# Facing the Burden of Cardiovascular Diseases in Latin America: A Case Report of an In-Service Specialist Training to Clinical Pharmacists in Brazil

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**SUMMARY**

Introduction: Cardiovascular diseases are the leading causes of mortality in Brazil, and cardiology specialized pharmacists can contribute to improve patients outcomes, in a variety of settings. This study aims to describe a seminal in-service training program in Cardiology, targeting newly hired pharmacists with no prior experience in the area.

Methods: Two generalist pharmacists received a 60-day training consisting of 3 phases (theoretical classes, pharmacist *'shadowing'* and supervised practice) with a former cardiology pharmacist. Evaluation of the program was carried out: December 20 to May 21 pharmacists' interventions were retrospectively analyzed and categorized.

Results: Following the training program, each trainee attended a mean of 75.7 ± 13.3 hospitalizations per month, with half of the patients receiving at least 1 intervention in their pharmacotherapy, suggested by the pharmacist.

Conclusion: The proposed in-service program may represent a feasible option to general pharmacist's and institutions in need for specialized training in cardiology.

Keywords: **cardiovascular, pharmacist, pharmacy education, pharmaceutical care, team-based care, training**

## *Enfrentando Enfermedades Cardiovasculares en Latinoamerica: Reporte de Caso de Capacitación en Servicio para Farmacéuticos Clínicos Especialistas en Brasil*

**RESUMEN:**

Introducción: Las enfermedades cardiovasculares son las principales causas de mortalidad en Brasil, y los farmacéuticos especialistas en cardiología pueden contribuir a mejorar los resultados de los pacientes, en una variedad de escenarios. Este estudio tiene como objetivo describir un programa seminal de capacitación en servicio, en el área de Cardiología, dirigido a farmacéuticos recién contratados sin experiencia previa. Métodos: Dos farmacéuticos generalistas recibieron una formación de 60 días que constaba de 3 fases (clases teóricas, seguimiento del farmacéutico y práctica supervisada) con un farmacéutico especialista en cardiología. Se realizó la evaluación del programa: de diciembre 2020 a mayo 2021 se analizaron y categorizaron retrospectivamente las intervenciones de los farmacéuticos. Resultados: Siguiendo el programa de formación, cada practicante atendió una media de 75,7 ± 13,3 hospitalizaciones al mes, recibiendo la mitad de los pacientes al menos una intervención en su farmacoterapia, sugerida por el farmacéutico. Conclusión: El programa en servicio propuesto puede representar una opción factible para los farmacéuticos generales y las instituciones que necesitan farmacéuticos con capacitación especializada en cardiología.

Palabras clave: **cardiovascular, farmacéutico, educación farmacéutica, atención farmacéutica, atención en equipo, formación.**

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## INTRODUCTION

Advanced and specialist development is one of International Pharmaceutical Federation (FIP) Development Goals for the decade ahead, reinforcing the need for specific skills and specialized competencies [1] . In Brazil, despite the burden of cardiovascular diseases (CVDs), the multidisciplinary teams still cater to professionals with specific training in cardiovascular care.

In cardiac transplantation, for example, a recent study showed that only 56.2% of Brazilian heart transplant centers can count with a pharmacist as part of their multidisciplinary teams; and in those centers, none of the pharmacists had specific training in any level, with a majority declaring to have started their activities without previous experience [2] . These data point to an unmet need of Brazilian cardiology institutions: hiring pharmacists who need to learn in practice, without training or previous experience, how to develop their clinical activities to patients with CVDs, without training or having previous experience in the area.

This case report aims to describe a seminal in-service training program in Cardiology, targeting newly hired pharmacists with no prior training, in southern Brazil.

The program was developed in a 900-bed tertiary academic hospital, counting on a Cardiology service that attends an average of 140 hospitalizations per month. Cardiology patients are distributed through diverse multidisciplinary teams (general cardiology, heart failure, cardiovascular surgery, heart transplant and cardiovascular emergencies); and alongside with cardiology wards, the hospital also relies on a coronary unit and a cardiac intensive care unit.

## METHODS

This is an observational study that evaluated a training program through the participation of a clinical pharmacist in the cardiology teams. Two generalist pharmacists have been hired and a 60-day training was ensued with a former cardiology pharmacist.

The study period was:

- Training program: October to November 2020.
- Retrospective analysis of the interventions performed between December 2020 and May 2021.

The training process was evaluated through the records of pharmaceutical interventions (PI) in the prescriptions of patients' admissions, hospitalization follow-up and discharge, after 30, 60, 90 and 180 days after training.

