

## RESEARCH

# Impact of a Pharmacy Management Course for Pharmacists Working Within Brazil's Public Health System

Fernanda Manzini, PhD, Andriago Antonio Lorenzoni, MSc, Luciano Soares, PhD, Norberto Rech, MSc, Silvana Nair Leite, PhD

Federal University of Santa Catarina, Florianopolis, Brazil

Submitted December 9, 2020; accepted April 2, 2021; published August 2021.

**Objective.** To assess the impact of a continuing education course that focused on the development of management competencies on pharmacists working in Brazil's public health system.

**Methods.** A specialization blended in-service course (360 hours) entitled Pharmaceutical Service and Access to Medicine Management was offered to pharmacists working within the Brazilian public health system. Data on course outcomes were collected through individual interviews with pharmacists who worked in the Brazilian public health system, as well as from focus groups and records of researchers' observations. The analysis was based on models of learning and training evaluation theory.

**Results.** The findings showed proximal outcomes on students' knowledge, skills, and attitudes; behavioral changes; and programmatic outcomes in the organization and management of health services, promoting the recognition and integration of the "pharmaceutical services division" – a dedicated sector within the health departments in municipalities and states. The inputs (course content, structure, and in-service hands-on activities) were directly linked to the outcomes reported by participants and helped them to overcome some of the barriers to using knowledge and skills in the workplace.

**Conclusion.** A well-structured course including leaning activities to intervene in the workplace had a positive impact on pharmacists' behavior and contributed to the capacity building of the organizations in which they operate.

**Keywords:** continuing education, management, training evaluation, impact, pharmacist

## INTRODUCTION

Management education and training of pharmacists are essential in building health management capacity. It will continue playing an important role in the future, supporting health systems to meet specific and sustainable health-related objectives.<sup>1</sup> However, there are shortcomings in the training of professionals in management positions, especially in complex health systems.<sup>2,3</sup> Health systems lack people with managerial competencies that match their responsibilities.<sup>4,5</sup>

The literature discusses various management competences, such as those related to people, relationships, rules and policies, and decision-making processes.<sup>4</sup> To make sure that health managers have the appropriate competences, the World Health Organization (WHO) proposes taking integrated actions. These include defining expected competences, setting of trainings,

assessment of training, and establishment of an accreditation system.<sup>3</sup> However, there is still a management competence gap in the health system as has been vastly reported.<sup>4,6</sup>

The International Pharmaceutical Federation has defined four clusters of professional competencies desired for pharmacists,<sup>7,8</sup> and management competencies constitute one of these clusters. These competencies pertain to the management of teams, supply chains, services, budgets, and procurements. Communication, leadership, and interprofessional collaboration are some of the other competency domains established by the Federation. Nevertheless, the literature mostly focuses on leadership training for and competencies of physicians, nurses, and public health specialists.<sup>7</sup>

In Brazil, management competencies are crucial for pharmacists working in the public health system (Sistema Único de Saúde - SUS). The system offers access to health services, including access to medicines, to the entire population. The services are financed by public funds.<sup>8</sup> About 70% of all the healthcare procedures in the country (in primary care, specialized care, and hospitals) are performed

---

**Corresponding Author:** Silvana Nair Leite, Federal University of Santa Catarina, Campus Trindidade, Santa Catarina, Florianopolis, Brazil. Tel: +55-47-999855478. Email: silvana.nair@hotmail.com

in public health facilities. Unlike other health systems, in the SUS, medicines are selected, acquired, distributed, and dispensed in public health centers. Pharmacists are responsible for managing the supply chain of medicines and pharmaceutical services in about 90% of the pharmaceutical divisions of the health departments in 5,570 municipalities.<sup>9</sup> This requires complex, multilevel, and intersectoral actions which account for about 16% of the costs of the health system.<sup>10</sup>

The Brazilian Ministry of Health requested that a public funded university, the Federal University of Santa Catarina, Florianopolis, Brazil, develop a specialization course to train pharmacists working in the public health system. The course, entitled Pharmaceutical Service and Access to Medicine Management, was conducted from 2010 through 2016. The desired learning outcomes for the course were for students to develop management competencies in pharmaceutical services, including social engagement, professional autonomy, and commitment to achieve the best results for the National Pharmaceutical Policy and the health system as a whole. The course was the first large-scale training program for pharmacists offered by the government.

