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Article

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Drug-dispensing problems community pharmacists face when patients are discharged from hospitals: a study about 537 prescriptions in Alsace

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Abstract

Objectives: To identify both type and frequency of the challenges community pharmacists face when dispensing drugs from hospital discharge prescriptions, to describe the measures undertaken to resolve the issues at stake and to list their consequences.
Design: We carried out an observational study in the community pharmacies of the French region of Alsace and asked the community pharmacy staff to review 537 hospital discharge prescriptions in 2013 using anonymous data collection forms.
Setting and Participants: Nineteen community pharmacies.
Main outcome measures: Number of patients informed about their medication (at hospital and/or community pharmacy), type and frequency of issues encountered during drug dispensing, type and frequency of measures undertaken to resolve the issues, type and frequency of the consequences regarding drug dispensing.
Results: Community pharmacists faced 165 challenges from 145 hospital discharge prescriptions (i.e. 27.5% out of 528 analysed prescriptions), mostly correlated to the quality of the prescriptions (n = 100, 60.6%) or to logistical matters (n = 54, 32.7%). A mere 36.8% of the patients received information pertaining to their medication while being hospitalized. Of note, 40.5% of the prescriptions were delivered to pharmacies within 2 days following the patients' discharge. In order to resolve the different issues preventing drugs from being dispensed (n = 33/145 prescriptions), pharmacists sought information, mainly from patients, colleagues and hospital prescribers. The pharmacists were able to dispense all the drugs prescribed in 138 out of 145 cases (95.2%).
Conclusions: This study highlighted the challenges encountered by community pharmacists and their significant contribution to the continuity of care upon patients being discharged from hospitals.

Key words: community pharmacist, hospital discharge, drug-related problems, pharmaceutical counselling, medication reconciliation

Introduction

The discharge period of patients from hospitals is crucial to ensuring the continuity in health-care services [1]. This transitional phase requires an effective cooperation and an optimal relay of information between the hospital and primary care in order to ensure the proper degree of coordination and seamless care [2, 3].

Discontinuation of the treatment is a significant part of drug-related problems observed after hospitalization. A large number of changes in treatment regimen during hospital stays are not communicated properly to either the patients, the primary care physicians or the community pharmacists. Incomplete or illegible discharge instructions, misspelt drug name, incorrect dosing and omission are but a few examples of frequent unintentional medication discrepancies that can be observed under these conditions [4–6]. Consequently, patients face increasing risks of post-discharge complications in the course of drug–drug interactions, adverse drug events, hospital readmissions, as well as drug-related cases of morbidity and mortality [7]. According to Coleman *et al.*, [1] 14.3% of patients aged 65 years or older who experienced medication discrepancies after their discharge were readmitted to hospitals within 30 days compared to 6.1% of patients who did not experience any discrepancy.

Hospital and community pharmacists are both well suited to ensure coordinated medical care by providing high-quality discharge information and counselling services [2, 4, 8, 9]. The main priorities are to prevent, to identify and to resolve unintentional medication discrepancies and drug-related problems. However, meeting these responsibilities can be challenging for community pharmacists as they are usually unaware of treatment changes following hospital discharge [5].

Several studies assessed how medication discrepancies and drug-related events affect hospital admissions or discharges [2, 5, 9]. Only a few carried out an analysis from the point of view of community pharmacists [4, 8, 10]. For instance, a European study by Paulino *et al.* examined the effects of a wide range of drug-related problems on patients discharged from hospitals. However, this study did not include French community pharmacies [4]. Consequently, pharmacists require a better assessment and understanding of the quality of hospital discharge prescriptions in order to ensure optimal patient management.

The purpose of the study was 3-fold. One the one hand, it aimed at identifying both type and frequency of the challenges community pharmacists face when dispensing drugs from hospital discharge prescriptions, on the other hand at describing the measures undertaken to resolve the issues at stake and, finally, at listing their consequences.

Method

Background

This study was conducted by the OMEDIT (Observatoire des Médicaments, des Dispositifs médicaux et de l'Innovation Thérapeutique) of Alsace, an entity linked to the regional health agency (Agence Régionale de Santé—ARS). Alsace is a French region with 1.8 million inhabitants.

