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Reducing Medication Errors Through Workflow Redesign

Abstract

Lack of medication reconciliation at the point of transitions between skilled nursing facilities/nursing homes (SNF/NHs) and acute care hospitals (ACHs) is a common point of origin for medical errors that cause harm to patients. The goal of this quality improvement initiative was to improve medication reconciliation at the point of transition from the SNF/NH to the ACH which in turn would reduce medication errors, adverse drug events, and medication-induced injury to the vulnerable elderly population. We implemented a workflow redesign process to reconcile the accuracy of residents' medications at the time of transfer from the SNF/NH to the ACH. After the initiation of a medication reconciliation protocol, 72% (n=13/18) of the medication administration records (MARs) had no medication errors.

Keywords

medication errors, workflow design, medication reconciliation

Medication errors remain a main cause of adverse drug events (ADEs) and often occur when patients transition from one facility to another (Boockvar, Fishman, & Kyriacou, 2004). Patient transfers from skilled nursing facilities and nursing homes to acute care hospitals account for about 8.5% of all Medicare admissions, and approximately 40% of these hospitalizations occur within 90 days of being admitted to a nursing facility (American Medical Directors Association [AMDA], 2010). Transitions between facilities and hospitals are a common point of origin for medical errors. Approximately 1.5 million preventable ADEs occur each year as a result of medication errors, at a cost of more than \$3 billion a year, and account for approximately 2.5% of all emergency department visits for unintentional injuries (Budnitz, Pollock, & Weidenbach, 2006). These preventable ADEs represent one medication error per hospitalized patient per day (Institute of Medicine [IOM], 2006).

Significance of the Problem

Medication errors are a leading cause of injury for hospitalized patients and cause needless harm and suffering, poor patient care outcomes, extended hospital stays, and higher financial cost to the system and individuals. In 2006, each event was estimated to add \$8,750 to the cost of hospitalization (Young, 2008). The IOM and Institute for Healthcare Improvement (IHI) attribute medication errors to poor communication at transition points, such as transition from one unit to another and discharge to home (IOM, 2006; Institute for Healthcare Improvement [IHI], 2005).

The IHI recommends workflow assessment to map the process of medication reconciliation, and the website provides medication reconciliation forms (See Appendix A) and suggestions for conducting an effective medication reconciliation process (IHI, 2011). The assessment should describe common problems associated with implementing a medication reconciliation process and determine how to overcome commonly associated barriers (IHI, 2011). The Joint Commission (2015) requires that hospitals collect a medication list at admission and have it available at any point of care transition.

The Joint Commission addressed the problem of accurately and completely reconciling medications across the continuum of care more than a decade ago (The Joint Commission on Accreditation of Healthcare Organizations, 2015) while organizations were required to develop processes for medication reconciliation and implement them by January 2006. Joint Commission requirements mandated that nursing homes and long-term care facilities have a medication reconciliation process that compares previous medication lists to the most current list, with the list then communicated to the next service provider at the point of transfer. Additionally, The Joint Commission recommends that all healthcare organizations accomplish the following (The Joint Commission on Accreditation of Healthcare Organizations, 2015):

- Place the patient's medication list in a highly visible location
- Create a process for reconciling medications at all interfaces of care
- Provide the patient with a complete list of medications at discharge
- Encourage patient to provide a medication list to share with providers.

Scope of the Problem

Despite national attention to the magnitude of medication errors and related ADEs, nursing homes often lack electronic medical records, or pertinent data is often incomplete. The process by

which medication reconciliation is conducted is often unclear and poorly followed by staff when a patient is transferred to an acute care facility. Consequently, outdated medication administration records (MAR) or medication orders that are difficult to read may accompany a patient when transferred to an acute care hospital.

Project Purpose

The medication reconciliations initiative was designed to facilitate nursing facility staff's use of a user-friendly process for medication reconciliation at the point of transition. The desired outcome was for medication forms to contain updated information and the medication reconciliation process to be efficient, fast, and invite compliance from the nursing staff. To this end, a workflow process was redesigned with the intent of reducing ADEs and medication-induced injury. The aims of the initiative were to improve, within 3 months, medication reconciliation by 25% and achieve a 90% nursing compliance with the medication reconciliation process.

