

Lack of Patient Knowledge Regarding Hospital Medications

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BACKGROUND: Patient involvement in preventing inpatient medication errors is predicated upon patient knowledge of their medications. However, there is little published on the accuracy of patient knowledge or understanding of their hospital medications.

OBJECTIVE: To assess hospitalized patients' knowledge of their hospital medications and attitudes towards involvement in the medication safety process while hospitalized.

METHODS: A cross-sectional study of 50 adult internal medicine inpatients at the University of Colorado Hospital. Patients completed a list of the hospital medications they believed were prescribed to them and a survey of attitudes toward involvement in the medication safety process. The patient-completed hospital medication list was compared to the hospital medication administration record.

RESULTS: Ninety-six percent of study patients omitted at least one prescribed hospital medication. On average, patients omitted 6.8 hospital medications. Forty-four percent of patients believed they were receiving at least one hospital medication that was not actually prescribed. Patients < 65 years old omitted 60% of their as needed (PRN) medications whereas patients ≥ 65 years old omitted 88% ($P = 0.01$). Only 28% reported having seen their hospital medication list, although 81% reported this would improve their satisfaction with hospital care. Ninety percent wanted to review their hospital medication list for accuracy and 94% felt patient review of the hospital medication list had the potential to reduce errors.

CONCLUSIONS: Our findings suggest that, in contrast to patient preferences, there are significant deficits in patients' knowledge of hospital medications. These results are a call to reexamine how we educate patients regarding their hospital medications. *Journal of Hospital Medicine* 2010;5:83–86. © 2010 Society of Hospital Medicine.

KEYWORDS: medical error, medication reconciliation, patient education, patient safety.

Inpatient medication errors represent an important patient safety issue. The magnitude of the problem is staggering, with 1 review finding almost 1 in every 5 medication doses in error, with 7% having potential for adverse drug events.¹ While mistakes made at the ordering stage are frequently intercepted by pharmacist or nursing review, administration errors are particularly difficult to prevent.² The patient, as the last link in the medication administration chain, represents the final individual capable of preventing an incorrect medication administration. It is perhaps surprising then that patients generally lack a formal role in detecting and preventing adverse medication administration events.³

There have been some ambitious attempts to improve patient education regarding hospital medications and involve selected patients in the medication administration process. Such initiatives may result in increased patient participation and satisfaction.^{4–7} There is also potential that increased patient knowledge of their hospital medications could promote the goal of medication safety, as the actively involved patient may be able to catch medication errors in the hospital.

Knowledge of prescribed medications is a prerequisite to patient involvement in prevention of inpatient medication errors and yet there is little research on patient knowledge of their hospital medications. Furthermore, as the experience of hospitalization may be disorienting and disempowering for patients, it remains to be seen if patient attitudes toward participation in inpatient medication safety are favorable. To that end, we conducted a pilot study in which we assessed current patient awareness of their in-hospital medications and surveyed attitudes toward increased patient knowledge of hospital medications.

Patients and Methods

We conducted a cross-sectional study of 50 cognitively intact adult internal medicine inpatients at the University of Colorado Hospital, a tertiary-care academic teaching hospital. This study was part of a larger project designed to examine potential for patient involvement in the medication reconciliation process. A professional research assistant approached eligible patients within 24 hours of admission. To be eligible, patients had to self-identify as knowing their

TABLE 1. Patient Knowledge of Their Hospital Medications List

	Total Medications	Scheduled Medications	PRN Medications
Percent of patients with at least 1 hospital medication they could not name (95% CI)	96% (90-100%)	94% (87-100%)	80% (69-92%)
Average number of hospital medications omitted by patient (range)	6.8 (0-22)	5.2 (0-15)	1.6 (0-7)
Percentage of hospital medications omitted by patient (95% CI)	60% (52-67%)	60% (52-67%)	68% (57-78%)

NOTE: n = 50 patients.

Abbreviations: CI, confidence interval; PRN, as needed.

outpatient medications, speak English, and have been admitted from the community. Nursing home residents and patients with a past medical history of dementia were excluded. Enrollment was tracked during the first half of the study to estimate effect of inclusion/exclusion criteria. Thirty-eight percent of hospital admissions to medicine services were excluded based on the specified criteria. Thirty-four percent of eligible patients were approached and 50% of approached patients agreed to participate in the study. Patient knowledge of their outpatient medication regimen was compared to admitting physician medication reconciliation to assess accuracy of patient self-report of outpatient medication knowledge.

