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Article

Medication dispensing as an opportunity for patient counseling and approach to drug-related problems

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The objective was to describe and evaluate a model of drug dispensing developed and implemented in a community pharmacy in Brazil. This was a descriptive, observational, quasi-experimental study performed in the period between 21 January 2013 and 20 April 2013. The model was evaluated and described in terms of three parameters: structure, process and outcome. The description and assessment of each parameter was performed as follows: (I) Structure: profile of patients, pharmacist's professional profile, physical facility, informational material; (II) Process: drug-related problems, pharmaceutical interventions performed, results of pharmaceutical interventions; (III) Outcome: patient knowledge of medications. Dispensing service improved patient knowledge of medications ($p < 0.05$), which was associated with pharmacotherapy complexity ($p < 0.05$). The main problems identified were related to lack of patient knowledge regarding their medication (52.9%). Pharmaceutical interventions were mostly performed directly to the patients (86.3%) by verbal (95.4%) and written (68.2%) information, and most of the problems were completely solved (62.7%). The medicine dispensing model was able to identify and solve drug-related problems and promote an improvement in patient knowledge about medication.

Uniterms: Community Pharmacy. Medicines/dispensing. Patients/directive counseling. Medication/errors. Pharmaceutical Care. Quasi-experimental study.

O objetivo foi descrever e avaliar um modelo de serviço de dispensação de medicamentos desenvolvido e implantado em uma Farmácia Comunitária no Brasil. Trata-se de restudo descritivo, observacional e quase-experimental, realizado no período de 21 de janeiro a 20 de abril de 2013. A descrição e avaliação do modelo foi realizada segundo os parâmetros: estrutura, processo e resultado.Os aspectos descritos e avaliados foram: 1. Estrutura: perfil dos pacientes, perfil profissiográfico dos farmacêuticos, estrutura física, material de informação; 2. Processo: problemas relacionados ao medicamento detectados, intervenções farmacêuticas realizadas, resultados das intervenções farmacêuticas; 3. Resultado: conhecimento do pacientes sobre os medicamentos utilizados. A dispensação proporcionou melhora do conhecimento do paciente sobre os medicamentos ($p < 0,05$), que demonstrou-se associada à complexidade da farmacoterapia ($p < 0,05$). Foram identificados majoritariamente problemas relacionados à falta de condições do paciente em utilizar o medicamento (52,94%). As intervenções farmacêuticas foram realizadas predominantemente junto ao paciente (86,27%) através do fornecimento de informações verbais (95,4%) e escritas (68,2%) e, em sua maioria, o problema que originou a intervenção foi totalmente resolvido (62,75%).O serviço foi capaz de identificar e resolver os problemas relacionados ao medicamento e contribuiu para a melhoria do conhecimento dos pacientes relativo aos medicamentos utilizados.

Unitermos: Farmácia Comunitária. Medicamentos/dispensação. Pacientes/aconselhamento diretivo. Medicação/erros. Atenção farmacêutica. Estudo quase-experimental.

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INTRODUCTION

According to the current legislation in Brazil, dispensing consists in "the pharmacist's role in providing instructions, medications and medicinal products to a patient, as a remunerated work or not"(Conselho Federal de Farmácia, 2001).This definition is in accordance with regulatory documents in European countries and in the United States of America, as well as the recommendations developed by the World Health Organization (WHO). In these documents, there is a consensual concept that dispensing should incorporate the cognitive aspect of understanding the information contained in the drug prescription to the medication and to the patient, and convert them into individualized instructions in order to promote an appropriate use of the medication and increase the chances of therapeutic success (American Pharmacists Association, 1998; Angonesi, 2008; Foro de Atención Farmacéutica, 2008; World Health Organization, 2002). In addition, dispensing aims to identify drug-related problems (DRP), which are those situations that cause or may cause adverse effects associated with the use of drugs, and correct them by means of interventions (Angonesi, 2008; Foro de Atención Farmacéutica, 2008).

