Clinical Outcomes of a Home-Based Medication Reconciliation Program After Discharge from a Skilled Nursing Facility

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Abstract and Introduction

Abstract

**Study Objective:** To assess the impact of a pilot pharmacist-managed medication reconciliation program on mortality and use of health care services in patients discharged to home from a skilled nursing facility (SNF).

**Design:** Quasi-experimental, controlled trial. Setting. Health maintenance organization (HMO). Patients. Five hundred twenty-one HMO members. Intervention. Patients were assigned to the medication reconciliation program (113 patients) or to the usual care control group (408 patients) after discharge to home from an SNF. Assignment to the medication reconciliation group or to the control group was based on provider submission of a discharge summary within 0-48 hours of discharge or more than 48 hours after discharge, respectively.

**Measurements and Main Results:** Integrated electronic medical and pharmacy data and multivariate analyses were used to assess the medication reconciliation program with regard to its impact on postdischarge mortality, rehospitalization, and ambulatory clinic and emergency department visits. Compared with usual care during the 60 days after discharge from the SNF, patients who received the medication reconciliation intervention had an adjusted 78% reduction in the risk of death (adjusted hazard ratio 0.22, 95% confidence interval [CI] 0.06-0.88) and a trend toward an increased rate of ambulatory care visits (adjusted incidence risk ratio 1.17, 95% CI 0.99-1.37). No significant differences were noted in adjusted risks of an emergency department visit and rehospitalization (p>0.05) between the medication reconciliation and usual care groups.

**Conclusion:** Our data support the hypothesis that a formal medication reconciliation process, with its increased coordination of information between health care providers and patients, can decrease mortality after discharge from an SNF. Our findings support the role of medication reconciliation as an integral step in the transitional care process and interests of health care accrediting agencies, such as the Joint Commission, that have included medication reconciliation as an important initiative.

Introduction

The transfer of patients from one health care setting to another can be associated with poor postdischarge outcomes. Recent evaluations suggest that approximately 20% of patients discharged to home from a hospital will experience an adverse event (i.e., an injury caused by medical management) during this transition and that 66-72% of these events are drug related.[1,2] Assuming a frail patient population with multiple comorbidities, one might argue that patients discharged from a skilled nursing facility (SNF) are at greater risk of experiencing an adverse event. With appropriate transitional care, however, such poor outcomes may be prevented and/or mitigated.

An important component of transitional care is the review and reconciliation of drug orders between two transition points. The term medication reconciliation refers to the process of comparing the drugs that the patient, client, or resident has been taking before the time of admission or entry to a new setting with the drugs that the organization is about to provide.[3] A "new setting" could include an SNF, hospital, or ambulatory care and other settings. An analysis of changes in drug therapy for primary care patients discharged from an acute care facility revealed a 50% turnover in drugs used between the primary care practice and acute care facility.[4] For example, antihypertensive drugs were discontinued whereas antulcer agents were begun widely in acute care facilities, resulting in confusion among discharged patients as to which drugs they should be continuing after discharge.[4]

Medication reconciliation, thus, is a critical component of a patient's transition between levels of care. Accrediting organizations, such as the Joint Commission, have included medication reconciliation as part of their goals to help promote patient safety.[5] Kaiser Permanente...
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Methods

Setting

Kaiser Permanente Colorado is a group model, not-for-profit, health maintenance organization with approximately 480,000 members in the Denver-Boulder, Colorado, metropolitan area, operating 18 regional medical offices as of April 2007. The KPCO CPCC was established in 1996 and is staffed with approximately 20 clinical pharmacists and six pharmacy technicians. The CPCC is responsible for transitioning new members into KPCO (e.g., recommending conversions of nonformulary to formulary drugs); managing drug therapy queries from members, patients, and health care providers; answering patient questions about regional drug therapy initiatives; and participating in other special drug therapy projects (e.g., drug-laboratory monitoring adherence).[11]

At the time of this study, KPCO contracted with eight Denver-Boulder area facilities to provide skilled nursing care for its members. In 2003, a pilot pharmacist-managed medication reconciliation program was developed and implemented. This program was designed to augment the usual care transitional services (e.g., ensuring patients had access to durable medical equipment, reviewing activities of daily living to assess if patients required home-based care, referring to disease state management programs) managed by the KPCO chronic care coordinator nurses and primary care physicians. Because of resource restrictions, three KPCO-contracted SNFs and six KPCO SNF providers participated in the pilot. Each SNF had a dedicated provider team: a medical doctor and nurse practitioner. Throughout the pilot, each SNF had the same provider team discharging patients from that SNF. All providers had geriatrics training and at least 3 years of continuing care experience at the time of the pilot.

