

Perceptions of Pharmacy students about their competences for professional practice in community pharmacy

Marina Melo Antunes Coelho¹, Alessandra Rezende Mesquita²,
Marina Guimarães Lima^{1,2*}

¹Programa de Pós-Graduação em Medicamentos e Assistência Farmacêutica da Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brasil, ²Departamento de Farmácia Social, Faculdade de Farmácia, Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brasil

Pharmaceutical education should enable the development of competences for community pharmacy practice, which is an important field for the pharmacist workforce. The aim of this study was to evaluate the competences perceived by pharmacy interns from a Brazilian pharmacy school for community pharmacy practice. This study adopted a combined quantitative and qualitative approach. The study cohort included undergraduate students who undertook internships in community pharmacy in the final year of the pharmacy course. Students responded to an 11-item structured questionnaire according to a five-point Likert scale that included perceptions of their competences for community pharmacy practice. Among the 693 possible answers, 605 (87.3%) agreed that the course promoted the development of competences for professional practice in community pharmacy. Less than 70% of students perceived themselves as prepared to respond to symptoms and provide non-prescription medicines. Qualitative analysis of the comments revealed three themes: the need to improve patient information skills, improve practice as a member of a health care team, and improve dispensing according to legal requirements. These findings may support improvements in undergraduate pharmacy programs, such as the inclusion of experiential learning, active learning methods, interprofessional education, and development of clinical skills.

Keywords: Education. Pharmacy. Community Pharmacy Services. Professional Competence.

INTRODUCTION

Community pharmacy is an important segment of pharmaceutical practice worldwide. According to a survey on the United States pharmacist workforce, in 2014, 44.1% of active practicing pharmacists worked in traditional community pharmacy settings (independent, chain, mass merchandiser, and supermarket pharmacies) (Midwest Pharmacy Workforce Research Consortium, 2015). In Brazil, 81.1% of pharmacists

worked in community pharmacies in the same year (Serafin, 2015).

Pharmaceutical practice has shifted from its original product-centered focus to the current patient-centered focus in many countries around the world, with differences in degrees of occurrence (Addo-Atuah, 2014). On average, pharmacists working in community pharmacies in the United States devoted around 68% of their time to patient care services associated with medicines dispensing, 12% to patient care services not associated with medication dispensing, and 11% to business/organization management (Midwest Pharmacy Workforce Research Consortium, 2015). According to Brazilian law, community pharmacy pharmacists should promote rational use of medicines through dispensing,

*Correspondence: M. G. Lima. Departamento de Farmácia Social. Faculdade de Farmácia. Universidade Federal de Minas Gerais. Avenida Presidente Antônio Carlos, 6627-Campus Pampulha. Belo Horizonte-MG. CEP: 31270-901. Phone: 55-31-34096715. E-mail: marina.glima@gmail.com

in addition to providing clinical services and ensuring proper drug storage (Brasil, 2001). Community pharmacy practice can support health improvements by reducing adverse drug events and promoting better medication adherence (Mossialos *et al.*, 2015). Some countries establish competence standards for the pharmacy profession. For example, the New Zealand Pharmacy Council recommends the following competence standards: practice pharmacy in a professional manner; facilitate rational use of medicines; provide primary health care; apply management and organizational skills; research and provide information; dispense medicines; and prepare pharmaceutical products (Kairuz, Noble, Shaw, 2010). These requirements are expected to be attained by the pharmacist workforce and are especially relevant to community pharmacy practice.

The shift in community pharmacy practice from a product-centered to a patient-centered model has led to changes in pharmaceutical education. In countries such as the United States, Australia, and New Zealand, pharmacy courses began to focus on the development of patient care competences through experiential learning (Nemire, Meyer, 2006; Marriott *et al.*, 2008; Kairuz, Noble, Shaw, 2010). In Sierra Leone and Brazil, pharmaceutical education is based on basic and pharmaceutical sciences with incipient exposure to clinical care (James, Cole, 2016; Mendonça, Freitas, Ramalho de Oliveira, 2017). In 2017, a law was published in Brazil that established guidelines for pharmaceutical education, recommending the development of patient care competences and experiential learning activities throughout undergraduate courses (Brasil, 2017).

