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Original Research

Evaluation of simulated drug dispensing and patient counseling in the course of pharmaceutical improvement: 2009 to 2015

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Abstract

Background: Aiming to facilitate the drug dispensing process and patient counseling, specific professional skills are required. The knowledge, skills and attitudes involved in this process can be improved. From 2012 to 2015, a nationwide course was held, in partnership with the Ministry of Health and the Federal University of Rio Grande do Sul (UFRGS) – Brazil, to train pharmacists working in primary health care through the development of their clinical and communication skills. One of the steps in this process involved the simulation of the drug dispensing process and patient counseling.

Objective: To evaluate the performance of pharmacists in drug dispensing and counseling through patient simulation role-playing held in a face-to-face meeting at the end of a training course.

Methods: A cross-sectional and retrospective study with analysis of patient simulation recordings and data collection using an assessment instrument with scores ranging from 0 to 10 points to assess pharmacist's behavior, skills, and technical knowledge.

Results: Participants presented poor-to-regular performance, with median scores equal to or lower than six. The median time of the drug dispensing simulation was five minutes and the patient counseling was eight minutes. Pharmacists had better scores in the simulation of asthma cases. In drug dispensing, 99.5% of pharmacists had difficulty checking the patient's time availability, 98.5% did not know how to use the devices, and 94.7% did not advise the patient on what to do if they forgot to take a dose. In patient counseling simulation, 1.18% of pharmacists remembered to advise on what do with medication leftovers, and 50.6% asked questions that induced the patient's responses.

Conclusions: The low-to-regular performance showed that pharmacists had difficulties at improving their skills in the performance of complete and effective drug dispensing and patient counseling.

Keywords

Simulation Training; Role Playing; Pharmacists; Pharmaceutical Services; Counseling; Primary Health Care; Education, Pharmacy, Continuing; Retrospective Studies; Brazil

INTRODUCTION

The low drug information and poor understanding of counseling transmitted by healthcare professionals to patients are considered a major cause of medication non-adherence.[1,2] These situations may lead to therapeutic failure, increased incidence of adverse effects due to inappropriate dosage or treatment duration, and the increase of incorrect self-medication that may worsen the patient's health status.[3]

Both drug dispensing and patient counseling are part of the healthcare process, whose purpose is to educate the patient about the appropriate and rational use of drugs, as well as to identify, and reduce potential risks of drug therapy.[3,4] To do this, pharmacists must have the competence to evaluate the patient's clinical history and make clinical decisions when problems arising. Therefore, knowledge about drugs, but also communication skills are essential for both pharmaceutical anamnesis and patient education.5

Several studies have used the simulated patient or simulated shopper technique, which aims to identify the quality of care provided alongside the dictates of scientific knowledge.[6] In this sense, communication between individuals is a complex process that involves more than just verbal communication.[7] Deficits in communication and counseling skills were mentioned as barriers to patient care.[8] However, communication skills in the community pharmacy can be improved with modern education and training techniques.[9] It is commonly accepted that the education of Brazilian healthcare professionals needs reformulations to create suitable professionals adapted to the health needs of the population and National Health Service.[10]

Macleod-Glover (2006) defined certain aspects of communication that influence pharmacy practice, such as verbal and nonverbal communication as well as empathy and communication barriers, which may come from the environment itself, from the pharmacist or the patient.[11] Active listening is an essential element for good pharmacist communication to allow them to cope with patient's situation. This dialogue will facilitate the establishment of relationships between patient and pharmacist, in a symmetrical process of information exchange.[1]

Several authors have reported the effectiveness of the use of active methods to increase the skills of healthcare professionals.[10,12-15] Patient simulation is among this active methods that have been used and described in the literature.[16] As defined by Gaba (2007), simulation is a

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technique, not a technology, to replace or amplify real experiences with guided experiences, usually of an immersive nature, that evoke or replicate substantial aspects of the real world in a fully interactive way.[17] Compared to other health professions like medicine or nursing, pharmacy education through simulation is still a relatively new method, but it is growing rapidly to meet the needs of a new generation of healthcare professionals.[6,18] Evidence suggests that the use of simulation in pharmacy field enables the integration of knowledge and skills related to pharmacy practice, such as communication, clinical decision-making, patient history taking, physical assessment, and pharmaceutical care.[5]

Role-playing is one of the simulation-based educational strategies.[19] Role-play is a contextualized method that allows participants to practice communication in different contexts and social roles, and to consolidate theoretical-practical learning.[20] The usefulness of role-playing as a teaching-learning tool is evident, allowing participants to acquire and train technical and non-technical skills, and improving their professional practice without exposing patients to risk, while enabling trainees to attain different levels of education, from academia to specialization.[21] While technical skills involve the specific skills of the profession, such as those related to disease and pharmacological treatment, non-technical skills are those related to human factors, such as communication, empathy, teamwork and leadership. As described by Jeffries, didactic knowledge acquired from simulations is retained longer than knowledge acquired through traditional teaching methods. Using simulation, students also tend to increase self-confidence, improve clinical judgment, and improve problem-solving skills.[22] According to Limberger, an evaluation should provide a moment of reflection on the practices developed and the performances achieved, as well as the elaboration of strategies for the improvement of learning.[10] A typical role-play situation, comprise two stages, one with the simulations itself, and then a feedback to evaluate participants' performance.

A Brazilian nationwide improvement course was created for pharmacists working in primary healthcare settings with the main objective of developing the clinical skills required for these pharmacists to work in the community. The simulations used in this course were intended to demonstrate and consolidate the theoretical and practical content acquired in the course. This study arose from the need to identify the main weaknesses and strengths of the trainee pharmacists during the drug dispensing and patient counseling processes, as a way of mapping deficiencies in pharmacy education in Brazil. Thus, the objective of this study was to evaluate the performance of professionals during a simulation process used in a professional development course. Role-play was used as a teaching method and competence assessment. The competence assessment approach included knowledge and skills acquired during the course and similarly those that the trainees should have acquired during their university education and professional practice.

