-medication-reconciliation. Accessed April 13, 2017.

17. National Transitions of Care Coalition. Improving transitions of care: the vision of the National transitions of Care Coalition (May 2008). http://www.ntocc.org/Portals/0/PolicyPaper.pdf. Accessed April 13, 2017.

18. Hippisley-Cox J, Coupland C. Predicting risk of emergency admission to hospital using primary care data: derivation and validation of QAdmissions score. BMJ Open 2013;3:e003482. http://bmjopen.bmj.com/content/3/8/e003482.full. Accessed April 13, 2017.

19. Billings J, Dixon J, Mijanovich T, and Wennberg D. Case finding for patients at risk of readmission to hospital: development of algorithm to identify high risk patients. BMJ. 2006;doi:10.1136/bmj.38870.657917.AE. http://www.bmj.com/content/early/2005/12/31/bmj.38870.657917.AE. Accessed April 13, 2017.

20. Choudhry NK, Shrank WH, Levin RL, et al. Measuring concurrent adherence to multiple related medications. Am J Manag Care. 2009;15:457-464.

21. Crisp G et al. Development and testing of a tool for assessing and resolving medication-related problems in older adults in an ambulatory care setting: the individualized medication assessment and planning tool. Am J Geriatr Pharmacother. 2011;9:451-60.

Table 1: Baseline Characteristics		
	Treatment (35)	Control (34)
Age (years)	64	69
Male Gender	16 (46%)	15 (44%)
Education level (graduated from HS)	26 (74%)	27 (79%)
Prior Hospitalization within 1 year	19(54%)	21 (62%)
RealmR score[a]	6.6	5.7

[a]The Rapid Estimate of Adult Literacy in Medicine-Revised is a rapid assessment of potential health literacy problems.
A score of 6 or less identifies patients at risk for poor health literacy.

Table 2: Study Outcomes			
	Treatment Group (N=35)	Control Group (N=34)	p-value
Adherence (PDC > 80%)	0.76	0.73	0.69
Patients with readmissions within 6 months (yes/no)	15/36 (43%)	21/34 (62%)	NA