Assessing the impact and efficacy of continuing education (CE) programs in health<sup>13,14</sup> as a part of the continued efforts of health system's capacity building is crucial. However, such tasks have proven to be a challenge. The assessment of educational strategies in health must comprehend not only the evaluation of knowledge, skills, and attitudes, but also the evaluation of behavioral changes in professional practice as well as concrete outcomes in health services.<sup>15-18</sup> Impact assessment is understood as the assessment of long-term outcomes that can be attributed to a given intervention, in which the measurement of impact does not happen immediately after the educational intervention and the knowledge and skills learned during the intervention are retained over time.<sup>19</sup>

The Pharmaceutical Service and Access to Medicine Management course aimed to improve the management capacity of pharmaceutical services in the public health system. Taking into consideration the regional diversity of Brazilian municipalities and the significant decentralization of management and organization of services,<sup>20,21</sup> we expected that the impact of an educational intervention such as this course would be felt in different ways by the target audience (pharmacists) and the health services. This article describes and discusses our assessment of the impacts that were achieved through this continuing education course for pharmacists in the public health system.

## METHODS

The course was free of charge and used a blended approach that included e-learning and in-service training activities.<sup>11</sup> The course was offered to pharmacists in all regions of the country. The 2,500 pharmacists who enrolled in this course worked in 1,068 (19.1%) of the 5,570 Brazilian municipalities.

One hundred thirty-two tutors (pharmacists) were selected to work in 31 regional centers in 20 universities. The student workload for the course was 375 hours (14 months), including both online and in-service hands-on activities. There were four face-to-face meetings.

During the course, students performed an in-service training activity called an *operative plan*, based on the principles of strategic situational planning developed by Carlos Matus.<sup>12</sup> In this activity, the pharmacists were directed to apply management concepts, practices, and tools to the diagnosis of services, identification of problems, establishment of goals and development of a participatory planning involving other professionals, managers, and patients.

Data were collected by conducting individual interviews, hosting focus groups, and reviewing records of researchers' observations about the characteristics of the interviewees' municipalities and workplaces. The study took place from August to October 2018 (on average, three years after the pharmacists had finished the course) in 10 states across the country.

In each state, 10 students were randomly selected for the focus groups and three were selected to be individually interviewed. There were 10 focus groups in the capital cities that lasted for approximately 90 minutes each. Focus groups had an average attendance of six participants. Some participants were invited to be interviewed individually to further explore some themes if the need for such action became evident during the focus group. The in-depth interviews took place in the pharmacists' workplaces after written informed consent had been given.

All focus groups and interviews were recorded and later transcribed and identified in the individual interviews by the letter E followed by an abbreviation of the geographical region in which the interview was conducted (ie, EN = North region, ENE = Northeast, ECO = Central West, ES = South, ESE = Southeast). Focus groups were identified by the abbreviation GF.

Two independent researchers reviewed all notes from the field, transcribed audio-recordings, and read these materials repeatedly before generating an initial codebook. They increased their familiarity with the manifest content as well as with the latent content. Inductive and deductive approaches were used to conduct content and thematic

