

Medication Reconciliation at the Admission of the Medical Emergency Unit of Teaching Pediatric Hospital of Ouagadougou, Burkina Faso

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Abstract

Introduction and Problem Statement: Many medication errors occur during the community and hospital transition. Indeed, the World Health Organization launched the international “High 5S” project to implement medication reconciliation in healthcare facilities to reduce them and ensure patients a safe, high-quality healthcare pathway. **Objective:** This study aimed to detect medication errors by reconciling drug treatments and assess the relevance and feasibility of this standardized practice within the Medical Emergency Unit of the Teaching Pediatric Hospital of Ouagadougou (Burkina Faso). **Methods:** Patients whose parents gave their consent at their entrance were enrolled. For each patient, the pharmacy team completed a reconciliation form that included the patient’s usual treatment, which was taken and in progress and received upon admission to the medical emergency unit. Patients’ treatments were reviewed to detect and characterize discrepancies. The data of each form were reported and analyzed using KoboCollect, an Android application. **Results:** 135 records and 412 medication lines were captured over six weeks. The average time of treatment reconciliation per patient was 57 minutes. One thousand one hundred ninety-eight (1198) intentional discrepancies were detected, of which 6.09% were documented. Seventy-one (71) unintentional discrepancies were collected, including 39 omissions, 24 regimen dosing errors, and 8 pharmaceutical form dosage errors. Forty-nine (49) unintentional

discrepancies, or 69.01%, were corrected by formulated pharmaceutical interventions toward physicians. **Conclusion:** Medical treatment reconciliation during hospital admission is critical because discrepancies can compromise the efficacy and/or safety of the patient's hospital medication.

Keywords

Admission Medication Reconciliation, Medication-Error, Medical Emergency Unit, Pediatric, Burkina Faso

1. Introduction

Medication error is the unintentional omission or performance of an avoidable act during the therapeutic management of medication, which may cause a risk or an adverse event for the patient [1]. Medication-related problems are an actual public health concern [2]. In terms of mortality and morbidity, every year in France, 10,000 to 30,000 deaths are caused by medication errors [3]. The American Institute of Medicine's report of 2016 indicated that 251,454 deaths occur each year as a result of medical errors, including 7000 as a result of medication errors [4].

A study in Burkina Faso reported that antithrombotic-associated adverse events were the leading cause of hospitalization in the cardiology department, 50% of which cases were avoidable [5]. Medication errors are due to labeling, information, and human factors, such as the need to respect SOPs and good practice guidelines or a lack of competence.

Many solutions have been developed to help prevent and reduce medication errors, including pharmaceutical analysis of prescriptions, therapeutic patient education, nominative hospital dispensing, the pharmaceutical record, and medication therapy reconciliation.

Drug therapy reconciliation is an approach that organizes patient's medication management during care [5]. It has been defined by the Institute for Healthcare Improvement as "the process of identifying the most accurate list of a patient's current medicines, including the name, dosage, frequency, and route—and comparing them to the current list in use, recognizing and documenting any discrepancies, thus resulting in a complete list of medications" [6]. WHO, since 2006, has coordinated an essential project in several countries. In France, between 2010 and 2015, 21,320 medication errors were intercepted and corrected in 22,863 patients aged 65 and over in nine establishments experimenting with the SOP Med'REC reconciliation protocol. These patients were hospitalized after an emergency visit, and their treatments had been reconciled on admission [7]. In two Australian studies, 54% and 60% of patients had at least one medication discrepancy (medication error during hospital prescribing). Medication reconciliation from admission to discharge reduced the number of prescription errors by 50% to 94% [8] [9].

We have developed clinical pharmacy activities at the teaching pediatric hospital, and in particular, the introduction of individual nominative dispensing, pharmacists find themselves permanently present in clinical units. This context represents an opportunity to implement medication reconciliation. This study aimed to describe the implementation of medication reconciliation in the medical emergency unit of the teaching pediatric hospital of Ouagadougou, in Burkina Faso.