Some researchers have proposed patient-focused structuring models of dispensing services that consider both cognitive and technical aspects in community pharmacies in Brazil and other countries such as Spain (Angonesi; Rennó, 2011; Foro de Atención Farmacéutica, 2007; Soares *et al*., 2013). However, few studies have evaluated these models after their implementation.

The present study aimed to describe and evaluate a medicine dispensing model developed and implemented in a community pharmacy of a public university in Goias, Brazil.

METHODS

This was a descriptive, observational, quasi-experimental study performed in a community pharmacy of a public, national university, located in Goiás, Brazil.

This study was approved by the Research Ethics Committee of the Federal University of Goiás (number 222/2012) and participants gave written informed consent before taking part.

Setting charachteristics

In Brazil, campus pharmacies are community pharmacies run by schools of pharmacy, and designed for academic education (Conselho Federal de Farmácia, 2008).

The following described process, which is now part of the routine service of the campus pharmacy (CP), was implemented in January 2012 aiming to establish a medication dispensing model in accordance with the National Policy of Pharmaceutical Assistance (Brasil, 2004) and current legislation (Brasil, 2009, 2001; Conselho Federal de Farmácia, 2001). The model was based on previous experiences reported by Angonesi e Rennó (2001), Dáder *et al*. (2008), Iglésias-Ferreira and Santos (2009) and the Foro de Atención Farmacéutica (2007). In order to standardize each procedure and conduct, we established standard operating procedures, and performed the training of all pharmacists responsible for drug dispensing.

Medication dispensing process at the CP is conducted in continuing steps to obtain personal and pharmacotherapy information about the patient, to understand and interpret drug prescription, to perform pharmaceutical interventions, and finally to dispense medications (Figure 1). It is worth pointing out that, since dispensing of compounding medications is also performed at the CP, not all steps illustrated in Figure 1 are performed in the presence of the patient. Interpretation of prescription, for example, is generally conducted in the interval between the compounding medication order and its dispensing.

Medications are dispensed to patients and/or their caregivers. Drug prescription is carefully examined for its comformity to Brazilian regulations (Brasil, 1973). Then, the patient is interviewed by a pharmacist regarding

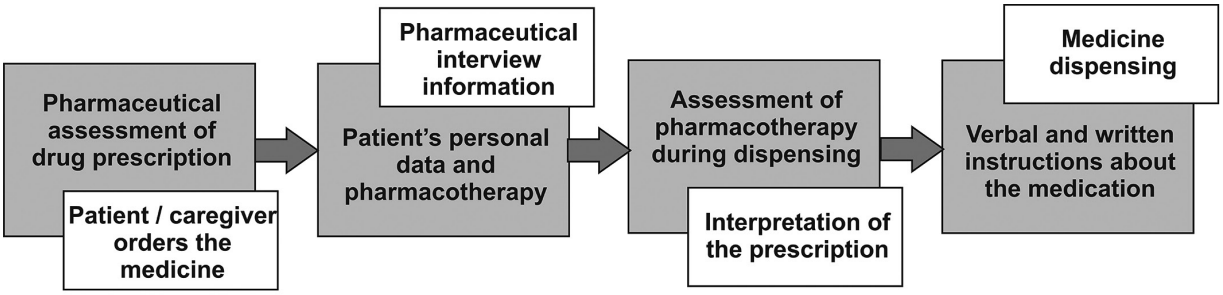

FIGURE 1 - Flowchart of the dispensing services routinely conducted at the Campus Pharmacy of the Federal University of Goias.

personal data and information related to pharmacotherapy: age, sex, height, weight, occupation, allergies and other chronic diseases, use of medications, smoking and drinking habits, pregnancy and lactation. Also, the pharmacist asks whether the patient is aware of the aim of the therapy, how to take the medications, and verifies if expected results of the therapy are being achieved and the occurrence of adverse effects. All data are stored in a dedicated software for pharmaceutical data management, Pharmacie (Pharmasoftware, 2013). Finally, the pharmacist interprets the prescription according to an adaptation of the guidelines proposed by the *Grupo de Investigações em Cuidados Farmacêuticos da Universidade Lusófona*, Portugal, (GICUF) (Group for Investigation on Pharmaceutical Care of Lusofona University, Portugal) (Iglésias-Ferreira, Santos, 2009) (Figure 2).