Ethical Issues

The nursing facility's executive team granted approval to develop and implement the initiative. Because the project was designed as a university course completion activity, the university classified the project as a quality improvement initiative with no need for Internal Review Board (IRB) oversight. The subjects' personal health information was coded to assure confidentiality and compliance with HIPAA. Chart review data were kept in a password-protected laptop that was locked when not in use.

Methods

Context

The institution is a 116-bed nursing and rehabilitation center that maintains an 85% occupancy rate. Referrals to the facility originate from the local area and the majority of patients are long-term care residents primarily funded by either Medicaid or private insurance. Approximately one-third of the residents are admitted for short-stay rehabilitation treatment. Residents generally are 60 or older, with a small percentage (10%) under 60. On average, each resident has 2 to 4 chronic conditions (such as diabetes, hypertension, and heart disease) as well as dementia and related behavioral and psychiatric conditions. Residents are frequently prescribed 6 to 10 medications, a number close to the national average of 8.1 for nursing home residents (U.S. Department of Health and Human Services, 2002)..

Project Planning

Stakeholder involvement and support was sought from the chief executive officer, chief operating officer, administrator, director of nursing, and assistant director of nursing of the nursing facility. The project planner and stakeholder group addressed implementation issues on an ongoing basis as data became available for review.

The planning team reviewed evidence-based practices and guidelines for medication reconciliation. Also, key nursing staff identified inefficiencies contributing to medication errors in the transfer process. From this, the team redesigned a workflow for medication reconciliation. Prior

to the rollout of the initiative, the researcher conducted education sessions on the revised medication reconciliation process for each charge nurse on all units. In addition, specific medication reconciliation instructions were made available at each nurses' station.

To ensure compliance with the revised medication reconciliation process, nursing facility staff reconciled the MAR with updates and order changes in the patient's record. The charge nurse signed the MAR, marks it as "reconciled," and dated it to confirm the real-time reconciliation of medications prior to transfer to an acute hospital. Patient medication related forms were sent to the receiving acute care hospital. The forms included the MAR printed at the time of the patient's admission to the facility, the MARs generated at the first of each month, and the medication orders written after the last MAR was printed.

The revised workflow design required that the patient medication forms be reviewed for compliance with the revised process and flagged for review upon the patient's return to the nursing facility. Upon the patient's return, his or her medical chart would be reviewed to identify any medication errors introduced upon the patient's admission to the hospital. Discrepancies were reconciled with the original medication list, any errors introduced noted, and updates were made as necessary. For each patient transferred back to the nursing facility, feedback concerning the effectiveness of the process was discussed with nursing facility staff.

Data Collection and Analysis

To obtain a baseline for a pre to post intervention comparison, a review was conducted of 30 records of patients who had been transferred to the ACH and later returned to the nursing facility (Group 1). Subsequently, nursing staff used the revised workflow in preparing 18 patients for transfer (Group 2). Medical records and forms submitted at time of transfer for both groups were examined for medical reconciliation accuracy. The Chi-square test was used to measure the significance of differences between the two groups to determine if a significant difference existed between the pre and post workflow redesign intervention.

Results

In reference to the baseline group, the reconciliation review found inaccuracies on the MARs that included outdated medications as well as mistakes in the reconciliation process. Results revealed that 83% (n=25) of the MARs contained one or more medication errors. Of the 18 MARs reviewed after implementation of the workflow redesign, 27.8% (n=5/18) of the charts reflected errors, compared to the baseline of 83.3% (n=25/30) before the implementation of the workflow redesign. This difference was statistically significant ($\chi^2(1) = 14.815, p < .001$), and the desired outcome of 25% improvement was met. The change in the medication reconciliation process demonstrated a 55% reduction in medication reconciliation errors. Nurses complied with the new process in 13 of the 18 records reviewed (72%), and this result fell short of the projected goal of 90% compliance within the stated time frame.

A reason for not meeting the projected goal of 90% compliance was the loss of key management personnel and lead nursing staff that occurred during project implementation. This necessitated training new staff part way through the project and ensuring that written procedural

guidelines were available, particularly on evening and night shifts where turnover was most prevalent.