The process of changing pharmacy courses to foster clinical skills should be based on scientific research conducted in educational institutions. To date, few studies have evaluated students' perceptions of the development of competences for pharmacy practice (Kairuz, Noble, Shaw, 2010; James, Cole, 2016; Rios *et al.*, 2017), especially in Brazil and in community pharmacy setting. A Brazilian qualitative study (Rios *et al.*, 2017) analyzed students' perception of their preparedness for pharmacy practice; however, the study did not comprise a representative sample of the undergraduate student population and did not address, through a questionnaire, competences relevant to community pharmacy practice.

The aim of this study was to evaluate the competences perceived by pharmacy interns from a Brazilian pharmacy school for community pharmacy practice.

MATERIAL AND METHODS

Study setting

The study setting was the undergraduate pharmacy course at the Federal University of Minas Gerais, Brazil. This program comprised 4005 credit hours and includes basic and pharmaceutical sciences, totaling 2520 hours of mandatory disciplines, 810 internship hours, and 675 hours of elective disciplines and academic activities. Regarding the mandatory curriculum, disciplines such as Internship in Pharmacy, Pharmacology, Community Pharmacy Practice, Ethics and Pharmaceutical Legislation added up to 645 hours and directly addressed knowledge and skills required for community pharmacy practice. Elective disciplines included Pharmaceutical Care, Pharmaceutical Services, Medication Therapy Management, and other disciplines that address issues important to pharmaceutical practice in health services. The program spans 10 semesters for the day course and 13 semesters for the evening course, both awarding the same degree. According to 2017 data, in the final year of the course, students undertook a 375-hour internship program in community pharmacy that included supervised activities in management, inventory control, storage, medicine dispensing, compliance with legal requirements, and provision of information to patients at community pharmacies. The internship program also included parallel web-based academic activities and university meetings.

Sample

The study cohort included undergraduate students who undertook internships in community pharmacy in the final year of the pharmacy course, from March to June of 2017 (first semester of 2017) (n=66). The calculation of the minimum sample size considered a 95% confidence interval (CI) and a 5% significance level, resulting in a minimum of 57 undergraduates.

Survey forms, data collection, and analysis

This study adopted a combined quantitative and qualitative approach. An 11-item questionnaire was created based on that developed by Kairuz and colleagues (2010) to analyze pharmacy interns' perceptions regarding their preparedness for pharmacy practice. Although the Kairuz and colleagues' questionnaire was created based

on competence standards for pharmacy practice in New Zealand, the researchers in this study verified that it addresses essential competences required for community pharmacy practice in Brazil. Thus, a cross-cultural translation of the questionnaire was conducted in order to adapt it to the Brazilian setting. Both New Zealander and Brazilian questionnaires included the following competence standards: professionalism in pharmacy practice, facilitate rational use of medicines, provide health care, apply management and organizational skills, research and provide information, and dispense medicines. One of the Kairuz's form items ("Respond to symptoms, and supply non-prescription medicines, and refer to patients as appropriate") was divided into three sub-items so that sufficient information could be obtained. The New Zealander questionnaire included a five-item domain on effective spoken and written English communication. Kairuz and colleagues (2010) reported that there were concerns about the English communication skills of some graduates because many of them were born outside New Zealand and therefore English was not their first language. However, the researchers in this study considered this type of concern not applicable to the Brazilian context and thus excluded these items from the form. Responses were rated according to a five-point Likert scale ("strongly agree," "agree," "neutral," "disagree," and "strongly disagree"). For each Likert item on the form, there was a field that students could fill in with voluntary comments and additional information. Demographic variables and a question about the perception on the internship program were also included in the questionnaire.

The questionnaire was personally distributed to interns ($n=63$, 95.5% of undergraduates) in July 2017, during the last day of academic activities of the internship program. Students were required to sign an informed consent form to be included in the research. Data were entered into a PSPP software database. A descriptive analysis was performed through frequencies, means, and standard deviations, with the interns and their responses being the analysis units. Responses according to the established Likert scale were calculated as a percentage of the total possible answers (e.g., 11 statements \times 63 respondents=693). The proportion of students that agreed with the Likert-scale sentences ("agree" or "strongly agree") was calculated and their associated factors were analyzed using a chi-square test with a confidence interval of 95% and a significance level of 5%. Factors included demographic variables (gender and age) and

positive perception of the internship program. All the voluntary comments of the students were categorized through thematic analysis according to the Bardin model. PSPP software was used for statistical analysis.