In this pharmacotherapy assessment tool, the five questions regarding each medication presented in the

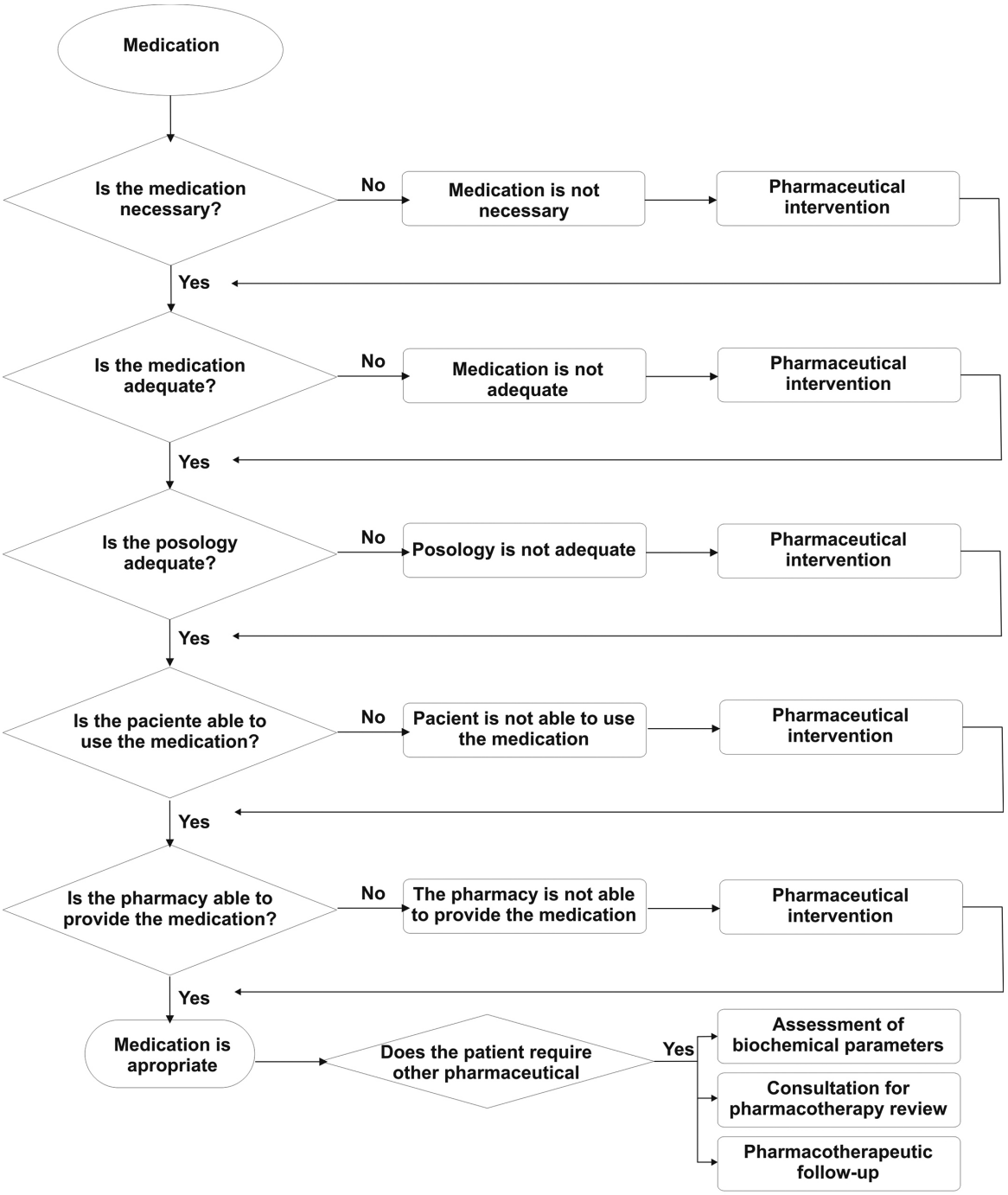

FIGURE 2 - Flowchart of the assessment of pharmacotherapy at the Campus Pharmacy of the Federal University of Goias. Adapted from: Iglésias-Ferreira, Santos, 2009.