Discharge notification to the patient's primary care physician occurred at the time of discharge for all patients. Thus, independent of acuity, coordination of care was similar across patient groups. However, discharge summaries that were completed by the SNF providers were sent electronically to the CPCC at varying times after discharge. Discharge summaries that were completed by the SNF's provider team within 48 hours of discharge were forwarded to the CPCC, whereas discharge summaries that were completed by the SNF's provider team after 48 hours of a patient's discharge were forwarded to chronic care coordinator nurses. Thus, naturalistic groups arose during the pilot whereby one group of patients received usual care plus medication reconciliation and another group received only usual care.

Study Design and Participants

This was a quasi-experimental, controlled study that used integrated electronic medical, pharmacy, and membership records. All male and female KPCO patients aged 18 years or older and discharged from any one of the three participating SNFs during the time period of October 1, 2003-March 31, 2004, were eligible for inclusion in the study. Patients were excluded if they were discharged from an SNF to a hospice, long-term care facility, hospital, or emergency department, or if they did not have continuous KPCO membership eligibility during the 6 months before admission to the SNF. If a patient had more than one SNF stay during the study period, only the data from the earliest stay during the study period was included in the analysis. All phases of this study were reviewed and approved by the KPCO institutional review board.

Patients whose discharge summaries were received by the CPCC within 48 hours of discharge from the SNF to primary care were assigned to the medication reconciliation program group. After CPCC intervention, a copy of the clinical pharmacist's medication reconciliation note would be forwarded to the patient's primary care physician and appropriate chronic care coordinator nurse for usual transitional care services. Discharge summaries received 48 hours or more after discharge from the SNF were forwarded to a chronic care coordinator nurse, and the patient received usual transitional care services; these patients were assigned to the usual care control group.

The a priori primary objective of this study was to assess if there were differences between the groups in the time to death during the 60 days after discharge from an SNF. Secondary objectives included an assessment of the relationships between the groups and rates of ambulatory visits and risks of an emergency department visit and rehospitalization during the 60 days after discharge from the SNF.

Intervention

The CPCC received faxed discharge summaries written by the SNF discharging provider. A CPCC pharmacist examined each discharge summary within 72 hours after discharge and conducted a drug regimen review. This review included the following: examination of electronic pharmacy records, which contain 24 months of prescription data including drug name, dosage, fill dates, and other applicable information, to identify the patient's previous ambulatory drug history before admission to the SNF; comparison of the data contained in the discharge summary with the CPCC medication reconciliation program; and intervention to reconcile potential discrepancies, which included reordering of necessary drugs, changing dose, adjusting frequency, and stopping drugs if necessary. The pharmacist's intervention note was faxed to the patient's primary care provider within 72 hours of discharge to ensure that patients were on the correct regimen by the time of discharge.
ambulatory drug regimen with the discharge drug list to identify drug therapy modifications as well as unexplained discrepancies; determination of formulary status for discharge drugs and appropriateness of conversion to therapeutic alternatives; and review of available drug information (e.g., medical records, pharmacy records, patient report) for any possible drug-related problems.

If necessary, the CPCC-reviewing pharmacist would then do the following: contact the discharging provider or patient's primary care physician to discuss any unexplained discrepancies or potential drug-related problems and recommend possible alternatives; discuss recommended conversions of nonformulary drugs and/or drugs requiring prior authorization to formulary alternatives with the discharging provider if appropriate; if necessary, alert the patient's primary care physician to any unresolved potential drug-related problems and provide recommendations; contact patient or caregiver by telephone to review the patient's SNF discharge drugs or updated therapeutic plan and review the status of any other drugs the patient may have in the home; if warranted, follow-up with the patient's primary care provider to inform him or her of newly recognized nonadherence or other drug-related issues; and document this information in the patient's electronic medical record with a copy of the note forwarded electronically to the patient's primary care provider, chronic care coordinator nurse, and, when appropriate, other providers or clinical pharmacy services (e.g., anticoagulation service). On average, the drug review, consult, and documentation would take 45-60 minutes to complete.

