Cogitare Enfermagem

ORIGINAL ARTICLE

Medication reconciliation in an emergency department: a process of continuous improvement

HIGHLIGHTS

1. The need for family involvement for safe care.
2. The potential of telehealth for patient safety.
3. The importance of structuring communication in the transition of care.
4. Nursing participation in medication reconciliation.

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Abstract

Objectives: to structure an improvement plan for medication reconciliation in a Portuguese emergency department. **Method:** The improvement project was developed using the Plan, Do, Act, Plan (PDSA) methodology in an observational, descriptive, quantitative study. In the Plan stage, 282 patients admitted to the emergency department participated, whose family member had received a nursing teleconsultation; and 447 participated in the Study stage. The teleconsultation was structured using the Identify, Situation, Background, Assessment, and Recommendation (ISBAR) technique; the team was trained. **Results:** in nurses' usual practice, 4.6% (n=13) unintentional discrepancies were identified between the prescription and the medication in use at home. The number of discrepancies increased to 9.4% (n=42) after the teleconsultation was structured to include questions about usual medication. The most frequent discrepancy, which was later corrected, was the interruption, especially of drugs that act on the central nervous system, of the wrong dose/frequency. **Conclusion:** the study helped to identify/correct failures in medication reconciliation, highlighting the importance of nursing and family participation.

Descriptors: Medication Reconciliation; Patient Safety; Hospital Emergency Service; Telehealth; Accompanying Family Members

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INTRODUCTION

Medication Reconciliation (MR) is an evidence-based process that involves obtaining the list of medications in use by the patient, and comparing it with the updated medical prescription, instituted at the different care interfaces, in light of the reasons for discontinuing, adding, or replacing medications[1].

MR is a shared responsibility of the multidisciplinary team, which must establish a partnership with the patient/family to ensure complete information on medications during transitions of care[2-3]. This way, any errors or discrepancies can be detected, such as the exchange, omission, or duplication of medicines; different dosages, routes, or frequency of administration; lack of treatment adherence; adverse reactions, allergies, and drug interactions[1].

The evolution of the concept of patient safety contributes to recognizing the risks associated with healthcare. A deeper understanding of the epidemiology (frequency, causes, type, and impact) of adverse events makes it possible to identify critical areas. A Portuguese epidemiological study[4] showed a 12.5% incidence rate of adverse events in a hospital setting; 9.8% of these were associated with medication errors.

Admission, transfer within or outside the healthcare organization, and hospital discharge are critical moments in the transfer of information relevant to the continuity of care[5]. Incomplete, incorrect, or non-existent information about the patient and their therapeutic plan can occur throughout their journey and contribute to the incidence of adverse events[5-7]. Elderly, chronic, and polymedicated patients are more prone to multiple transitions of care, with a greater risk of safety incidents occurring[3].

MR involves obtaining and validating information on the patient's medication from at least two sources of information (e.g. clinical records and electronic prescription systems; patient/family interviews; liaison with primary healthcare or community pharmacies)[1,6].

MR contributes to the identification and correction of Unintentional Discrepancies (UDIs)[6]. On hospital admission, MR is the basis for the entire patient journey[6]. Patients and families must be encouraged to have complete and up-to-date information about the medicines they are taking, accompanied by a list that lists them. They should also be alerted to question professionals if they identify any errors associated with their medication[3].

The occurrence of incidents in the transition of care is often associated with communication failures. The use of a structured communication tool in the transition of care contributes to the effective transmission of information between all those involved in healthcare, including information about the medicines in use, reducing the likelihood of errors and adverse events[2-3,7]. The transfer of standardized information using the ISBAR technique has been shown to increase patient safety, especially when used in telephone communication[7]. Because of its relevance, in Portugal, the recommendation to use it is part of the communication pillar of the National Patient Safety Plan (2021-2026)[8]. The acronym ISBAR used as a mnemonic, stands for Identify, Situation, Background, Assessment, and Recommendation[5].

As a use of information and communication technologies, telehealth enables a person-centered approach, which facilitates proximity and continuity of care between the health institution and the home.

There are various telehealth services, but for this study, it is important to look at the concept of teleconsultation. This consists of a consultation carried out remotely, using tools such as the telephone, which allows interaction with the patient, caregiver, and/

or legal representative, sharing information, and requiring mandatory recording in the patient's clinical record[9].

