Patient misadventures caused by prescribing errors detected at a Brazilian community pharmacy

Contratempos causados a pacientes por erros de prescrição detectados em uma farmácia comunitária brasileira

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Abstract: *Background*: Efforts to reduce medication errors in healthcare have been widespread around the world with the aim to improve the quality of care. Failures observed at the prescription phase are reported as being the most prevalent preventable errors. Adverse events related to inappropriate prescriptions are an important threat to patient safety. In this context, a community pharmacist is in a strategic position to evaluate, detect, and correct problems that may have occurred during prescribing. Consequently, this reduces the risk of negative clinical and economic outcomes. *Objective*: To identify the consequences of prescription errors that impede drug dispensing at a Brazilian community pharmacy from the perspective of patients. *Method*: Cohort study, with no comparison group, in a Brazilian community pharmacy, which included patients with prescription errors, which made it impossible for correct drug dispensing. Patients were interviewed at the time of problem detection and followed up until an outcome was reached. *Results*: Of the 32 interviewed patients, 23 (71.9%) reported some harm to their health due to a delay in starting treatment, and 19 (59.4%) experienced extra expenses due to medication not being dispensed. *Conclusion*: Prescription errors that preclude the dispensing of any medication can lead to negative clinical outcomes and a financial loss to patients.

Keywords: Medication errors; Patient safety; Community pharmacy.

Resumo: *Contexto:* Esforços para reduzir erros de medicação na prestação de cuidados de saúde têm sido difundidos em todo o mundo com o objetivo de melhorar a qualidade do atendimento. Falhas observadas na fase de prescrição são relatadas como sendo os erros evitáveis mais prevalentes. Eventos adversos relacionados a prescrições inadequadas são uma ameaça importante para a segurança do paciente. Nesse contexto, o farmacêutico comunitário está em uma posição estratégica para avaliar, detectar e corrigir falhas que possam ter ocorrido durante a prescrição e, consequentemente, reduzir o risco de resultados clínicos e econômicos negativos. Objetivo: Identificar as consequências de erros de prescrição que impedem a dispensação de medicamentos em uma farmácia comunitária brasileira da perspectiva dos pacientes. *Método:* Estudo de coorte, sem grupo de comparação, em uma farmácia comunitária brasileira, que incluiu pacientes com erros de prescrição que impossibilitaram a correta dispensação do medicamento. Os pacientes foram entrevistados no momento da detecção do problema e acompanhados até que um resultado fosse alcançado. *Resultados:* Dos 32 pacientes entrevistados, 23 (71,9%) relataram algum dano à sua saúde devido ao atraso no início do tratamento, e 19 (59,4%) tiveram despesas adicionais devido à não dispensação dos medicamentos. *Conclusão:* Os erros de prescrição que impedem a dispensação de qualquer medicação podem levar a resultados clínicos negativos e perdas financeiras para os pacientes.

Palavras-chave: Erros de medicação; Segurança do paciente; Farmácia comunitária.

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Introduction

Medication errors are amongst the most common failures affecting patients undergoing treatment by healthcare teams. They may occur at one or more steps in the therapeutic process, including prescribing, dispensing, preparing, and administration of medication, or may even be concerned with the patient's adherence.[1]{, 2007 #19} In the United States, it is estimated that at least 1.5 million people are exposed to medication errors, and approximately 177 million dollars are spent annually on drug-related morbidity and mortality.[2, 3]

Among medication errors, those that occur at the prescribing stage are most frequent and predispose the occurrence of failures in the subsequent stages of the drug use process.[4] These features cause prescription errors to be associated with threats to patient safety and demonstrate that avoiding failures at the prescribing stage is one of the most important measures to prevent medication errors.[4] However, despite widespread information about prescribing errors and all risks they may have on health, most recent studies still report high rates of this type of medication error. For example, in reports from outpatient clinics in India and Finland, 12-56% of prescriptions presented with at least one error.[5, 6]

