Medication reconciliation: implantation process in a hospital complex with the use of electronic system

Reconciliação de medicamentos: processo de implantação em um complexo hospitalar com a utilização de sistema eletrônico

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ABSTRACT This study evaluated the implementation of medication reconciliation in a philanthropic, teaching, and multi-block hospital with the use of an electronic system to record the multidisciplinary activity. A total of 438 nursing professionals were trained on medication reconciliation. From October 2017 to March 2018, the information about previous use of drugs for 1,379 patients was registered by the nurse in the electronic system. Only 347 of those records were reconciled by the pharmacist, and 106 needed intervention of the prescribing doctor. The number of patients who had the medication prescribed without any change was 180, 47 had the medication prescribed with some change, and 106 did not have the prescribed the medications of previous use. The use of computerized systems can be useful for the teams to perform medication reconciliation, but it depends on the correct use of the system and training of the teams. The daily follow-up of the clinical pharmacist increases patient safety regarding the use of drugs within the hospitals, but to perform the activity some improvement measures are necessary to obtain compliance with the patients' medication reconciliation in their entirety.

KEYWORDS Medication reconciliation. Patient safety. Medication errors.

RESUMO *Este estudo avaliou a implantação da reconciliação de medicamentos em um hospital multibloco, filantrópico e de ensino com a utilização de um sistema eletrônico para realizar o registro da atividade com atuação multiprofissional. Foram capacitados 438 profissionais da enfermagem sobre a reconciliação de medicamentos. De outubro de 2017 a março de 2018, foram registradas pelo enfermeiro, no prontuário eletrônico, a informação sobre uso prévio de medicamentos para 1.379 pacientes. Foram reconciliados pelo farmacêutico apenas 347 destes registros, sendo que 106 precisaram de intervenção com médico prescritor. O número de pacientes que tiveram o medicamento informado como de uso prévio prescrito sem nenhuma alteração foi de 180, os que tiveram o medicamento prescrito com alguma alteração foram 47, e os que não possuíam os medicamentos informados prescritos foram 106. A utilização de sistemas informatizados pode ser útil para as equipes executarem a reconciliação medicamentosa, mas depende da correta utilização do sistema e treinamento das equipes. O acompanhamento diário do farmacêutico clínico aumenta a segurança do paciente quanto ao uso de medicamentos dentro dos hospitais, entretanto, para executar a atividade, é necessário realizar algumas medidas de melhoria para obter o cumprimento da reconciliação de medicamentos dos pacientes na sua totalidade.*

PALAVRAS-CHAVE *Reconciliação de medicamentos. Segurança do paciente. Erros de medicação.*

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Introduction

Adverse events in the health care process are frequent in all countries of the world, directly influencing patient safety. This, in turn, is already being considered as a public health problem, such as obesity, motor vehicle accidents and breast cancer[1].

Medication errors have been identified as the most common type of error that affect the Safety of the Patients and as the most possible common cause to be avoided[2-4].

Medication errors contribute to increased hospital morbidity, which may or may not be originated in the hospital pharmacy service. However, it must participate in all stages and processes involving drugs in the hospital, and, therefore, be responsible for the occurrence of morbid outcomes that include, among its determinants, medications and medicinal therapy[5].

Pharmacotherapy has an intrinsic multiprofessional character, since it involves different professionals directly or indirectly in the care of the patient. That way, all must observe and minimize possible failures in the process, aiming at ensuring patient safety and maintaining good care practices[6].

Hospitals assist many patients who have previously used medicines at home and should be reassessed in each care given. The correct management of pharmacotherapy, in this way, makes medication reconciliation a fundamental tool for patient safety.

Medication reconciliation is an activity that seeks to reduce prescription discrepancies, such as duplicities or omissions of medications, and aims to prevent medication errors[7]. It is described as a process for obtaining a complete, accurate and up-to-date list of medications that each patient uses at home (including name, dosage, frequency and route of administration), to be compared with medical prescriptions made at admission, referrals, outpatient consultations with other physicians and hospital discharge[8,9].

International and national accreditation organizations consider drug reconciliation as a priority, as this activity is a key tool in the prevention of adverse events[4,8].

The Spanish Society of Hospital Pharmacy aims to implement, by 2020, in all hospitals in the Country, the normalization of the process of reconciliation both at admission and hospital discharge[10]. In Brazil, the reality of institutions is different, and more studies are needed on the implementation of medication reconciliation, as well as confirmation of the results of this intervention when performed in different health services[8,9,11].