Outcomes

A summary of frequent potential drug-related problems encountered during the intervention was tabulated. Unadjusted proportions of patients with any cause of death, a rehospitalization, or an emergency department visit, and mean counts of ambulatory visits in the 60 days after discharge from the SNF were compared between the groups. Hazard ratios (HRS) of death, odds ratio (OR) as an estimate of the relative risk) of an emergency department visit, and daily incidence rate ratios (IRR) of ambulatory visits and days of rehospitalization in the 60 days after SNF discharge were calculated between the groups while adjusting for age, sex, chronic disease score (a risk adjustment score indicating health status at the time of admission to the SNF), discharging SNF, and hospital-to-SNF primary discharge diagnosis.

Data Analysis

Information on patients who were discharged from the three participating SNFs from October 1, 2003-March 31, 2004, and their discharging provider were obtained from a KPCO administrative database. Discharge dates were used as index dates with which specific individual patient 6-month baseline and 60-day follow-up periods were determined. Demographic characteristics (date of birth, sex); hospital-to-SNF discharge diagnosis; ambulatory drug use history before admission to the SNF; and postdischarge ambulatory, SNF, and inpatient health care services utilization were identified by using integrated electronic medical and pharmacy records. Information on dates and causes of death (when applicable) and KPCO membership and Medicare eligibility was obtained from integrated electronic membership records.

Age and Medicare eligibility were determined as of discharge date. Due to the non-conditionspecific nature of the study, a wide range of hospital-to-SNF primary discharge diagnoses were identified among the discharged patients. To account for the variability in the disease burden during the analysis while providing for a manageable number of variables to include in the models, hospital-to-SNF primary discharge diagnoses were categorized as cardiology, internal medicine, neurology, oncology, orthopedic, and pulmonology related or other based on International Classification of Diseases, Ninth Revision diagnosis codes (specific codes available from corresponding author on request).

A chronic disease score was calculated for each subject by using ambulatory prescription drug data from the 6-month baseline period. Chronic disease scores can range from 0-35, with increasing scores indicating an increasing burden of chronic diseases under treatment. Use of the chronic disease score allows for the accounting of each patient's risk of mortality and future health care utilization at the time of his or her discharge. For example, with coadjustment for age and sex, a patient with a chronic disease score of 7 would have 9.8 times the risk of death compared with a patient with a score of zero. The chronic disease score has been used in over 50 MEDLINE-listed publications to adjust for baseline health status differences between groups. As routinely demonstrated, the chronic disease score is highly predictive of mortality and health care utilization and is comparable to other, common diagnosis-and prescription drug-based risk adjustment scores.

Survival time for the mortality outcome in the 60 days after SNF discharge with censoring (for living patients, censoring occurred at time of termination from KPCO membership or 60 days after discharge, whichever came first) was compared between groups by using Cox proportional hazards modeling while adjusting for age, sex, chronic disease score, discharging SNF, and hospital-to-SNF primary discharge diagnosis. Negative binomial regression modeling was used to assess the relationships between the group and number of post-SNF discharge ambulatory visits and days of rehospitalization while adjusting for age, sex, chronic disease score, discharging SNF, and hospital-to-SNF primary discharge diagnosis. Logistic regression modeling was used to assess the relationships between the group and a post-SNF discharge emergency department visit while adjusting for age, sex, chronic disease score, discharging SNF, and hospital-to-SNF primary discharge diagnosis. All patients in the pilot who met the eligibility criteria were included in the analysis. The α level was set at 0.05.

Results

A total of 700 patients were identified as being discharged from the participating SNFs during the study period (Figure 1). A total of 521
patients were included in the analysis: 113 and 408 in the medication reconciliation program and usual care groups, respectively. Whereas patients in the medication reconciliation group had a higher but not statistically significant mean baseline CDS score (suggesting worse health status for this group), other baseline characteristics were similar between the groups except for differences in the discharging SNF proportions ($p < 0.001$; Table 1). Analysis of medication reconciliation records for intervention patients indicated that greater than 90% of all discharge summaries contained at least one potential drug-related problem. Potential drug-related problems identified included duplicative drugs, omitted therapy, and contraindications (Table 2).

**Figure 1.**

Flow diagram showing patient assignment to study groups and exclusions from the study.