Studying medication errors and their causes has been an important tool to identify opportunities for the improvement of the medication process, with a consequent reduction in the risks and costs associated with these adverse events.[7] However, this information has evidently not been sufficient to convince health managers and prescribers to invest in changes that can reduce prescribing errors. Therefore, although prescribing errors have been widely studied, misadventures experienced by patients due these errors are neglected by healthcare professionals, especially in the cases of low-income patients covered by public health systems.[7, 8-10]

Notwithstanding the difficulty in demonstrating most relevant outcomes produced by prescription errors, some of these errors may be easily monitored and their results can be measured. A prescription error that makes it impossible to dispense a drug is a temporary obstacle for medication access. This impediment leads to the need for returning to the prescriber in order to ask for a new corrected prescription. Thus, a delay is expected in starting the treatment and extra expenses are accrued for returning to the prescriber.[10, 11] The outlay will be directly related to the difficulty in accessing the health service.[12]

This study aimed to identify the consequences of prescribing errors that impede drug dispensing at a private Brazilian community pharmacy from the perspective of patients.

Methods

A cohort study without a comparison group was performed with users of a community pharmacy in a city located in North East Brazil over four months. The pharmacy operates from Monday to Saturday from 7 am to 10 pm, and on Sundays from 7 am to 6 pm. Pharmacists cover the entire operation time on business days. They work half day on Saturdays and are not present on Sundays. When prescribing errors are detected and a pharmacist is present, he/she usually tries to contact the prescriber to resolve the problem. However, most of time this contact is unsuccessful. Thus, the next step is checking if the patients have information about their prescription that would help resolve the problem without further delay. If this is not possible, the prescribing error is fully described to the patients including what need to be fixed and that the reason for the delay is for their safety. However, this care is not generalizable to all community pharmacies in Brazil.

In Brazilian pharmacies, the medicines can be purchased through three procedures: 1) verbal request, without presentation of a prescription; 2) simple presentation of the prescription, although not mandatory; 3) presentation and retention of the prescription, which is restricted to substances subject to special control and antimicrobials, according to Brazilian laws. In the specific cases of narcotics, psychotropics, retinoic substances for systemic use and immunosuppressive drugs, the sale is made exclusively by the presentation of the prescription and retention of a document issued by the prescriber called 'Notification of Prescription'. At the end of the working day, the prescriptions are reviewed by the pharmacist and stored in the establishment for

two years and have to be made available for regulatory inspections. In Brazil, notwithstanding regulatory requirements, drugs are not sold exclusively by pharmacists or even for the training of a pharmacy technician to perform such an activity. Therefore, 'pharmacy auxiliaries' sell most drugs, a common practice in Brazilian community pharmacies.[13]

Pharmacy users, 18 years and older, were invited to participate in the study if they have tried to purchase a drug by presenting a prescription with errors that made it impossible to dispense at least one of the prescribed drugs. Users whose prescriptions presented unreadable corrections in the date, or whose prescription lacked a 'prescription notification' when it was needed were excluded from the study, in order to exclude possible tampering produced by the users themselves and that could be mistaken as errors. Users were also excluded when the error was identified to be lack of date, because in such cases, the dispensing is not impossible, as reported by the pharmacy team.

Data collection was performed only on business days between 2 pm and 6 pm. The entire pharmacy team was asked to refer all users to the study investigator when their prescription had errors that prevented dispensing. Those who fit the inclusion criteria were invited to participate in the study and asked to sign the consent form (ICF). After consent, data collection was started by asking patients to complete a pre-prepared questionnaire, regarding their demographic and economic data, clinical history, and the detected error. Thereafter, each study participant was contacted daily until the respondent reported resolution of the problem and the follow-up was completed. These definitions may be: acquisition of the drug from another pharmacy without substitution of the prescription, return to prescriber to correct the error and subsequent acquisition of medication, or no return to prescriber and ceasing of the treatment. The study project team neither used data that identified the prescriber nor established contact with the prescribers. Some of the medications that were not dispensed due to prescription error were identified and grouped under the first level of the Anatomical Therapeutic Chemical (ATC) Classification system[14], while those medications whose prescriptions were illegible were left unidentified.

The study was approved by the local ethics committee under registry number: CAAE 31537014.3.0000.5556.