METHODS

The project was approved by the (UFRGS) Research Ethics Committee (Opinion No. 3,051,517; CAAE 00180918.3.0000.5347). The researchers signed the Term of Commitment to use the database with audiovisual archives, ensuring confidentiality and privacy relative to participant performance.

The improvement training course

After a request from the Department of Pharmaceutical Services and Strategic Inputs of Brazilian Ministry of Health, the Pharmaceutical Care Research and Development Group (GPDAF) created an improvement training course called "Pharmacists in Primary Health Care: Networking".[23] This course involved face-to-face class and distance learning. The face-to-face phase consisted in a 60-hour training organized in two meetings. The first face-to-face module had 16 hours of training and happened at the beginning of the course, and included the familiarization of the student in the virtual teaching environment. Module 2 addressed National Health Care and health public policies and the third module addressed evidence-based health, pharmacoepidemiology, pharmaco-economy and health technology assessment. The second face-to-face moment had 44 hours of training, where clinical practices in pharmaceutical care were approached. The distance learning step had 290 hours of training. During the course, pharmacists underwent the same theoretical training on drug dispensing and patient counseling methods.

The distance learning activities were developed in the virtual teaching-learning environment MOODLE (Modular Oriented-Object Dynamic Learning), commonly used by the UFRGS as its institutional environment for distance learning courses since 2007. The second face-to-face meeting sought to consolidate the pharmacists' clinical practices in primary health care and develop clinical skills related to the use of medications through a role-playing session. The clinical skills addressed involved the development of appropriate communication with the patient, relevant information about the disease and treatment, use of the medication, guidance on the pharmacist's stance and professional ethics. In this step, pharmacists participated in the simulation of patient care, being randomly allocated in one of the cases of drug dispensing or patient counseling.

The techniques of drug dispensing, patient counseling, communication with the patient, and information about medications were previously discussed in distance learning classes, including simulations in the online environment. During the activities on the Moodle platform students also participated in forums about videos and texts about the methods. In the face-to-face encounter, pharmacists were previously informed about the simulations. Simulations were individually performed and had the participation of simulated patients and were videotaped. Then in a debriefing phase, the students were distributed into groups where videos were presented to promote discussion and joint analysis to identify what they had done correctly and what problems existed during the simulation. After a few weeks, the students received a Moodle link of their simulation recording, as well as an opinion about their performance delivered by one of the course trainers.

Six editions of this course were held with pharmacists from various states of Brazil educated by different Universities and who worked in different primary care settings: logistics, family health, administrative management, and clinical pharmacy, acting from logistics to Family Health Support Nucleus.[22] Both, drug dispensing and counseling pharmacist simulations occurred in editions 1 to 4. In editions 5 and 6, simulations of drug dispensing occurred only.

Data collection

A cross-sectional and retrospective study was performed by evaluating the simulation videos of the improvement course where trainees performed the drug dispensing simulation or patient counseling. The socio-demographic, academic, and professional data of the participants were obtained from the course registration database. The data of trainees' performance was obtained by analyzing the recordings of drug dispensing and patient counseling simulations performed during the course editions. A systematic observation technique was used.

The trainee pharmacists were scheduled for the assessment. Both the type of technique to be used and the type of case to be simulated were randomly distributed among the participants. Four cases were developed, one of which was presented to the pharmacist:

1) Case of asthma: A standard patient with a prescription for beclomethasone and salbutamol spray, claiming that he only needs salbutamol because he still has beclomethasone. Reports to the pharmacy: not using prescription drugs correctly - use beclomethasone and salbutamol only in crises.
2) Hypertension case: Standard patient with a prescription of amlodipine and hydrochlorothiazide, used the drugs for one month, discontinued without medical knowledge due to pain and swelling in the lower limbs.
3) Adult infection case: Standard female patient, prescribed amoxicillin, with inadequate dosage, and

Table 1. Description of the necessary attributes to be achieved in each evaluation domain of drug dispensing simulation and patient counseling

Domain	Description of behavior, skill or technical knowledge to be evaluated
Patient Introduction	The initial stage of care where the pharmacist is expected to wear proper work clothing (lab coat), give a brief greeting and introduce himself or herself with the name or profession to the patient or caregiver.
Receptivity and welcome	At this stage, the pharmacist should welcome the patient/caregiver, checking their availability of time to talk, allowing them to be comfortable in the environment and, when available, offering a place to sit. You should briefly explain about the pharmaceutical service being offered.
Patient Identification	Identify by open question (s) who the prescribed drug (s) is. Care should be taken not to try to deduce answers such as "is this drugs for your child?", "Is this your prescription?", using questions such as "who are these drugs for?", "Who is this prescription for?
Question Formulation	Demonstrate ability to structure questions in an organized and rational manner, following a logical and coherent sequence, formulate open-ended questions appropriately and ask closed-ended questions only when relevant, so as not to induce patient/ caregiver responses. Example of open-ended questions: "How do you use this drug?", "What health problems do you have?". Example of closed questions: "Do you know how to use this drug?", "Do you understand what I explained to you?"
Knowing the patient	In the case of the patient counseling method, additional information about the patient, their health and their habits should be obtained: question what health problems they have, what profession or activities they perform and at what times, what kind of habits they have (if they smoke, ingest alcohol, practice physical activity) and how is your eating routine. In both methods, the patient should be asked about how they use their drugs and in guidance, especially if they use others.
Drug Information	In this domain, the pharmacist should demonstrate his knowledge of clinical pharmacology/clinical pharmacy. In simulated cases, situations with prevalent drugs in primary care were presented. The pharmacist needed to provide the necessary guidance to the patient, especially what he was unaware of: inform the name of the drug, therapeutic indication, dosage, duration of treatment, what to do if you miss a dose, as should be how, where to store, what to do with the leftover drugs, if any interaction with any food or other drugs can occur, what possible adverse effects may occur, and what non-pharmacological measures can be used to aid treatment. You should also check if the patient has an allergy or has had an adverse reaction to any medication.
Use of proper communication process	Clear and easily understood patient/caregiver language should be used, without the use of technical language, jargon, slang, language addiction, facial expressions, gestures or voice intonation that make it difficult to understand the guidelines and that induce or embarrass them or inhibit the patient's response. The guidelines should be transmitted always looking at the patient or caregiver. Do not talk too fast or too slowly.
Use of available resources	Provide written guidance, which may be done on a separate sheet, on the prescription itself or on the drugs box, to facilitate understanding of the patient. Advice on the handling of devices related to the patient's health problem, as follows: in the case of antibiotic therapy - advice on the use of thermometers, in case of hypertension - advise on the use of blood pressure monitoring equipment, if asthma - advise on the use of inhalers and spacers.
Implementation of the patient counseling plan	It should provide basic guidelines for understanding the prescription, identify basic aspects of the patient's routine to adjust drugs, administration schedules, advise on health care that can assist in improving health or prevent the complication of the disease and make an agreement. With the patient about both pharmacological and non-pharmacological guidelines that should be followed for successful treatment.
Posture and professional ethics	If you have any questions regarding your prescription, you should contact your prescribing physician for clarification. Perform the care process professionally and without invading the intimacy of the person - do not ask questions or guidelines that may embarrass the patient/caregiver; do not take any inappropriate action from an ethical point of view (change of medical prescription; criticism of the prescriber, etc.).
Completion of patient counseling/drug dispensing	Should perform feedback, taking back with patient/caregiver the information that was transmitted to confirm if there was understanding; advise to see the pharmacist if you have any questions and close the patient counseling/drug dispensing with a brief farewell. In the case of patient counseling, you must also make a written record of the counseling performed and schedule a new appointment for patient follow-up.