The patient is vulnerable and prone to errors during the hospital stay. Often, this vulnerability is attributed to inefficient communication between different caregivers and the loss of important information during their journey within the hospital[9]. Incomplete information or lack of these may impair medicinal therapy during hospitalization, resulting in adverse events[9].

According to Collegiate Board Resolution (RDC) nº 585, dated August 29, 2013, elaborating an updated list of medicines used by patients during the admission, transfer and discharge processes is part of the clinical attributions of the pharmacist[12]. The Joint Commission International advises that, for hospital accreditation, a list of the medicines they use prior to admission should be available to the pharmacy on the promptuary of the patients. According to the same institution, this list must be compared with the prescription after hospitalization, according to the procedure established by each institution[8].

In practice, it is not only the pharmacist who is responsible for this activity. Communication among the multiprofessional team is fundamental for medication reconciliation to take place, since, in addition to pharmacists, physicians and the entire nursing team work directly in medication therapy as responsible for prescription, dispensing, medication administration, monitoring and patient education during hospital admission[9].

The multidisciplinary team must work in

order to obtain a single list of medications to be properly recorded and obtained through interview with the patient at the time of hospital admission, transfers or discharge. In this way, the doubts generated by the lists obtained by the many professionals of the team at different moments are eliminated. Interviews carried out by more than one professional and without proper communication and registration may generate insecurity and discomfort to the patient, due to the need to repeat information already provided, which may result in a divergence between information obtained from different sources[11].

Therefore, the objective of this study was to evaluate the implementation of medication reconciliation in a multiblock, philanthropic and teaching hospital with the use of an electronic system to record the multiprofessional activity.

Methodology

A retrospective quantitative study of the records in the health history of patients' electronic health records regarding prior use of medications and the number of medications reconciliations performed by pharmacists and recorded in medical records from October 1, 2017 to March 31, 2018.

The study site was a multi-block teaching hospital of philanthropic character located in Porto Alegre (RS), which has seven hospitals, totaling over one thousand beds. It is a hospital complex that serves the areas of medical clinic, general surgery, cardiology, neurosurgery, pneumology, oncology, pediatrics and transplants.

The Pharmacy Service of the hospital complex has developed an action plan in the year 2017 for the implementation of medication reconciliation in the seven hospitals. To initiate this plan, it was defined as a priority to reconcile medications during the hospitalization of new patients, taking into account the size (number of beds and patients) and the complexity of the institution.

The hospitals of the complex work with a computerized management system that includes electronic prescription. The strategy chosen was to use the hospital management system to register the list of medications used before admission to the patients.

The nursing was responsible for registering in the system, during the nursing interview, the medications that the patient reports to use before the hospitalization. It was up to the team of pharmacists compare the medications informed by patients with those prescribed after hospitalization, intervening whenever necessary with the prescriber responsible.

Nursing was involved in this activity due to the fact that nurses were in greater numbers (535 professionals in 2017), while the team of pharmacists, in the same year, was made up of 24 professionals, with half working in the production sectors and half in the care sector.

Another aspect considered for the involvement of nurses is that these professionals already conduct an interview with the patient, recording it in the nursing history. In this way, it was also tried to avoid that the patient answered questions on the same subject for different professionals of the team.

Together with the Information Technology (IT) sector of the hospital, the functions of the information system were evaluated. Among others, there was a specific module for information regarding medication reconciliation that was not being used. This module has an interface with the registry called Health History in which it is possible to include the list of medications that the patient informs to use before the hospitalization.

In the months of September and October 2017, training sessions were carried out with the nursing teams contemplating nurses and nursing technicians. The concept of medication reconciliation, the module of the information system to be filled and what information should be inserted, the importance of correct and complete registration and the responsibilities of other members of the multidisciplinary

team were addressed. In all, 438 professionals were trained.

The activities developed for the implementation of medication reconciliation at this hospital followed the schedule presented in *chart 1*:

Chart 1. Schedule of activities developed for the implementation of the activity

Activity	**Implementation period Month/Year**
1. Definition of necessary actions for implementing the plan	04/2017
2. Evaluation of the computerized management system and necessary parameterizations together with IT	05/2017 – 07/2017
3. Discussion of the plan with the approval of the nursing technician responsible so that the information was recorded by the nurses	08/2017
4. Training of nurses to record information on health history	09/2017
5. Training of all pharmacists of the team	09/2017
6. Beginning of the activity in the Hospital	10/2017

Source: Own elaboration.