Ethics aspects

Ethical approval for the study was obtained from the Federal University of Minas Gerais Ethics Committee (Protocol 1.952.236/2017).

RESULTS AND DISCUSSION

Results

A total of 63 (95.5%) students voluntarily completed the questionnaires. The age of respondents ranged from 22 to 40 years, with an average of 24.75 (± 3.16) and a median of 24; 46 (73%) interns were women and 17 (27%) were men; 61 (96.8%) students perceived that the internship program improved their understanding of pharmacist practice in community pharmacy.

Most responses revealed agreement or strong agreement with the questionnaire statements. Given that the responses comprised one of the units of analysis, 605 responses (87.3%) agreed or strongly agreed that the undergraduate pharmacy course promoted the development of competences essential for community pharmacy practice.

Table I summarizes the interns' responses (in percent). Seven competence standards were analyzed. Regarding the competence standards "practice pharmacy in a professional manner," "apply management and organizational skills," and "research and provide information," over 88% of students agreed or strongly agreed with the statements. However, less than 70% of interns agreed or strongly agreed that the course prepared them to respond to symptoms and supply non-prescription medicines. According to Table II, only the female sex was significantly associated with responses of agreement or strong agreement that the course developed competences needed to community pharmacy.

Students provided 18 voluntary comments for the questionnaire items. Qualitative analysis of all comments revealed three themes (Table III), including the need to improve patient information skills, improve practice as a member of a health care team, and improve dispensing in accordance with legal requirements.

TABLE I - Perceptions of pharmacy interns about their competences to practice in community pharmacy, 2017, Brazil

Competence standards	Related Survey Item: Having attended the course until the present moment enabled the intern to...	Disagree or strongly disagree N(%)	Neutral N(%)	Agree or strongly agree N(%)
Professionalism in pharmacy practice	Demonstrate compliance with legal, ethical and cultural requirements in the workplace	2 (3,17)	0 (0,00)	61 (96,83)
	Accept responsibility and work within their limitations	2 (3,17)	5 (7,94)	56 (88,89)
Facilitate the rational use of medicines	Utilize basic scientific and therapeutic knowledge in terms of promoting the rational use of medicines	2 (3,17)	0 (0,00)	61 (96,83)
	Respond to symptoms of patients	13 (20,64)	13 (20,63)	37 (58,73)
Provide health care	Supply non-prescription medicines for the treatment of minor disorders	10 (15,87)	10 (15,87)	43(68,26)
	Refer patients to other health practitioners as appropriate	3 (4,76)	1 (1,59)	59 (93,65)
Apply management and organizational skills	Take responsibility for their own work and professional development	1 (1,59)	1 (1,59)	61 (96,83)
	Contribute to the pharmacy organization in which they work as an effective team member	2 (3,17)	2 (3,17)	59 (93,65)
Research and provide information	Access, evaluate and provide information about medicines and healthcare	0 (0,00)	3 (4,76)	60 (95,24)
Dispense medicines	Dispense medicines safely, accurately and in compliance with legal requirements	1 (1,59)	5 (7,94)	57 (90,47)
	Effectively counsel patients about their medicines	2 (3,18)	10 (15,87)	51 (80,95)

TABLE II - Factors associated with agreement or strong agreement that the pharmacy degree course developed competences to practice in community pharmacy

Characteristics	Agree or strongly agree N(%)	Chi-square value	P value
Sex			
Female	451(89,1%)	5,66	0,017
Male	154 (82,3%)		

(continuing)

TABLE II - Factors associated with agreement or strong agreement that the pharmacy degree course developed competences to practice in community pharmacy

