Impact of a Medication Review Program on Hospitalization Rate among High-Risk Dialysis Patients

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Introduction

- Patients with end-stage renal disease (ESRD) take an average of 8 medications per day.
  - The average daily pill burden for these patients is 21 pills.
- Complex medication regimens such as those used by ESRD patients may lead to greater risk of medication-related problems and patient non-adherence.
- In an effort to reduce medication-related problems and hospitalizations, a renal specialty pharmacy associated with a large dialysis organization launced a pharmacist-led medication review program.
  - In this program, ESRD patients who are identified as high risk based on recent hospital discharge are offered an in-depth, pharmacist-led medication review (Figure 1).

Objective

- To determine the association between receipt of a medication review and subsequent hospitalization rate among high-risk ESRD patients.

Methods

Patients and Characteristics

- Patients considered were those with ESRD who were enrolled in 1 of 3 participating managed care organizations and were receiving dialysis care at the facilities of the large dialysis organization.
- Baseline demographic information was derived from electronic health records maintained by the LDO.

Study Design

- Time periods considered were:
  - Cohort 1: October 2012 - November 2014
  - Cohort 2: October 2012 - November 2014
  - Cohort 3: April 2013 - March 2015
  - Cohort 4: March 2012 - June 2013, with follow-up through December 2013
- Patients who were discharged from the hospital during the study periods were offered a medication review either during the month of hospital discharge or the subsequent month.
  - For all cohorts, patients who completed the review were assigned to the test group for that cohort; those who did not were assigned to the corresponding control groups.
  - Patients in Cohorts 1 and 2 were enrolled in the same managed care organization. Cohort 1 represents patients within that organization who were under the age of 65 at the time of hospital discharge, whereas Cohort 2 represents patients who were aged 65 and over upon hospital discharge.
- Patients were followed forward in time from the month of hospital discharge until the end of the study period.

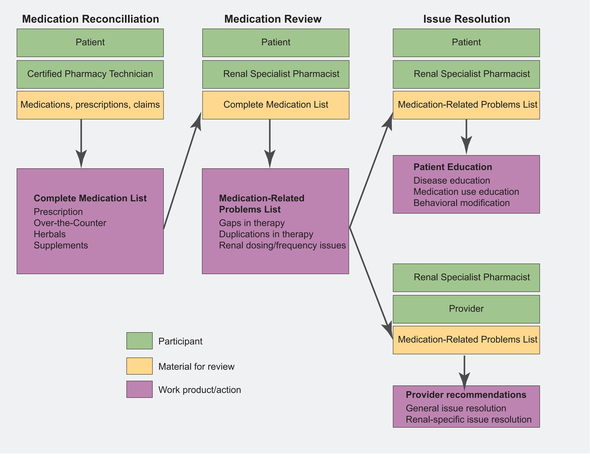
Outcomes and Analysis

- The outcome of interest was hospitalization, identified from claims data from the managed care organizations.
- Within each cohort, hospitalization rates were compared using adjusted generalized linear Poisson models.
- The results of these studies were pooled in a random effects meta-analysis.

Results

- The medication review program is summarized in Figure 1.
  - Medication Reconcilliation: A certified pharmacy technician interviews the patient to prepare a list of all prescription medications, over-the-counter medications, herbals and supplements that the patient is using and compares with a list obtained from claims-based sources.
  - Medication Review: A renal specialist pharmacist uses the medication list as a guide to systematically review the medications with the patient to identify any medication-related problems
  - Issue resolution: the pharmacist provides education to the patient to improve medication adherence, and provides recommendations to the provider with regard to any medication-related problems identified
- Within each cohort in this study, patients were offered a medication review either in the same month as hospital discharge or in the subsequent month. Patients who completed a review were assigned to the test group, whereas those who did not complete a review were assigned to the control group.

Figure 1: Medication Review Program

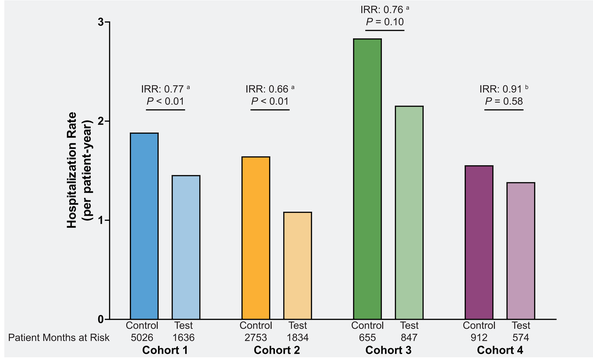


- A total of 1223 patients were analyzed in this study: 475 patients who received a pharmacist-led medication review, and 748 who did not.
- Characteristics of patients in each cohort and exposure group are summarized in Table 1.
- Within each cohort, patients who received a medication review had a lower crude hospitalization rate than those who did not receive a medication review (Figure 2).
- In Cohort 1, patients who received a medication review had a 23% lower rate of hospitalization than patients who did not receive a review ($P < 0.01$). This trend was more pronounced in Cohort 2, where patients who received a review had a 34% lower hospitalization rate than those who did not ($P < 0.01$).
- In Cohorts 3 and 4, a trend towards lower hospitalization rate among patients who received a medication review compared to those who did not was observed (24% and 9% lower, respectively). However, these trends did not reach statistical significance.
- The pooled estimate for the treatment effect, calculated by random effects meta-analysis, was 0.75 (95% confidence interval 0.67-0.83).

Table 1: Patient Characteristics by Cohort

	Control (No Medication Review)	Test (Medication Review)
Cohort 1		
Patients, n	405	157
Age, average	54	55
Sex, male, %	60	67
Enrolled months, average	37	39
Dual-eligible, %	84	78
Cohort 2		
Patients, n	175	164
Age, average	72	72
Sex, male, %	50	51
Enrolled months, average	28	36
Dual-eligible, %	76	81
Cohort 3		
Patients, n	88	100
Age, average	72	73
Sex, male, %	48	46
Enrolled months, average	11.8	11.8
Cohort 4		
Patients, n	80	54
Age, years, %		
< 55	34	44
55-64	33	26
65-74	19	15
75+	15	15
Sex, male, %	54	50
DxCG risk score, %		
Q1	16	6
Q2	38	34
Q3	24	34
Q4	22	26

Figure 2: Hospitalization Rate by Medication Review Status



Abbreviation: IRR, incidence rate ratio
[a] Adjusted for age, gender, dialysis vintage, months in managed care, and percent dual-eligible
[b] Adjusted for age, gender, vintage, and DXCG score

Conclusions

- Patients who received a pharmacist-led medication review tended to have a lower rate of hospitalization than those who did not.
- All patients in this study were considered high-risk, in that they had recently been discharged from a hospitalization.
  - Further studies will be needed to determine the applicability of these findings to other patient populations.

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