NOTE

Pharmacist- versus physician-obtained medication histories

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Purpose. Physician-obtained medication histories were compared to those obtained by a pharmacist.

Methods. Patients whose medication histories were obtained were included in the evaluation if they were at least 18 years old and admitted to an internal medicine service at the University of Virginia Medical Center. Data were collected in two phases. The first 20 patients identified for inclusion were asked to provide an accurate medication history to pilot test the medication history form used by the pharmacist and received no pharmacist follow-up or interventions. In the second phase, patients were asked to provide an accurate medication history, and a pharmacist intervened when discrepancies in the pharmacist-obtained medication history were identified.

Results. A total of 55 patients were included in the study. The pharmacists identified 614 medications for these patients, compared with 556 identified by the physicians ($p \leq 0.001$). The pharmacist documented significantly more medication doses and dosage schedules than did physicians (614 versus 446 and 614 versus 404, respectively) ($p \leq 0.001$ for both comparisons). The pharmacist identified 353 discrepancies, including 58 medications not initially identified from the physician-obtained histories. The pharmacist intervened for 161 discrepancies, correcting 142 after contacting the respective physician; 19 medication discrepancies could not be justified by the physician.

Conclusion. A total of 353 discrepancies were identified when medication histories obtained by physicians were compared with those obtained by a pharmacist during the study. During the intervention phase, the majority of discrepancies identified were either corrected by the pharmacist after contacting the respective physician or justified by the physician.

Index terms: Documentation; Interventions; Patient information; Pharmacists; Physicians

Am J Health-Syst Pharm. 2008; 65:857-60

In 1999, the Institute of Medicine (IOM) reported that medical errors accounted for 44,000–98,000 deaths annually, making medical errors the eighth leading cause of death in the United States.[1] These errors translate into an additional $25 billion in annual health-related costs. In response to the data presented in the IOM report, the Joint Commission developed the National Patient Safety Goals (NPSGs).[2] The eighth NPSG addresses medication reconciliation, defined by the Joint Commission as the process of comparing the patient's medications before admission to those medications prescribed during admission. The Joint Commission developed this goal to avoid errors of transcription, omission, and duplication as well as drug–drug and drug–disease interactions.[2]

Hospitals across the country struggle with obtaining accurate and complete patient medication histories at the time of admission. Incomplete or inaccurate medication histories can lead to an interruption in drug therapy or inappropriate drug therapy during hospitalization, placing the patient at a significant risk of medication-related complications that may result in prolonged hospitalization or death.[3] Complications may include drug–drug interactions, disease exacerbation, and therapeutic duplication.

It has been reported that up to 60% of patients admitted to a hospital will have at least one error in their admitting medication history.[4] Within this group of patients, approximately 6% will experience a serious complication due to an inadvertent drug discontinuation, with many of these events considered preventable.[4] As the number of medications taken by the aging population increases, do does the complexity of drug regimens

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The guidance and assistance of Stacey Baker, Pharm.D., BCPS, Kristi Hofer, Pharm.D., and Michelle McCarthy, Pharm.D., are acknowledged.

DOI 10.2146/ajhp070292

and the potential for serious complications.[5] The use of nonprescription drugs and herbal agents is often overlooked in traditional methods of recording medication histories. Even occasional use of these products may result in significant interactions and adverse events.[3]

Much of the published research related to medication errors has focused on medication ordering and delivery systems, with little attention paid to obtaining accurate medication histories. Without proper verification of the patients' home medications, medical errors will continue to occur, regardless of the quality of medication ordering and delivery systems.

Barriers to the collection of complete and accurate medication histories include time constraints, language barriers, the severity of the patient's illness, the patient's cognitive status, and the patient's familiarity with his or her medications.[4] A formalized process in which the interviewer is familiar with drug names, drug characteristics, adverse effects, dosage forms, and administration of medications would minimize many of the barriers and improve patient safety.[3]

Cornish et al.[4] stated that the medication reconciliation process begins with the medication history and should be performed by a pharmacist to minimize adverse drug events (ADEs) while maximizing patient safety. In an evaluation of over 1000 hospitals, Bond and colleagues[6] found that there were 51% fewer medication errors reported in hospitals when a pharmacist was involved with obtaining medication histories. The Joint Commission does not specify any one profession to assume the responsibility of collecting medication histories but simply states that they must be collected.[2] However, the American Society of Health-System Pharmacists (ASHP) developed the 2015 Health-System Pharmacy Initiative for pharmacists practicing in health systems to help make medication use more effective, scientific, and safe while improving public health.[7] The first goal of this ASHP initiative is to increase the involvement of the pharmacist in helping the hospitalized patient achieve the best use of the medications prescribed, specifically that pharmacists be involved in acquiring medication histories for at least 75% of admitted patients who have complex and high-risk medication regimens.[7]

We initiated a project to compare pharmacist-obtained medication histories with those obtained by physicians for patients admitted to the hospital under the care of an internal medicine team. The time required for the pharmacist to obtain the medication histories was also evaluated.