Study design

An observational study was carried out in community pharmacies in Alsace, in partnership with the Faculty of Pharmacy of Strasbourg—Alsace. All senior pharmacists, supervising 1 of the 38 pharmacy students as part of their 6-month practical internship in 2013, were sent a letter explaining the purpose of the study, and asked whether they agreed to participate in the study. Upon approval, the students were asked to fill in anonymous data collection forms for each hospital discharge prescription—initial prescription or renewal—that they themselves or another health professional of the community pharmacy dispensed between 13 May and 15 June 2013.

Data collection forms

A pilot study was conducted in three community pharmacies to test the data collection form. Following this exploratory evaluation, it was decided to split the data collection form into two separate documents: one was dedicated to the collection of data related to drug dispensing without any problem, the second to complex situations resulting in specific issues. Both questionnaires were designed with a section dedicated to the collection of general information: name of the community pharmacy, name of the pharmacy student collecting the data, start and end dates and time of drug dispensing, name of the hospital and identification of the medical department, type of prescription (initial prescription or renewal), information about the interlocutor at the community pharmacy (patient, relative(s) or caregiver), and additional data related to the information provided to the patients about their treatment (either written or verbal counselling, category of hospital staff who provided the information). These additional data were gathered only when available as part of the pharmacists' standard activity. Neither the patients nor their relatives were asked specific questions related to the study. The second questionnaire was designed with additional sections, aiming at a detail record of (i) the problems pharmacy students or their colleagues identified while dispensing a hospital discharge prescription, (ii) their actions to solve these problems and (iii) the impact of these problems on the patient's clinical management. A problem was defined as any situation with a potential negative impact on patient management, whether logistically, from the point of view of quality and/or the content of the prescription or any pathophysiological disorder contraindicating the use of the prescribed drug.

Both the anonymized hospital discharge prescriptions and the data collection forms were sent electronically by means of a secure platform the OMEDIT made available for the purpose of this study. All participating pharmacy students received an instruction manual detailing the procedure for electronic submission of the documents. The students who did not have the convenience of a scanner gave the documents directly to the study coordinator once a week.

Follow-up

A few days prior to the launch of the survey, a meeting was held with the pharmacy students at the Faculty of Pharmacy. The aim was to review the objectives and the methodology of the study. The students were taught how to collect data and how to use the submission platform. Each participant was given a copy of the two different data collection forms and advised to contact the study coordinator in case of questions related to the data collection procedure. E-mail reminders were sent before and at regular intervals during the study in order to enhance participation and to optimize the number of questionnaires completed.

An estimate of 500 prescriptions was calculated based on a study time frame of 1 month and a daily consultation average of one patient discharged from hospital for each pharmacy student.

Statistical analysis

Following the pilot study, the questionnaire was subject to important changes. Hence, the questionnaires from the pilot study were

not combined with the main study for analysis. Data were gathered and analysed using Microsoft Excel® 2007; data from the questionnaires were cross-referenced by a second independent reviewer from the OMEDIT with the anonymized hospital discharge prescriptions upon completing the Microsoft Excel® 2007 spreadsheet. Furthermore, data quality control was carried out on 30 questionnaires (5.68% of all data collected) upon final data entry. Numbers, averages and proportions were used to sustain the descriptive statistics. Comparison was performed using Pearson's Chi-squared test, since all of the variables were categorical variables. A *P*-value below 0.05 was considered to be of statistical significance. Computations were performed using R, version 3.1.0.

Ethical approval

Information strictly required for the purpose of the study was collected in an anonymized manner. The authors state that no ethical approval was needed.

Results

A total of 19 community pharmacies expressed their approval of participating in the study. The main reasons provided for renouncing participation were lack of time and workload. Data collection forms were collected for 537 hospital discharge prescriptions. Nine questionnaires were excluded from the analysis: they were either incomplete, did not concern any drug dispensing or were not filled out in time. This resulted in 528 questionnaires being analysed.

Characteristics of hospital discharge prescriptions

The prescriptions were from 25 hospitals: 333 (63.1%) of them from the University Hospital of Strasbourg. Emergencies, gynaecology and obstetrics, psychiatry, paediatrics, medical oncology, haematology–oncology, internal medicine and ophthalmology were among the main medical departments issuing hospital discharge prescriptions.