flowchart are sequentially answered. When a DRP is identified (i.e. when the answer to any of these questions is "no"), the assessment process is discontinued and the problem-solving process is initiated. According to the pharmacist's clinical decision, each DRP may lead to pharmaceutical interventions, followed by the reassessment of the pharmacotherapy. These steps are successively repeated until the answers to all the questions are "yes". The interventions can be directed to the person who made the prescription, the patient or the medication in use, in accordance with the Pharmaceutical Care Network Europe classification of DRP (Version 6.2) (Pharmaceutical Care Network Europe Foundation, 2010). At the end of the pharmacotherapy analysis, the pharmacist evaluates whether the patient needs other pharmaceutical services and refer the patient when deemed necessary. All DRP identified and pharmaceutical services performed are registered in the appropriate registration form of the CP.

Medication is then dispensed and proper directions of use are provided by the pharmacist as recommended by the International Pharmaceutical Federation (International Pharmaceutical Federation, 2012). Medication information is provided orally or in written form.

Description and assessment of the CP dispensing service

The description and assessment of the service was performed in terms of the three parameters: structure, process and outcome, used by Donabedian (2005) to evaluate the quality of medical care and adapted by Farris e Kirking (1993) to evaluate the quality of pharmaceutical care.

The description and assessment of each parameter was performed as recommended by the Ministry of Health of Brazil (Brasil, 2006), international agencies (Morak *et al.,* 2010) and previous studies (França Filho *et al*., 2008; Correr *et al*., 2004; Dewulf *et al.,* 2006; Donabedian, 2005; Fernández-Llimós *et al*., 2002; Martins, 2012), as follows: (I) Structure: profile of patients, pharmacist's professional profile, physical facility, informational material; (II) Process: drug-related problems, pharmaceutical interventions performed, results of pharmaceutical interventions; (III) Outcome: patient knowledge of medications.

Structure description

The profile of patients was defined by the following variables: sex, age, type of health service from which drug prescription was obtained (public or private), and complexity of pharmacotherapy, collected from the CP registration database (Pharmasoftware, 2013). Complexity of pharmacotherapy was calculated using the Medication Regimen Complexity Index (Melchiors, Correr, Fernández-Llimos, 2007) and dichotomized into low (< 7 points) and high (≥ 7 points)(Fröhlich, Pizzol; Mengue, 2010).

Pharmacists' professional profile was defined by the following variables: the time elapsed since graduation, postgraduate course, graduate degrees, refresher courses in the area completed within the last 5 years, and attendance in symposium and conferences in the last 5 years. These data were obtained from the pharmacists' résumé available at the National Council for Scientific and Technological Development website (Brasil, 2013a).

The informational material was described according to updating of the content and classification of the source of information (primary, secondary, tertiary).

Process description

The duration of each stage of the dispensing service was recorded by the pharmacists, who used a digital chronometer. The first service was determined as the time elapsed between the moment the patient presented the prescription to the pharmacist and the moment the patient left the drug dispensing table. The time taken for the interpretation of the prescription was determined by the time taken by the pharmacist to start and conclude the prescription analysis if no DRP was detected, or by the time taken by the pharmacist to start the prescription analysis and detect the first DRP. The time for dispensing was defined by the time elapsed between the moment the patient ordered the prescribed drug and the moment the patient left the drug dispensing table.

DRPs were classified according to the parameters proposed by the GIGUF (Iglésias-Ferreira, Santos, 2009). Pharmaceutical interventions were classified according to the Pharmaceutical Care Network Europe – PCNE V6.2 classification(Pharmaceutical Care Network Europe Foundation, 2010). To each DRP, more than one intervention could be made.

All data were obtained from the CP registration database.