Developed from the theoretical approach on communication and care methods presented by the authors Beardsley *et al*. and Berger.[24,25]

acetaminophen, due to respiratory infection that began a few days ago.

4) Pediatric infection case: Standard caregiver - patient's mother – received a prescription for amoxicillin and acetaminophen for her son, due to a respiratory infection that began a few days ago.

Two instruments for data collection were developed, first to evaluate the drug dispensing technique and a second to evaluate the patient counseling technique, based on previous instruments developed by the Pharmaceutical Care Research and Development Group supported by theoretical foundations on communication and patient care from Beardsley *et al*. (2011) and Berger (2011).[24,25] Each instrument consisted of several evaluation domains and each domain consisted of various criteria, where the evaluator marked whether the performance met the criteria (yes or not). In a side column, the score was recorded, obtaining the sum of points at the end of the evaluation, with a maximum value of 10 points. The instruments were tested and validated by two researchers with a five-record pilot test performed to assess inter-rater agreement.

Table 1 presents a description of the attributes needed to achieve the objectives of each simulation evaluation domain. The recordings were numerically identified, and no data that could identified the students and participating actors were collected. Each file was evaluated twice at different times by the same researcher in a quiet and uninterrupted environment. The second evaluation was compared with the first, and the differences in the questions were reviewed.

Data analysis

Data were tabulated in a Microsoft Excel spreadsheet and statistically analyzed. The normality of quantitative data was assessed by the Shapiro-Wilks test. Variables with normal distribution presented as mean and standard deviation, while for variables with non-normal distribution

Table 2. Baseline characteristics of the participants of the course "Pharmacists in PHC: working in a network" who performed drug dispensing simulation activity or patient counseling

Variable	Drug dispensing		Patient counseling		Total	
	n	%	n	%	n	%
Gender						
Female	170	81,0	72	84,7	242	82,0
Male	40	19,0	13	15,3	53	18,0
Age						
22 - 30 years	83	39,5	38	44,7	121	41,0
31 - 40 years	99	47,1	38	44,7	137	46,4
41 - 50 years	22	10,5	7	8,2	29	9,8
Over 51 years	6	2,9	2	2,4	8	2,7
HDI-M (Municipal human development index) from the city where it operates						
Low (<0,550)	21	10,0	8	9,4	29	9,8
Medium (0,550 a 0,699)	69	32,9	24	28,2	93	31,5
High (0,700 a 0,799)	107	51,0	50	58,8	157	53,2
Very high (>0,800)	13	6,2	3	3,5	16	5,4
Workplace						
Family Health Support Nucleus (NASF)	30	14,3	11	12,9	41	13,9
Direct point of care	149	71,0	59	69,4	208	70,5
Management point	23	11,0	12	14,1	35	11,9
Others (Hospitals, State management)	6	2,9	1	1,2	7	2,4
Not specified	2	1,0	2	2,4	4	1,4
Working time in the public health service						
Less than 1 year	42	20,0	24	28,2	66	22,4
1 to 5 years	114	54,3	40	47,1	154	52,2
6 to 10 years	38	18,1	12	14,1	50	16,9
Over 10 years	8	3,8	4	4,7	12	4,1
Not specified	8	3,8	5	5,9	13	4,4
Weekly workload						
Up to 30h	60	28,6	27	31,8	87	29,5
31 to 40h	138	65,7	53	62,4	191	64,7
Over 40 hours	10	4,8	5	5,9	15	5,1
Not specified	2	1,0	0	0,0	2	0,7
School affiliation						
Public	78	37,1	33	38,8	111	37,6
Private	131	62,4	52	61,2	183	62,0
Not specified	1	0,5	0	0,0	1	0,3
Specialization level						
Generalist	140	66,7	66	77,6	206	69,8
Qualified	30	14,3	6	7,1	36	12,2
Not specified	40	19,0	13	15,3	53	18,0
School region						
South	87	41,4	38	44,7	125	42,4
Southeast	49	23,3	18	21,2	67	22,7
North	17	8,1	6	7,1	23	7,8
Northeast	44	21,0	22	25,9	66	22,4
Midwest	13	6,2	1	1,2	14	4,7

Table 2 (cont.). Baseline characteristics of the participants of the course "Pharmacists in PHC: working in a network" who performed drug dispensing simulation activity or patient counseling