At 60 days after SNF discharge, no statistically significant differences were noted between the groups in the proportions of patients who died, had an emergency department visit, or were rehospitalized. However, patients in the medication reconciliation group had higher mean cumulative ambulatory care visits ($p < 0.01$; Table 3). In unadjusted modeling, no statistically significant differences were noted in risks of death, emergency department visit, and rehospitalization ($p > 0.05$). However, patients in the medication reconciliation group had a higher rate of ambulatory care visits (IRR 1.31, 95% CI 1.13–1.51; Table 4).

Adjusting for age, sex, chronic disease score, primary discharge diagnosis, and discharging SNF during the 60 days after SNF discharge, patients in the medication reconciliation group had a 78% reduction in the risk of death (HR 0.22, 95% CI 0.06–0.88; Table 4). The most common causes of death for patients in the usual care group were heart failure (21%) and chronic obstructive pulmonary disease (21%) whereas patients in the medication reconciliation group all died of heart failure (Table 5). During the 60 days after SNF discharge, an increased adjusted rate of ambulatory care visits (IRR 1.17, 95% CI 0.99–1.37) was noted, but this was not statistically significant. There were no significant differences in the adjusted risks of an emergency department visit and rehospitalization ($p > 0.05$).

**Discussion**

It is common for a patient to receive multiple prescriptions from multiple providers when transferring from one care setting to another; thus, patients may be confused about which drugs they should take and how they should take them.[16] Medication reconciliation is receiving considerable attention as a strategy to ensure patient safety and quality care during transition from one health care setting to another.[3] In an effort to assess the effectiveness of a medication reconciliation program for SNF discharges, we conducted an evaluation to compare our pharmacist-managed medication reconciliation program with usual care.

We found that the pharmacist-managed program resulted in a meaningful 78% reduction in the risk of death after SNF discharge.
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Compared with usual care in our adjusted analysis, this outcome may have been a result of the identification of unintended drug discrepancies and potential drug-related problems through the medication reconciliation process. For example, our intervention identified a patient who had been taking warfarin 20 mg for 3 days after discharge from an SNF. With this intense dose, the risk of hemorrhage is greatly elevated.[17] During telephonic patient counseling, a CPCC pharmacist was able to determine that the patient was complying with conflicting information provided at the point of discharge. The CPCC pharmacist was able to counsel the patient on the appropriate use of warfarin and arrange for the patient to be seen promptly in clinic for further evaluation and treatment.

Compared with usual care, medication reconciliation may enhance a discharged patient's understanding of his or her drug regimen, discharge instructions, and potential adverse effects. By having the clinical pharmacist speak directly with patients or their caregivers, prevention of drug-related problems may have been facilitated by the patient-focused counseling, which was not offered in usual care.[6] When receiving telephonic home-based counseling, a higher level of information uptake may be obtained because patients may be under less duress and, thus, more able to focus on the counseling.[6]

Although our investigation identified a reduction in the adjusted risk of death compared with usual care, another investigation reported a dissimilar finding of no significant differences in mortality rates when examining a home-based pharmacist drug review intervention among hospital-discharged elderly patients.[10] Our encouraging results may have differed from these investigators' results because of their patients' older age range and the emergency nature of their hospital admission. Our adjusted HR for mortality (0.22) was lower than our HR in the unadjusted model (0.45). Multivariate modeling provided adjustment for covariates among the patients including any differences in baseline health status, provision of care at individual SNFs, and burden of primary condition at discharge. Differences in these factors were important enough that adjustment for them reduced the risk of death substantially for the intervention group.

Examination of the causes of death between the groups suggests that the patients in the usual care group who died might have benefited from a reconciliation of their medications. For example, patients who experience chronic obstructive pulmonary disease have been found to be at a high risk for adverse events after discharge.[16] Medication reconciliation for these patients may have identified gaps in care and/or potential drug-related problems that, once identified and addressed, might have prevented chronic obstructive pulmonary disease-related deaths.

We found a trend toward an increased rate of ambulatory visits in our intervention group, but this was not significant. Another group of authors noted equivocal rates of follow-up ambulatory visits in their investigation of a transitional care intervention.[9] The lack of difference in our finding may be indicative of the KPCO system in which both control and intervention patients were made aware of the recommended follow-up appointment(s) with their primary care physicians. Alternatively, a post hoc power analysis determined that we were underpowered (power of 70%) for this outcome. We hypothesize that with an adequate sample size, our results would have detected a significant difference between the groups.