Outcome evaluation

Patients or their caregivers (age ≥ 18 years old) who attended the dispensing service in the period between 21 January 2013 and 20 April 2013 participated in the outcome evaluation stage. Informed consent was obtained from all participants.

Exclusion criteria included communication impairment, clinical limitations, situations when the

medication was dispensed to other individuals different from the patients or their caregivers, participants who did not answer all questionnaires.

The outcome evaluation questionnaires were applied in a pretest-postest design: first, by the pharmacist, when the patient ordered the medication at the campus pharmacy; second, by a trained telephone interviewer, 30 days following dispensing (Figure 3).

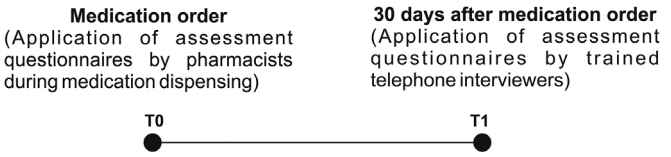

FIGURE 3 - Assessment timepoints of patient knowledge of medication in the evaluation of the dispensing service.

Patient knowledge of medication was assessed by a validated questionnaire (Fröhlich, Pizzol, Mengue, 2010), which was developed to evaluate the level of knowledge about drug prescription in the primary health care in Brazil. When more than one medication was dispensed, the questions were asked regarding the first medication listed on the prescription. The first question ("What's the name of the prescribed medicine?") was excluded from the evaluation, since the telephone interviewer stated which medication the patient would be asked about. The final classification point was adapted and appropriately corrected for this exclusion. Patients' level of knowledge about drug prescription was dichotomized into low (< 8 points) and high (≥ 9 points) (Fröhlich, Pizzol, Mengue, 2010).

Patients were categorized into two groups according to their level of knowledge about medication: (I) persistent low level of knowledge: patients who had a low level of knowledge before and after the pharmaceutical service; (II) increased level of knowledge: patients who had a low level of knowledge about drug prescription before the pharmaceutical service, and achieved a high level of knowledge after the service.

Data analysis

All data collected was stored in a Epi Info 3.5.4 (Centers for Disease Control and Prevention, 2012) database, and analyzed by using the STATA software, version 12 (Statacorp, 2011). Comparisons between the level of knowledge about drug prescription before and after medicine dispensing were performed by McNemar's test. A p-value < 0.05 was considered to be statistically significant. Associations between variables were assessed by the Wald test.

RESULTS

Structure description

During the study period 769 users attended the pharmacy, and 170 users met the inclusion criteria. Of these, 48 did not complete the data collection instrument in the second assessment, 16 did not return to the pharmacy to get the medication ordered and 02 did not receive their medications due to DRPs. Hence, a total of 104 patients completed the study.

Most participants were women (80.8%), aged ≥ 40 years (66.0%), users of the public health service (54.0%), who had previously attended the CP (63.5%), following a low-complexity pharmacotherapy regimen (80,8%).

Two pharmacists were responsible for the drug dispensing during the study. They had graduated at least 5 years before the beginning of the study, both of them did specialization courses, and one of them had a Master's degree. Also, they have attended refresher courses in the area, symposium and conferences within the last 5 years.

The sources of informations used in the study were of primary and secondary types - list of scientific journals and database such as Micromedex® e Drugdex®, available at the Capes website (BRASIL, 2013b), and tertiary - a comprehensive bibliography.

Dispensing was performed with the patient seated comfortably in appropriate physical facilities,including tables, chairs and private room if needed.

Process description

The average time for the stage of 'medicine ordering' was 448.30 s (SD = 263.52, Minimum = 32, Maximum = 1284), for 'interpretion of prescription' was 109.87 s (SD = 109.87, Minimum = 5, Maximum = 532), and for 'medicine delivery' was 130.02 s (SD = 122.05, Minimum = 16, Maximum = 663).

The dispensing service at the CP was able to identify DRPs and correct them by means of pharmaceutical interventions. The main DRPs identified were related to the lack of patient's knowledge regarding their medication (Table I).

Pharmaceutical interventions were made directly to the patient, by verbal information (Table II).