Characteristics	Agree or strongly agree N(%)	Chi-square value	P value
Age			
Below the average	274 (89,0%)	1,58	0,209
Above the average	331 (85,8%)		
Agreement that the internship program improved the comprehension about current profile of the pharmacists and their responsibilities in community pharmacies			
Yes	444 (87,8%)	0,55	0,460
No	161 (85,6%)		

TABLE III - Comments of the interns about competences to practice in community pharmacy

Themes	Interns comments
	"I feel prepared partially- the course does not have appropriate clinical part yet".
	"I do not feel prepared in all clinical cases".
	"I am afraid to indicate to the patients".
	"In the course there is a need to include disciplines that address clinical issues".
Need to improve clinical skills	<p>“Elective disciplines such as Medication Therapy Management and Pharmaceutical Care helped me in taking decision “.</p> <p>“The course is very research-centered and it does not address clinical skills.”</p> <p>"With research and remembering some subjects, I feel prepared".</p> <p>“There is a great diversity of medicines and we need often updating “.</p> <p>“The course should include more theory and competences in this field.”</p> <p>“It is needed to include in the course more knowledge related to community pharmacy.”</p> <p>“I feel prepared regarding to pharmacology disciplines, but I think they should be more in-depth.”</p> <p>“I can promote rational use of medicines with search of information and remembering some subjects.”</p>
Need to improve interaction with other health practitioners	<p>"I did not interact often with other professionals".</p> <p>"I do not believe that the course prepared me to work as a member team and to the business".</p>

(continuing)

TABLE III - Comments of the interns about competences to practice in community pharmacy

Themes	Interns comments
Dispensing according legal requirements	"I need to be more prepared about legislation."
	"The legislation should be addressed in the course more in-depth."
	"Many pharmacies do not follow legal requirements".
	"My internship experience did not contribute to dispensing according legal requirements and these issues could be addressed in the course more in-depth".

DISCUSSION

This paper presents the findings of a study with a Latin American pharmacy school on the perceptions about the competences needed for community pharmacy practice with a complete approach combining quantitative and qualitative methods.

The demographic profile of the interns in this research was similar to that observed by other studies conducted with pharmacy undergraduates (Kairuz, Noble, Shaw, 2010; Rios *et al.*, 2017), with a predominance of female students under 30 years old. Almost all interns perceived that the internship program improved their competences for community pharmacy practice. The female sex was associated with agreement or strong agreement that pharmacy course enabled the development of competences essential for community pharmacy practice. In line with these results, a study conducted in the United Kingdom found that female and younger community pharmacists assessed themselves as more competent in the community pharmacy setting, especially in patient care activities (Mills *et al.*, 2005).

More than 88% of responses related to "practice pharmacy in a professional manner" and "research and provide information" indicated agreement or strong agreement with the corresponding sentences, revealing that these competence standards are perceived by students as developed. This proportion was similar to that observed by Kairuz and colleagues (2010). Since the development of ethical and professional behavior and social accountability are considered essential for all health-related professions, learning outcomes related to these competences are addressed by pharmacy degree courses in many countries such as Australia, Canada, United Kingdom, and the United States (Stupans *et al.*, 2016). In this study, the interns acknowledged that

they had developed the competences needed to access, evaluate, and provide information about medicines and commented that their course was research-centered.

Less than 70% of students perceived themselves as prepared to respond to symptoms and supply non-prescription medicines and this proportion was lower than that observed in the New Zealand study (Kairuz, Noble, Shaw, 2010). The comments revealed that undergraduates perceived themselves lacking sufficient preparation for patient care and supply non-prescription medicines due to lack of clinical preparation during the undergraduate program. Some interns felt that research skills had been fostered at the expense of clinical skills in the course. Mendonça and colleagues (2017) obtained similar results in an ethnographic study conducted at the pharmacy undergraduate course of the Federal University of Minas Gerais. The differences between the results of this study and those of the New Zealand study are related to pharmacy course structures. In developed countries such as New Zealand, Australia, and the United States, pharmacy degree programs deeply address pharmaceutical care competences (Stupans *et al.*, 2016; Kairuz, Noble, Shaw, 2010). In Brazil and other countries such as Sierra Leone, patient care competences are incipient in undergraduate pharmacy courses, and programs are more product-centered than patient-centered (Pereira, Freitas, 2008; James, Cole, 2016; Ramalho-de Oliveira, 2012). According to studies conducted in the United States, experiential learning and active learning methods should foster skills in health promotion, medication therapy management, and patient communication (Ryan Haddad *et al.*, 2012; Nuffer *et al.*, 2017). In Brazil, there are a few experiences comprising the use of experiential learning to develop clinical skills in pharmacy undergraduates, although restricted to elective disciplines in undergraduate pharmacy

