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Original Study

Medication Reconciliation in Continuum of Care Transitions: A Moving Target

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A B S T R A C T

Objective: To study medication discrepancies in clinical transitions across a large health care system.
Design: Randomized chart review of electronic medical records and paper chart medication reconciliation lists across 3 transitions of care.
Settings and participants: Subacute patient medication records were reviewed through 3 transition care points at a large health care system, including hospital admission to discharge (time I), hospital discharge to skilled nursing facility (SNF; time II) and SNF admission to discharge home or long term care (LTC; time III).
Measurements: Medication discrepancies were identified and categorized by the principal investigator and a pharmacist. Discrepancies were defined as any unexplained documented change in the patients' medication lists between sites and unintentional discrepancies were defined as any omission, duplication, or failure to change back to original regimen when indicated.
Results: We reviewed 1696 medications in the 132 transition records of 44 patients, identifying 1002 discrepancies. Average age was 71.4 years and 68% were female. Median hospital stay was 5.5 days and 14.5 SNF days. Total medications at hospital admission, hospital discharge, SNF admission, and SNF discharge were 284, 472, 555, and 392, respectively. Total medication discrepancies were 357 (time I), 315 (time II), and 330 (time III). All patients experienced discrepancies and 86% had at least 1 unintentional discrepancy. The average number of medications per patient increased at time I from 6.5 to 10.7 ($P < .001$), increased at time II from 10.7 to 12.6 ($P < .0174$), and decreased at time III from 12.6 to 8.9 ($P < .001$). Patients, on average, had 8.1, 7.2, and 7.6 medication discrepancies at times I, II, and III, respectively. Surgical patients had more discrepancies than medical at times I and III (8.94 vs 5.3, $P < .019$; 8.0 vs 5.8, $P < .028$). In the unintentional group, cardiovascular drugs represented the highest number of discrepancies (26%).
Conclusion: This study is the first to follow medication changes throughout 3 transition care points in a large health care system and to demonstrate the widespread prevalence of medication discrepancies at all points. Our findings are consistent with previously published results, which all focused on single site transitions. Outcomes of the current reconciliation process need to be revisited to insure safe delivery of care to the complex geriatric patient as they transition through health care systems.

Numerous studies show that medical errors and quality deficiencies commonly occur at times of transition.[1,2] Transitional care, during which a patient moves between different sites or levels of care, is a complex process fraught with challenges, particularly for the vulnerable geriatric population.[3,4] Moore et al demonstrated that nearly one-half of adult patients discharged from the hospital will have a medication error leading to discontinuity of care, with a significant increase in adverse drug events, rehospitalizations, and costs.[5–7] Astoundingly, Forster et al found that 75% of these transition errors are likely preventable.[6,7]

Medication discrepancy is defined in the literature as an incompatibility in a patient's documented medication regimen including medication additions, omissions, therapeutic interchanges, dosing

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changes and duplications.[7–9] These discrepancies are potential medication errors that may lead to adverse drug events.[10] Almost 40% of medication errors on admission to the hospital were considered potentially harmful.[11]

In response to this national concern, The Joint Commission adopted medication reconciliation as a National Patient Safety Goal (2006).[12] Medication reconciliation is the process of comparing and merging patients' medication lists at any point of transition, with the goal of preventing errors.[12,13] To date, medication discrepancies have been consistently demonstrated in single transition steps. Specifically, medication discrepancies were found in 54%–67% of patients between community and admission to the hospital, in 46%–70% of patients between hospital and discharge home, in 75% of patients between discharge from hospital to admission into a skilled nursing facility (SNF), and into long term care (LTC) facilities.[5–8,11,14–18] However, no studies have specifically examined individual medication reconciliation profiles for patients as they transition through multiple care sites across the health care system. The purpose of this study was to follow patients' medication reconciliation through hospitalization and rehabilitation to measure and classify medication changes that occur to assess the effectiveness of the medication reconciliation process as patients transition through a large health system.

Methods

Subacute patients were followed through care transitions at a large health care system operating in the New York metropolitan area. All subjects had transitioned through 2 sites of care during 1 single acute care admission cycle, including hospitalization and rehabilitation, thus, providing data for 3 transitions: hospital admission to discharge (time I); hospital discharge to skilled nursing facility (SNF) admission (time II); and SNF admission to discharge to LTC or home (time III) across 4 medication reconciliations (hospital admission, hospital discharge, SNF admission, and SNF discharge).