Outcome evaluation

The dispensing process developed by the group increased patient knowledge about medication. More than

TABLE I - Drug related problems identified during the dispensing process at Campus Pharmacy, Goias, Brazil, 2013

Variables	n (%)
Inappropriate medication	13 (25.5)
Drug interaction	9 (69.2)
Possible adverse reaction	2 (15.4)
Therapy duplication	2 (15.4)
Inappropriate posology	11 (21.6)
Dose not specified	6 (54.5)
Treatment duration not identified	5 (45.5)
Insufficient dose	3 (27.2)
Inappropriate route of administration	1 (9.1)
Route of administration not identified	1 (9.1)
Schedule of administration not identified	1 (9.1)
Lack of patient's knowledge	27 (52.9)
Patient does not know how to use medication appropriately	15 (55.6)
Patient does not know about food-drug interactions	8 (29.6)
Non adherence	8 (29.6)
Difficulty in understanding how to use medication appropriately	6 (22.2)
Patient can not afford medication	5 (18.5)
Patient does not know the treatment duration	4 (14.8)
Patient does not know how to store the medication	3 (11.1)
Patient does not know about adverse effects	2 (7.4)
Patient does not know about drug-drug interactions	2 (7.4)
Patient does not know the time for medicine to take effect	1 (3.7)
Patient does not know the purpose of the treatment	1 (3.7)
TOTAL	51 (100.0)

50% of patients achieved a high level of knowledge after the dispensing process (p = 0.0001) (Table III).

Association between structure, process and outcome

The majority of the pharmaceutical interventions were performed in patients aged greater than 60 years and in users of the public health system (Table IV).

The increase in the level of patients' knowledge about their medications was associated with the complexity of pharmacotherapy (Table V).

TABLE II - Pharmaceutical interventions performed during the dispensing process at Campus Pharmacy, Goias, Brazil, 2013 (n=51)

Intervention domain		n (%)
No intervention		3 (5.9)
Prescriber		9 (17.6)
Prescriber was informed		7 (77.8)
Intervention proposed, not approved by prescriber		2 (22.2)
Patient		44 (86,3)
Verbal information provided only		42 (95.4)
Writteninformationprovidedonly		30 (68.2)
Patient referred to prescriber		7 (15.9)
Drug		8 (15.7)
Dosage changed to…		5 (62.5)
Instructions for use changed to...		6 (75.0)
Outcome of intervention		**n (%)**
Not known	Outcome of intervention not known	11 (21.6)
Solved	Problem totally solved	32 (62.7)
Partially solved	Problem partially solved	2 (3.9)
Not solved		6 (11.8)
Problem not solved, lack of cooperation of patient		1 (16.7)
Problem not solved, lack of cooperation of prescriber		2 (33.3)
No need or possibility to solve problem		3 (50.0)

DISCUSSION

These findings suggest that the dispensing process developed and implemented in the CP provided patient counseling on medication use, hence increasing patient knowledge about medications and chances of therapeutic success.

The lack of patient knowledge of medications may result in poor adherence and a negative impact on the therapy success, due to pharmacotherapy failure, increased incidence of adverse effects and intoxications, and deterioration in health status (Fernandes, Pires, Gouvêa, 2002; Margonato, Thomson, Paoliello, 2008; Oenning; Oliveira; Blatt, 2011). This is also evident in previous studies, as reported by Margonato *et al*. (2008), correlating the incidence of hospitalization secondary

TABLE III - Patient knowledge about medications before and after the dispensing process at the Campus Pharmacy, Goias, Brazil, 2013 (n=104)

Level of knowledge about medication		After dispensing n (%)			*p**
		Low level of knowledge	High level of knowledge	Total	
Before dispensing n (%)	Low level of knowledge	27 (44.3)	34 (55.7)	61 (100.0)	0.0001
	High level of knowledge	9 (20.9)	34 (79.1)	43 (100.0)	
	Total	36 (100.0)	68 (100.0)		

* McNemar test

TABLE IV - Pharmaceutical interventions and associated factors performed during the dispensing process at the Campus Pharmacy, Goias, Brazil, 2013

