

*Full Length Research Paper*

## Medication use history in patients admitted to a teaching hospital: A cross-sectional study

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Although the literature shows several studies on medication safety, there are few Latin American studies describing aspects in the practice of medication reconciliation carried out by pharmacists in the admission process. This study aimed to describe the acquisition of medication use history of patients during admission, and to characterize the unintentional discrepancies in their pharmacotherapy in a Brazilian teaching hospital. This cross-sectional study was conducted within the University Hospital of the Federal University of Sergipe. Pharmacist-researchers collected patient data in four steps through a structured questionnaire developed by the researchers and adapted from the literature. After collection, the pharmacist-researcher and pharmacy students analysed the data and assessed if there were any unintentional discrepancies. The present study defined unintentional discrepancies (UD) as the unjustified variations between the patient's previous medication use history and the pharmacotherapy prescribed during hospitalization. In this study, 358 patients were included. Of all patients, 261 (72.90%) were adults with the mean age of  $47.16 \pm 18.80$  years. In 117 cases of adult patients (44.82%), there was no record of previous pharmacotherapy, and 137 (52.49%) were not questioned about their allergies. A total of 327 UD were found in 150 patients (41.90%). Of these UD, omission was the most common type, followed by different doses, erroneous frequency, and unjustified start of treatment. This study revealed the prevalence of unintentional discrepancies in the studied hospital, and points out that the assessment of the history of medications used is a complex practice, in which the pharmacist can be an ally.

**Key words:** Patient safety, medication errors, medication discrepancies, medication reconciliation.

### INTRODUCTION

Adverse drug events are a worldwide concern in the healthcare system. Studies have reported that such

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failures range from 45 to 76% with most occurring on admission due to unreliability on medication histories (Cornish et al., 2005; Bell et al., 2011). Medication reconciliation (MR) has been defined as a process that enables for the compilation of the most accurate medication list for a patient and proven to significantly reduce the rate of discrepancies in the pharmacotherapy. This list combines previously used drugs and the ones prescribed on admission, providing the correct medications for the patient anywhere in the hospital. Besides, MR has been associated with correction of medication history errors with clinical significance in up to 59% of cases (Mueller et al., 2012; Kwan et al., 2013).

Acquisition of a best possible medication history (BPMH) on admission is a critical step in MR, and the identification of medication discrepancies on admission may be an important factor to avoid errors and damages to the patients (Zed, 2015). However, MR has high complexity and requires resource intensity in order to achieve effective results (Pevnick et al., 2016). Therefore, the identification of unintentional discrepancies is a process that should be improved before MR implementation. Although the literature shows several studies about MR, there are few Latin American studies describing aspects in the practice of MR carried out by pharmacists in the admission process. So, this study was conducted to describe the acquisition of medication use history of patients during admission, and to characterize the unintentional discrepancies (UD) in their pharmacotherapy in a Brazilian teaching hospital.

## MATERIALS AND METHODS

### Design and study duration

This cross-sectional study was conducted from 1 April to 17 July, 2013. Additionally, this short report is a secondary analysis of a previous case-control study in process to be published.

### Study location

This study was conducted in the surgical, medical and pediatric wards of the University Hospital of the Federal University of Sergipe, in Sergipe, Brazil. The hospital is fully integrated into the Brazilian Unified Health System (SUS) and has 123 beds divided into paediatric, psychiatric, surgery, internal medicine and intensive care wards.

### Study sample and patient selection

The recommended sample size calculated for this study was 325 patients, in accordance with Moser and Kalton (1985). The inclusion criteria were hospitalization for longer than 24 h from Monday to Friday. For children, patients, family or caregiver was asked to authorize their inclusion in the study. Patients who were excluded when their medical records were not available at the time of evaluation and interview was not possible to be conducted. In the hospital, there were no admissions on weekends and no MR practices being developed.