After training, whenever the nurses performed the records of the medications used by the patients prior to the hospitalization in the information system (historical health module), this information was visible to the pharmacists in the same tab of the system used by the professional to carry out the evaluation of the medical prescription.

Pharmacists were responsible for checking whether all registered medications were in the patient's prescription and whether the doses, the administration interval and the route were in accordance with what was recorded in the health record by the nurses.

Whenever any discrepancy was found between the information, the pharmacist should check with the medical staff and clarify whether the discrepancy was intentional or not. An intentional discrepancy occurs when a medication is prescribed in a different way than the patient had been using, but the prescriber does so intentionally, for a specific and deliberate reason. Unintentional discrepancies occur when the prescription of a medication is changed at the time of admission, but the prescriber does so without intention, for example, by carelessness or lack of knowledge at the time of prescription[4].

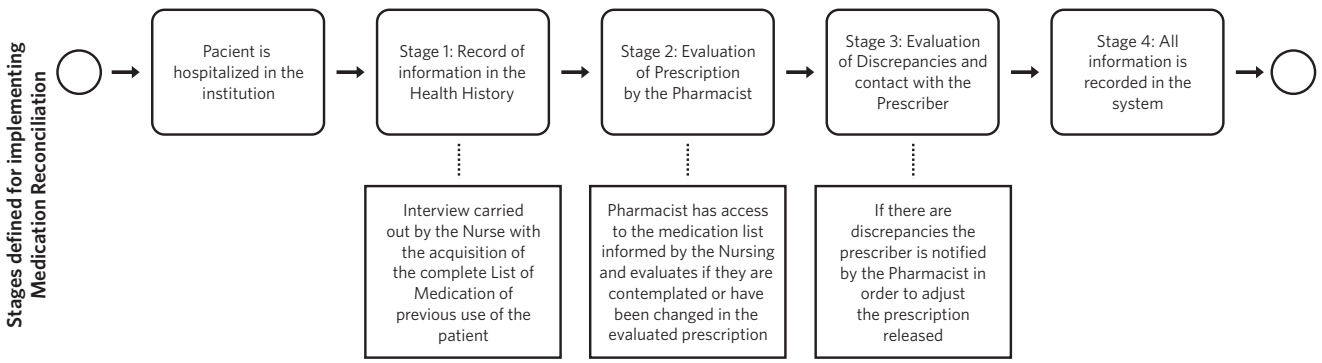
When unintentional discrepancies were identified, it was defined that the pharmacist would contact the prescriber in person, by telephone or using the alert tool available on the institution's electronic health record.

These are intentional discrepancies when the alteration is justified by the clinical situation; medical decision not to prescribe a medication or change dose, frequency or route according to protocols; therapeutic replacement according to the standardization of hospital medications. They are unintentional

discrepancies when the necessary medication omission occurs; addition of medication not justified by the clinical situation of the patient; substitution without clinical justification or reason of availability of the product; dose difference, route of administration, frequency, timetable or method of administration; duplication and medication interaction[9].

The stages defined for the implementation of medication reconciliation are described in *figure 1*:

Figure 1. Stages defined for implementing medication reconciliation in the hospital



Source: Own elaboration.

The following variables were analyzed:

- The number of records made by nurses in the health history;
- The number of reconciliations recorded by the pharmacist during evaluation of the prescription;
- The number of medications that were kept in the hospital prescription without change;
- The number of medications that have been prescribed, but with some change, such as: dose, frequency of administration, route etc.;
- The number of medications that were not prescribed during hospitalization, and for this number, it is necessary for the pharmacist to evaluate with the prescriber whether it was intentional or unintentional.

This study follows the legislation in force, according to the terms of Resolution nº 466/2012 of the National Health Council. The study was approved by the Ethical Committee on Adult Research of the Brotherhood of Santa Casa de Misericórdia of Porto Alegre (ISCMPA) under the number 83258218.5.0000.5335.

Results

Information were recorded by the nursing team in 1.379 health records (medical records of patients) in the information system, making it possible to reconcile the medications of these patients.