Characteristics of prescription		Number of prescriptions dispensed n (%)	Prescriptions that required interventions n (%)	PR [95% CI]	*p**
Patient-related					
Sex					0.73
	Female	84 (80.8)	30 (35.7)	0.7 (0.3 – 1.5)	
	Male	20 (19.2)	5 (25.0)	1.00	
Age					0.02
	18 - 40 years	29 (28.2)	4 (13.8)	1.00	
	41 - 60 years	35 (34.0)	14 (36.8)	2.7 (1.0 – 7.3)	
	≥ 60 years	33 (32.0)	17 (50.0)	3.73 (1.4 – 9.9)	
Drug-related					
Complexity of Pharmacotherapy					0.06
	Low	20 (19.2)	10 (50.0)	1.7 (0.9 – 2.9)	
	High	84 (80.8)	25 (29.8)	1.0	
Health service-related					
Was the prescription originated from the public health system?					0.01
	Yes	47 (54.0)	25 (53.2)	2.3 (1.2 – 4.3)	
	No	40 (46.0)	9 (22.5)	1.00	
First time using the dispensing services at the Campus Pharmacy					0.12
	Yes	66 (63.5)	26 (39.4)	0.6 (0.3 – 1.2)	
	No	38 (36.5)	9 (23.7)	1.00	

CI95%: 95% confidence interval; RP: prevalence ratio * Wald test

to non intentional, acute poisoning by medications with the lack of instructions for medication use at the time of dispensing. The increase in the knowledge level may increase the chances of the pharmacotherapy success, as evidenced by Angelini *et al*. (2009) in a study demonstrating that the improvement of patients' knowledge on the management of inhaled corticosteroid during an education program was associated with patients' clinical progress.

In the process description, we have found that most

TABLE V - Factors associated with the increase in the level of patient knowledge about medication during the dispensing process at the Campus Pharmacy, Goias, Brazil, 2013

Characteristics		Total of patients	Patients with increased level of knowledge	Odds ration [CI=95%]	*p**
Patient-related					
Sex					0.51
	Female	84 (80.8)	55 (65.5)	1.0	
	Male	20 (19.2)	13 (65.0)	0.7 (0.3 – 1.8)	
Age					0.67
	18 - 40 years	29 (28.2)	21 (72.4)	1.0	
	41 - 60 years	35 (34.0)	24 (68.6)	1.4 (0.6 – 3.0)	
	≥ 60 years	33 (32.0)	20 (60.6)	1.4 (0.6 – 3.2)	
Drug-related					
Complexity of Pharmacotherapy					0.00
	High	20 (19.2)	9 (45.0)	2.3 (1.3 – 4.1)	
	Low	84 (80.8)	59 (70.2)	1.0	
Health service-related					
User of the Brazilian public health system?					0.13
	Yes	47 (54.0)	29 (61.7)	1.7 (0.8 – 3.6)	
	No	40 (46.0)	27 (67.5)	1.0	
Utilization of dispensing services at the Campus Pharmacy for the first time?					0.20
	Yes	66 (63.5)	41 (62.1)	1,0	
	No	38 (36.5)	27 (71.0)	0.6 (0.3 – 1.3)	
Dispensingprocess-related					
Was an intervention made?					0.36
	Yes	35 (33.6)	21 (60,0)	1.3 (0.7 – 2.4)	
	No	69 (66.4)	47 (68,1)	1,0	

CI95%: 95% confidence interval; PR: prevalence ratio. * Wald test

of the DRPs identified were related to the fact that the patient did not know how to use medication appropriately. The pharmaceutical interventions were then performed by written and verbal instructions, given directly to the patient. This finding is corroborated by previous studies conducted in community pharmacies in Brazil and Germany (Nicolas *et al*., 2013; Oenning, Oliveira, Blatt, 2011), revealing that patient's knowledge about medications and their correct use was limited. These results support the importance of taking the time of dispensing as an opportunity to provide the patient with instructions for medication use.