programs (Mendonça, Freitas, Ramalho de Oliveira, 2017; Mesquita *et al.*, 2015).

In this study, some students perceived that the course did not prepare them to work as team members and had no opportunity to interact with other health professionals. Interprofessional education is an important strategy for the formation of health practitioners (Reeves, 2016). In this regard, many undergraduate pharmacy courses include interprofessional activities in the compulsory curriculum. Some studies have found that educational activities including pharmacy, nursing, and medical students have enabled the development of competences toward interprofessional collaboration (Kostoff *et al.*, 2016; Nuffer *et al.*, 2015). Brazil has only a few experiences of interprofessional education including pharmacy students, most of them restricted to elective academic activities (Barreto *et al.*, 2011; Mendes *et al.*, 2014).

Despite its valuable outcomes, this study has some limitations. First, since study participants were restricted to students of a pharmacy course, perceptions of competences from other stakeholders, such as internship preceptors, were not assessed. In addition, students' perceptions of competences could have been influenced by their behavioral characteristics. Regardless, this study presented novel scientific findings on the perceptions of Latin American pharmacy students on competences for community pharmacy practice through a questionnaire adapted to the Brazilian setting.

CONCLUSIONS

Most undergraduates agreed that the course prepared them for practice with limitations in specific competences, such as health care provision and promotion of rational use of medicines. The results of this study elicited suggestions for a curriculum reform that has been conducted in the institution studied, such as the inclusion of disciplines such as Pharmaceutical Services and Pharmaceutical Care as mandatory instead of elective, and the conduction of interprofessional practical activities in health services in the first semesters of the course. The findings of this research may further support improvements in undergraduate pharmacy programs in Brazil and in other countries, such as the inclusion of experiential learning, active learning methods, and interprofessional education, and the development of clinical skills.

REFERENCES

- Addo-Atuah J. Making a case for a public health orientation in global pharmacy education and practice in the context of the Millennium Development Goals (MDGs). *Curr Pharm Teach Learn*. 2014;6(5):723-29.
- Brasil. Conselho Federal de Farmácia. Resolução nº. 357, de 20 de abril de 2001. Aprova o regulamento técnico das Boas Práticas de Farmácia. *Diário Oficial da União* 27 abr 2001.
- Brasil. Resolução CNE/CES nº. 6, de 19 de outubro de 2017. Institui as Diretrizes Curriculares Nacionais do Curso de Graduação em Farmácia e dá outras providências. *Diário Oficial da União* 20 out 2017.
- Barreto ICHC, Loiola FA, Andrade LOM, Moreira AEMM, Cavalcanti CGCSC, Arruda CAM, et al. Development of interprofessional collaborative practices within undergraduate programs on healthcare: case study on the Family Health Alliance in Fortaleza (Ceará, Brazil). *Interface (Botucatu)*. 2011;15(36):199-212.
- James PB, Cole, CP. Intern pharmacists' perceived preparedness for practice, their extent of involvement in pharmacy related activities and future career choices in Sierra Leone: A baseline descriptive survey. *Pharmacy Education*. 2016;16(1):26-32.
- Kairuz T, Noble C, Shaw J. Preceptors, interns, and newly registered pharmacists' perceptions of New Zealand pharmacy graduates' preparedness to practice. *Am J Pharm Educ*. 2010;74(6):108.
- Kostoff M, Burkhardt C, Winter A, Shrader S. An Interprofessional Simulation Using the SBAR Communication Tool. *Am J Pharm Educ*. 2016;80(9):157.
- Marriott JL, Nation RL, Roller L, Costelloe M, Galbraith K, Stewart P, et al. Pharmacy education in the context of Australian practice. *Am J Pharm Educ*. 2008;72(6):126.
- Mendes SS, Cardoso JS, Groia RCS, Braga DS, Sorrentino F, Silva FMB, et al. Contribuições para a assistência farmacêutica: relato de uma experiência no Programa PET-Saúde. *Rev Med Minas Gerais*. 2014;24(Supl. 1):S19-S24.
- Mendonça SAM, Freitas EL, Ramalho de Oliveira D. Competencies for the provision of comprehensive medication management services in an experiential learning project. *PLoS ONE*. 2017;12(9):e0185415.
- Mesquita AR, Souza WM, Boaventura TC, Barros IMC, Antonioli AR, Silva WB, et al. The Effect of Active Learning