Variable	Drug dispensing		Patient counseling		Total	
	n	%	n	n	%	n
Graduation time						
0 - 3 years	40	19,0	23	27,1	63	21,4
4 – 6 years	56	26,7	17	20,0	73	24,7
7 – 9 years	41	19,5	16	18,8	57	19,3
10 - 12 years	39	18,6	16	18,8	55	18,6
Over 13 years	34	16,2	13	15,3	47	15,9
Postgraduation						
Yes	157	74,8	61	71,8	218	73,9
No	52	24,8	24	28,2	76	25,8
Not specified	1	0,5	0	0,0	1	0,3
Postgraduation type						
Specialization/MBA	135	64,3	54	63,5	189	64,1
Master	12	5,7	6	7,1	18	6,1
Doctorate	1	0,5	1	1,2	2	0,7
Residence	2	1,0	0	0,0	2	0,7
No post or unspecified	60	28,6	24	28,2	84	28,5
Simulated case type						
Asthma	3	1,4	85	100,0	88	29,8
Hypertension	31	14,8	0	0,0	31	10,5
Adult infection	29	13,8	0	0,0	29	9,8
Pediatric infection	147	70,0	0	0,0	147	49,8
Course Edition						
1	26	12,4	12	14,1	38	12,9
2	17	8,1	14	16,5	31	10,5
3	31	14,8	18	21,2	49	16,6
4	41	19,5	41	48,2	82	27,8
5	69	32,9	0	0,0	69	23,4
6	26	12,4	0	0,0	26	8,8
Total	210	100	85	100,0	295	100

the median and interquartile range were used. Categorical variables were presented with absolute and relative frequencies.

A comparison between two groups was performed by Student's t-test. Multiple analyses between three or more groups were performed by the ANOVA test, followed by the Tukey test where necessary. Categorical variables were analyzed by Pearson's chi-square test, with adjusted residual analysis. For correlation analysis between time to perform the pharmaceutical service simulation and an overall score, the Spearman correlation test was used. All analyses and data processing were performed using SPSS 18.0. The significance level was established at 5% ($p<0.05$).

RESULTS

A total of 459 trainees attended the six editions of the course. For this study, 295 recordings were analyzed, 210 drug dispensing technique simulations (71.2%), and 85 (28.8%) patient counseling simulations, which represents about 64% trainees had their performance evaluated in this study. The distribution of the simulated cases of drug dispensing and patient counseling according to the personal, professional, and academic characteristics of the pharmacists, type of simulated case and edition of the course are shown in Table 2.

Regarding the overall score, significant differences ($p <0.05$) were found between editions 4 and 2, 4 and 5, and 4 and 6. The result reveals that the participants of edition 4 performed significantly better than editions 2, 5, and 6. No factors were identified between these editions that could have contributed to these differences in performance.

Participants' academic and professional data were compared for the overall score obtained for each type of simulation (Table 3). In drug dispensing scenario, significant differences in performance were found only for the pharmacist's place of work ($p=0.008$), with pharmacists who worked directly at the Family Health Support Nucleus scored higher.

In the patient counseling simulation, significant differences were found for age ($p=0.003$), working place Municipal Human Development Index (IDH-M) ($p=0.009$), and specialization level ($p=0.050$). The IDH-M is a measure composed of indicators with three dimensions of human development: longevity, education, and income. The index ranges from 0 to 1, being 1 the greater the development. The specialization level refers to the curricular guidelines that the pharmacist graduated with curriculum with a generalist or technical focus. Gender, working time in the public health service, weekly workload, school affiliation, school region, graduation time and postgraduate had no influence, either positive or negative, on the performance of participants in the activities.

The performance results regarding the simulation type, edition and case type are presented in Table 4. The difference between the general drug dispensing score and the patient counseling were not statistically significant ($p<0.05$). Regarding the time variable, the simulation time of asthma cases was statistically longer than all other simulated cases in the present study. In the Spearman correlation analysis, between the variable time of simulation and the overall score of all editions, a moderate positive correlation was observed, with rho=0.480 and

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Table 3. Performance assessed by score in drug dispensing simulation processes and patient counseling of pharmacists participating in the improvement course

Variable	Drug dispensing; N (SD)	Patient counseling; % (SD)
Gender		
Female	5,8 (±1,2)	5,9 (±1,5)
Male	5,5 (±1,1)	5,6 (±1,6)
Age		
22 - 30 years	5,7 (±1,1)	6,0 (±1,3)[1]
31 - 40 years	5,8 (±1,1)	5,6 (±1,5)[2]
41 - 50 years	5,8 (±1,2)	7,0 (±1,1)[3]
Over 51 years	6,1 (±1,2)	2,8 (±0,4)[123]
HDI-M (Municipal human development index) from the city where it operates		
Low (<0,550)	5,3 (±0,9)	4,2 (±1,5)[1]
Medium (0,550 a 0,699)	5,8 (±1,2)	5,7 (±1,5)
High (0,700 a 0,799)	5,9 (±1,1)	6,1 (±1,4)[1]
Very high (>0,800)	5,8 (±1,1)	5,7 (±1,4)
Workplace		
Family Health Support Nucleus (NASF)	6,3 (±0,8)[1]	5,9 (±1,9)
Direct point of care	5,6 (±1,1)[1]	5,9 (±1,4)
Management point	5,9 (±0,9)	5,5 (±1,6)
Others (Hospitals, State management)	6,5 (±1,1)	3,1 (±0,0)
Working time in the public health service		
Less than 1 year	5,8 (±0,9)	5,5 (±1,4)
1 to 5 years	5,9 (±1,1)	6,0 (±1,4)
6 to 10 years	5,6 (±1,3)	5,8 (±1,7)
Over 10 years	5,9 (±1,3)	6,9 (±0,9)
Weekly workload		
Up to 30h	5,9 (±1,2)	6,1 (±1,6)
31 to 40h	5,7 (±1,0)	5,7 (±1,4)
Over 40 hours	6,0 (±1,4)	5,2 (±2,0)
School affiliation		
Public	5,8 (±1,1)	6,2 (±1,6)
Private	5,8 (±1,1)	5,6 (±1,4)
Specilization level		
Generalist	5,7 (±1,1)	5,6 (±1,6)[1]
Especialized	6,0 (±1,1)	7,0 (±1,4)[1]
Graduation region		
South	5,9 (±1,7)	6,2 (±1,4)
Southeast	5,8 (±1,1)	5,7 (±1,3)
North	5,7 (±0,9)	5,9 (±1,5)
Northeast	5,5 (±1,1)	5,3 (±1,7)
Midwest	6,1 (±1,0)	4,6 (±0,0)
Graduation time		
0 - 3 years	5,6 (±0,9)	5,7 (±1,5)
4 – 6 years	5,7 (±1,2)	6,4 (±1,0)
7 – 9 years	5,8 (±1,0)	5,4 (±1,3)
10 - 12 years	5,6 (±1,2)	5,6 (±1,7)
Over 13 years	6,1 (±1,1)	6,0 (±1,8)
Post-graduation		
Yes	5,8 (±1,2)	5,8 (±1,6)
No	5,8 (±1,0)	5,7 (±1,3)