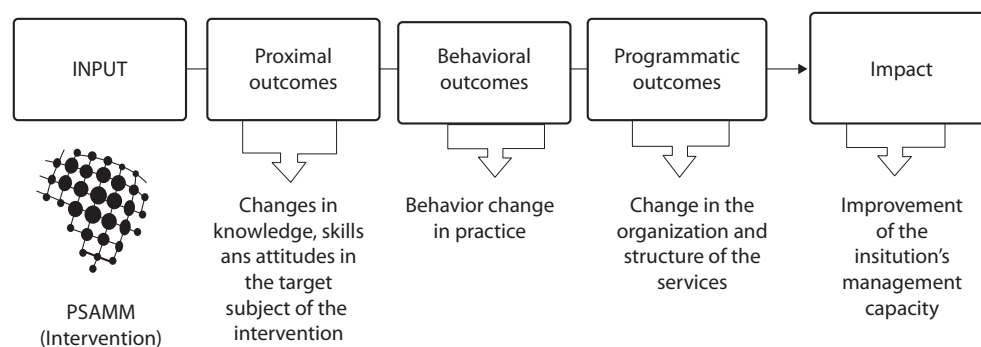


Figure 1. Framework of the Impact Assessment of the Pharmaceutical Service and Access to Medicine Management (PSAMM) Course

analyses: identification of all relevant concepts and themes; indexation of highlighted excerpts by theme and correlation with others; rearrangement of the highlighted excerpts, taking into account their contexts and specificities in a coherent and understandable flow; mapping of the concepts, scope, and nature of the studied phenomenon; attempt to associate themes in order to build an explanation for the findings, connecting them to a theoretical framework.<sup>22,23</sup> The construction of the general categories is based on the framework presented in Figure 1. Themes were identified inductively from the analyzed material.

The qualitative data analysis software, NVivo 10 (QSR International), was used to manage the data during the coding process and help organize themes. The design of this study considered the impact assessment of an educational strategy as the assessment of the long-term outcomes that can be attributed to a given intervention.<sup>24</sup> It was based on models from Kirkpatrick's learning and training evaluation theory,<sup>15</sup> Coons and Hanson's evaluation hierarchy in CE,<sup>17</sup> and Mutale and colleagues' cascade effect leadership and management training (Figure 1).<sup>2</sup>

The themes identified in each level were identified according to indicatives from the reference literature on management and management competences<sup>2-5</sup> as well as the results obtained from the field research. The bedrock of the field results were the subjects' observations and perceptions about the training and its impact in the service (deductive and inductive analysis).

Permission to conduct this study was obtained from the Ethics Committee in Research with Human Beings. All the participants in the research signed a Free Informed Consent Term.

## RESULTS

Thirty-one interviews and 10 focus groups were conducted. Six participants gave an individual interview and

participated in a focus group. The participants' profiles are presented in Table 1. The sample's profile is similar to the profile of the 2,500 students in the course.<sup>25</sup> The 10 states selected for the research had the highest concentration of students in the course (70%). More than 80% of the sample of pharmacists had remained in the same workplace approximately three years after completing the course.

The results are presented in four categories: inputs (Table 2), proximal outcomes (Table 3), behavioral outcomes (Table 4), and programmatic outcomes (Table 5), according to the framework presented in Figure 1 and the identified major themes that emerged from interviews and focus groups.

The e-learning modality is strategic for CE as it required only brief absences from the workplace for a very short period, thus guaranteeing the continuity of pharmacy services. The course, because it was mostly distance learning, provided interiorization of training by reaching 19% of Brazilian municipalities.

The results showed that, to many students, the course brought technical qualification, not only in management, but also in the fields of pharmaceutical policy and public health. Although they worked within the public health system, many participants were not fully trained in the system's organization and its pharmaceutical policy and services. The training provided also increased the pharmacists' self-confidence. The participants showed during the data collection their self-confidence as managers due to the acquisition of theoretical knowledge and practical skills. As they had to engage other actors in the development of the Operative Plan, each pharmacist had to develop better communication skills. They recognized the importance of listening to others and valuing and acknowledging their experience.