Teleconsultation is seen as an advanced practice that requires clinical reasoning based on a consistent theoretical foundation for the application of the nursing process[10]. Professionals need to develop digital and communication skills. This way, they will be able to establish and strengthen the relationship with patients and their families and contribute to their empowerment and the integration of care[9]. The structuring of communication and the education and/or training of professionals are crucial for quality teleconsultations, as they enable them to identify risks and incidents and carry out interventions aimed at patient safety[10].

The hospital center where the work was carried out has several initiatives to improve MR, driven essentially by the accreditation/certification program and the guidelines expressed in the General Directorate of Health (GDH) Standard on MR, published in 2016 and updated in 2024[1]. Despite the actions taken, there is clearly a need to invest in this area, especially when admitting patients to the emergency department. This is a critical point in obtaining relevant information, due to various factors, such as the patient's inability to describe the medication they are taking. The reasons for this may be associated with age, clinical situation, stress, or the absence of an up-to-date list of the patient's medication, especially if the patient is polymedicated.

In March 2021, the Polyvalent General Emergency Service of the *Centro Hospitalar Universitário Lisboa Central* started the project: "*i-Urgência*", as a way of minimizing the impact of the restrictions on companions imposed by the COVID-19 pandemic. As a result, the nursing team began to make daily telephone contact with the relatives of admitted patients, to obtain and/or pass on relevant information about their condition and their journey in the unit/institution.

Due to its characteristics, this project is part of the concept of telehealth, defined in this paper as a health service made available to the citizen or caregiver, through remote access channels, supported by information/communication technology, which can take place at various points in the provision of care, integrating or complementing the provision of face-to-face health care[11].

During the annual risk assessment, the nurses who made the telephone contacts mentioned that UDIs were identified daily between the active prescription and the medication the patient was taking in the outpatient clinic. However, this information was only obtained on the initiative of the family member, or when it was not available in the patient's clinical file or on the health portal.

Considering that telehealth and safe practices in MR are objectives set out in the National Patient Safety Plan 2021-2026[8], the development of an improvement project in this area became pertinent.

To gain a deeper understanding of this issue, the following research questions were defined: i) Can UDIs and the reasons for their occurrence be identified in the telephone contact that nurses make with the relatives of patients admitted to the emergency department? ii) Can structured communication in telephone contact contribute to identifying and correcting a greater number of discrepancies between the medication taken by the patient at home and that prescribed on admission?

The general aim of this study was to draw up an improvement plan to contribute to the MR of patients admitted to the emergency department. The specific objectives were: i) to identify the frequency and type of UDI between the medication information obtained on the patient's admission and that provided by the reference relative in the

nursing teleconsultation; ii) to structure the communication process in the teleconsultation and the essential information to be collected about the patient and their medication on their admission to the emergency department.

It is important to clarify that in this study it was considered that MR involves reviewing all the patient's medication, including non-prescription drugs, natural products, and/or food supplements[1].

METHOD

The methodology for problem-solving and continuous quality improvement disseminated by Deming, known as the PDSA cycle - Plan, Do, Study, and Act[12] - was applied, and the process developed at each stage is presented.

Plan - a quantitative observational study was carried out to identify the risk factors for MR in patients eligible for *i-Urgência*. At the same time, a literature search was carried out on MR, preferably in emergency settings, and a document analysis of current national and institutional standards and procedures.

At this stage, an instrument was developed to record risk factors and discrepancies between the prescribed medication and the patient's medication in the outpatient clinic, based on bibliographic research and observations of contacts made through *i-Urgência*, and it was tested for three days. Subsequently, the instrument was only applied in situations where there was a need to obtain/validate information about the patient's medication, in line with the nurses' usual practice.

Population: patients admitted to the emergency department. **Study sample:** a non-probabilistic convenience sample was used, with data collected over a week (seven days) in December 2022 by a nurse from the *i-Urgência* team. **Inclusion criteria:** patients admitted to the emergency department whose relatives were contacted by *i-Urgência*. **Exclusion criteria:** patients not included in *i-Urgência*; patients eligible for *i-Urgência*, in the process of being transferred or discharged. For analysis purposes, the following indicator was defined at this stage: (Total patients with UDI related to medication in the outpatient clinic/Total patients whose family member was contacted through *i-Urgência*) x 100.