After receiving approval from the North Shore-LIJ Institutional Review Board, a retrospective chart review was conducted on patients admitted to 1 of 2 tertiary care hospitals within the health care system, transferred to a SNF for subacute rehabilitation, and ultimately discharged home or to a LTC facility. Subjects were randomly selected via an online random number generator (http://www.randomizer.org/form.htm) from subacute SNF discharges between April 1 and June 30 of 2011. Subjects were excluded if they were not discharged from 1 of the 2 tertiary hospitals within the health system, or if their charts did not contain all 4 medication reconciliation lists at hospital admission, hospital discharge, SNF admission, and SNF discharge. Of the 70 charts pulled by the medical records staff at the SNF, 26 were excluded as the patients had been discharged from hospitals outside of the health system. All charts contained the necessary 4 medication reconciliation lists as these are standards of care for the 2 hospitals and the SNF.

The healthcare system in which this study was conducted requires medication reconciliation on admission to the hospital, and at time of discharge from the hospital. Medication reconciliation data were accessed electronically via a uniform electronic medical record. For the SNF, admission orders are required for every patient and there is a standard hand-written discharge medication reconciliation. The SNF charts were reviewed to obtain epidemiologic patient information (age, sex, comorbid conditions, admission to the medical or surgical service, length of stay in the hospital, length of stay in the SNF), past medical history, admission diagnosis to the SNF, hospital course, and SNF course.

Data from the 4 medication reconciliation lists included total number of medications, total daily doses, and the total number of as needed medications (as needed). The medication reconciliation lists were evaluated for discrepancies using 3 separate transitions of care: hospital admission to hospital discharge (time I), hospital discharge to SNF admission (time II), and SNF admission to SNF discharge (time III).

A thorough review of the literature on medication discrepancies was conducted to identify a validated survey tool for the purpose of this study. The Medication Discrepancy Tool (MDT), published in 2005 by Dr Eric Coleman, had identified a new approach to characterizing medication discrepancies in the care transition process.[19] The primary purpose of the MDT was not only to highlight gaps in transition-related medication problems, but, most importantly, to provide a practical approach in solving them. Other researchers, such as Tjia et al, had defined medication discrepancies as unexplained differences among documented medication regimens, including the hospital discharge summary, patient care referral form, and SNF admission orders, whereas the methodology of Stitt et al, classified discrepancies as omissions, additions, duplications, therapeutic interchanges, dosing changes, and route changes.[8,16]

The goal of this study was to follow patients across multiple transitions of care. Although several authors had studied medication discrepancies at a single transition point (eg, hospital to home), no one tool existed to follow patients across care sites.[8–10,18–21] We chose to draw from the approaches used by Coleman, Cornish, Tjia, and Stitt. Tjia specifically addressed medication changes in transition between hospital and skilled nursing facilities, whereas Stitt focused strictly on hospital discharge. Furthermore, since the design of this study was retrospective, we adapted the system level section of Coleman's MDT tool, which allowed for retrospective chart review, without requiring prospective patient or physician interview, to best categorize discrepancies.[19] Finally, we incorporated Cornish et al's separation of unintentional and intentional discrepancies.[11]

Specifically, medication discrepancies were defined as any changes between medication reconciliation records that were not clearly supported. The process began with a review of each medication in the reconciliation record at each transition point for all 44 patients by the principal investigator (PI). Any discrepancies were further categorized into medication class, type of change (omission, addition, duplication, or therapeutic interchange), and whether it was considered intentional or unintentional. All medication discrepancies were then reviewed in conjunction with the study pharmacist for final categorization into intentional and unintentional discrepancies. Intentional discrepancies were defined as any changes in medication regimens that were judged by the reviewers to be a deliberate decision made by the medical team, such as omission of furosemide for dehydration, or addition of a medication such as proton pump inhibitor, opiates, or a bowel regimen. Unintentional discrepancies were changes in the medication regimen that were judged by the reviewers to potentially cause harm, as defined by Cornish.[13] Unintentional discrepancies included omission of a bowel regimen on discharge for a patient on opioids; omission of aspirin for a patient with known coronary artery disease; omission of antibiotics from hospital to SNF admission; duplication of medications; and failure to change therapeutic interchanges back to original medications. On the rare instances where the PI and pharmacist's assessments of discrepancy classifications did not corroborate (3 of the 1002 drug changes, or less than 1%), the decision was made to classify the discrepancy as intentional.

Statistical Methods

Mean, standard deviations, medians, minimum, and maximum values for continuous data such as age and total number of discrepancies were computed. Frequencies and percentages were used for categorical data including sex, discharge diagnosis, comorbidities,