The students reported an improvement in their ability to use the tools and the theoretical knowledge learned in the course in negotiations with managers, the general

Table 1. Demographics of Pharmacists Working in Brazil's Public Health System Who Completed a Pharmacy Management Course

| Variable  | n (%)     |
|---|-----------|
| Gender  |           |
| Female  | 65 (78.3) |
| Male  | 18 (21.7) |
| Age range   |           |
| 30–39   | 25 (30.1) |
| 40–49   | 32 (38.6) |
| 50–59   | 22 (26.5) |
| 60 and above  | 4 (4.8)   |
| Governmental sphere (work)                              |           |
| Municipal   | 48 (57.8) |
| State   | 24 (28.9) |
| Other   | 11 (13.3) |
| Labor relationship                                      |           |
| Government Employee (with job stability)                | 66 (79.6) |
| Outsourced  | 8 (9.6)   |
| Other   | 9 (10.8)  |
| Continuance in the workplace after finishing the course |           |
| Yes   | 69 (83.1) |
| No  | 14 (16.9) |

population, and other actors, such as the local legislative power. They also point out that the course promoted the acknowledgement of the importance of interprofessional collaboration and of the feeling of belonging to a team. The results show the course promoted the development of skills that favor the leading of the team and confidence in decision-making. They saw themselves as leaders after taking the course.

Students presented evidence of improvement in work. An approximation with the working team was observed, particularly with the nursing team. The betterment of technical procedures, for example, the composing of a public notice, was a result of the incorporation of other professionals to the processes led by the pharmacists. Sometimes, to implement the actions proposed in the Operative Plan, the pharmacist had to collaborate with the managers who were hierarchically superior to them, like the head of the health department. The students reported that the course qualified them to do so, which resulted in concrete changes in the health services.

Participation in conferences and discussion of pharmaceutical policy with the popular councils of health were pointed as actions that resulted from the greater awareness they had from taking the course. These activities combined with the Operative Plan promoted the valorization

of the pharmaceutical services and made the implementation of changes in the work process easier. The inclusion of planning in the pharmaceutical services management is acknowledged by the students as a result of the course that has led to the effective mobilization of resources and to concrete results to the health services.

Factors associated with the sustainability of the improvement in management skills among participants in the course were identified. For instance, their active participation in the construction of a Municipal Health Plan. There are plenty of changes in the work process directly connected to the course that stemmed from the Operative Plan or other proposed activities.

## DISCUSSION

Consolidation of pharmaceutical policy within the public health system in Brazil began in 2000. The decentralization of the management of this sector to the municipalities started to be consolidated in 2004. Therefore, pharmacy management, fundamental for pharmacists working in Brazil's public health system, was not established in the framework of competences for the training of pharmacists until this period. Development of this knowledge in the field was one of the proximal outcomes of the course (Table 3).

Table 2. Analysis of Course Program Inputs of the Pharmaceutical Service and Access to Medicine Management Course From the Students' Perspective

| Program Inputs                                    | Quotes   |
|---|--|
| Course theme                                      | "The best part of the course, that which I could take away and use in my daily practice was the management competences that I use today working with a group of 130 people" [ESE4]   |
| Quality of the teaching materials                 | "I liked the teaching material very much. It is a material that I use to this day, to study, to teach classes. I've used it many times. That's a point that I consider extremely positive in the course." [GF09]   |
| Gratuitousness                                    | "For the first time in my life, I would have a qualification without having to spend money, in the field in which I worked." [ENE9]  |
| Didactic-pedagogical project                      | "Some of the tools that we came across in the course I already knew of, but I was only able to apply them and use them in real life in this course." [GF05]<br>"It pushed us to build a way, make a diagnosis, discuss with all stakeholders, design proposals, revise proposals, listen. Apply the management tools." [ENE6]  |
| Infrastructure (mentorship, regional centers)     | "We had very good support here in our town. The tutors and regional coordinators would help us when we had difficulties" [EN5]   |
| Course organization adapted to the regional needs | "And I thought the most interesting thing was that you had this act of care with the students [ <i>providing the materials in a DVD/flash drive</i> ], understanding the situation we live in with the difficulty to access the internet." "I was supervising in indigenous villages. The internet was a big nuisance." [GF01] |
| Reliability of the providing institution          | "I couldn't miss the opportunity of taking a specialization by the Ministry of Health and the Federal University of Santa Catarina." [ENE9]  |
| Offer of the course in the e-learning modality    | "It's necessary to have discipline, being a mother is a complex thing to manage. I would tuck the boy in and then I would study." [ENE8]   |