After consenting to participate, study patients completed a structured list of their outpatient medications and a survey of attitudes about being shown their in-hospital medications, hospital medication errors, and patient involvement in hospital safety. They then completed a list of the medications they believed to be prescribed to them in the hospital.

The primary outcomes were the proportions of as needed (PRN), scheduled, and total hospital medications omitted by the patient, compared to the inpatient medication administration record (MAR) (patient errors of omission). Secondary outcomes included the number of in-hospital medications listed by the patient that did not appear on the inpatient MAR (patient errors of commission), as well as patient attitudes measured on a 5-point Likert scale (1 indicated "strongly disagree" and 5 indicated "strongly agree.") Descriptive data included age, race, gender, and number of inpatient medications prescribed. Separate analysis of variance (ANOVA) models provided mean estimates of the primary outcomes and tested differences according to each of the patient characteristics: age in years (<65 or ≥65), self-reported knowledge of hospital medications, and self-reported desire to be involved in medication safety. Similar ANOVA models adjusted for number of medications were also examined to determine whether the relationship between the primary outcomes according to patient characteristics were altered by the number of medications. The protocol was approved by the Colorado Multiple Institutional Review Board.

Results

Participants averaged 54 years of age (standard deviation [SD] = 17, range = 21-89). Forty-six percent (23/50) were

male, and 74% (37/50) were non-Hispanic white. Using a structured, patient-completed, outpatient medication list, patients in the study were on an average of 5.3 outpatient prescription medications (range = 0-17), 2.2 over-the-counter medications (range = 0-8), and 0.2 herbal medications (range = 0-7). The admitting physician's medication reconciliation list demonstrated similar number of outpatient prescription medications (average = 5.7) to the patient-generated list. Fifty-four percent of patient-completed home medication lists included all of the prescription medications on the physician's medication reconciliation at admission. According to the inpatient MAR, study patients were prescribed an average of 11.3 scheduled and PRN hospital medications (range = 2-26) at time of study enrollment.

Patient Knowledge of Their Hospital Medication List

Ninety-six percent (48/50) of study patients omitted 1 or more of their hospital medications. On average, patients omitted 6.8 medications (range = 0-22) (Table 1). Among scheduled medications, patients most commonly omitted antibiotics (17%), cardiovascular medications (16%), and antithrombotics (15%) (Figure 1). Among PRN medications, patients most commonly omitted analgesics (33%) and gastrointestinal medications (29%) (Figure 2).

Patients less than 65 years omitted 60% of their PRN medications whereas patients greater than 65 years omitted 88% ($P = 0.01$). This difference remained even after adjustment for number of medications. There were no significant differences, based on age, in ability to name scheduled or total medications. Forty-four percent of patients (22/50) believed they were receiving a medication in the hospital that was not actually prescribed.

Patient Attitudes Toward Increased Knowledge of Hospital Medications

Only 28% (14/50) of patients reported having seen their hospital medication list, although 78% (39/50) favored being given such a list, and 81% (39/48) reported that this would improve their satisfaction with care. Ninety percent (45/50) wanted to review their hospital medication list for accuracy and 94% (47/50) felt patient participation in reviewing hospital medications had potential to reduce errors. No associations were found between self-reported knowledge of hospital medications or self-reported desire to be involved in

Omitted Scheduled Medications

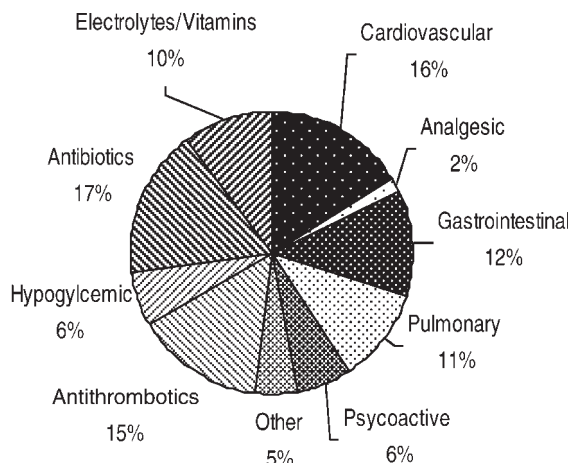


FIGURE 1. From 260 omitted scheduled hospital medications by 50 study patients.