- Methodologies on the Teaching of Pharmaceutical Care in a Brazilian Pharmacy Faculty. *PLoS ONE*. 2015;10(5):e0123141.
- Midwest Pharmacy Workforce Research Consortium. 2014 National Pharmacist Workforce Survey [Internet]. Minnesota: Midwest Pharmacy Workforce Research Consortium, 2015. [Cited 2017 May 15]. 175p. Available at: <https://www.aacp.org/sites/default/files/finalreportofthenationalpharmacistworkforcestudy2014.pdf>
- Mills E, Laaksonen R, Bates I, Davies G, Duggan C. Self-assessment of competence in a community pharmacy setting. *Pharmacy Education*. 2005;5(3):1-11.
- Mossialos E, Courtin E, Naci H, Benrimoj S, Bouvy M, Farris K, et al. From “retailers” to health care providers: transforming the role of community pharmacists in chronic disease management. *Health Policy*. 2015;119(5):628-39.
- Nemire RE, Meyer SM. Educating student for practice: educational outcomes and community experience. *Am J Pharm Educ*. 2006;70(1):20.
- Nuffer W, Gilliam E, McDermott M, Turner CJ. Sustainability of a Practice-based Interprofessional Introductory Pharmacy Practice Experience Course. *Am J Pharm Educ*. 2015;79(5):62.
- Nuffer W, Gilliam E, Thompson M, Vande Griend J. Establishment and Implementation of a Required Medication Therapy Management Advanced Pharmacy Practice Experience. *Am J Pharm Educ*. 2017;81(2):36.
- Pereira LRL, Freitas, O. A evolução da Atenção Farmacêutica e a perspectiva para o Brasil. *Rev. Bras. Cienc. Farm.* 2008;44(4):601-612.
- Ramalho-de Oliveira D. Global Perspective: Brazil. In: Cipolle R, Strand L, Morley P. *Pharmaceutical care practice: the patient-centered approach to medication management*. 3rd ed. New York: McGraw-Hill; 2012. p. 697.
- Reeves S. Why we need interprofessional education to improve the delivery of safe and effective care. *Interface (Botucatu)*. 2016;20(56):185-97.
- Rios MC, Souza WM, Mesquita AR, Cerqueira-Santos S, Lyra Junior DP, Silva WB, et al. Assessment of Brazilian pharmacy students' perception of their level of preparedness for pharmaceutical practice. *Afr J Pharm Pharmacol*. 2017;11(40):517-25.
- Ryan Haddad AM, Coover KL, Begley KJ, Tilleman JA. An Advanced Pharmacy Practice Experience in Community Engagement. *Am J Pharm Educ*. 2012;76(5):90.
- Serafin C. Perfil do farmacêutico no Brasil: relatório [Internet]. Brasília: Conselho Federal de Farmácia, 2015. [Cited 2017 May 15]. 44 p. Available at: http://www.cff.org.br/userfiles/file/Perfil%20do%20farmac%C3%AAutico%20no%20Brasil%20_web.pdf
- Stupans I, Atkinson J, Meštrović A, Nash R, Rouse MJ. A Shared Focus: Comparing the Australian, Canadian, United Kingdom and United States Pharmacy Learning Outcome Frameworks and the Global Competency Framework. *Pharmacy*. 2016;4(3):26.

Received for publication on 04th September 2018

Accepted for publication on 12nd June 2019