Methods

We compared the medication histories obtained by pharmacists and physicians through a prospective evaluation. Patients whose medication histories were obtained were included in the evaluation if they were age 18 years or older and admitted to an internal medicine service at the University of Virginia Medical Center (UVAMC). The internal medicine service was chosen because patient acuity is lower than that of an intensive care patient, resulting in a higher number of admissions and discharges. Patients were excluded if they were unable to communicate orally, transferred from an outside hospital, or unable to provide consent. Data were collected from January to May 2006. This project received institutional review board approval.

Physician members of the internal medicine service completed a physical examination of and obtained a medical history, including a medication history, from each patient using a standardized form generally within several hours of the patient's admission to the internal medicine service. Within 24 hours of admission, patients were asked by a single pharmacist investigator to provide an additional medication history. The pharmacist attempted to obtain information about medication use just before admission, including all medications with correct dosages and the dosage schedule. For this project, medications were defined as prescription and nonprescription medications and dietary supplements. In addition, the pharmacist inquired about allergies and pregnancy and lactation status and documented the most recent influenza and pneumococcal vaccinations for each patient.

Data were collected in two phases. The first 20 patients identified for inclusion were asked to provide an accurate medication history to pilot test the medication history form used by the pharmacist and received no pharmacist follow-up or interventions. The pharmacist obtained information about the medication regimens through oral communication with the patient, family members, or both and obtained a written medication list from the patient, when available, and compared the information obtained with that documented by the physician. In the second phase, patients were asked to provide an accurate medication history, and a pharmacist intervened when discrepancies were identified. A discrepancy was defined as any difference noted between the pharmacist-obtained medication history and that obtained by a physician, including omissions, medication dose, or dosage schedule. For example, if a physician ordered metoprolol with no further documentation of the dose or dosage schedule, two discrepancies would be noted. An intervention was defined as communicating to the physician a noted discrepancy between the medication history and the current medication regimen.

The pharmacist obtained information about a patient's medications directly from the patient. If the patient could not remember a dosage or a medication name, he or she was asked to provide contact information for the community pharmacy that

filled the prescriptions. The pharmacist then contacted the pharmacy to obtain a more accurate medication history. After data collection was completed, pharmacist-obtained medication histories were compared with physician-obtained medication histories. The average time required to complete each medication history was also recorded.

The types of data gathered were considered nominal and independent of each other, which allowed statistical analysis using chi-square analysis.

Results

A total of 55 patients (28 women and 27 men) were included in the study. The mean age of patients was 62 years (range, 30–92 years). The mean ± S.D. time to complete a medication history for the first 20 patients, for whom the pharmacist provided no follow-up or interventions, was 16.4 ± 7.3 minutes. The mean ± S.D. time required to complete the medication history, compare the pharmacist-obtained medication history with the form completed by a physician, and contact the physician regarding any discrepancies was 28.7 ± 13.6 minutes. No correlation could be determined between the amount of time required to obtain each medication history and the number of medications identified. Further, no correlation was made between the number of discrepancies identified versus the number of medications a patient was receiving.

For the 55 patients interviewed, 614 medications were identified by the pharmacist, compared with 556 identified by physicians ($p \leq 0.001$). The pharmacist documented significantly more medication doses and dosage schedules than did physicians (614 versus 446 and 614 versus 404, respectively) ($p \leq 0.001$ for both comparisons).

The medications identified by the physicians ($n = 556$) created a potential for 1668 discrepancies. The pharmacist identified a total of 353 actual discrepancies from the physician-obtained medication histories. Compared with the pharmacist-obtained medication histories, the physician-obtained histories had a discrepancy rate of 21%. The 353 discrepancies involved 295 medications identified in the physicians' medication histories and 58 medications not initially identified by the physicians, which were identified by the pharmacist.

A total of 161 discrepancies were identified in the subgroup of 35 patients during phase 2 of the project; 142 of the discrepancies (88%) were corrected or had some justification after the pharmacist contacted the respective physician. Of the 142 corrected discrepancies, 111 were completely corrected. For 31 (19%) of the 161 total discrepancies identified, physicians provided justification for why the medication, dose, or dosage schedule had been altered or not restarted during hospitalization. However, for 19 (12%) of the 161 actual discrepancies, the physician could not justify why the discrepancy existed.

The medication histories obtained for the subgroup of 35 patients during phase 2 included information from the patient's medications brought from home, a medication list, or the patient's community pharmacy. Information collected from the patient's pharmacy also included when the prescription was last filled. Such information would alert the interviewing pharmacist if a patient was not taking a medication appropriately, a message that the pharmacist would convey to the physician.