We detected no significant differences in risk of rehospitalization after discharge. Although another investigation reported decreases in the rates of rehospitalization secondary to acute heart failure in a post-hospital discharge home-based pharmacist and nurse drug management intervention,[8] this intervention was specific for one disease state. In an investigation of a quasi-experimental, nurse-led, postdischarge transitional care intervention that targeted discharges of patients with nonspecific diseases, no significant differences in rehospitalization rates were detected between the groups.[9] In a randomized, controlled trial of a pharmacist directed medication reconciliation program in patients with nonspecific diseases at time of hospital discharge, the intervention was associated with lower rates of preventable adverse drug events 1 month after discharge.[19] However, differences in health care utilization were not detected. Our investigation resembled more the latter investigations in that we intervened on a patient population with multiple disease states (as evidenced by our groups' elevated chronic disease scores). By not limiting our population to a specific disease state, those patients with complex disease states may have required supplemental care above what our intervention provided. Conversely, the absolute rate of rehospitalization we observed in the intervention group (17.7%) may be indicative of appropriate hospitalizations due to better patient-recognition of drug-related problems, and such rehospitalization may have partially mediated mortality.

We found no significant differences in the risk of an emergency department visit after discharge. Other investigators have noted a reduced likelihood of an emergency department visit among their patients enrolled in a pharmacist-facilitated, post-hospital discharge, home-based drug management intervention.[5] It may have been that we did not find differences in our study due to the limited sample size (power of 10%) we had for this outcome. Future investigations with adequate sample sizes need to be undertaken to further evaluate this relationship.

It is important to take into account some of the limitations of our investigation. Patients were not randomly assigned to the intervention group. Nevertheless, we attempted to control for important baseline clinical differences between the groups including a baseline risk adjustment tool.[12,13] Other differences (e.g., home care environment, socioeconomic factors) may have existed that we were unable to control.

Our study was predicated on equivalence in post-SNF discharge treatment and coordination of care except for the medication reconciliation intervention as, independent of acuity, coordination of care was similar across groups. Nevertheless, group assignment was based on receipt of the discharge summary within different time frames after discharge. With patients in the intervention group having a nonsignificantly higher mean chronic disease score, it could be suggested that these patients had higher acuity than the control group at baseline. However, based on overall baseline patient characteristics, we identified no evidence that the receipt of a discharge summary within 48 hours or after 48 hours was related to patient acuity or study outcomes.


25/06/2008
In addition, although our sample size was adequate to detect differences in 60-day ambulatory visit rates, differences in other outcomes were not detected possibly due to the limited power to detect these differences. Thus, Type II errors may have been present in our findings, making the association between the intervention and positive outcomes tenuous. Furthermore, because of our study's design, we were unable to access and examine the control group's SNF discharge summaries to assess whether medication reconciliation could have prevented the negative outcomes observed. Finally, the outcomes we found may not have been exclusively related to the intervention but may have been related to unspecified aspects of the pharmacist consultation including a patient's perception of the provision of "TLC" during the consult.

**Conclusion**

Medication reconciliation is a strategy to ensure patient safety and quality health care during care transitions. In our investigation, a pharmacist-managed medication reconciliation process, with its coordination of information between health care providers and patients, was associated with decreased mortality after SNF discharge. Our findings support the role of medication reconciliation as an integral step in the transitional care process and interests of health care accrediting agencies, such as the Joint Commission, that have included medication reconciliation as an important initiative. A future investigation with a larger sample size, randomization of patients to study groups, and an assessment of the outcomes-drug therapy relationship should be undertaken to confirm our findings.