In this study, the improvement in patient knowledge of medications was associated with the complexity of pharmacotherapy. One possible explanation for this is that patients with a high medication regimen complexity index tend to be more attentive to the instructions provided by the pharmacist during the dispensing process. Another possibility is that the pharmacist is more likely to provide the patients with complex medication regimens with better care during dispensing.

In comparison to a similar study previously conducted in the south of Brazil (Oenning, Oliveira, Blatt, 2011), a greater improvement in patient's level of knowledge of medication after dispensing was found in our study. This may be explained by differences regarding the pharmacy structure, including the quality of informational materials, and pharmacists' academic background. The structure of the CP in our institution is considerably distinct from pharmacies located in other parts of Brazil (França Filho *et al*., 2008; Correr *et al.,*

2004; Henningen, 2007; Lucchetta, Mastroianni, 2010; Silva,Vieira, 2004), where pharmaceutical care decisions are also strongly influnced by pharmaceutical industries.

Our study demonstrated that by applying the dispensing procedures adapted from the GICUF (Iglésias-Ferreira, Santos, 2009), DRPs were identified and completely solved by more than 60% of the pharmaceutical interventions performed. This is explained by the fact that the DRPs identified in the CP, including incomplete prescriptions, prescribing errors, drug-drug interactions and lack of patient knowledge, can be prevented. On the other hand, these DRPs may have a negative impact on patient's health, if not identified or maintained unsolved.

The demand for pharmaceutical interventions was associated with age greater than 60 years, which may be explained by the higher frequency of DRPs detected in elderly patients (Buurma *et al*., 2001). This is a relevant data considering that the elderly population has increased worlwide. For example, the older population has doubled in the last 20 years in Brazil (Brasil, 2013c), and is estimated to be between 10-37% of people living in European Union countries (Giannakouris, 2010).

Also, the prevalence of interventions was higher in patients with drug prescriptions that derived from the public health system, which is a major source of low quality prescriptions, as reported by Lyra Junior *et al*. (2004). These authors indicate that prescription and medication errors may cause DRPs, and the involvement of a pharmacist in the dispensing process would prevent or minimize such mistakes. DRPs have been frequently identified in drug prescriptions even in countries with very different health systems (Buurma *et al*., 2001; Nicolas *et al*., 2013), including European countries.

In this study, the pharmacist was responsible for the approach of most of the DRPs identified, and only in few situations, the prescriber had to be contacted. This is in agreement with other studies (Indermitte *et al.*, 2007; Lyra Junior *et al*., 2004) on pharmaceutical interventions in the dispensing process, demonstrating that the pharmacists deal with a variety of DRPs, without requiring the involvement of other health care providers.

Finally, the average time taken for the dispensing process was 11.5 minutes. As compared to the pharmacotherapy follow-up, which lasts an average time of 60 minutes (Oliveira, 2011), a greater number of patients can be seen in a shorter period of time in the dispensing process. Consultation time is a crucial issue for the quality of the public health system in Brazil, since there are more than 110 million users only in the primary care system, and an average of 0.75 pharmacist per 1000 inhabitants (Brasil, 2013c). The work of the pharmacist in the dispensing process may contribute to the solution of numerous DRPs. Also, dispensing may be regarded as a screening stage to determine whether a referral to the pharmacy follow-up is required.

Although the study was conducted in a CP with structural conditions and human resources very different from those observed in the vast majority of the country's pharmacies, it was interesting to observe how medication dispensing performed by the pharmacist and ideal conditions could significantly contribute to the rational use of medicines.

One limitation of the study was the limited number of variables assessing the association between structure, process and outcome of the model. Further studies including a greater number of variables are needed to elucidate the possible association between these components of the dispensing service. Also, further studies are required to assess this medication dispensing model in different scenarios and designs in order to evaluate the reproducibility of the model.

CONCLUSION

The service of medicine dispensing developed and implemented in the CP was able to identify and solve DRPs. Also, it promoted an increased level of patient knowledge of medications. The model of drug dispensing represents a component of the appropriate soft technology in health care, so that patients can have greater benefit from their pharmacotherapy.

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