[123]: editions in which there was a statistically significant difference between the variables and the general score ($p<0.05$) according to the ANOVA test. Note: Maximum score 10 points.

$p<0.01$. This correlation indicates that the longer the drug dispensing or patient counseling, the better the participant's performance, evidenced by a higher score.

When analyzing only the technical knowledge, through the performance evaluation in the domain "Information on drugs", the participants obtained an average of 5.1 points between drug dispensing and patient counseling. Statistically significant differences were found in the age variables, where participants older than 51 years underperformed as compared to other age groups, and between editions 4 and 5, where the participants of edition 4 had better technical performance than those of edition 5. The other variables did not present significant differences.

The least used items in the drug dispensing simulation were those related to checking patient time availability (n=1), device handling guidance (n=3), counseling, if it occurred, missed doses (n=11), health care education (n=14), guidance on non-pharmacological treatment measures (n=21), and drug or food interactions (n=29). The worst scoring item of patient counseling method was the information on what to do with the leftover drugs, where only 1.18% (n=1) of the pharmacists performed. Next, in decreasing order, of the 85 pharmacists, two (2.35%) questioned the patient about diet and mealtimes, three (3.53%) reported possible interactions with food or other medications, five (5.88%) explained about the patient

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Table 4. Score and time of drug dispensing and patient counseling according to the type of simulation, course edition and simulated scenario

Median (IQR 25-75%)	Overall score	Time (minutes)
Type		
Drug dispensing	5,8 (5,0-6,7)	5,0 (4,0-7,0)[1]
Patient counseling	6,2 (4,6-7,1)	8,0 (6,0-11,0)[1]
Edition		
1	6,2 (5,0-7,1)	7,5 (5,0-12,0)[12]
2	5,0 (3,9-6,4)[a]	6,0 (4,0-9,0)
3	6,0 (5,0-6,9)	6,0 (5,0-8,0)
4	6,6 (5,6-7,2) [abd]	7,0 (5,0-9,0)[3]
5	5,7 (4,7-6,3)[b]	5,0 (3,5-7,0)[123]
6	5,2 (5,0-5,9)[d]	5,0 (4,0-6,0)
Scenario		
Pediatric infection	5,8 (5,0-6,7)	6,0 (4,0-8,0)[1]
Adult infection	5,3 (4,6-6,3)[a]	5,5 (4,0-8,2)[2]
Asthma	6,2 (4,6-7,2)[a]	9,0 (6,0-11,0)[123]
Hypertension	5,6 (5,0-6,5)	6,0 (5,0-8,2)[3]

IQR - interquartile range, [123]: editions in which there was a statistically significant difference between the variables and the overall score (P <0.05) according to the ANOVA test. [abd] - editions in which there was a statistically significant difference between variables and time (P <0.05) according to the ANOVA test.
Note: Editions 1 to 4: drug dispensing and pharmacist counseling simulations. Editions 5 to 6: only drug dispensing simulation. Edition 1: simulation of asthma and pediatric infection cases. Editions 2 to 4: simulation of pediatric infection cases. Editions 5 and 6: simulation of hypertension, pediatric infection and adult infection cases.

counseling, ten (11.76%) book a new meeting and twelve (14.12%) asked the patient about their habits.

Of the total evaluations, 112 (53.3%) participants of drug dispensing recordings scored below 6 out of 10 points. None of these participants checked the availability of patient/caregiver time to talk, nor guide them how to handle devices. Only five (4.5%) of the pharmacists provided information on what to do if doses were missed, seven (6.3%) on health care, and ten (8.9%) on non-pharmacological measures and the presence of drug interactions.

During the drug dispensing simulation, 18 participants included inappropriate ethical actions, such as dispensing prescription-only medicines or changing the medical prescription. In the patient counseling, the most frequent inappropriate actions involved the induction of patient responses, the absence of verifying the drug user, and asking closed questions.

DISCUSSION

The low to regular performance evidenced by scoring average lower than 60%, both in drug dispensing and patient counseling activities, reflects the lack of preparation and expertise of the participants. Our data confirm the study by Reis *et al*., where about 80% of professionals working in community pharmacies in São Paulo presented unsatisfactory knowledge in drug dispensing.[26]

One could think that the underperformance of participants over 51 years old could be related to the change in the National Curriculum Guidelines in 2002, where pharmacy education model changed from specialized to generalist. The specialized curriculum model was centered on the drug, not the user (patient), was also characterized by fragmented and out-of-context knowledge provision, obliging the student to opt for one of the specializations (i.e., laboratory and food analysis, drug industry, or hospital pharmacy).[27] In the generalist pharmacy curriculum, currently in force, the specializations disappeared and the scope of education began to cover all areas of pharmaceutical sciences. In addition to what specialized curriculum covered, the new curriculum should cover the development of communication skills with the health team and the patient.[28] However, our data showed a contradictory result when considering the specialization level of the graduation. Specialized pharmacists who graduated with the old pharmacy curriculum performed better than those trained in the new generalist curriculum. It seems that the old specialized curriculum devoted more time to the development of some competencies about pharmaceutical care, mainly regarding the dispensing of drugs, while in the new curriculum, this approach decreased in time and quality.