**Table 1. Baseline Characteristics by Study Group for the 521 Patients Discharged from a Skilled Nursing Facility**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Usual Care Group (n=408)</th>
<th>Medication Reconciliation Group (n=113)</th>
<th>Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at discharge (yrs)</td>
<td>77.7 ± 10.5</td>
<td>78.7 ± 9.3</td>
<td></td>
</tr>
<tr>
<td>Chronic disease score(^a)</td>
<td>5.0 ± 3.4</td>
<td>5.4 ± 3.7</td>
<td></td>
</tr>
<tr>
<td>No. (% of Patients)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>160 (39.2)</td>
<td>34 (30.1)</td>
<td></td>
</tr>
<tr>
<td>Medicare</td>
<td>363 (89.0)</td>
<td>105 (92.9)</td>
<td></td>
</tr>
<tr>
<td>Skilled nursing facility</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>188 (46.1)(^b)</td>
<td>25 (22.1)</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>78 (19.1)</td>
<td>68 (60.2)</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>142 (34.8)</td>
<td>20 (17.7)</td>
<td></td>
</tr>
<tr>
<td>Primary diagnosis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oncology</td>
<td>6 (1.5)</td>
<td>2 (1.8)</td>
<td></td>
</tr>
<tr>
<td>Neurology</td>
<td>35 (8.6)</td>
<td>4 (3.5)</td>
<td></td>
</tr>
<tr>
<td>Internal medicine</td>
<td>57 (14.0)</td>
<td>20 (17.7)</td>
<td></td>
</tr>
<tr>
<td>Pulmonology</td>
<td>42 (10.3)</td>
<td>9 (8.0)</td>
<td></td>
</tr>
<tr>
<td>Orthopedic</td>
<td>151 (37.0)</td>
<td>43 (38.1)</td>
<td></td>
</tr>
<tr>
<td>Cardiology</td>
<td>67 (16.4)</td>
<td>16 (14.2)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>50 (12.3)</td>
<td>19 (16.8)</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\)The chronic disease score is a risk adjustment score indicating health status at the time of admission to the skilled nursing facility. Scores range from 0–35, with increasing scores indicating an increasing burden of chronic diseases under treatment.

\(^b\)p<0.001 between groups.

**Table 2. Categories and Frequency of Potential Drug-Related Problems Commonly Identified in the Medication Reconciliation Group**

### Table 3. Outcomes by Study Group After Discharge from the Skilled Nursing Facility

<table>
<thead>
<tr>
<th>Drug-Related Problem</th>
<th>Example</th>
<th>No. (%) of Patients (n=113)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dosage adjustment</td>
<td>Furosemide dosage titrated to 40 mg twice/day in hospital or skilled nursing facility, but lower dose inadvertently ordered at discharge</td>
<td>82 (73)</td>
</tr>
<tr>
<td>Omitted therapy</td>
<td>Hydrochlorothiazide omitted during transition</td>
<td>54 (48)</td>
</tr>
<tr>
<td>Therapeutic duplication</td>
<td>Metoprolol and atenolol</td>
<td>21 (19)</td>
</tr>
<tr>
<td>Patient adherence</td>
<td>Patient taking more or less than prescribed dose</td>
<td>6 (5)</td>
</tr>
<tr>
<td>Contraindication</td>
<td>Use of propoxyphene in the elderly</td>
<td>6 (5)</td>
</tr>
</tbody>
</table>

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### Table 4. Postdischarge Unadjusted and Adjusted Outcome Ratios

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Usual Care Group (n=408)</th>
<th>Medication Reconciliation Group (n=113)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulative ambulatory visits, mean ± SD</td>
<td>5.0 ± 3.8</td>
<td>6.8 ± 4.9</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. (%) of Patients</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Any cause of death</td>
<td>24 (5.9)</td>
<td>3 (2.7)</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Rehospitalization</td>
<td>48 (11.8)</td>
<td>20 (17.7)</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Emergency department visit</td>
<td>65 (15.9)</td>
<td>15 (13.3)</td>
<td>&gt;0.05</td>
</tr>
</tbody>
</table>

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### Table 5. Postdischarge Causes of Death by Study Group

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Unadjusted Ratio (95% CI)</th>
<th>Adjusted Ratio (95% CI)²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any cause of death</td>
<td>HR 0.45 (0.13–1.48)</td>
<td>HR 0.22 (0.06–0.8)</td>
</tr>
<tr>
<td>Cumulative days of rehospitalization</td>
<td>IRR 1.45 (0.86–2.43)</td>
<td>IRR 1.39 (0.77–2.5)</td>
</tr>
<tr>
<td>Emergency department visit</td>
<td>OR 0.80 (0.44–1.46)</td>
<td>OR 0.71 (0.36–1.3)</td>
</tr>
<tr>
<td>Cumulative ambulatory visits</td>
<td>IRR 1.31 (1.13–1.51)</td>
<td>IRR 1.17 (0.99–1.3)</td>
</tr>
</tbody>
</table>

CI = confidence interval; HR = hazard ratio; OR = odds ratio; IRR = incidence rate ratio. Usual care group is the reference group.

²Adjusted for age, sex, chronic disease score, primary discharge diagnosis, and discharging skilled nursing facility.

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**References**


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