2. Methodology

2.1. Study Design

We conducted a 6-week cross-sectional study from March 15 to April 30, 2023, in the medical emergency unit of the teaching pediatric hospital of Ouagadougou. This hospital has 152 beds, 16 of which are in the medical emergency unit. We enrolled newly admitted patients whose parents verbally consented to participate in the study and who received a medical prescription in the unit. The data required for medication reconciliation were collected using a pre-established form.

2.2. Patients and Medical Staff

Sampling involved a census between 8 a.m. and 6 p.m. of all patients admitted to the medical emergency unit and the medical staff in the unit during the study period.

Patients and medical staff who had given verbal consent to participate were included in the study. Patients admitted for observation to the medical emergency unit, seen within 24 hours of their admission by the investigating team, and having received a medical prescription were considered. The medical staff working in the unit during the visit of the investigators and having given consent to participate were included.

Patients coming from inside units (intensive care or hospitalization) or dead at the entrance were not included. The medical staff who were absent during investigators' visits were not included.

2.3. Study Variables

The data collected was related to groups of variables such as patients' characteristics (age, sex, and weight), clinical data (date, mode of admission, transfer, referral, direct entry), elements of the optimized medication assessment (nature and number of intentional discrepancies, unintentional discrepancies, drugs' INN, galenic form dosage and doses) and conciliation performance data.

2.4. Data Collection

The collection tools were an admission conciliation form, a parents' interview sheet, and a semi-open questionnaire form addressed to the medical staff. The variables were collected from sources such as patient's medical records, old medical prescriptions, admission prescriptions, and admission registers. The medication reconciliation activity was carried out every day from 8 a.m. to 6 p.m. Investigators were previously trained with study procedures and tools.

2.5. Study Procedure

The patient medication in less than 24 hours reconciliation at the admission point was carried out every day from 08:00 am to 06:00 pm. Once all new patients requiring reconciliation had been identified, we followed the following steps [10].

Step 1: Establishment of the Best Possible Medication History (BPMH). It consisted of an active search for information on the patient's treatment regimen to draw up an exhaustive and complete list of medications prescribed or not and taken or to be taken by the patient before hospitalization. At least three sources of information: physician, medical records, accompanying person, external incoming or reference form, and previous prescription were consulted.

Step 2: Verification and documentation of the history. The Verified Information obtained in step 1, including international non-proprietary names (INNs), dosages, galenic forms, routes of administration, and dosages, was documented.

Step 3: Medication reconciliation at admission. This step consisted of a mixt model of proactive and retroactive medication reconciliation, reconciliation of the BPMH, and reconciliation of the first admission medication orders (AMO). Discrepancies such as discontinuation, modification, suspension, substitution, and treatment addition were identified.

Step 4: Supplying accurate information. This stage involved Medical-pharmaceutical collaboration to ensure safe continuity of care. Undocumented discrepancies, whether intentional or unintentional, were determined. The discrepancies were made explicit in the patient record in the first case. In the second case, discrepancies were considered medication errors, and a pharmaceutical intervention for correction was formulated. The Best Possible Medication Discharge Plan (BPMDP) was drawn up at the end of the episode.

Fifth-year pharmacy students performed most of the Best Possible Medication Histories (BPMH) while hospital interns reconciled drugs from the individual dispensing unit integrated into the medical emergency unit.

2.6. Data Processing and Analysis

Collected data were transferred to a digital database using the kobocollect android application for analysis.

Depending on whether or not the information was found in the patient's medical record, discrepancies were then characterized as "documented" or "undocumented." An "undocumented" status was considered a discrepancy, and the prescriber's intention was determined. Intentional undocumented discrepancies were voluntary changes to the prescription that were not documented in the patient record and could be a source of medication error. Unintentional, undocumented discrepancies were considered to be medication errors according to the unit SOPs and therapeutic guidelines. Subsequently, for each unintentional discrepancy, the therapeutic class involved was determined, as well as the characterization of the medication error using the "Characteristics of medication errors REEM-NCC-MERP" grid from the French Society of Clinical Pharmacy, according

to the degree of concretization (potential or proven medication error) and the severity of the clinical consequences for the patient [1].