The results demonstrate that the accomplishment of postgraduate courses have not influence on pharmacists performance in the role-play. Our results differ from Paravattil *et al*. (2017), where pharmacists with a master's degree in pharmacy had significantly better scores than those with PhDs and bachelor's degrees. This difference may be related to the evidence that the generalization of postgraduate courses in Brazil had not impact in pharmacy practice.[29]

International studies in countries such as Germany, Canada, Qatar, Jordan, and Iran as well as another national study also showed performances similar to or poorer to those found in this study.[29-35] Simulations conducted in Canada evaluated the performance of pharmacists in a mental health program for men, where the scores were divided into categories. The patient pre-assessment category, including name, age, medical and personal support, symptoms and duration of the disease, use of other medications, allergies, among others, obtained an average score of 5.7 out of a total of 13 points.[30] A patient counseling study in diabetes and asthma with simulated patients in Qatar identified an adequate professional performance below 35%.[29] Patient counseling was rated as poor to very poor in a simulation of oral contraceptive drug dispensing by Obreli-Neto *et al*.[31] A study conducted in Iran

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identified low-quality counseling practice on vitamin supplementation and suggests that it is related to insufficient information gathering, inadequate knowledge and deficiencies in the communication skills of professionals.[32] Note that all these studies were conducted to check the performance in community pharmacies and their results showed also a poor scenario.[36]

Counseling times, which ranged from 2 to 18 minutes for drug dispensing and from 2 to 25 minutes for patient counseling scenarios, are similar to those found in Mesquita *et al*. or Oh *et al*.[36] In the systematic review by Mesquita et al., the time ranged from 30 seconds to 15 minutes.[21] The study by Oh *et al*. found that the average patient contact time is approximately 3 minutes, taking an increase of 1.8 minutes when therapy is needed and 0.5 minutes when drug interactions are identified.[36] The minimum time that WHO recommends the pharmacist to counsel a patient is three minutes. However, the time spent on counseling should be sufficient to collect relevant patient information, evaluate the use of medications, provide relevant information and verify patient understanding.[3,21]

Some authors state that the longer the contact time between dispenser and patient, the more time is devoted to the transmission of information between the actors and, consequently, the greater the patient's understanding of the correct use of drugs.[3,33] In our study, participants who had the best performance in drug dispensing were those who took longer to perform the activity. However, in our patient counseling scenarios, the best performing participants took a shorter time than poor performing ones.

Other studies have found that counseling on forgetting to take the medication and contraindications of the drugs are the least likely to be communicated to patients.[29,32] In the study of Paravattil, Kheir and Yousif (2017), the drug allergies, the offer of pharmaceutical follow-up, and the verification of understanding of the information provided to the patient were not met by any of the pharmacists and only 6.5% of the participants correctly explained all the steps in device management.[29]

Between 10 and 20% of our pharmacists recommended non-pharmacological care measures, such as regular physical activity, reduced salt intake, or reduce exposure to allergens, among others. Similar results were found in the study by Zolezzi, *et al*., where guidance on non-pharmacological care measures, such as physical activity, weight control and smoking cessation, was provided by less than one-third of the simulation participants.[33] In the study by Reis *et al*., the main difficulties pointed out by professionals were explanations regarding drug interactions, adverse events and drug action mechanisms, justified by insufficient academic training and lack of improvement activities.[26]

Performing the care process professionally and without invading the intimacy of the person in attendance was the only issue met by the 210 participants of the drug dispensing simulation. Then, in descending order, the use of the lab coat (n=208), the explanations with proper eye contact with the patient (n=204), the provision of information on the dosage of medications (n=196), the use of easy and accessible language (n=194) and the initial greeting of the patient (n=191).

The frequency of the use of items related to drug information corroborates the findings of Paravattil *et al*. In this study, the components most often implemented by pharmacists were drug names, instructions for use, indications and dosage.[29] Proper eye contact, empathetic listening, clear language, and initial greeting are highlighted in the study by Zolezzi *et al*. as adhered to by most pharmacists.[33] In the drug dispensing simulation, few or no questions were put to the patient which is coincident with the study by Obreli-Neto *et al*. where more than 90% of pharmacists did not ask questions before dispensing the contraceptive.[31] Inappropriate actions taken by pharmacists in simulations can be explained because the pharmacist believes that the patient, who already uses given drugs continuously, knows the drugs well and additional advice would be unnecessary and may lead to a negative reaction from the patient.[31] It is important to note that a considerable part of the counseling failures are related to the pharmacist behavioral attitudes and communication skills to adequately transmit the information to the patients. Similar difficulties were found by Paravattil *et al*., where disease management and problem-solving skills were below expectations, as many patients were referred back to the doctor for problems that could have been resolved with guidance from the pharmacist.[29]

Although all participants had access to the same theoretical content during the distance learning stage of the improvement course, it was up to the student to read the material and the activities proposed at this stage. They participated in a forum where the drug dispensing process was discussed, as well as a simulation to register a patient counseling process. In this first stage of the evaluation, it is also possible to identify the knowledge that was aggregated with the accomplishment of the distance learning stage. It should be noted that the knowledge and skills evaluated in both drug dispensing and patient counseling should already be part of the practice and routine of pharmacists. With the evaluation of simulations in final stages of the course, we found that pharmacists keep having difficulties in communicating with the patient, as well as a deficient and ineffective knowledge about the drugs. Theoretical knowledge about professional practice may help in simulation exercises, but it is not sufficient to improve practice. Only after simulate several times a situation, skills, attitudes, and knowledge content are consolidated.

The results of our study could identify gaps in the education of Brazilian pharmacists, which might be improved during the graduation period, but also with continuous training through specific training activities matched to the reality of the pharmacists' performance. It is necessary to include communication techniques with the patient and the multidisciplinary team in pharmacy curriculum. It is also crucial to bring the academic environment closer to the reality of pharmacists' work. Pharmacists working in patient care should have their performance periodically assessed to identify the aspects

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that should be improved when the counseling their patients.