SUS = Brazilian Public Health System (Sistema Único de Saúde – SUS)

Analyzing the themes that emerged from the field findings, which were categorized as proximal and behavioral outcomes (Tables 3 and 4), revealed characteristics that reflected a very close relationship with the expected competences of a health manager was observed.<sup>4,5</sup> The experiences and facts reported by participants demonstrated their acquisition of knowledge and development of skills that would assist them in performing their roles as managers. These pharmacists already express the resulting attitudes and behaviors.

The participants' pharmacy education was predominantly of a technical and biological nature, and did not provide experiences in which they could learn interdisciplinary and social practices. During the course, especially during completion of the Operative Plan, pharmacists had

to establish a dialogue with other actors, such as professionals, managers, and patients, thereby developing new skills as they completed the process. The students' reports pointed to a change in their understanding of the role of the manager and management. It is very expressive the recurrence in the use of the term "putting out fires" to describe the former function of the pharmacist. There has been a change for the participants, who now recognize themselves as managers (Table 3). As managers, they started to plan their actions and were no longer simply guided by the problems that arose.

Negotiation is inherent to the role of a manager, especially in the public health service.<sup>8</sup> However, it is common for health managers not to acknowledge the role of popular councils and not act in partnership with these players.<sup>26</sup>

Table 3. Analysis of the Proximal Outcomes of the Pharmaceutical Service and Access to Medicine Management Course From the Students' Perspective

| Theme  | Quotes   |
|--|--|
| Knowledge gaining  | “What it brought to me was the knowledge of the laws and what tools I had to work with. It was empowering.” [ECO4]   |
| Increase in Confidence   | “This course brought me greater confidence to debate, discuss with the technical team. This course brought me confidence to offer a trustworthy solution.” [GF10]  |
| Communication capacity   | “We begin to see other possibilities, to listen to others. In management, it is too easy to make a decision disconnected from reality, but when we go to the service and look at the factual reality, we notice the need to put ourselves, at least a little, in other people’s shoes.” [ENE8] |
| Negotiation capacity   | “This was for me the greatest merit of the course, it was teaching me what to do with the information that I have and that we can convince and we can show to <i>[the management]</i> .” [GF01]  |
| Acknowledgement of the importance of interprofessional collaboration     | “Today we work like this, involving other people of the service in the management. It’s no use for me to have a brilliant idea if I’m the only one who believes in it, right?” [ESE1]  |
| Leadership capacity  | “I stopped being the boss to effectively be their leader, helping them, showing that I was there to make everybody’s work process better.” [GF08]  |
| Change in the understanding of the role of the manager and of management | “I didn’t see myself as a manager, I was a person putting out fires, without any idea of how to solve things and without anybody to share the burden. We have always worked a lot. The course was a landmark in my workflow.” [GF10]   |

The situations reported by the students bring about experiences involving negotiation (Tables 4 and 5), with both senior managers and social control. This was instigated by the course. It illustrates different attitudes that, considering the principles and organization of Brazil’s public health system, constitute values that improve management capacity and contribute to the development of the system.

The changes in the behavior of pharmacists (Table 4) as managers who negotiate, establish relationships with other professionals, work as allies of social control, and expand the scope of action of the pharmaceutical sector to the healthcare network, leads to the understanding that the pharmaceutical division of these institutions is now effectively integrated into the health policy and the health system management. As part of the Municipal Plan for the future, the actions of the pharmaceutical division gain in sustainability as demonstrated in Table 5.