A multidisciplinary team consisting of two pharmacists and two physicians assessed the clinical impact of the pharmaceutical interventions. This assessment used the Clinical, Economic, and Organizational (CLEO®) Tool [11].

Implementation and effectiveness of medication reconciliation were measured using the MED'REC performance indicators from the international "SOP MED'REC" project [12] [13]. Indicators are:

- Percentage of patients involved in a medication reconciliation process within 24 hours (MR1).

MR1

$$= \frac{\text{Number of eligible patients with medication reconciliation within 24 hours}}{\text{Number of eligible patients admitted to the department}} * 100$$

- Percentage of undescribed intentional deviations (MR2)

$$\text{MR2} = \frac{\text{Number of undescribed intentional deviations}}{\text{Number of eligible patients}} * 100$$

- Percentage of unintentional discrepancies (MR3)

$$\text{MR3} = \frac{\text{Number of unintentional deviations not described}}{\text{Number of eligible patients}} * 100$$

- Percentage of patients with at least one unintentional discrepancy (MR4)

$$\text{MR4} = \frac{\text{Number of patients with at least one unintentional discrepancy}}{\text{Number of patients who benefited medication reconciliation}} * 100$$

The different expected targets are MR1 = 100%; MR2 = 0; MR3 ≤ 0.3 ME/patient; MR4 = 0.

2.7. Ethical Approval

The Medical Commission authorized the study, with permission from the Head of the Hospital, with N° 2023-0146 DG. The patient's parents were informed about the research and gave oral consent. Data were collected on an anonymous form and with respect to medical secrets.

3. Results

3.1. Optimized Medication Regimen

The study included 135 patients admitted to the medical emergency Unit. All these patients benefited from medication reconciliation. The majority (60.74%) of patients were under 2 years old, with a sex ratio of 1.1. The optimized medication review identified 412 lines of medication. The average number of treatment lines per patient was three.

The primary sources of information for the optimized medication review were the parents (87.7%), the medical record (74.81%), and the health record (74.04%). Several of these sources were used cumulatively to reconcile patients' respective treatments. The average number of sources available was 3.8.

3.2. Characteristics of Discrepancies

The cumulative frequency of discrepancies was 1269, of which 1198 were intentional (94.4%), and 71 were unintentional (5.6%). Undocumented intentional discrepancies accounted for 6.1% of intentional discrepancies. The average number of unintentional discrepancies per patient was 0.5. The most frequent type of intentional discrepancy was additions (63.1%) (Figure 1), while omission (55%) was the most frequent type of unintentional discrepancy (Figure 2).

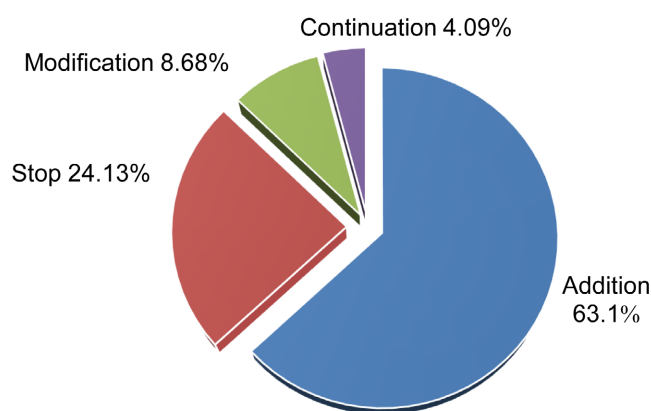


Figure 1. Characterization of intentional discrepancies.