Do - analysis of the results obtained in the Plan stage, identifying the occurrence and type of discrepancy, the consequence, the reason for it, and the medication involved. A script was drawn up to structure teleconsultation communication, following the ISBAR methodology, as shown in Figure 1.

Figure 1 - ISBAR model for *i-Urgência* contact. Lisbon, Portugal, 2024

Source: The authors (2024)

The application test was carried out, observing the contacts made, focusing above all on the questions asked of the patient's family member, related to the medication being used at home, in order to identify the type of discrepancies, the reason, the consequences, and the medication involved, as well as timing the duration of the contact.

Study - A quantitative study was carried out with a non-probabilistic convenience sample over one week (seven days) in February 2023, maintaining the inclusion and exclusion criteria defined for the Plan stage. The data was collected by two nurses from the *i-Urgência* team, following the ISBAR script, which now includes systematic questioning of all family members contacted regarding the medication being used by the patients. The information collected described the type of discrepancy, the consequence, the reason for it, and the medication involved. Quantitative data analysis was carried out using descriptive statistics.

Act – Meetings were held with the head of the emergency department, *i-Urgência* professionals, and the institution's Patient Safety Office in March 2023 to discuss the results obtained. Subsequently, three training sessions were held for the emergency service team on MR, led by one of the *i-Urgência* nurses responsible for data collection and a

professional from the institution's Patient Safety Office, to present the results obtained and record suggestions for improvement.

Ethical considerations: the project was approved by the Ethics Committee of the *Centro Hospitalar Universitário Lisboa Central*, under opinion no. 1319/2022.

RESULTS

Plan - Before data collection, eight contacts were observed on *i-Urgência* to identify the duration and aspects addressed with the patient's family member. It was found that each contact lasted between two and eight minutes.

During the period of data collection relating to the discrepancies identified according to the nurses' usual practice, 893 patients were admitted to the emergency department, with 616 patients (69%) eligible for *i-Urgência*. Of these, contact was made with the relatives of 282 patients (46% of eligible patients). The situations in which contact was not established were due to: patient refusal (39; 6%); no contact (140; 23%); contact not answered (26; 4%); discharge/transfer process completed (129; 21%). Of the 282 contacts established, UDIs were identified in 13 patients (4.6%).

In terms of characterizing the sample, it was found that of the 13 patients, 10 were female and three were male, with an average age of 79. The data obtained at this stage is presented in Tables 1, 2, and 3, together with the data obtained at the Study stage.

From the results obtained in the Plan stage, it can be seen that the most frequent reason for UDI was the patient's unfamiliarity with their usual medication (eight; 62%), as shown in table 1:

Table 1 - Reasons for UDI identified by stage (Plan and Study). Lisbon, Portugal, 2024

	Absolute frequency (N)		Relative frequency (%)	
Reason	*Plan*	*Study*	*Plan*	*Study*
Patient doesn't know	8	11	62	26
Patient cannot provide information	5	31	38	74
Place of origin (e.g. home) did not provide information	1	6	8	14
Information on the health portal is out of date	5	19	38	45

Source: The authors (2024)

In five patients (38%) the information on the health portal was found to be out of date for several reasons, such as manual prescription; prescription written in the name of the patient's relative; telephone prescription to change the dosage; and prescription made in a private institution.

The introduction of the drug was the most frequent change to the prescription (11; 85%), which led to the unintentional interruption of treatment (10; 77%), as shown in Table 2. All the discrepancies identified implied a review of the prescription by the medical team.

Table 2 - UDI identified and consequences of failure in MR by stage (Plan and Study). Lisbon, Portugal, 2024

		Absolute frequency (N)		Relative frequency (%)	
		Plan	*Study*	*Plan*	*Study*
Change in prescription identified	Introduction of a medicine	11	32	85	76
	Suspension of medicine	0	5	0	12
	Dose change	1	5	8	12
Consequence of failure to reconcile medication	Interruption of treatment	10	32	77	76
	Starting treatment	2	5	15	12
	Lower dose	1	4	8	9
	Excessive dose	0	1	0	2
Other information	Allergies	0	3	0	7
	Social issues	0	1	0	2

Source: The authors (2024)

In five patients (39%) there was a discrepancy in more than one drug: four patients had MR failures for two drugs and one patient for three drugs. In two situations, due to MR failure, treatment was started on a patient who had not adhered to it, by his own decision (15%). Between one and three discrepancies/day were identified, with two discrepancies/day being the most frequent.