Discussion

The nursing staff using the revised workflow process expressed satisfaction when they found accurate MARs for patients returning from the acute care hospital. Improvement in the process became apparent immediately after the initiative was implemented. Based on this information, the nursing institution adopted the revised workflow process as policy. Project findings supported the supposition that medication reconciliation reduces the incidence of medication errors and, thus, may mitigate associated ADEs. Medication errors are reduced and outcomes are favorable when the nursing staff reconciles the patient's MAR in the transfers to and from an acute care hospital.

In the *Medications at Transitions and Clinical Hand-offs Toolkit for Medication Reconciliation*, suggestions were made to assess the current workflow, identify gaps in the process, devise methods to revise the process, implement support mechanisms to guide the process, educate and lead the process, and measure outcomes (Agency for Healthcare Research and Quality, 2012). The current study followed the suggestions in revising processes to bridge gaps in medication reconciliation at points of transition to and from the nursing facility.

Support for devising the quality initiative came from literature. A study of 400 patients discharged from a tertiary care hospital found that 20% of ADEs were linked to medication changes during transfers between nursing facilities and hospitals (Boockvar et al., 2004). A similar study linked ADEs to drug reconciliation discrepancies (Boockvar, LaCorte, Giambanco, Fridman, & Siu, 2006). The authors identified that correct reconciliation was achieved upon a patient's return from a hospital to the nursing facility when pharmacists received a reconciled medication list received prior to hospitalization. Another study showed that pharmacy-based reconciliation led to a substantial reduction in medication discrepancies (Van den Bemt et al., 2013).

In any transition, medication reconciliation is the responsibility of the sending facility (AMDA, 2010). While this medication reconciliation initiative focused on the transition from a nursing facility to an acute care hospital, another point of transition is facility to home. The same reconciliation process is needed at every transition point, and creating a process for medication reconciliation provides safe quality patient care.

Project Considerations

The project had stakeholder support from the beginning, as well as full support from the nursing staff and the nursing facility medical director. Changing the workflow that had been the status quo required frequent reinforcement of the process with staff, and encouragement to keep the revised process working. Tacit approval and consistent implementation of the revised workflow was necessary to meet the desired goal to reduce errors in the MAR that accompanied the patient at the point of transfer. Ongoing evaluation and feedback to the nursing staff during the roll out period strengthened the medication reconciliation processes. Building partnerships with the nursing staff and leadership was key in implementing the change that brought about successful medication reconciliation.

A positive aspect of the project came from outside the nursing facility. When the transferred patient had an updated, accurate, and reconciled MAR, receiving hospitals were less likely to initiate ADEs. Thus, savings in cost and time and safer patient outcomes were achieved.

Lessons Learned

A quality initiative must be carefully planned up front and buy in from key stakeholders achieved. Investing the time to properly design the project was as important as the time needed to implement the project and assess outcomes. Providing ongoing feedback to staff promoted adherence to the revised workflow process. This was also to diminish fears of added work for an already burdened staff. Loss of key staff during project implementation identified the need for continued staff education.

Conclusion

Innovation in the health care environment through the implementation of evidence-based practice and strategies improves patient care outcomes. In this initiative, medication reconciliation at all points of transition was critical in assuring patient safety and well-being. The issue of effective and efficient medication reconciliation for patient safety in every healthcare facility is at the forefront of national patient safety goals and initiatives. This initiative demonstrated significant reductions in medication errors and associated ADEs toward gains for healthcare quality outcomes.

Prestigious organizations from American Medical Directors Association to The Joint Commission promote medication reconciliation is the responsibility of the sending facility. Actualizing this concept through an easy to use and implement workflow redesign holds implications for all stakeholders. For clinical practice, the assurance is that patients will transition with the correct medications and thus, incur fewer ADEs and associated morbidity and mortality. For the payers, the implications include less money spent treating ADEs, less litigation, and lower medicolegal costs. For the patients and their families, the implications are better quality care and reduced avoidable error and injury.

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Appendix A. Sample medication reconciliation form

PATIENT NAME: _____

DOB: _____ /**SS: (LAST 4)** _____

DATE: _____

Date ordered	Drug Name	DOSE	SCHEDULE	LAST TAKEN	Ordered on Admission?	Ordered at discharge?

DRUG ALLERGIES: _____ **CODE STATUS:** _____

Sending Nurse/Staff: _____

Contact telephone number: _____

PATIENT NAME: _____

DOB: _____ /**SS: (LAST 4)** _____

DATE: _____