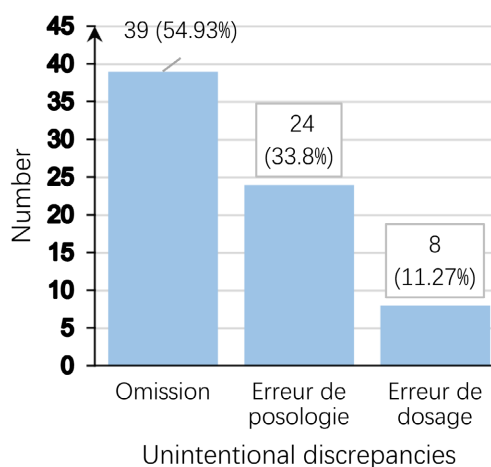


Figure 2. Characterization of unintentional discrepancies.

The 71 unintentional divergences or medication errors consisted of D and C-category. Category D was errors that occurred and caused increased patient monitoring, and C-category, was errors that occurred to the extent of affecting the patient but did no harm to the patient. The C-category was the most represented, with 77.46% of unintentional divergences (Figure 3).

3.3. Medication Reconciliation Performance

The average time for medication reconciliation was 53.7 minutes, with a range of 40 to 77 minutes. Table 1 gives the WHO “MED’REC” indicators characterizing

the degree of implementation of medication reconciliation in medical emergency units.

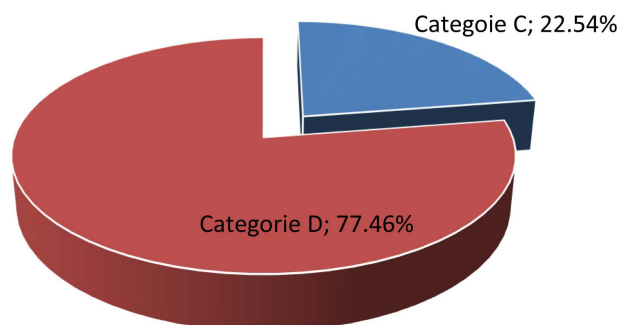


Figure 3. Characteristics of identified medication errors according to REEM-NCC-MERP classification.

Table 1. Indicators characterizing the degree of implementation of medication reconciliation at medical emergency Unit admission.

Indicators	Calculated values (%)
MR1	71.85
MR2	54.0
MR3	52.6
MR4	34.8

Of the 71 unintentional discrepancies or medication errors identified, 49 (69.0%) were corrected after pharmaceutical interventions, which doctors considered relevant in 88.23% of cases. Their clinical impact score, according to the CLEO[®] Tool, is given in **Table 2**.

Table 2. Pharmaceutical interventions' clinical Impact rating scale according to the CLEO[®] Tool.

Score	Impact	Proportion* (%)
0C	Null	38.04
1C	Minor	43.66
2C	Moderate	18.30

*Corrected medication errors N= 49.

The clinical impact of pharmaceutical interventions was moderate at 18.30%.

4. Discussion

Medication reconciliation at patient admission in the medical emergency unit was implemented for the first time at the teaching pediatric hospital of Ouagadougou in Burkina Faso. Our study had limitations, such as the lack of sample size calculation and the stopping of patient medication reconciliation during the night.

Nevertheless, it occurred in the context of an individual nominative dispensing of medicines close to the bed. Medication conciliation participate in setting-up of clinical pharmacy process to strengthen patient safety and promote cooperation between physician and pharmacist.

The prescribed medication at admission was compared to the patient's medication before the hospital by a pharmacist. Undocumented intentional discrepancies were 6.1% of intentional discrepancies. Schiettecatte *et al.* [2], Zongo *et al.* [14] reported 78.9% and 21%, respectively, of undocumented intentional discrepancies. Our study reported, also, 5.6% of unintentional discrepancies—this proportion was low compared to the reported values of other studies [15]-[17]. A frequency of 0.5 unintentional divergences per patient was reported in our study. As part of the Med' Rec project, experimental results showed that the number of medication errors or unintentional discrepancies ranged from 0.4 to 2.7 per patient in 2014 [12].