Antiparkinsonian drugs were the most frequently associated with UDI (four; 31%), as shown in Table 3.

Table 3 - Pharmacotherapeutic classification of medicines with UDI by stage (Plan and Study). Lisbon, Portugal, 2024

		Absolute frequency (N)		Relative frequency (%)	
Pharmacotherapeutic classification		*Plan*	*Study*	*Plan*	*Study*
Central nervous system	Psychotropic drugs	3	10	23	24
	Antiparkinsonians	4	11	31	26
	Analgesics/narcotics	1	5	8	12
Cardiovascular system	Antihypertensives	2	6	15	14
	Diuretics	3	7	23	17
Digestive system	Gastric mucosal protectors	1	2	8	5
Medicines used for eye conditions	Various eye drops	1	5	8	12
Respiratory system	Antiasthmatics and bronchodilators	1	0	8	0
Hormones and medicines	Thyroid hormones	0	1	0	2

Source: The authors (2024)

Do - the script drawn up using the ISBAR methodology to standardize communication during telephone contact in "*i-Urgência*" was adapted from the model presented in Standard No. 01/20175, including the aspects usually covered in teleconsultation; frequently asked questions by family members; and questions relating to the patient's medication, namely: name, dosage, frequency, route of administration, and in the event of a discrepancy, the reason for the change. A test application was carried out on six contacts. They lasted between three and six minutes.

Study - during the data collection period, 1,096 patients were admitted, 799 of whom were eligible for *i-Urgência* (73%). Contact was made with the relatives of 447 patients (56% of those eligible). Contact was not established for several reasons, such as patient refusal (74; 9%); no contact (124; 15%); family member unavailable (37; 5%); and discharge/transfer process (117; 15%). In the established contacts, it was found that in 218 patients (48.8%), the family member was unaware of or had doubts about the medication. The conformity between the information obtained on admission and the medication being used by the patient was confirmed by the relatives of 187 patients (41.8%).

UDIs were identified between clinical information and outpatient medication information for 42 patients (9.4%). Of these, 28 (67%) were female and 14 (33%) male, with an average age of 86 years. The patient's inability to provide information was the most frequent reason for the occurrence of UDI, as shown in Table 1.

Not knowing the information led to treatment being interrupted in 32 patients (76%), as shown in Table 2. Three patients (7%) were found to be allergic to the drug, which was not recorded in the clinical file. It should be noted that none of these drugs had been prescribed, so there was no adverse event. In contact with one of the patients' relatives, it was possible to identify his inability to manage his medication, and he was referred to social support. All the discrepancies identified were reported to the medical team and involved a therapeutic review.

As can be seen in Table 3, similar to the results obtained in the Plan stage, the most frequently identified drugs were those that act on the central nervous system, namely: antiparkinsonian drugs (11; 26%) and psychotropic drugs (10; 24%), according to the official pharmacotherapeutic classification of drugs in Portugal[13].

It was also found that 11 patients (26%) had UDIs related to more than one drug. Thus, UDIs associated with two drugs were detected in eight patients (19%) and those associated with three drugs in three patients (7%). Between four and seven UDI/day were identified, with seven UDI/day being the most frequent.

Act - The results obtained were presented to the professionals on the team and it was decided to implement the ISBAR script systematically by *i-Urgência*. The structuring of communication in the contact was felt by the professionals to facilitate time and information management, allowing them to detect flaws in the MR.

A video entitled "Safety in Healthcare: Medication Reconciliation" was produced with recommendations for patients and their families on MR, to be shown on waiting room screens, alternating with other videos on topics such as fall prevention, safe identification, and diagnostic safety. It can be accessed on the Internet at the following link: https://youtu.be/uvEvUbzYYxw?si=2g3Lb-aajGbxhX[49].

It was decided that monitoring would be carried out every six months by analyzing incidents due to MR failures reported in the internal notification system; patient/family complaints; and audits of *i-Urgência*'s clinical records on MR.

DISCUSSION

According to the WHO, most hospitalized patients will have at least one medication discrepancy, at one or more points in the transition of care2. MR is essential for detecting failures in the transfer of information[1]. The process must be centered on the patient/family, combined with their participation in conjunction with the professionals responsible for MR, such as doctors, nurses, and pharmacists[1,3].