Discontinuation of drug regimen due to patients

We used the time frame between a patient's hospital discharge and presentation of the prescription at the community pharmacies to determine whether patient behaviour could result in interruption of treatment: in 40.5% of cases, the patients came to a community pharmacy <2 days upon hospital discharge. This time frame corresponded to a renewal of prescription in 40.3% of the cases ($n = 81$). We then conducted an analysis of the hospital discharge prescriptions for which the period was longer than 2 days. Based on our observations, we found that heparins were delivered to three patients 3–5 days following hospital discharge.

Information addressed to patients or relatives

As shown in Table 1, patients or family members received information about the treatment at the hospital in 36.8% of the cases ($n = 193/525$, three questionnaires with a blank for this specific item). Patients or relatives experienced more difficulties at the community pharmacies, when they were not provided with information about their treatment in hospitals (Pearson's Chi-squared test, $P = 0.012$). The result suggests that providing information prior to being released from hospital reduces the risk of encountering difficulties. Physicians and resident doctors resorted to verbal counselling in 92.4% ($n = 134/145$, 48 blanks) of the cases to provide information. Our analysis showed only one clinical hospital pharmacist providing information to a patient.

With respect to community pharmacies, they provided counselling in 85.4% of cases ($n = 450/527$), and delivered information mainly through verbal counselling (57.6%, $n = 256/444$, 6 blanks) but also verbal briefing associated with written reminders (39.0%, $n = 173/444$, 6 blanks).

Difficulties encountered during drug dispensing

Table 2 highlights the frequency of difficulties encountered during drug dispensing. The staff of the community pharmacies reported one or more difficulties when dispensing drugs from the hospital prescriptions in 27.5% of the cases ($n = 145$ prescriptions). The table also highlights 165 different categories of issues, ranging from 1 to 4 different sorts of difficulties per prescription. The quality of the paper form of the prescription accounted for 60.6% of the cases ($n = 100$, with illegible or incomplete prescriptions preventing immediate drug dispensing in 19 cases). In 32.7% of the cases, the issues were related to logistics ($n = 54$, with issues

Table 1 Information provided to patients or relatives at the hospital

Information provided	Prescription without difficulties ($n = 382$)		Prescription with difficulties ($n = 145$)		Pearson's Chi-squared test *P*-value
	n	%	*n*	%	
Yes	155	40.6	38	26.6	$P = 0.012$
No	62	16.2	28	19.6	
'Do not know'	165	43.2	77	53.8	

Table 2 Hospital discharge prescriptions: type of prescribing form and frequency of difficulties encountered during drug dispensing

Type of prescribing form	Prescription without difficulties ($n = 383$)		Prescription with difficulties ($n = 145$)		Pearson's Chi-squared test *P*-value
	n	%	*n*	%	
Written or partly written prescription (including French national regulatory paper form for specific drugs)	295	77.0	134	92.4	<0.001
Computerized prescribing form	88	23.0	11	7.6	

preventing the drug from being dispensed in 10 cases: drugs that were out of stock, no longer on the market or reserved exclusively for hospital use). Problems related to drug prescription (drug–drug interactions, overdose, …) and associated with the patient's clinical status were detected in 4.8% ($n = 8$) and 1.8% ($n = 3$) of the cases, respectively. All these problems prevented the treatment from being immediately dispensed. Details of the difficulties are shown in Table 3.

Resolution of difficulties preventing the drug dispensing

Thirty-three out of 145 prescriptions presented at least one difficulty which prevented drugs from being dispensed. Furthermore, several difficulties resulted from these 33 prescriptions. Hence, 42 different researches had to be carried out in order to seek information which could be used to resolve the issues, either from the patients (40.5%, $n = 17$) or from colleagues [pharmacists (26.2%, $n = 11$) or pharmacy technicians (4.8%, $n = 2$)]. Pharmacists also resorted to other various databases—pharmaceutical records (11.9%, $n = 5$), former prescriptions (2.4%, $n = 1$) or other (14.3%, $n = 6$) to seek for information.

In eight cases, information was obtained outside of community pharmacies, namely through one wholesale-distributor and seven hospital health-care professionals (nurses and practitioners) either to offer a substitution drug (three cases), to ask for more specific information (two cases) or to suggest a new prescription (one case) and to request the addition of a drug to the prescription (one case). All the requests were accepted by hospital health-care professionals.