The use of the patient simulation technique must be increasingly considered as a method that provides meaningful learning in a shorter time. However, it is important to keep in mind that repetition achieves the best learning results, and simulated patient technique allows repetition with no negative impact on actual patients. Commonly known as deliberate practice, described by Castro and Couto and by Ericsson, is a simulation strategy where a clinical case is simulated several times until the competence desired is acquired. When the objectives of this cycle are achieved, a new cycle begins, increasing the complexity of the tasks required to reach full mastery it targets skills.[37,38]

Limitations

The difficulty of participants to integrate into the simulated situation and to view the activity as a real situation of daily pharmacy is one of the main limitations of our study. It is noticeable that many students only completed the compulsory course activity, and therefore the results may be underestimated due to this lack of adherence. Another limiting factor is the observer bias. Although the inconsistencies in the double scoring process were evaluated by a second researcher, since all recordings were analyzed by a single researcher, trends in the evaluation process may have compromised the results. The idea of developing this study occurred after the simulations were carried out based on the questions that arose from the teaching staff about the difficulties that pharmacists presented. Therefore, as data were retrospectively evaluated, the profile and the level of knowledge and experience of the participants when entering the course were unknown. This pre-assessment analysis would be important to be able to adequately measure how far pharmacists have evolved during the improvement course. The cross-sectional nature of the study is also a limiting factor, as it demonstrates the assessment of the skills of pharmacists at a given time, without considering the possible changes of these over time.

CONCLUSIONS

The simulated patient recordings analyzed demonstrated a regular-to-unsatisfactory performance of participants, suggesting that trainees have difficulties in properly performing drug dispensing and patient counseling. The main difficulties faced by pharmacists are related to deficient technical knowledge, observed in inadequate patient counseling, and barriers to communication with the patient, causing the counseling and transmission of information to be impaired due to the failures. Limitations in skills, both involving non-technical and technical knowledge, should promote a critical analysis on how education methods should be adapted to raise the awareness of pharmacists to modify the way they act, communicate, and listen to the patient. The use of active methodologies, such as simulation, should become a routine in pharmacy education because the more the student repeats a certain technique, the greater the learning and knowledge will be gained. Our study also provides relevant data for pharmacy education in Brazil and may serve as a basis for improving gaps in pharmacy education.

CONFLICT OF INTEREST

The authors declare that have no conflict of interest that might influence on the results of this article.

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References

1. Possamai FP, Dacoreggio MS. [The skill of communicating with the patient in the pharmaceutical care process]. Trab Educ Saude. 2008;5(3):473-490. https://doi.org/10.1590/S1981-77462007000300008
2. Palhano T. [Pharmacist-led patient counseling]. Infarma. 1992;1(1): 5-7.
3. Oenning D, Oliveira BV, Blatt CR. Conhecimento dos pacientes sobre os medicamentos prescritos após consulta médica e dispensação [Patient awareness about drugs prescribed after medical appointment and prescription]. Cien Saude Colet. 2011;16(7):3277-3283. https://doi.org/10.1590/s1413-81232011000800027
4. Galato D, Alano GM, Trauthman SC. Vieira AC. [The dispensation of medicines: a reflection for prevention, identification and solution of drug related problems]. Rev Bras Ciencias Farm. 2008;44(3):465-475. https://doi.org/10.1590/S1516-93322008000300017
5. Smithson J, Bellingan M, Glass B. Mills J. Standardized patients in pharmacy education: An integrative literature review. Curr Pharm Teach Learn. 2015;7(6):851-863. https://doi.org/10.1016/j.cptl.2015.08.002
6. Björnsdottir I, Granas AG, Bradley A, Norris P. A systematic review of the use of simulated patient methodology in pharmacy practice research from 2006 to 2016. Int J Pharm Pract. 2020;28(1):13-25. https://doi.org/10.1111/ijpp.12570
7. McDonough RP, Bennett MS. Improving communication skills of pharmacy students through effective precepting. Am J Pharm Educ. 2006;70(3):58. https://doi.org/10.5688/aj700358
8. Pohjanoksa-Mäntylä, Puumalainen I, Marja Airaksinen M. Counselling, Concordance and Communication – Innovative Education for Pharmacists. The Hague: FIP; 2012.
9. Kerr A, Strawbridge J, Kelleher C, Mertens F, Pype P, Deveugele M, Pawlikowska T. How can pharmacists develop patient-pharmacist communication skills? A realist review protocol. Syst Rev. 2017;6(1):14. https://doi.org/10.1186/s13643-016-0396-0
10. Limberger JB. [Active teaching-learning methodologies for pharmaceutical education: a report on experience]. Interface. 2013;17(47), 969-975. https://doi.org/10.1590/1807-57622013.3683

www.pharmacypractice.org (eISSN: 1886-3655 ISSN: 1885-642X)