The allergy information documented by the pharmacist and physicians matched for only 34 patients; however, the physicians had not documented the allergy status for 15 patients. Allergies identified by the pharmacist but not by the physician included morphine, sulfa, penicillin, latex, and eggs. Patient reactions to specified allergies were also poorly documented by physicians. Allergy status was not verified by a second outside source, such as from a nursing home or the patient's community pharmacy, but was assessed during the pharmacist–patient interview and compared with the admitting medical history and documented in the patient chart. The pharmacist documented the influenza and pneumococcal vaccination status for all 55 patients interviewed, whereas the physicians documented status for 18 patients (33%).

Discussion

The ultimate goal of medication reconciliation is the prevention of ADEs.[2] Accurate and complete medication histories at the time of admission are the beginning of this process.

The first objective in meeting the NPSG of medication reconciliation is to establish who will complete the medication histories. Currently, the admitting physicians (resident or intern physicians) of the internal medicine service at UVAMC complete the histories. In some nursing units at UVAMC, nurses, and in some instances nursing assistants, are given the responsibility of completing an accurate medication history from an often complex medication regimen. Pharmacists must begin to take a more active role in the medication reconciliation process. This project, along with several previous studies, demonstrated that pharmacists obtain more accurate and up-to-date medication histories than do other health care professionals.[3-5]

Bond and Raehl[8] examined data from 584 hospitals across the United States and found that patients in hospitals where pharmacists obtained medication histories had the least amount of reported adverse drug reactions. However, in only 4.5% of the hospitals surveyed was this service provided by a pharmacist. In a 2004 study, up to 64% of physician prescribing errors were found to occur at admission.[9] One reason for the increased rate of prescribing errors is

that physicians may simply not have enough time to ask pertinent questions to obtain the most accurate medication history.

At UVAMC, the number of discrepancies on physician-obtained medication histories was 31.7%, lower than the 60% observed in a previous study.[8] The discrepancy rate observed during this project indicates that for every 10 medications identified by the pharmacist, 3 of them were incorrectly ordered or not identified at all by the physicians. The physicians identified 556 medications, yet there was still inadequate documentation of correct dose or dosage schedule for many of the medications identified. Lack of documentation of correct medication dosage schedules was responsible for the greatest number of discrepancies between the histories obtained by physicians and the pharmacist. For example, lisinopril 10 mg is administered once daily, but one physician documented that the medication should be given twice daily. This scheduling discrepancy was corrected after the pharmacist intervened.

The largest barrier for obtaining medication histories was the time requirement, which may have been due to several factors. For example, awaiting faxes from individual pharmacies and responses from physicians increased the time to complete a medication history.

The number of allergies not identified by physicians during the study is concerning. As with allergy status, the documentation of current vaccinations by the physician was very poor. Only two vaccinations (influenza and pneumococcal) are included on the current history and paper forms used by the internal medicine service. Poor documentation of allergies and vaccinations could result in significant morbidity and mortality if not accurately documented or updated.

Several options were considered for implementing pharmacist-obtained medication histories at UVAMC. First, for the pharmacy department to implement pharmacist-obtained medication histories on every patient care unit within UVAMC, an additional 2.7 full-time equivalents (FTEs) would be needed. The FTEs were calculated based on the UVAMC 2005 average daily admission census of 52 patients. These FTEs would then be assigned to work Monday through Friday. For coverage seven days a week, an additional 1.2 FTEs, for a total of 3.9 additional positions, would be necessary. The UVAMC pharmacy department would have to hire an additional four full-time pharmacists to complete a medication history for every new admission within the allotted 24 hours without changing current pharmacists' schedules.

A second option would distribute the number of daily patients admitted among the clinical pharmacists and decentralized pharmacists. Currently, nine clinical pharmacy specialists and six decentralized clinical pharmacists are assigned to patient care units Monday through Friday. This staffing model would allow a total of 15 full-time pharmacists to divide the daily admission medication histories Monday through Friday; however, weekend decentralized duties are covered by the specialized pharmacy residents on an every-other-weekend basis.

A third option would allow pharmacy students and seven pharmacy residents to obtain patient medication histories as part of their experiential training. This would decrease the number of histories to be completed per pharmacist each day. However, this option has not been explored because the students' and residents' breaks and vacations would not allow for complete scheduling coverage. These options are still being evaluated to determine the most effective method for implementing pharmacist-obtained medication histories at UVAMC.

This project found that pharmacist-obtained medication histories resulted in less discrepancies and more-thorough medication histories than did physician-obtained medication histories. Further, physicians who obtain medication histories at UVAMC may be missing specific and pertinent information, such as specific medications, medication doses, dosage schedules, allergies, and immunization status.

Conclusion

A total of 353 discrepancies were identified when medication histories obtained by physicians were compared with those obtained by a pharmacist during the study. During the intervention phase, the majority of discrepancies identified were either corrected by the pharmacist after contacting the respective physician or justified by the physician.

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