Consequences of the challenges encountered during the drug dispensing

Table 4 lists the consequences of the challenges encountered with 145 hospital prescriptions. In over 95% of the cases ($n = 138$), drug dispensing was eventually possible despite the challenges. In 25.5% of the cases ($n = 37$), drug dispensing was delayed. Our study detected only two cases of refusals of drug dispensing by a community pharmacy: to renew a hypnotic drug and to deliver a drug prescribed twice.

Table 3 Hospital discharge prescriptions: characterization of the type of the difficulties encountered

Type of the difficulties encountered	Number of difficulties = 165 (concerning a total of 145 prescriptions)
Failure in supply chain/logistics	*54 (32.7%)*
Drug or medical device out of stock at the community pharmacy	42 (77.8%)
Drug or medical device out of stock at the manufacturer	3 (5.6%)
Drug or medical device not reimbursed under French public plans	2 (3.7%)
Drug or medical device ceased to be marketed	2 (3.7%)
Insufficient quantity prescribed	2 (3.7%)
Drug prescribed twice	1 (1.9%)
Drug marketed in a foreign country but not in France	1 (1.9%)
Drug for exclusive hospital use	1 (1.9%)
Quality of the prescribing form	*100 (60.6%)*
Name of the physician unspecified	62 (62.0%)
Date of the prescription missing	10 (10.0%)
Drug dosage unspecified	5 (5.0%)
Signature of the physician missing	4 (4.0%)
Size of bandages and compresses unspecified	4 (4.0%)
Improper or missing treatment period	3 (3.0%)
Name and/or first name of the patient missing or unidentifiable	3 (3.0%)
Patient information necessary for drug dispensing missing (weight of the child, leukocyte count, …)	2 (2.0%)
Name of the physician illegible	2 (2.0%)
Name of the drug/medical device illegible	1 (1.0%)
Narcotic drugs: improper prescription	1 (1.0%)
Lack of information concerning the drug prescribed	1 (1.0%)
French national regulatory paper form for specific drugs not used	1 (1.0%)
Unidentifiable hospital	1 (1.0%)
Drugs	*8 (4.8%)*
Inadequate drug dosing	2 (25.0%)
Drug interaction	1 (12.5%)
Overdose	1 (12.5%)
Omission	1 (12.5%)
Dosage not matching with usually prescribed dosage	1 (12.5%)
Inadequate drug prescribed amount	1 (12.5%)
Non-existent dosage	1 (12.5%)
Clinical status of the patient	*3 (1.8%)*
Inappropriate galenic form	1 (33.3%)
Off-label prescription for a woman	1 (33.3%)
Inadequate size of the medical device	1 (33.3%)

Discussion

The following study focused on the analysis of 528 hospital discharge prescriptions and identified the challenges community pharmacists face when dispensing drugs as well as their consequences on patient management.

Furthermore, we revealed that any delay in visiting a community pharmacy upon hospital discharge can lead to a discontinuation of the treatment. Although we have identified but a few cases, these can nevertheless have serious clinical consequences. By applying the method of scoring of the potential gravity of medication errors of Doerper *et al.* [11], the omission of anticoagulants such as heparin for 3–5 days after hospital discharge is considered to be a serious and major drug event (i.e. likely to have clinical consequences such as readmission, reversible or permanent physical impairments). Such cases of treatment discontinuations due to patients' behaviours suggest that they are not fully informed of the risks associated with a misuse of prescribed drugs. Therefore, the patients should be provided with increased counselling upon their hospital discharge (goal of the treatment, explanations for changes, potential side effects, …) [12, 13]. The optimal approach which would allow patients to feel more involved with their medication is the development of medication reconciliation, supported by pharmaceutical counselling at the time of hospital discharge [5, 8, 14]. Patients' follow-up could also be organized beyond hospital discharge by means of home visits or telephone calls and should help patients to better understand their drug regimen [9,15–16]. Extra monitoring of patients upon hospital discharge could equally be used as an opportunity to check upon the patients' adherence to treatment and allow an earlier detection of adverse drug reactions. Several studies have evaluated the efficiency of these types of actions [5, 9, 17–20]. For example, Al-Rashed *et al.* [17] showed that