Immediate outcomes in the health services organization and capacity building of the pharmaceutical division were exemplified by the course participant referenced as

ENE5. In the Operative Plan, the problem prioritized by the team was the shortage of medicines and the objective was ensuring a regular supply. In examining the problem during workshops, participants found that sometimes the medicine had already been purchased by the municipality but was not available at the health centers because of the logistics of delivery, which was dependent on trucks from the central warehouse. Negotiation with managers was part of the development of the Plan and resulted in the availability of a car for the pharmacy to use to transport the medicines. The course provided practical soft tools for pharmacists to use in facing daily challenges.

Despite examples of important impacts on the practice of services, it was possible to observe that some pharmacists faced great barriers to transfer their training into practice, as some authors have already described.<sup>6,18</sup> Rouse<sup>18</sup> highlights that the environment must be receptive for the transfer of knowledge and skills into practice to occur and that barriers might be present, such as the lack of opportunity to use one's learning or resistance from

Table 4. Analysis of the Behavioral Outcomes of the Pharmaceutical Service and Access to Medicine Management Course From the Students' Perspective

| Theme  | Quotes  |
|--|---|
| Networking                                     | “To this day I keep in touch with some classmates from the course. We have a WhatsApp group; we answer each other’s questions.” [ECO3]  |
| Negotiation with hierarchical superiors        | “To better negotiate with the suppliers, I needed access to the City Hall’s financial system. So, I negotiate the permission to access with the health department and the management secretary.” [ECO3]   |
| Interprofessional collaboration                | “We are pharmacists, and we work with nutrition, and we had never consider looking for a nutritionist to write the proper description of a product in an auction notice. So, we established a partnership with the nutritionists of the companies that already took part in the process to help us with the reference terms.” [ECO3]  |
| Actions integrated with the healthcare network | “It was created a service of patient orientation with the social workers and an algorithm that guides them to have an idea where to send the patients. If it is a primary care demand, for instance, they send the patient to the municipal sphere institution, if the demand is for a specialist, they send patients to the unities where the access is organized.” [ENE2] |
| Actions integrated with social control         | “Motivated by the course, we went to a health conference where we introduced a guideline of pharmaceutical policy and services and two participants were elected health counselors. The course motivated this interaction, this participation in the management processes.” [GF07]  |

peers to the use of new approaches. Thus, the training needs to provide the pharmacist with the resources to overcome these barriers. Such resources include the ability to engage and sensitize other professionals in the service.

The pedagogical strategy adopted for a practical in-service activity allowed the pharmacists to create the environment to use their newly acquired skills. However, the conditions found in each work environment were diverse. In some, the barriers placed against the intervention of pharmacists in the management of the service did not allow the achievement of programmatic goals in these cases, the results were obtained only in the proximal and behavioral spheres. The barriers observed were, in particular, those of a political nature, such as the pharmacists having to leave their workplaces, the lack of support for the implementation of changes in the workflow, and the fragility in the hiring process of pharmacists. It is important to remember that the municipal health services are under the direct control of governing authorities who are elected every four years. This makes their administration subject to political interests and crisis.

The results highlight some characteristics of the course that were important for obtaining the desired results (Table 2), particularly the content very close to the reality of the services they provide. The infrastructure with regional centers and local tutors allowed the activities to be carried out with the support of professionals working in each region. Thus, despite the same course content being offered throughout the country, the structure allowed for adaptation of the course to local needs.

The execution of the Operative Plan was clearly linked to the outcomes of the course. This in-service hands-on activity created the opportunity of a real-life practice of the content learned. The students could also use management and planning tools in the reality of the services in real time during the course (Table 5). The execution of the Plan in stages allowed the student to act in the service and then reflect upon their actions with the support of the instruments and the tutor.