Omitted PRN Medications

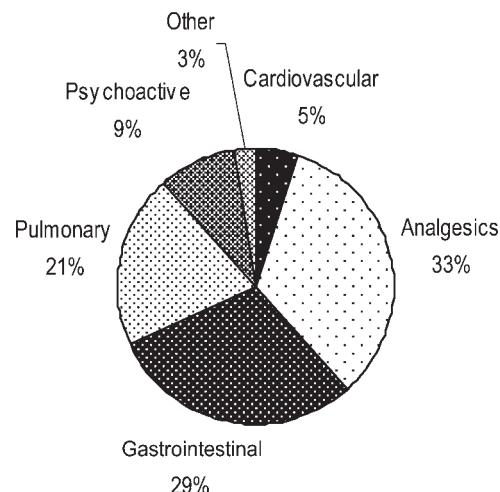


FIGURE 2. From 78 omitted PRN hospital medications by 50 study patients.

medication safety and the proportion of PRN, scheduled, or total medications omitted.

Discussion

Overall, patients in the study were able to name fewer than one-half of their hospital medications. Our study suggests that adult medicine inpatients believe learning about their hospital medications would increase their satisfaction and has potential to promote medication safety. At the same time, patients did not know many of their hospital medications and this would limit their ability to fully participate in the medication safety process. Study patients frequently committed both errors of omission (ie, they did not know which medications were prescribed), and errors of commission (ie, they believed they were prescribed medications that were not prescribed). Younger patients were aware of more of their PRN medications than older patients, potentially reflecting greater patient care involvement in younger generations. However, study patients, regardless of age, were able to name fewer than one-half of their PRN hospital medications. The most common scheduled hospital medications that patients were unable to name come from medication classes which can be associated with significant adverse events, including antibiotics, cardiovascular medications, and antithrombotics.

We posit that without systematically educating patients about their hospital medications, significant deficits in patient knowledge are inevitable. Some might argue that patients should not be asked to know their hospital medications or identify medication errors while sick and vulnerable. Certainly with multiple medication changes, formulary substitutions, and frequent modifications based on changes in clinical status, inpatient medication education could be time consuming and potentially introduce patient confusion or anxiety. Incorrect patient feedback could have potential to introduce new

errors. An educational program might use graded participation based on patient interest and ability. Models for this exist in the literature, even extending to patient medication self-administration.⁵⁻⁷ In our sample of inpatients, the majority desired a more active role in learning about their hospital medications and believed that their involvement might prevent hospital medication errors from occurring.

Medication literacy, education, and active patient involvement in medication monitoring as a means to improve patient outcomes has received significant attention in the outpatient setting, with lessons applicable to the hospital.^{8,9} More broadly, the Joint Commission has established a Hospital National Patient Safety Goal to “encourage patients’ active involvement in their own care as a patient safety strategy.”¹⁰ Examples set forth by the Joint Commission include involving patients in infection control measures, marking of procedural sites, and reporting of safety concerns relating to treatment.

While this study identifies patient knowledge deficit as a barrier to utilizing patients as part of the hospital medication safety process, it does not test whether reducing this knowledge deficit would actually reduce medication error. Our study population was limited to cognitively intact adult medicine patients at a single institution, limiting the generalizability of our conclusions. Our enrollment process may have resulted in a study population with less serious illness, greater knowledge of their hospital medications, and greater interest in participating in medication safety potentially overestimating patient knowledge of hospital medications. Finally, our small sample size limits the power to find differences in study comparisons.

Our findings are striking in that we found significant deficits in patient understanding of their hospital medications even among patients who believed they knew, or desired to know, what is being prescribed to them in the hospital.

Without a system to incorporate the patient into hospital medication management, these patients will be disenfranchised from participating in inpatient medication safety. These results are a call to reexamine how we educate and involve patients regarding hospital medications. Mechanisms to allow patients to provide feedback to the medical team on their hospital medications might identify errors or improve patient satisfaction with their care. However, the systems and cultural changes needed to provide education on inpatient medications are considerable. Future research is needed to determine if increasing patient knowledge regarding their hospital medications would reduce medication errors in the inpatient setting and how this could be effectively implemented.

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