In the health history, it is recorded if the patient confirms, denies or does not know the use of medications prior to the period of hospitalization. In 11 registries (0.8%), the patients denied the previous use of medications. In the remaining 1,386 (99.2%), it was

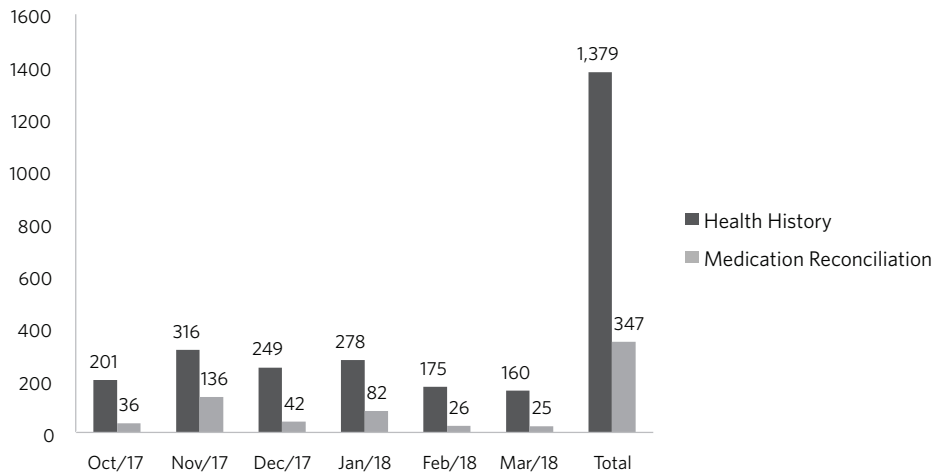
reported that patients used prior medications, indicating the need to perform medication reconciliation.

In the 11 records (0.8%) in which the patients have denied the previous use of medications, it was verified that there is a need for the pharmacy to complete the information system in order to be considered as reconciled, since there was no need for professional intervention, only finalization of registration in the electronic system.

Of the 1,368 health histories (99.2%) (medical records of patients) with information indicating the need to perform medication reconciliation, only 347 (25%) were effectively completed and reconciled by the group of pharmacists in the information system.

Graph 1 shows the number of records in the health history and the medication reconciliations performed by pharmacists in the information system during the study period.

Graph 1. Number of records carried out in the health history and number of medication reconciliations performed by pharmacists from October/2017 to March/2018



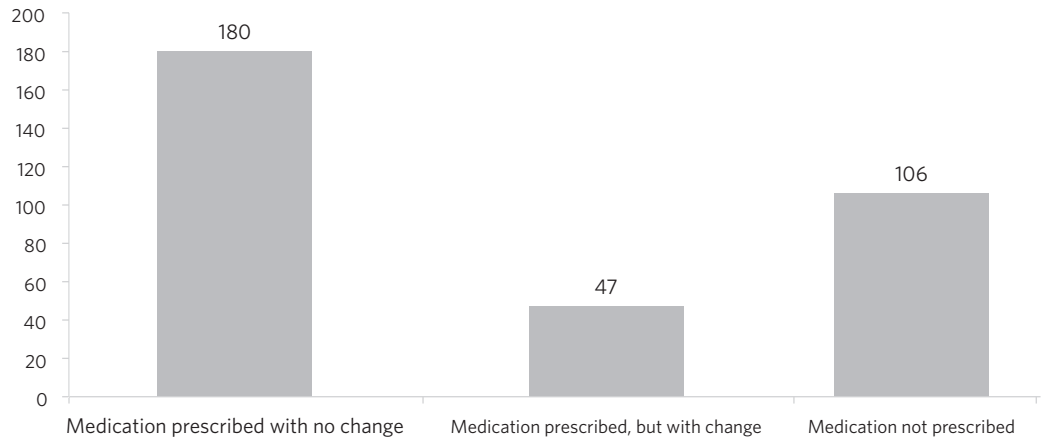
Source: Computerized management system.

To complete the reconciliation in the information system, after giving the patient's prescription for admission, a valid prescription within the 24-hour period defined by the hospital, the pharmacist must inform whether the medication has been prescribed without change (without discrepancy), if it has been prescribed with (with intentional discrepancy), whether it has been prescribed with any unnecessary change (with unintentional discrepancy), or whether the physician no longer prescribes the medication as informed in the health history intentionally or unintentionally.

Analyzing, in light of the options given by the information system, it is observed that the team of pharmacists had evaluated the discrepancies in 333 records (24.14%). The remaining 14 records were finalized without choosing one of the three available options, not characterizing the completion of medication reconciliation.

In *graph 2*, it is possible to verify that the pharmacist had to intervene with the prescriber in 106 of the records (31%) performed to verify if the discrepancy was intentional or unintentional.

Graph 2. Evaluation of records reconciled by pharmacists in relation to discrepancies in the period from October/2017 to March/2018



Source: Computerized management system.

The options available in the system – a prescribed medication, but with a change, and a non-prescribed medication – does not make it possible to assess whether the discrepancies were intentional or unintentional. As already mentioned, this information is obtained after the intervention of the pharmacist with the prescriber and can be registered in the field destined to the observations in the information system. However, it was verified that there is no registration standard that would allow this evaluation.