11. Macleod-glover N. Communication in Pharmacy Practice : An Overview. Available at: https://www.tevacanada.com/globalassets/canada-ph2/pdf-documents-en/archived-ces/practice-ces/0606_practice-ce_communication-in-pharmacy_en.pdf (accessed Mar 1, 2020).
12. Silva MJ. [Comunication has a solution: Comunication in interpersonal relations]. Sao Paulo: Loyola;2010. ISBN: 9788515025534.
13. Devraj R, Butler LM, Gupchup GV, Poirier TI. Active-learning strategies to develop health literacy knowledge and skills. Am J Pharm Educ. 2010;74(8):137. https://doi.org/10.5688/aj7408137
14. Mesquita AR, Souza WM, Boaventura TC, Barros IM, Antoniolli AR, Silva WB, Lyra Júnior DP. The effect of active learning methodologies on the teaching of pharmaceutical care in a Brazilian pharmacy faculty. PLoS One. 2015;10(5):e0123141. https://doi.org/10.1371/journal.pone.0123141
15. Hermida PM, Barbosa SS, Heidemann IT. [Active methodology in nursing education: innovation of the practice in the primary health care]. Rev Enferm UFSM. 2015;5, 1–9. https://doi.org/10.5902/2179769216920
16. Roman, C. Ellwanger J, Becker GC, Silveira AD, Bezerra Machado CL, Manfroi WC. [Learning and teaching active learning methods in the Brazilian traching process]. Clin Biomed Res. 2017;37(4):349-357.
17. Gaba DM. The future vision of simulation in healthcare. Simul Healthc. 2007;2(2):126-135. https://doi.org/10.1097/01.sih.0000258411.38212.32
18. Regan K, Harney L, Goodhand K, Strath A, Vosper H. Pharmacy Simulation: A Scottish, Student-Led Perspective with Lessons for the UK and Beyond. Pharmacy (Basel). 2014;2:50-64.
19. Rabelo L, Garcia VL. Role-play for the development of communication skills. Rev Bras Educ Med. 2015;39, 586-596.
20. Oliveira KC, Cavalcanti RC, Brito BR, Pimentel TS, Lima AX. Implementação da técnica role-play como estratégia metodológica para ensino do processo de enfermagem: relato de experiência. Available at: https://www.esenfc.pt/event/event/abstracts/exportAbstractPDF.php (accessed Mar 1, 2020).
21. Mesquita AR, Lyra DP Jr, Brito GC, Balisa-Rocha BJ, Aguiar PM, de Almeida Neto AC. Developing communication skills in pharmacy: a systematic review of the use of simulated patient methods. Patient Educ Couns. 2010;78(2):143-148. https://doi.org/10.1016/j.pec.2009.07.012
22. Jeffries PR. A framework for designing, implementing, and evaluating simulations used as teaching strategies in nursing. Nurs Educ Perspect. 2005;26(2):96-103.
23. UFRGS. [Improvement course: Pharmacists in primary healthcare]. Available at: http://www.ufrgs.br/farmaceuticosabemrede (accessed Mar 1, 2020).
24. Beardsley R, Kimberlim C, Tindall W. Communication skills in pharmacy practice. Philadelphia: Lippincott Williams & Wilkins; 2011. ISBN-13: 978-1608316021
25. Berger B. Habilidades de comunicação para farmacêuticos: construindo relacionamentos, otimizando o cuidado aos pacientes. Sao Paulo: Pharmabook; 2011. ISBN: 978-8589731546
26. Reis TM, Guidoni CM, Girotto E, Rascado RR, Mastroianni PC, Cruciol JM, Pereira LR. Knowledge and conduct of pharmacists for dispensing of drugs in community pharmacies: a cross-sectional study. Brazilian J Pharm Sci. 2015;51(3):733-744. https://doi.org/10.1590/S1984-82502015000300025
27. Departamento de Assistência Farmacêutica e Insumos Estratégicos. [Pharmaceutical care in primary healthcare] Brasilia: Ministerio da Saude; 2015.
28. Pereira LR, Freitas O. [Evolution of pharmaceuytical care and the Brazilian perspective]. Rev Bras Ciencias Farm. 2008;44:601-612.
29. Paravattil B, Kheir N, Yousif A. Utilization of simulated patients to assess diabetes and asthma counseling practices among community pharmacists in Qatar. Int J Clin Pharm. 2017;39(4):759-768. https://doi.org/10.1007/s11096-017-0469-8
30. Murphy AL, Gardner DM. A simulated patient evaluation of pharmacist's performance in a men's mental health program. BMC Res Notes. 2018;11(1):765. https://doi.org/10.1186/s13104-018-3869-5
31. Obreli-Neto PR, Pereira LR, Guidoni CM, de Oliveira Baldoni A, Marusic S, de Lyra-Júnior DP, de Almeida KL, Pazete AC, do Nascimento JD, Kos M, Girotto E, Cuman RK. Use of simulated patients to evaluate combined oral contraceptive dispensing practices of community pharmacists. PLoS One. 2013;8(12):e79875. https://doi.org/10.1371/journal.pone.0079875
32. Clayton K, Luxford Y, Colaci J, Hasan M, Miltiadou R, Novikova D, Vlahopoulos D, Stupans I. Community pharmacists' recommendations for natural products for stress in Melbourne, Australia: a simulated patient study. Pharm Pract (Granada). 2020;18(1):1660. https://doi.org/10.18549/pharmpract.2020.1.1660
33. Zolezzi M, Abdallah O, Kheir N, Abdelsalam AG. Evaluation of community pharmacists' preparedness for the provision of cardiovascular disease risk assessment and management services: A study with simulated patients. Res Social Adm Pharm. 2019;15(3):252-259. https://doi.org/10.1016/j.sapharm.2018.04.032
34. Elayeh ER, Hammad EA, Tubeileh RH, Basheti IA. Use of secret simulated patient followed by workshop based education to assess and improve inhaler counseling in community pharmacy in Jordan. Pharm Pract (Granada). 2019;17(4):1661. https://doi.org/10.18549/pharmpract.2019.4.1661
35. Yaacoub SG, Koyess V, Lahoud N, Lahoud N, Rahme D, Francis N, Saleh N, Maison P. Antibiotic prescribing for acute uncomplicated cystitis in Lebanese community pharmacies using a simulated patient. Pharm Pract (Granada). 2019;17(4):1604. https://doi.org/10.18549/pharmpract.2019.4.1604
36. Oh Y, McCombs JS, Cheng RA, Johnson KA. Pharmacist time requirements for counseling in an outpatient pharmacy. Am J Health Syst Pharm. 2002;59(23):2346-2355. https://doi.org/10.1093/ajhp/59.23.2346
37. De Castro LT, Couto TB. Rapid cycle deliberate practice: A modern simulation strategy. Sci Med (Porto. Alegre). 2018;28(1):28849. https://doi.org/10.15448/1980-6108.2018.1.28849
38. Ericsson KA. Deliberate practice and acquisition of expert performance: a general overview. Acad Emerg Med. 2008;15(11):988-994. https://doi.org/10.1111/j.1553-2712.2008.00227.x