### The process of obtaining the best possible medication history (BPMH)

In the hospital, the admissions are planned and performed only in the morning, and there are no admissions on weekends. At admission, each patient was evaluated by a physician (or evaluated by a medical student and further evaluated by a physician) or resident physician. All evaluations were written and stored in the clinical records, as well as descriptions of the physicians' interventions, requests for tests, and evaluations from other professionals. In some of the evaluations, the cooperation of parents and/or caregivers was necessary to assess relevant information. It is important to highlight that there are no medication reconciliation practices standardized in the hospital. Before the study begin, the pharmacist-researcher responsible for the collection and evaluation of data conducted a pilot study on March, 2013, to familiarize herself with the process of hospital admission, calibrate the medication use record, and improve the data collection method.

A structured questionnaire developed by the researchers and adapted from the literature was used to collect data at four steps (Gleason et al., 2004; Cornish et al., 2005; Coffey et al., 2009; Giménez-Manzorro et al., 2011). At step 1, the pharmacist-researcher collected data from the admission records, which were available at hospital admission and generated whenever patients were admitted. The records included sociodemographic information, the ward in which the patient was admitted, and the reason for hospitalization. At step 2, the pharmacist-researcher recorded the first prescription made by the physician responsible for admission. At step 3, the patient's medical record was reviewed to obtain the pharmacotherapy history as recorded by the physician based on the following data: patient's main complaints, history of previous diseases, questions on previous medications and allergies, and the conduct of the physician responsible for admission.

At step 4, a clinical interview was performed with the patient and/or their caregiver. The following variables were analyzed: way to acquire medication, allergies (to medicines, foods, and other), alerts and special needs, habits and addictions, and medications that were being used prior to admission. Medications that the patient used sporadically, supplements, vitamins, and those whose names the patients and/or caregivers could not recall were excluded.

To obtain higher accuracy of data, all sources of information available at the time of interview were evaluated. This included the interview with the caregiver, the patient records, and data on hospital transfer (for cases in which the patient was shifted from another hospital). The prescription medication taken by the patient was also investigated. The time spent at each of the four assessment steps was recorded. All evaluations occurred until 36 h after admission. After collection, the pharmacist-researcher and three pharmacy students analyzed the data collected and assessed if there were any unintentional discrepancies. In the case of divergences, a second researcher analyzed the data.

This study defined unintentional discrepancies (UD) as the unjustified variations between the patients' previous medication use history and the pharmacotherapy prescribed during hospitalization. These UD were classified as medication omissions (when it occurs an omission of a required medication), differences in dosage or in the frequency of administration, therapeutic duplications and initiation of therapy without justification (Gleason et al., 2004; Cornish et al., 2005; Coffey et al., 2009; Giménez Manzorro et al., 2011; Magalhães et al., 2014). The same method to acquire the BPMH was used in a case-control study in process to be published.

### Statistical analysis and ethical considerations

The Epiinfo statistical program was used to examine associations

**Table 1.** Average duration of data collection at the four pre-established steps, Brazil.

Parameter	Step 1*	Step 2*	Step 3*	Step 4*	Total
Average (minutes)	1.68 ± 0.59	2.04 ± 1.52	5.15 ± 3.82	3.78 ± 2.11	12.61 ± 5.54
Range (minutes)	1-7	1-13	1-19	1-19	4-37

\*Step 1 – Collection of demographic data and other data from the admission form. \*Step 2 – Review of prescription by the physician responsible for admission. \*Step 3 – Review of the patient's record. \*Step 4 – Clinical interview with the patient and/or their caregiver.

between the data using Chi-square tests with a significance level of 0.05. The study was authorized by the Hospital Board and the Research Ethics Committee of the HU/UFS under CAAE number 08125912.5.0000.0058.