Discussions

Of the 1,379 records released in the patients' health history, only 333 (24.14%) were effectively completed and reconciled by the group of pharmacists in the system. This percentage demonstrates the need to adopt some measures to increase this percentage, such as conducting group trainings and including medication reconciliation among the priorities of the team of pharmacists. One must consider, as well, the human resources involved in this activity, since the recommendation of the Brazilian Society of Hospital Pharmacy is 1 pharmacist for every 50 beds. Since the institution in analysis presents around one thousand beds, the recommended one would be at least 20 professionals; however, the number of pharmacists acting in the care is 12, totaling 1 pharmacist for every 83 beds[13].

The implementation of medication reconciliation remains a challenge within the institution. It is fundamental to maintain the records by nursing professionals as well as the reorganization of the pharmaceutical professionals so that they can direct their actions to this process accomplishing reconciliation for all patients.

The study by Santana et al.[14] carried out an evaluation of Pharmaceutical Assistance (PA) in ten public hospitals. In all the hospitals evaluated, the authors observed the lowest compliance rate for the pharmaceutical care activities of the patients, generally, finding better percentages in the indicators related to the logistic stages to the detriment of the technical-assistance stages. It is a fact that the pharmaceutical profession has undergone many changes over the years, evolving towards a practice focused on the health care

of the patient[15]. Therefore, a more proactive participation of the pharmaceutical professional is fundamental for their inclusion in the multidisciplinary team, such as the reference professional of the medication[15].

Pharmaceutical intervention occurred with a prescriber in 106 (31%) of the records made to verify whether the physician no longer prescribes the medication informed in the health history intentionally or unintentionally. It was observed at this stage that the registration process in the information system needs to be reviewed and standardized so that the pharmacist can adequately record their discrepancies and motives (intentional or unintentional), as this information is relevant to the reconciliation activity and should be evaluated through indicators.

Another topic that needs to be adjusted in the information system and activity indicator is how to record the medication reconciliation of patients who deny the prior use of medications. In the evaluation of the results, it was observed that the pharmacist did not complete the registration in the information system, accounting as pending such action at the moment of the indicator evaluation.

In Al-Hashar's study, although pharmacists reported knowing the importance of the medication reconciliation service, 47% reported, among the difficulties in implementing the service, lack of time, resources and failure to communicate with other staff of health[16].

Final considerations

The Pharmacy Service of the hospital complex targeted for this work should provide the necessary conditions for pharmacists to perform the medication reconciliation. These include the adequacy of the information system in order to obtain more data to know and intervene in the nature of the discrepancies known when evaluating the prescriptions. It is known that improvements in the quality and safety of health care cannot afford to dispense with attention to medication discrepancies. In this sense, the reconciliation process helps to minimize the risk of errors, since it includes double checking of medications used, interviewing the patient, family or caregivers, comparing medical prescriptions and discussing cases with the team[9].

Medication reconciliation is an activity capable of avoiding and correcting approximately 75% of the clinically relevant inconsistencies before reaching the patient[13]. Likewise, it is known that the daily follow-up of the clinical pharmacist increases the patient's safety regarding the use of medications within hospital institutions. In this sense, the results achieved by this research show the need for the insertion of the pharmacist in the multidisciplinary team, acting in a more effective way, contributing to the various discussions related to the medications.

The Pharmacy Service of the institution must establish new actions and make efforts to ensure that pharmacists perform the medication reconciliation, as well as obtain more data to quantify and measure the discrepancies observed through the records given during the evaluation of the prescriptions, as improving the quality and safety of health care includes attention to medication discrepancies.

Collaborators

Santos CO (0000-0003-4035-6186)* contributed to the design, planning, analysis and interpretation of data; elaboration of the draft and critical review of content; and approval of the final version of the manuscript. Lima LH (0000-0001-6595-5623)* contributed to the design, planning, analysis and interpretation of data; elaboration of the draft and critical review of content; and approval of the final version of the manuscript. Lazaretto FZ (0000-0002-6654-6546)* contributed to the analysis and interpretation of data; elaboration of the draft and critical review of content; and approval of the final version of the

manuscript. Azambuja MS (0000-0002-9811-1459)* contributed to the design, planning, critical review of content; and approval of the final version of the manuscript. Million LF (0000-0003-3399-7428)* contributed to the design, planning, critical review of content; and approval of the final manuscript version. ■

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