Participants reported that they were already conceptually familiar with the Strategic Situational Planning (SSP). Some had already received training in it. However,

Table 5. Analysis of the Programmatic Outcomes of the Pharmaceutical Service and Access to Medicine Management Course from the Perspective of Practicing Pharmacists Who Had Completed the Course

| Theme   | Quotes   |
|---|--|
| Recognition and integration of the pharmaceutical division in the health department | “We used to go to the administrative meetings but when there was a more technical meeting sometimes the pharmacy was forgotten. So, we make them remember us and started to be more informed of the routines of the health center, of how things worked the interaction with the other professionals improved very much and this was also a benefit to us. To the service.” [ESE4] |
| Sustainability of the management actions  | “We have recently completed our municipal planning using the methodology we learned in the Operative Plan. We sat down with the whole team, building the planning, so that the chapter of pharmaceutical policy was built in the Municipal Health Plan.” [ENES]  |
| Changes in the process of work identified during the course                         | “We did not have a Pharmacy and Therapeutics Commission. With what I learned in the course, I set up the commission. I invited doctors and nurses, everybody participated.” [ES3]  |
| Changes in the process of work identified after the course                          | “We applied the Operative Plan methodology years later in the management for building the computerized management system of the pharmaceutical division and the services. Being trained in a methodology helps you wherever you are.” [ESE1]   |

it was the pedagogical strategy chosen for a mandatory activity of an intervention in the service, with real-time and long-term tutoring, that provided the development of management skills in the pharmacists in a lasting way. This finding strongly corroborate with the authors that highlight the importance of hands-on activities in CE<sup>4,13</sup> and indicates this is a core condition for training professionals in management capacity.

This study had some limitations. The study design did not include a comparison group, quantitative indicators were not used for the impact analysis on services, and the results were obtained only from reports of facts by the pharmacists themselves and observations from the field researchers. The complexity of the examined outcomes makes it difficult to isolate the direct impacts of the course and other factors related to the students and the institutions. However, the force of the facts reported indicates the possibility of extrapolating the conclusions to the impacts on the services offered to the population.

## CONCLUSION

The data gathered suggests that completing the Pharmaceutical Service and Access to Medicine Management course resulted in increased knowledge, skills, and individual motivation among pharmacists working in Brazil's

public health system, with participants reporting greater confidence in management practices as a result of using pedagogical strategies tailored to organizational contexts.

Pharmacists' management training generated impacts on health services. It is evident from the results presented that the level of impact generated in the services is related to the pedagogical strategies adopted in the training process. In some cases, these activities resulted in immediate impacts on services through the development of the Operative Plan itself, as well as post-training impacts, with the incorporation of SSP into health services. However, the level of impact the pharmacists' training had on pharmacy services varied because of political issues and significant regional differences.

Considering that the impact of CE found by this research was of varied levels in professionals and services, it is important to advance studies on the topic and develop methods that can shed light on what the contextual and educational conditions are that result in a greater or lesser impact of CE on pharmacists and health services.

## ACKNOWLEDGMENTS

We thank all participants in the focus groups and interviews and members of the Pharmaceutical Policies



and Services research group from the Federal University of Santa Catarina for their contribution.