## RESULTS

In this study, 358 patients were included. In total, 327 UD were found in 150 patients (41.90%). Regarding to the types of UD, omission was the most prevalent ( $n = 128$ , 85.33%), followed by different doses ( $n = 20$ , 13.34%), erroneous frequency ( $n = 1$ , 0.66%), and unjustified start of treatment ( $n = 1$ , 0.66%). Of all patients included in the study, 261 (72.90%) were adults with 151 women. The mean age was  $47.16 \pm 18.80$  (14 to 93) years. No statistically significant association was found between the presence of UD and type of patient: child or adult ( $\chi^2 = 0.771$ ,  $p = 0.380$ ), gender ( $\chi^2 = 1.217$ ,  $p = 0.269$ ), and the patients' age ( $\chi^2 = 9.119$ ,  $p = 0.104$ ). At admission documentation, there was no record of previous pharmacotherapy in 117 adult patients (44.82%; 95% CI: 0.44 to 0.45), and 137 of them (52.49%; 95% CI: 0.52 to 0.53) were not questioned about their allergies. Similarly, 52 children (53.60%; 95% CI: 0.53 to 0.54) had no record of previous medication history reported in their medical records. There was also no record of allergies for 72 children (74.22%; 95% CI: 0.73 to 0.74). A statistically significant association was found between the presence of UD and the questions concerning previous medication ( $\chi^2 = 6.422$ ,  $p = 0.001$ ), but not with the questions regarding allergies ( $\chi^2 = 1.393$ ,  $p = 0.237$ ). Another variable observed was that 112 patients (31.28%; 95% CI: 0.26 to 0.36) brought the drugs they used at home to the hospital. A statistically significant association ( $\chi^2 = 39.121$ ,  $p = 0.001$ ) between this variable and the presence of UD was found. Regarding to time evaluation, the analysis of medical records was the step that proved to be most time-consuming in the assessment of the pharmacotherapy history. Table 1 shows the average, the minimum, and the maximum time for each evaluation point. A statistically significant association was found between the presence of UD and the total time spent on the review of the pharmacotherapy history ( $\chi^2 = 13.177$ ,  $p = 0.001$ ).

## DISCUSSION

One association found in this study suggests that the

review of the pharmacotherapy history demanded more time during the investigation of discrepancies. This amount of time was different from the time reported in other studies (Gleason et al., 2004; Stone et al., 2010). This may be due to methodological differences, as well as differences in the sources of information used to obtain the pharmacotherapy histories. The incomplete or inaccurate acquisition of the pharmacotherapy history as well as omission of important information (for example, drug-drug interactions and allergies) can cause risk to the patients during hospitalization as an indicator for inappropriate medications (Nester and Hale, 2002; Mueller et al., 2012). In this context, the pharmacist can complement the interview carried out by the physician during MR and to increase patient safety (Curatolo et al., 2014).

The unintentional discrepancies may occur when there are no questions regarding the patient's medication history or no recording of the data obtained on the use of medications prior to admission. The lack of medical questioning about previously medications used may have been a major cause of medication omission in this study.

Stephens and colleagues claim that the failure to record allergies occurs more frequently and may increase when documented with acronyms and summary information (Stephens et al., 2008). Thus, improving the interviews with patients and caregivers as well as the documentation of medical records can be decisive in reducing patients' allergic reactions, especially in children.

Regarding the use of medications prior to hospital admission, Nayar and Kozakiewicz (2013) reported that sometimes patients are benefited by the continued use of their pharmacotherapy, thus, reducing the risks of treatment discontinuation. Moreover, such an initiative can reduce the patients' medication costs to the hospital. Nevertheless, it is indispensable keeping in view clinical condition of the patient to evaluate the treatment. The association found may indicate that the lack of reassessment of these drugs in the wards may be related to the presence of discrepancies.

This study has strengths and limitations. Strengths of the present study include: addition of children and adult patients, observation of the presence of allergies noted in the medical records, and structured interviews with the patient and/or their caregiver. Limitations include: no investigation of the clinical relevance of the discrepancies found, reflection of the characteristics of the study location in

the data collected, and absence of integrated information system on the pharmacotherapy of patients in Brazil (for example, health system database or data from community pharmacies).

## Conclusion

In summary, the present study revealed the prevalence of UD in the studied hospital emphasizing the importance of implementation MR processes. Moreover, this paper points out that the assessment of the history of medications used is a complex practice, in which the pharmacist can be an ally.

## Conflict of Interests

The authors have not declared any conflict of interest

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