Results

In the study period, 110 users met the inclusion criteria, of which 32 (29.1%) confirmed their participation in the study. There were 87 drugs prescribed, with a mean of 2.7 ± 1 (Md ± SD) drugs for each prescription. Table 1 shows the sociodemographic characteristics of the study population.

Table 1. General characteristics of users of the private community pharmacy included in the study.

Characteristics	*n*	%
Sex		
Male	17	53.1
Female	13	46.9
Age (years)		
18 to 39	14	43.7
40 to 60	18	56.3
Total family income (US$)		
≤28300	3	9.4
284 to 56600	8	25.0
56700 to 84900	9	28.1
85000 to 113200	4	12.5
≥113200	4	12.5
No answer	4	12.5
Prescriber category		
Doctor	30	93.8
Dentist	2	6.3
Type of health servisse		
Private	17	53.1
Public	15	46.9
Cause of attendance		
Infection	11	34.4
Psychiatric disorder	7	21.9
Pain/Inflammation	6	18.8
Other	4	12.5
Cardiovascular disorder	3	9.4
Neurological disorder	1	3.1

Of the 32 prescriptions, 20 (62.5%) were handwritten. Among the drugs that were no longer dispensed, eight (25.0%) could not be identified because they

were prescribed illegibly (all handwritten). The other drugs were grouped in the first level of the ATC Classification system, and are listed in Table 2.

Table 2. Anatomical Therapeutic Chemical (ATC) class of non-dispensed medication due to prescriptions errors at the private community pharmacy.

ATC class	*N*	%
Anti-infective for systemic use	10	31.3
Nervous system	9	28.1
Cardiovascular system	2	6.3
Musculoskeletal system	2	6.3
Dermatologicals	1	3.1
Illegible	8	25.0
Total	32	100.0

Table 3 presents the types of medication errors identified in the study.

Table 3. Kind of prescription errors identified that impeded drug dispensing

Kind of error	*n*	%
Incorrect dose	14	43.7
Illegible prescription	8	25.0
Lack of prescriber data	4	12.5
Incorrect prescription form	2	6.3
Incorrect dosage form	2	6.3
Erasure	1	3.1
Non-existent drug	1	3.1
Total	32	100.0

Nine patients (28.1%) reported no health impairment. All of them had been attended to by a private health service and were able to return to the prescriber the same day the problem was identified in the pharmacy. Among the 24 (75.0%) patients who tried to return to the prescriber, 16 (66.7%) reported difficulties in rescheduling a new appointment. The time to return to the prescriber ranged from 0 to 17 days. The mean time in public establishments was 8 ± 6.9 days (Md ± SD), while in private establishments the mean was 2.17 ± 3.1 (Md ± SD) days.

The eight users who purchased the drug at another pharmacy reported not having been seen by a pharmacist. Table 4 presents the main outcomes reported by users affected by prescription errors.

Table 4. Outcomes reported by the pharmacy users after their medications were not been dispensed because prescription errors.

Reported outcome	*n/N*	%
Returned to the prescriber	18/32	56.3
Spent time for return to health service (days)		
< 1	6/18	33.3
1 to 5	7/18	38.9
6 to 10	3/18	16.7
> 10	2/18	11.1
Purchased drug in other pharmacy	8/32	25.0
Remained untreated	6/32	18.7
Reported significant health damage	23/32	71.9
Reported extra expenses	19/32	59.4

Discussion

This study demonstrated that prescription errors that preclude dispensing of drugs at community pharmacies impaired access to medications and, as a consequence, produced clinical and economic harm to patients. Among the 32 users included in the study, 23 (71.9%) reported worsening of symptoms and of these, one (3.1%) reported the need for hospitalization. All of these patients associated the negative outcomes to the delay at the beginning of pharmacotherapy.

