



Comparing medication histories obtained by pharmacy technicians and nursing staff in the emergency department

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ABSTRACT

Background: An accurate medication history is crucial for maintaining continuity of care. There are numerous opportunities for discrepancies to occur, such as medication omissions, commissions, incorrect dosing, incorrect frequencies, or incorrect formulations. Medication discrepancies may prolong hospital length of stay, increase the number of future emergency department (ED) visits, and increase hospital readmissions. Numerous studies have established the advantages of utilizing pharmacy technicians to complete medication histories. This study aimed to compare the accuracy of obtaining medication histories through pharmacy technicians compared to nursing staff.

Objective: To compare the accuracy of obtaining medication histories through pharmacy technicians compared to nursing staff in the emergency department.

Methods: This was a single-center, retrospective, observational analysis of patients presenting to the ED between December 2018 through January 2019. A pharmacy technician received on-site training on how to properly obtain a medication history and performed medication histories on the days the pharmacy resident was present between 10:00 and 18:00. Medication histories were obtained by nurses on the days the pharmacy technician was not present. All study medication histories were reviewed for discrepancies by the pharmacy resident.

Results: Medication histories conducted by a pharmacy technician ($n = 102$) resulted in a greater number of accurate medication histories [96 (94.1%) versus 59 (57.8%); $p < 0.01$] when compared to those conducted by nurses ($n = 102$). A total of seven discrepancies were found in the pharmacy technician group compared to 131 in the nursing group ($p < 0.01$). There was also a statistically significant lower amount of high impact discrepancies in the pharmacy technician group compared to nursing (1 versus 15; $p < 0.01$).

Conclusions: Pharmacy technicians in the ED provided more accurate medication histories when compared to nursing staff, thereby reducing potential medication errors.

Introduction

Medication reconciliation is the comparison of the medications a patient was previously taking to the current medication regimen.¹ The Centers for Medicare & Medicaid Services (CMS) incorporated a measure in 2018 for medication reconciliation stating that an eligible hospital receiving a patient from another setting of care should perform a medication reconciliation. The measure mandates performance of medication reconciliation for more than 50% of transitions of care.²

Obtaining the best possible medication history (BPMH) is a crucial aspect of completing a medication reconciliation and in maintaining the continuity of care. A study conducted by Dobrzanski et al. evaluated the nature of hospital prescribing errors and found one of the main causes of errors to be inaccurate medication histories at the time of hospital admission. A total of 587 errors were identified, 27% of which were attributed to inaccurate medication histories.³ There are numerous opportunities for discrepancies to occur when obtaining a medication history, such as medication omissions, commissions, incorrect dosing, incorrect frequencies, or incorrect formulations. Medication

discrepancies may prolong hospital length of stay, increase the number of future emergency department (ED) visits, and hospital readmissions.^{4,5} Also, inappropriate inpatient prescribing is likely to occur from inaccurate medication histories which has been associated with increased morbidity, mortality and healthcare costs.⁶

The ED is a pivotal time to obtain a medication history as the majority of hospitalized patients are admitted through the ED.⁶ However, there are many barriers to obtaining an accurate medication history and these barriers are often more prevalent in the ED. Possible barriers may include patients with altered mental status (e.g., confusion, impaired memory, psychiatric disorders, intoxication), language barriers, time constraints, and patients using multiple outpatient pharmacies.⁷ Outside resources can be utilized, such as contacting the patient's pharmacy, however this may be a time consuming process.

As a result, there is a role for pharmacy personnel to participate in the process of obtaining medication histories. Pharmacy technicians are ideal for this position due to having experience with common medications and they are associated with decreased labor costs when compared with pharmacists and nurses.⁸

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Numerous studies have established the advantages of utilizing pharmacy personnel to perform medication histories in the ED. A recent study conducted by Bowman et al. evaluated the differences in medication history errors between pharmacy personnel (pharmacy students, pharmacy technicians, and pharmacists) and nursing staff. The pharmacy personnel group had a significantly lower error rate per medication compared to the nursing group (0.03 versus 0.09; $p = 0.03$).⁹ Furthermore, multiple studies have demonstrated this benefit solely utilizing pharmacy technicians. A pre-post study compared medication histories obtained in the ED by nurses to those obtained by pharmacy technicians. The study found that medication histories conducted by pharmacy technicians were accurate 88% of the time compared with 57% of those conducted by nurses ($p < 0.0001$). Medication history errors were made by pharmacy technicians 1.1% of the time versus 8.3% of the time by nurses ($p < 0.0001$).⁸ A similar study also compared the medication history error rate of pharmacy technicians to nurses in the ED. An error was made on 100% of the medication histories obtained by nurses compared to 36% of the medication histories obtained by pharmacy technicians.¹⁰ Furthermore, a study conducted in Canada demonstrated that pharmacy technicians are able to obtain complete medication histories in the ED with as much accuracy as pharmacists. There were no significant differences in the number of medication discrepancies between the two groups ($p = 0.47$).¹¹

With increasing importance being placed on obtaining accurate medication histories and the current time-restraints nursing staff face in the ED, alternative options need to be explored. The current literature has established the advantages of utilizing pharmacy technicians to complete accurate medication histories. The aim of this study was to compare the accuracy of obtaining medication histories through the use of pharmacy technicians compared to nursing staff in the ED.