## REFERENCES

1. Aroni A. Health management capacity building: an integral component of health systems' improvement. 2012;31.
2. Mutale W, Vardoy-Mutale A-T, Kachemba A, Mukendi R, Clarke K, Mulenga D. Leadership and management training as a catalyst to health system strengthening in low-income settings: evidence from implementation of the Zambia management and leadership course for district health managers in Zambia. *PLOS ONE*. 2017;12(7):e0174536. <https://doi.org/10.1371/journal.pone.0174536>
3. WHO. Towards better leadership and management in health: report of an international consultation on strengthening leadership and management in low-income countries, 29 January –1 February, Accra, Ghana. Geneva: World Health Organization; 2007. <https://apps.who.int/iris/handle/10665/70023>
4. Filerman G. Closing the management competence gap. *Hum Resour Health*. 2003;1(1):7.
5. Liang Z, Howard PF, Leggat S, Bartram T. Development and validation of health service management competencies. *J Health Org Manage*. 2018.
6. French SD, Green SE, O'Connor DA, et al. Developing theory-informed behaviour change interventions to implement evidence into practice: a systematic approach using the Theoretical Domains Framework. *Implementation Science*. 2012;7(1):1–8.
7. Tudor Car L, Kyaw BM, Atun R. The role of eLearning in health management and leadership capacity building in health system: a systematic review. *Hum Resour Health*. 2018;16(1):44. <https://doi.org/10.1186/s12960-018-0305-9>
8. Castro MC, Massuda A, Almeida G, et al. Brazil's unified health system: the first 30 years and prospects for the future. *The Lancet*. 2019;394(10195):345–356.
9. Faraco EB, Guimarães L, Anderson C, Leite SN. The pharmacy workforce in public primary healthcare centers: promoting access and information on medicines. *Pharmacy Practice*. 2020;18(4). <https://doi.org/10.18549/PharmPract.2020.4.2048>
10. Vieira FS. *Evolução do gasto com medicamentos do sistema único de saúde no período de 2010 a 2016*. 2018:46.
11. Manzini F, Diehl EE, Farias MR, et al. Analysis of a blended, in-service, continuing education course in a public health system: lessons for education providers and healthcare managers. *Front Public Health*. 2020;8(827). <https://doi.org/10.3389/fpubh.2020.561238>
12. Matus C. Planificación y gobierno. *Cuadernos de Economía (Santafé de Bogotá)*. 1995;14(23):232–259.
13. Meštrović A, Rouse MJ. Pillars and foundations of quality for continuing education in pharmacy. *Am J Pharm Educ*. 2015;79(3):45.
14. Ruggeri K, Farrington C, Brayne C. A global model for effective use and evaluation of e-learning in health. *Telemedicine and e-Health*. 2013;19(4):312–321.
15. Kirkpatrick JD, Kirkpatrick WK. *Kirkpatrick's Four Levels of Training Evaluation*. Association for Talent Development; 2016.
16. Attree M. Evaluating healthcare education: issues and methods. *Nurse Educ Today*. 2006;26(8):640–646.
17. Coons SJ, Hanson AL. The need for evaluation of the ultimate impact of continuing pharmaceutical education. *Möbius: A Journal for Continuing Education Professionals in Health Sciences*. 1986; 6(4):33–38.
18. Rouse DN. Employing Kirkpatrick's evaluation framework to determine the effectiveness of health information management courses and programs. *Perspectives in Health Information Management*. 2011;8(Spring).
19. Bauer A. *Avaliação de impacto de formação docente e serviço: o programa Letra e Vida*. Universidade de São Paulo; 2011.
20. Paim J, Travassos C, Almeida C, Bahia L, Macinko J. The Brazilian health system: history, advances, and challenges. *The Lancet*. 2011;377(9779):1778–1797. [https://doi.org/10.1016/S0140-6736\(11\)60054-8](https://doi.org/10.1016/S0140-6736(11)60054-8)
21. Victora CG, Barreto ML, do Carmo Leal M, et al. Health conditions and health-policy innovations in Brazil: the way forward. *The Lancet*. 2011;377(9782):2042–2053. [https://doi.org/10.1016/S0140-6736\(11\)60055-X](https://doi.org/10.1016/S0140-6736(11)60055-X)
22. Denzin NK, Lincoln YS. *The SAGE Handbook of Qualitative Research*. 5th ed. Sage Publications; 2018.
23. Pope C, Ziedland S, Mays N. Analysing qualitative data. *BMJ*. 2000;320(114). <https://doi.org/10.1136/bmj.320.7227.114>
24. Santos RId, Farias MR, Pupo GD, Trindade MCNd, Dutra FF. *Políticas de saúde e acesso a medicamentos*. Assistência Farmacêutica no Brasil: Política, Gestão e Clínica. Editora da UFSC; 2016:226.
25. Lorenzoni AA, Manzini F, da Trindade MCN, et al. Attending a blended in-service management training in a public health system: constraints and opportunities for pharmacists and health services. *Pharmacy*. 2021;9(1):12.
26. Martins CS, Sartori MT, Dietrich HLD, et al. Conhecimento dos usuários, trabalhadores da saúde e gestores sobre conselheiros e Conselhos de Saúde. *Saúde em Debate*. 2013;37:437–445.