Regarding the nature of medication errors, we reported that 55%, like others (54%, 61%), medication errors by omission are the most common [18] [19]. These omissions are oversights in prescribing treatments already started by the patient and not considered in hospital prescriptions. However, an emergency requires rapid action. Nevertheless, it is always necessary to check that the patient is not under treatment and if the treatment is to be continued. Indeed, communication with the patient's family on admission should be stepped up to reduce errors of omission.

Category D errors accounted for 22.54% of characterized errors. These involved failures to respect the administration interval between medications received by the patient before admission to the emergency unit, which was pursued. These errors could constitute circumstances of overdosage, justifying the monitoring proposed in pharmaceutical intervention. Our result is slightly lower than that of Boissinot *et al.*, who reported a frequency of 1/3 of category D errors [20].

The average medication reconciliation time was 53.7 minutes, close to the results found in the literature: 50 minutes in France and 49 minutes at Luneville Teaching Hospital [20] [21]. Other authors, however, have reported a significantly higher average reconciliation time than ours. Zongo *et al.* in Burkina Faso reported that it took an average of 4 hours to conciliate a patient in 2018. This finding was explained by the delayed availability of drug prescriptions on admission due to the absence of specialist doctors to write the prescription.

The proportion of patients conciliated within 24 hours (MR1) was 71.85%. Compared to the results in the literature, it is close to the value retrieved by Zongo *et al.* in Burkina Faso (67.39%). Fetique *et al.* in France reported 53.1%. This high rate of patients conciliated within 24 hours can be explained by the relatively continuous presence of hospital interns in charge of reconciliation [22]. In our study, hospital interns were present during the morning and afternoon throughout the study period, enabling the majority of patients admitted at each time of day to be conciliated. This indicator ranged from 2.6% to 64.9% in the Med' Rec project.

Variations are justified by the number of eligible patients in the Med' Rec SOP, which differed according to enrolled hospitals and the available resources allocated, which were not systematically proportional to the number of patients reconciled.

In our study, the proportion of unintentional discrepancies (MR3), which evaluates the number of medication errors with an optimal target of 0%, was 52.3%. This is lower than the value of Luneville Teaching Hospital, which was 80%. This discrepancy could be explained to some extent by the specific nature of the emergency unit, with an overload of work and a limited number of staff members, which can lead to medication errors, particularly on admission. Also, the recording of medication history could be different between hospitals.

Medication reconciliation intercepted at least one medication error in 34.8% of patients (MR4). This is a practical aspect that calls for strengthening the reconciliation process by increasing both human and material resources. With the evolving of health information technology, the development of a network for the exchange of patient prescriptions and medication histories between hospitals, computer-assisted electronic prescriptions, and the set-up of patient pharmaceutical records. A reduction of medication errors at the level of medication conciliation will contribute to mitigating other errors downstream of patient medical management as evoked elsewhere [23].

Also, providing continuous training to the hospital staff can help to minimize unintentional discrepancies.

5. Conclusion

Medication reconciliation is an effective tool for improving the therapeutic management of patients in hospital. However, some difficulties of implementation, such as the low availability of physicians and the absence of crucial information on the transfer sheets at hospital admission, do not facilitate the establishment of the patient treatment history. Medication reconciliation in the patient's care pathway is essential. A complete and accurate list of patient medications was made available; medication errors were identified and prevented. Time was freed for the medical team. The daily integration of medication reconciliation at transition points will allow safe patient treatment during stay and discharge from the teaching pediatric hospital.

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Informed Consent Statement

See ethical approval.

Institutional Review Board Statement

Considered in ethical approval.

Data Availability Statement

Any supplementary information can be obtained on request addressed to the corresponding author.

Authors' Contributions

Conceptualization, O.M., D.W.G; O.A., YH, O.W.E; Original draft preparation, B.P., O.M., D.W.G.; Writing—review and editing, O.M., D.W.G., O.K.; Read and corrections: S.B.C.; K.A.; Y N.H.E. All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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