Methods

Study design

This investigation was a single-center, institutional review board (IRB) approved, retrospective, observational analysis of all patients presenting to a community hospital ED between December 2018 and January 2019. Patients were excluded if all of the following criteria were met: unable to provide a medication history, have an unknown preferred pharmacy, and no other resources available to perform a medication history.

Baseline characteristics were collected for both groups including patient age, gender, and number of home medications. Medication history discrepancies were classified into five categories: drug omissions (leaving a medication off that a patient is currently taking), drug commissions (addition of a medication that a patient is not currently taking), an incorrect or missing dose, an incorrect or missing frequency, or an incorrect formulation (e.g., extended release product versus regular). A discrepancy was considered high impact if it involved anticoagulation medications or insulins that could have led to a medication error.

The pharmacy technician received on-site training by a pharmacy resident. Training included how to properly obtain a medication history and updating the electronic medical record. Nurses were informed of the project and educated on the role of the pharmacy technician in the ED. The pharmacy technician obtained medication histories in the ED during the days an emergency medicine pharmacist was present between the hours of 10:00 and 18:00. Resources to obtain the BPMH included patient and or caregiver interviews, outpatient pharmacies, external medical records and external medication insurance claims. The resources utilized were the same for both the pharmacy technician and nursing groups. Medication histories were obtained by the nursing staff on days when the pharmacy technician was not present in the ED. All study medication histories were then reviewed for discrepancies by the pharmacy resident.

Study outcomes

The primary outcome was to determine the difference in the number of accurate medication histories obtained by pharmacy technicians compared to nursing staff in patients presenting to the ED. Secondary outcomes included the total number of medication discrepancies and the number of high impact medication discrepancies.

Statistical analysis

Data analysis was conducted using Student's t-test for continuous data and Chi-Square for categorical data. P values of < 0.05 were considered statistically significant.

Results

Baseline characteristics

A total of 204 medication histories (102 in each group) were evaluated in the study. Baseline characteristics were similar between the groups. There were no significant differences in terms of patient age, gender, or number of home medications. However, there were more patients in the nursing group admitted to the hospital compared to the pharmacy technician group (57.8% versus 45.1%; $p < 0.01$; Table 1).

Primary and secondary outcomes

Medication histories conducted by a pharmacy technician resulted in a greater number of accurate medication histories [96 (94.1%) versus 59 (57.8%); $p < 0.01$] when compared to those conducted by nurses. A total of seven discrepancies were found in the pharmacy technician group compared to 131 in the nursing group ($p < 0.01$). There was also a significantly lower amount of high impact discrepancies in the pharmacy technician group compared to nursing (1 versus 15; $p < 0.01$) (Fig. 1). The majority of discrepancies were drug omissions, followed by drug commissions, incorrect doses, incorrect frequencies, and incorrect formulations (Fig. 2).

Discussion

The importance of obtaining accurate medication histories has been well established throughout current literature. The majority of hospitalized patients are admitted through the ED making it the ideal time and place to obtain a medication history. Medication histories have been routinely obtained by nurses. However, recent literature suggests pharmacy technicians can obtain more accurate medication histories thereby reducing the number of medication discrepancies.

The results of this study are similar to previous studies and demonstrate the benefits of utilizing pharmacy technicians to obtain medication histories in the ED. Multiple studies have demonstrated that pharmacy technicians obtain more accurate medication histories when compared to nursing staff.^{7,9,10} In this study, medication histories conducted by a pharmacy technician resulted in a significant reduction in the number of total and high impact medication discrepancies compared to those conducted by nursing staff. The majority of

Table 1
Baseline characteristics.

