

Computers in Emergency Medicine



ACCURACY OF ELECTRONIC MEDICAL RECORD MEDICATION RECONCILIATION IN EMERGENCY DEPARTMENT PATIENTS

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Abstract—Background: Medication history discrepancies have the potential to cause significant adverse clinical effects for patients. More than 40% of medication errors can be traced to inadequate reconciliation. **Objective:** The objective of this study was to determine the accuracy of electronic medical record (EMR)–reconciled medication lists obtained in an academic emergency department (ED). **Methods:** Comprehensive research medication ingestion histories for the 48 h preceding ED visit were performed and compared to reconciled EMR medication lists in a convenience sample of ED patients. The reconciled EMR list of prescription, nonprescription, vitamins, herbals, and

supplement medications were compared against a structured research medication history tool. We measured the accuracy of the reconciled EMR list vs. the research history for all classes of medications as the primary outcome. **Results:** Five hundred and two subjects were enrolled. The overall accuracy of EMR-recorded ingestion histories in the preceding 48 h was poor. The EMR was accurate in only 21.9% of cases. Neither age ≥ 65 years (odds ratio [OR] = 1.3; 95% confidence interval [CI] 0.6–2.6) nor sex (female vs. male: OR = 1.5; 95% CI 0.9–2.5) were predictors of accurate EMR history. In the inaccurate EMRs, prescription lists were more likely to include medications that the subject did not report using (78.9%), while the EMR was more likely not to capture nonprescriptions (76.1%), vitamins (73.0%), supplements (67.3%), and herbals (89.1%) that the subject reported using. **Conclusions:** Medication ingestion histories procured through triage EMR reconciliation are often inaccurate, and additional strategies are needed to obtain an accurate list. © 2015 Elsevier Inc.

Keywords—electronic medical record; emergency department medications; medication reconciliation; medication history; reconciliation

INTRODUCTION

Medication history discrepancies have the potential to cause significant pain or clinical deterioration in >38%

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of patients admitted to the hospital (1). Medication reconciliation involves collecting a complete list of current medications and then updating the medical record to include all active medications and remove all inactive medications. Medication reconciliation is the first step in preventing medication errors, and The Joint Commission on Accreditation of Healthcare Organizations has mandated reconciliation during each patient encounter since 2005 (2).

While reconciliation is mandated and routinely performed, there is evidence that the process does not result in an accurate medication list. Up to 60% of patients admitted to the hospital have at least one medication reconciliation error (1,3,4). More than 40% of medication errors can be traced to inadequate reconciliation in handoffs during admission, transfer, and discharge of patients (5). Once an error occurs, it is likely to be carried through patient care transitions; therefore, obtaining the most accurate medication history in the emergency department (ED) can improve patient safety (1).

Electronic medical records (EMR) are becoming more common and offer several advantages over paper records for medication reconciliation. First, the EMR generates consistent, updated information for all providers caring for the patient (6,7). Second, it can automatically identify duplicate therapies and medication interactions (8). Finally, the EMR can generate a list for patients to improve compliance after discharge (9). However, if the EMR is inaccurate, these advantages are lost. The objective of this study was to determine the accuracy of EMR-reconciled medication lists obtained in an academic ED.

METHODS

Patients and Study Setting

This was a secondary analysis of a prospective observational cohort gathered in an academic United States ED with approximately 72,000 patient visits per year. A convenience sample of ED patients was enrolled between June 4, 2012 and January 25, 2013. Enrollment was performed between the hours of 9 AM and 5 PM. The subjects recruited during “business hours” are not statistically different with regard to sex and race, when compared to the overall ED population demographics. This sampling method outperforms 4-h time block sampling (10). Subjects were included in the parent study if they self-reported pain or nausea during the initial nursing assessment. Subjects were randomized to protocolized opioid and anti-emetic medication administration (11). Patients were excluded if they were <18 years of age, unable to speak English, or were previously diagnosed with chronic pain or cyclic vomiting. Overdose patients and those with acute altered mental status were excluded. In patients

with dementia or critical illness, the medication ingestion history was reconciled with the health care proxy. Patients were approached after triage, after nurse medication reconciliation, and after initial stabilization when the patient arrived by ambulance. The local Institutional Review Board approved the study and all subjects provided written informed consent. The research was performed in accordance with the Declaration of Helsinki, as revised in 2000 (12).

Medication Ingestion Histories

After nursing EMR medication list reconciliation, detailed medication histories for the 48 h preceding the ED visit were obtained by the principal investigator or a professional research assistant trained in identical methods. All prescription, nonprescription, vitamin, herbals, and supplement medications were captured, along with the dose and time since the patient’s last dose. Medication histories were gathered in a structured format. Initially, we asked, “what medications have you taken in the last 48 hours?” We then asked specifically about the use of prescription medications, nonprescription medications, vitamin, herbals or traditional medications, and dietary supplements. All reported medications were recorded. When available, pill bottles were obtained to verify medication doses. If the patient had difficulty recalling the prescription name, their pharmacy was contacted to ensure accuracy of the obtained history. Over-the-counter nonprescription combination formulations were reconciled using Internet pictures to verify the specific product ingested. Interviews ranged from approximately 30 s for those not taking medications, to approximately 5 min in patients with several comorbidities.

The EMR, previously updated by the triage nurse or treating nurse, was compared with the research history. An “accurate history” was considered 100% agreement between reconciled EMR and the research medication ingestion history. One hundred percent agreement was used as “accurate” because any inaccuracy, regardless of medication class, may result in negative effects on clinical conditions or result in medication interactions. Episodically taken medications were considered accurate if listed “as needed” in the EMR. Dose discrepancies were not considered inaccurate if the medication was listed in the EMR but the dose was different per the research history. Each EMR was coded as 1) medications in EMR, patient taking; 2) medications in EMR, patient not taking; 3) medications not in EMR, patient not taking; or 4) medications not in EMR, patient taking. Therefore each record could have two inaccuracies (both medications in EMR but patient not taking and medications not in EMR but patient taking).

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