In general, studies that primarily investigated prescription errors often look at identification, categorizing, and cause definition. Conversely, this study identified the clinical and economic outcomes generated by these errors from the perspective of the patient. This approach may be a tool to demonstrate that failures at the time of prescribing can increase the risk of negative outcomes related to pharmacotherapy because those failures are the source of other errors that begin during drug administration and can even affect the access to a needed medication. This information must be used to foment the implementation of processes that improve the safety of the whole medication cycle, from the decision-making to the monitoring of the patient. [15]

Purchasing the medication in other pharmacies using the same prescription containing an error, as opposed to returning to the prescriber, was reported by 25% of the participants. This number must

be attributed to the model of selling drugs in private community Brazilian pharmacies where, according to a study conducted in a city in North East Brazil, only 23.6% of all drugs were dispensed by a pharmacist and the remaining were sold by someone at a lower grade than technician. Despite being a wrong practice, it usually occurs throughout the country. Moreover, the absence of the pharmacists is alarming since he/she is the only professional licensed and technically qualified to dispense drugs. In fact, this failure in Brazilian pharmacies shows a weakness in the process of medication prescribing, because it demonstrates an oversight in the early detection of errors in the prescription assessment conducted by the pharmacist.

Several studies have associated prescription errors with extra expenses accrued for institutions or health systems.[5, 7, 16] In view of the method used in this study, and the hesitation of some participants to report the amount of money spent, it was impossible to quantify their financial loss. However, based on the report of 19 (59.4%) participants, it was demonstrated that prescribing errors are also source for unnecessary expenditure because the medicines were not dispensed. These costs had resulted from travel expenses for returning the prescription to the prescriber or another pharmacy, the need to reschedule attendance with another professional (doctor), and the purchasing of a wrong medication at another pharmacy.

Among the identified problems, 14 (43.8%) were related to the drug dosage forms. Of these, six (42.9%) occurred due to omitting the dosage on the prescription, when more than one dosage form was commercially available, and eight (57.1%) were due to the use of non-existent dosage forms. These data are similar to those found in previous studies, in which such classified errors ranged from 18.2% to 59.8%. [17-19] The large number of drugs and dosages available on the market leads to an increase in this type of error and produces the need for checking manuals containing information about medicines, a practice that is not commonly adopted due to the lack of time and overwork of prescribing professionals.[20, 21]

High rates of illegible prescriptions were identified in this study. The illegibility of prescriptions is one of the primary causes of failures in communication between the prescriber and the pharmacy team, which leads to misinterpretations and, consequently, enhances the risk of dispensing and administration errors.[22] These errors are also the cause for misunderstanding the prescription by the patient, which affects their adherence to the treatment.[23] All prescriptions with some illegible data were handwritten. Relevantly, the use of computerized prescriptions is cited as a way of minimizing the difficulties of understanding and solving these problems. [24] Unfortunately, this is still not a widely used technology in Brazilian health services, especially in the public health system.

The lack of prescriber data, such as lack of graphic marking and signatures, makes the communication between pharmacists, patients, and prescribers difficult, especially in situations where treatment doubts arise.[18] This type of carelessness contributes to the excessive and illicit use of medicines, as it allows adulterations of the prescription, as well as suppressing the legal value conferred on the document.[9]

The total time spent by patients in returning to prescribers ranged from 0 to 17 days. Patients who reported no worsening of symptoms were those who managed to get the new prescription on the same day that the error was detected by the pharmacist or, at the most, returned the next day. The delay in initiating treatment can bring serious risks to the patient since often medications are essential to the maintenance or improvement of health conditions, productivity, and general wellbeing.[25]

The therapeutic classes with the highest rate of errors in prescriptions were anti-infectives and drugs that act on the central nervous system, according to the ATC classification. This was expected in view of the greater rigor defined in dispensing these drugs because, for most of them, the dispensing is conditioned to the withholding of the prescription or notification and accountability to the sanitary regulatory authority.

One limitation of the study was that all data regarding financial expenses and clinical harm were self-reported. Thus, it was not possible to measure the expenses or harm to the patients' health produced by the delay in starting the treatment. The large number of users who refused to participate in

the study could be described as another limitation. However, we consider that this is not a source of bias since, even in a small number of individuals; it was possible to identify an important number of reports of preventable harms.

Conclusion

Prescribing errors that make it impossible to dispense drugs produced clinical harm and financial losses from the patient's point of view. Implementing procedures that reduce the chance of errors during the prescribing process and ensuring that all patients are attended to by a pharmacist can decrease medication errors and drug-related adverse events.

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