	Pharmacy technician (n = 102)	Nursing (n = 102)	p-value
Mean Age (years) $\pm$ SD	63 $\pm$ 16.6	65 $\pm$ 15.9	0.22
Male, n (%)	34 (33.3)	47 (46.1%)	0.06
Admitted, n (%)	46 (45.1)	59 (57.8)	< 0.01
Mean # of Home Medications, n (%)	8.7 $\pm$ 4.3	7.7 $\pm$ 4.2	0.119

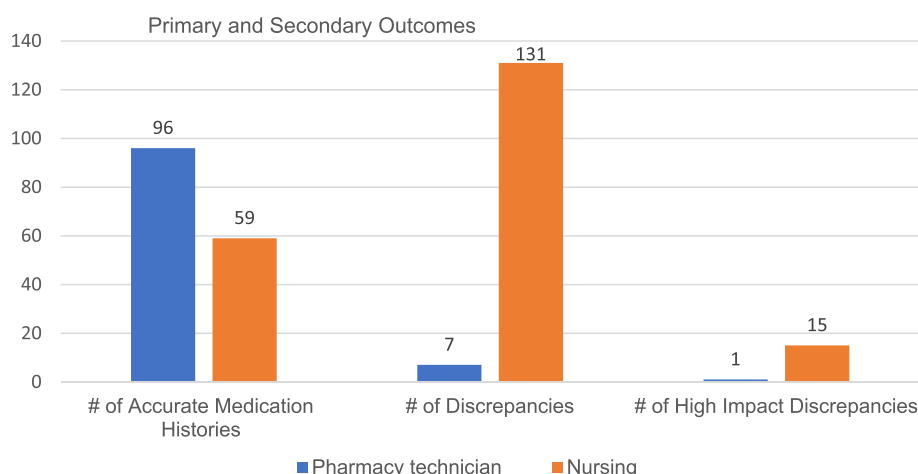


Fig. 1. Primary and secondary outcomes.

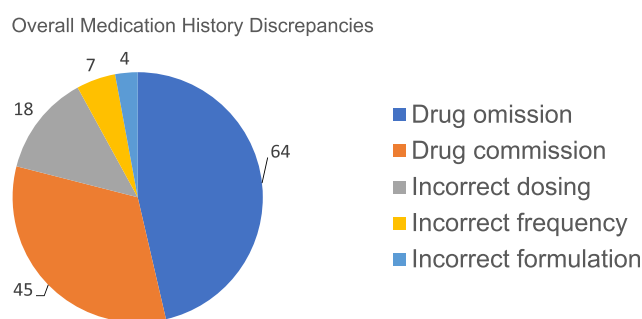


Fig. 2. Overall Medication History discrepancies.

medication discrepancies involved drug omissions and commissions which accounted for over 75% of the medication discrepancies identified in the study.

There were a few limitations associated with this study. First, the study design was not randomized and the data was collected unblinded by the investigator. This was due to the medication histories being evaluated in real time by the pharmacy resident. Also, nurse experience, training, and technique of performing medication histories may have varied. There are multiple outside resources that can be utilized when obtaining a medication history, including but not limited to the patient's: family, pharmacy, primary care physician, and many others. The nursing staff may not have taken advantage of all available resources due to time constraints or familiarity with these resources. Also, the pharmacy resident was the only evaluator which may have limited the validity of the study. Lastly, only one pharmacy technician was utilized in this study therefore limiting the generalizability of the results to other pharmacy technicians.

There was no cost analysis performed with this study. However, with the significant reduction in medication discrepancies, significant cost avoidance can be expected as a result of reducing future medication errors or events. Studies have demonstrated the relationship between medication discrepancies and prolonged hospital length of stay and increased readmission rates which are associated with increased healthcare costs.

Similar to previous studies, the objectives and results are not to criticize the competence of nurses performing medication histories. The intent is to help enhance patient care while also optimizing multidisciplinary workflow for the entire patient care team. Obtaining an accurate medication history can be a very time consuming process, especially in cases where it is necessary to utilize outside resources. For example, calling an outpatient pharmacy for a medication history may take up to 30 min due to the volume of calls these pharmacies receive.

This is a considerable amount of valuable time the nursing staff could be spending on other direct patient care activities. Annual ED visits have continued to rise over the years and with the increasing number of patients nurses face an increasing workload. Therefore, finding ways to assist nurses is of upmost importance and pharmacy technicians can fulfill that critical role. Beyond obtaining medication histories, pharmacy technicians have a role to play as pharmacy extenders in the ED to help improve patient care. Pharmacy technicians can assist in resolving automated dispensing system related issues, expediting medications to the bedside, assisting providers in optimizing discharge medication issues relating to affordability, as well as many other tasks as time permits.

Conclusion

Pharmacy technicians in the ED provided more accurate medication histories when compared to those collected by nursing staff, thereby reducing potential medication errors. Utilizing pharmacy technicians to obtain medication histories will also relieve nursing of a time consuming responsibility allowing them to focus on other patient care duties. The results of this study have implications for improving patient care as well as multidisciplinary workflow.

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