Table 4 Consequences of the difficulties encountered

Consequences of the difficulties	Number of prescriptions ($n = 145$)	Examples
Full drug dispensing	*138 (95.2%)*	
Possible drug dispensing	92 (63.4%)	
Drug dispensing delayed	34 (23.4%)	33 cases of drugs not in stock
Drug equivalent dispensing	8 (5.5%)	Stop marketing or non-existence of a specific dosage of a drug Switching a drug to another one with appropriate galenic form for a patient with a stoma Drug not available in France
Drug dispensing including a different dose	1 (0.7%)	No match of the prescribed dosage with the usually prescribed regimen: Drug dispensing of the usual dosage
Drug equivalent dispensing with delay	3 (2.1%)	Contraindicated drug and switch to an equivalent one Stop marketing
Partial drug dispensing	*7 (4.8%)*	
Partial drug dispensing or drug-dispensing denial	3 (2.1%)	Drug with a pharmaceutical firm out of stock Drug prescribed twice on two different prescribing forms Refusal of renewal of one hypnotic drug prescription (prescription legally limited to 28 days)
Partial dispensing with the introduction of an equivalent drug	1 (0.7%)	Drug restricted to hospitals
Partial drug dispensing due to patient refusal	3 (2.1%)	Non-reimbursed drugs

pharmaceutical domiciliary visits reduced unplanned hospital readmissions and visits to primary physicians. The community pharmacist could ensure this post-discharge monitoring [21, 22]. Thus, a variety of counselling approaches can be developed to optimize the performance of health-care providers, under the assumption of patient adherence, however. Indeed, some patients do not care about their own health even if properly informed.

The second part was dedicated to the community pharmacists' perspective on the analysis of the problems related to drug dispensing upon hospital discharge. Most of the challenges identified by the pharmaceutical staff were related to the quality of the prescription: lack of information or illegible information on prescription (60.6% of cases). These data support the study carried out by Calligaris *et al.* [23], who revealed that 23.9% of the prescriptions were illegible and 29.9% were incomplete. Computerization reveals to be an effective way to improve the quality of prescriptions and thus to overcome these difficulties, as shown in Table 2 [24–26]. In addition, prescription assistance software allows automatic detection of drug–drug interactions.

Very often, our study has shown that the treatment prescribed at the hospital was not immediately available at the community pharmacies. Although this difficulty can be easily solved through orders from a wholesale-distributor, it nevertheless led to a delay in drug dispensing in a quarter of the situations. This discontinuation of patient care is a perfect example of the need for a closer collaboration between hospital professionals, primary care physicians and pharmacists [12, 22]. Medication reconciliation upon hospital discharge could be the case for good clinical practice and avoid treatment discontinuation [5, 8, 14]. The development of secure electronic mailing systems should also facilitate the transfer of confidential data from hospitals to ambulatory care [27, 28].

The challenges related to contraindications, drug–drug interactions, use of inappropriate medication according to the patient's clinical status were less frequent than quality and logistical problems. This low frequency of issues reflects adequate management of the patients, but may also partly be explained by the impossibility of French community pharmacists to produce relevant pharmaceutical assessments due to restricted access to patients' medical and biological data [29]. Studies carried out abroad, such as Joosten *et al.* [30], showed that access of data relative to the patients' renal function allowed community pharmacists to identify iatrogenic effects through extensive pharmaceutical analysis.

We have to point out nonetheless that our study has some limitations. First, we cannot ensure that non-participating community pharmacists did not have different practices, especially regarding information provided to patients or relatives. Furthermore, as we had only asked pharmacists in Alsace, it is therefore difficult to extrapolate the results of this study on both the national and international levels. Finally, the study did not detect patients who had been discharged from the hospital but who never purchased their required drugs at community pharmacies.

Conclusion

Community pharmacists face many issues following a patient's discharge from hospital. In most cases, these difficulties are related to prescription quality or to various logistic concerns. Moreover, they face a higher risk of encountering difficulties with patients who are discharged without being given any information about their medication. These issues aside, many patients do not show up on timely manner with their prescription at community pharmacies. This may unknowingly lead to discontinuation of their treatment and hence to serious clinical complications. In order for community pharmacists to be able to successfully ensure continuous patient care, information provided by hospital health-care professionals needs to be improved.

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