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Assessment of risk factors for increased resource utilization in kidney transplantation

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ABSTRACT

Background: There are only a limited number of studies that have sought to identify patients at high risk for medication errors and subsequent adverse clinical outcomes. This study sought to identify risk factors for increased health care resource utilization in kidney transplant recipients based on drug-related problems and self-administered surveys.

Methods: In this prospective observational study, adult kidney transplant recipients seen in the transplant clinic between September and November 2015 were surveyed for self-reported demographics, medication adherence, and health status/outlook. Subsequently, patients were assessed for associations between survey results, pharmacist-derived drug-related problems, and health resource utilization over a minimum 6-mo follow-up period. Based on univariate associations, two risk cohorts were identified and compared for health care utilization using multivariable Poisson regression.

Results: A total of 237 patients were included, with a mean follow-up of 8 mo. From the patient survey data, Medicaid insured or self-rated poor health status were identified as a significant risk cohort. From pharmacist assessments, those who received incorrect medication or lacked appropriate follow-up medication monitoring were identified as a significant risk cohort (pharmacy errors). The Medicaid insured or self-rated poor health status cohort experienced 43% more total health care encounters (incident rate ratios [IRR] 1.43, 1.01-2.02) and 35% more transplant clinic visits (IRR 1.35, 1.03-1.77). The pharmacy errors cohort experienced 4.2 times the rate of total health care encounters (IRR 4.17, 1.55-11.2), 4.1 times the rate of hospital readmissions (IRR 4.09, 1.58-10.6), and 2.3 times the rate of transplant clinic visits (IRR 2.31, 1.04-5.11).

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Conclusions: Medicaid insurance, self-rated poor health status, and errors in the medication regimen or monitoring were significant risk factors for increased health care utilization in kidney transplant recipients. Further research is warranted to validate these potential risk factors, determine the long-term impact on graft/patient survival, and assess the mutability of these risks through prospective identification and intervention.

Introduction

Long-term care after kidney transplantation is complex and can lead to suboptimal outcomes. The management of multiple comorbidities, coupled with extensive medication regimens, and intensive follow-up care are substantial challenges in this population.[1,2] Medication-related problems (MRPs) are common among kidney recipients. Based on a recent study, over half of kidney transplant recipients experienced at least one medication error (ME) and three-quarter experienced at least one adverse drug reaction.[3] In spite of this, there is limited literature regarding risk factors and outcomes associated with MRPs in kidney transplant recipients.[4,5]

Extensive health care system utilization has been documented among kidney transplant patients after transplant. Literature demonstrates that nearly one-third of transplant patients are admitted within 30 d of discharge.[6] By 3 y post-transplant, more than three-quarter of transplant patients are readmitted at least once.[7] Emergency department (ED) visits are also a common occurrence among kidney transplant recipients.[8] Outside of the hospital setting, extensive outpatient clinic visits have been documented across a variety of subspecialties.[7] Generally speaking, health care encounters are costly and present risk for deleterious outcomes, especially among immunosuppressed patients.[9]

Although research has identified numerous patient and care factors that are predictive of outcomes after transplant, there are limited studies that seek to identify patients at high risk of MEs and subsequent adverse clinical outcomes. We previously developed a predictive model for MRPs, composed of nine patient-reported variables. This model includes factors pertaining to insurance coverage, medication access, medication understanding, perceived medication impact on daily function, and health status.[10] The model was reasonably predictive of MRPs, as identified by a blinded pharmacist and may potentially serve as a tool for managing patient care in the clinic. Given the predictive value of the patient self-report survey in discerning which patients are at greater risk for MRPs, the goals of this follow-up study were to comprehensively capture health care utilization in this patient population and determine if a correlation between patient self-report, pharmacist-determined risk factors, and health care utilization exists. We hypothesized that there are patient-reported and pharmacist-determined factors that significantly predict health care utilization in kidney transplant recipients.

Materials and methods

Study design and patients

This study was a prospective observational cohort study. Patients aged >18 y who visited the chronic renal transplant clinic and spoke with a transplant pharmacist were eligible to participate and complete the initial survey. Patients who received multi-organ transplants were included in the study. Patients were verbally consented and given the self-administered survey during their visit which occurred between September 16, 2015, and November 30, 2015. All patients who received the survey were at least 90 d posttransplantation. This visit was not included in the assessment of health care utilization. Subsequent to the completion of the survey, assessment of the pharmacist and transplant clinic visit, patients were monitored and all health care encounters were captured until June 28, 2016, the end date of the study. This study was approved by the local institutional review board.

Survey instrument

The self-administered patient surveys consisted of 24 multiple-choice and fill in the blank questions and took roughly 5 min to complete. Questions pertained to transplant information, baseline demographics, insurance information, health status/outlook, past medical history, and medication adherence. Survey variables were identified in the literature and adapted for use in this application. The medication adherence questions were adapted from the Morisky Medication Adherence Scale.[11] Surveys were completed in either paper form or electronically on iPads and responses were transferred or entered into a REDCap database for analysis. The full survey is available in the Supplemental Material section.

Pharmacist-determined risk factors

Before seeing the transplant physician, patients met with a transplant pharmacist who conducted a blinded medication history assessment during the patient's routine clinic visit to identify drug-related problems (DRPs). Assessed DRPs included nonadherence, over- or under-dosing, duplication of therapy, preventable of adverse drug reaction, medication omissions, erroneous medication, conflicting provider information, under or lack of monitoring, and wrong medication received. These DRPs were adapted and standardized from a comprehensive literature review as detailed by Covert *et al.*[12]

Health care utilization outcomes

Patient care records for study subjects were accessed for a minimum of 6 mo after survey completion using electronic medical records systems. Patient data were compiled systematically from provider notes, pathology reports, laboratory reports, and external records scanned into the health record system. Health care utilization data included hospital readmissions (number and admitting diagnosis), inpatient days, ED visits, ED diagnoses, outpatient transplant clinic visits