With the study, UDIs were identified between the prescription made on admission to the emergency department and medication in the outpatient clinic in the Plan and Study stages, through the participation of nursing staff and the family in this process. However, when compared to the usual practice of nurses, with systematic questioning about medication in the contacts made, there was a doubling of the percentage of patients in whom MR failures were identified. In the same vein, a systematic review and meta-analysis[14] concluded that MR carried out in emergency services by pharmacy professionals, when compared to the usual practice of nurses or doctors, reduced the proportion of patients with medication discrepancies by 88%.

At the Study stage, there was a significant percentage of patients whose MR had been correctly carried out by the doctor. Similarly, a study in which pharmacists reviewed prescriptions in an emergency department15 found that in 53.9% of cases, the MR was correctly performed by the doctor, and in 16.7% the prescription contained UDI.

The percentage of discrepancies identified by nurses in this study is not as significant as those presented in the studies mentioned above, associated with other professional groups. However, it highlights the opportunity for nurses to play a more important role in this process since all the discrepancies identified involved a review of the medical prescription.

The patient's inability to communicate, or their lack of knowledge about the medicines they usually take, were obstacles identified in another study16. This was reinforced by the results obtained in this study, which identified similar difficulties.

Outdated information on the health portal, due to institutionalization or medical follow-up in other institutions, was another risk factor identified in this study. In line with these results, a pilot study carried out in an Internal Medicine department identified problems with access; the quality of therapeutic information; and communication between the various health professionals[17].

A study carried out in an emergency department[6] found that 81% of patients had ≥1 discrepancy. In a total of 852 prescriptions, 242 UDIs were identified, namely: medication prescribed without adherence (61%), incorrect frequency (24%), omission (15%), or duplication of medication (9%); incorrect dosage (6%).

A systematic review and meta-analysis identified that the most frequent discrepancies included omission of medication, as well as incorrect dosage or frequency[14]. These results corroborated these findings, as they were also the most frequent type of discrepancies.

In this study, the most frequently identified drugs were those that act on the cardiovascular system and the central nervous system, namely: antiparkinsonian and psychotropic drugs. Similarly, a study consulted identified the omission of these drugs in the most frequent UDIs[17]. The fact that antiparkinsonian drugs were the most frequent in this study corroborates the conclusions of a systematic review of the literature[18], which found a prevalence of failures to prescribe these drugs in a hospital setting, with

the consequent lack of symptomatic control of the disease or the administration of contraindicated drugs.

Although the largest percentage of patients in this sample only had UDI associated with one drug, there were cases in which it was associated with more than one drug. A study carried out in Brazil found that 95.7% of patients had only one discrepancy, with 4.3% of patients having two discrepancies[19].

The limitations of this study include the fact that the sample was not probabilistic, so the data cannot be extrapolated to all the patients seen at *i-Urgência*. It was also impossible to identify all the situations in which family members went to the unit to hand in the list of medicines, given the turnover and the large number of professionals who provided the service at the unit.

CONCLUSION

The study contributed to the detection and correction of flaws in the MR of patients admitted to the emergency department of a Portuguese hospital and corroborated the need to use different sources of information for correct MR. The difficulties in accessing information on medication prescribed or in use in other institutions highlight the importance of complete clinical records and the need for a single recording system or intercommunication between the different applications.

The opportunity for the nursing team to play a more proactive and relevant role in improving MR was reinforced.

This study also showed the importance of structuring communication to obtain relevant information for continuity of care. Likewise, the importance of integrating the family into this process was highlighted, as they can provide important advice on the use and management of medication in the outpatient clinic, which makes it possible to identify problems of a different nature, of a social and family nature.

The need to increase patient/family participation justified the development of information materials to provide guidance on the risks and clarify how they play a fundamental role in collaborating with the healthcare team.

This project met its objectives. In the future, it will be pertinent to include other professional groups responsible for MR, with the continuity of the improvement plan in MR at the institution.

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Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work - **Diniz ACAM, Souza APB, Reis CT, Ramos SMSV, Barreiros PMM, Souza PJS.** Drafting the work or revising it critically for important intellectual content - **Diniz ACAM, Souza APB, Reis CT, Ramos SMSV, Barreiros PMM, Souza PJS.** Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved - **Diniz ACAM, Souza APB, Reis CT, Ramos SMSV, Barreiros PMM, Souza PJS.** All authors approved the final version of the text.

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