Figure 1 summarizes stages of the training program and its descriptions.

Interventions were categorized according to the PCNE Classification V 9.1 [3]. Data were analyzed by descriptive statistical analysis.

This project was approved by the institutional ethical board (CEP/HCPA), protocol #866904823.7.0000.5327, report #5.932.166.

## RESULTS

Following the end of training, 908 patients were assisted by the pharmacy trainees in the cardiology teams and wards, a mean of 75.7 ± 13.3 hospitalizations per month, during the study period. There was an increase in the PIs per patient in the periods of 30, 60, 90 and 180 days: 0.45, 0.42, 0.55 and 0.57; as described in Figure 2. Half of the patients receiving at least 1 PI made in their pharmacotherapy, suggested by the clinical pharmacist (total mean of 0.5 ± 0.07 PI/hospitalization). The most frequent causes of drug-related problems (that consequently triggered interventions) were medication reconciliation problems (21.3%), drug dosage too high (15%) and indication without/with insufficient treatment (13.2%), as described in Table 1. Intervention acceptance reached a mean rate of 88.87%.

## DISCUSSION

From our knowledge, this is the first in-service cardiology training devoted to pharmacists, in our country, despite the aforementioned Brazilian residency programs.

In Brazil there is still no regulatory recognition of advanced competences and specialization in the area of cardiology

**Figure 1. Phases of the In-Service Pharmacist Program Training in Cardiology**

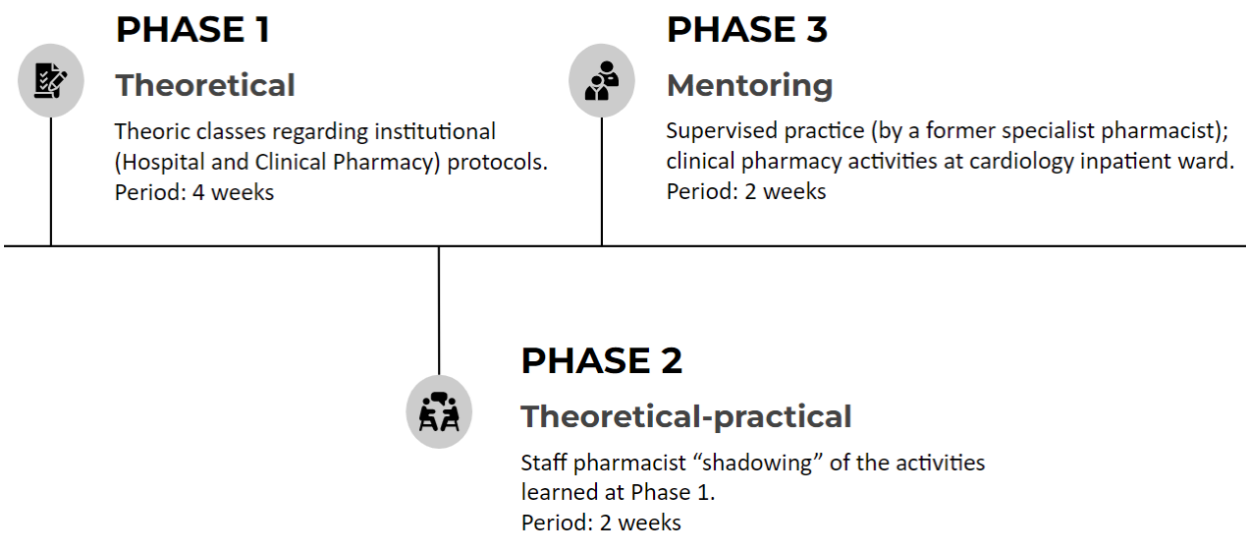


**Table 1. Types and frequencies of causes for drug-related problems that followed pharmacist interventions**

| Causes* | n (%) |
|---|---|
| Medication reconciliation problem | 68 (21.3%) |
| Drug dose of a single active ingredient too high | 48 (15.0%) |
| No or incomplete drug treatment in spite of existing indication | 42 (13.2%) |
| Drug dose too low | 37 (11.6%) |
| No indication for drug | 22 (6.9)% |
| Dosage regimen not frequent enough / too frequent | 14 (4.4%) |
| Dose timing instructions wrong, unclear or missing | 13 (4.1%) |
| Drug administered via wrong route by a health professional | 13 (4.1%) |
| Other causes | 62 (19.4%) |
| Total | 312 (100.0%) |

*Pharmaceutical Care Network Europe Drug Related Problem classification version 9.1 (2021)

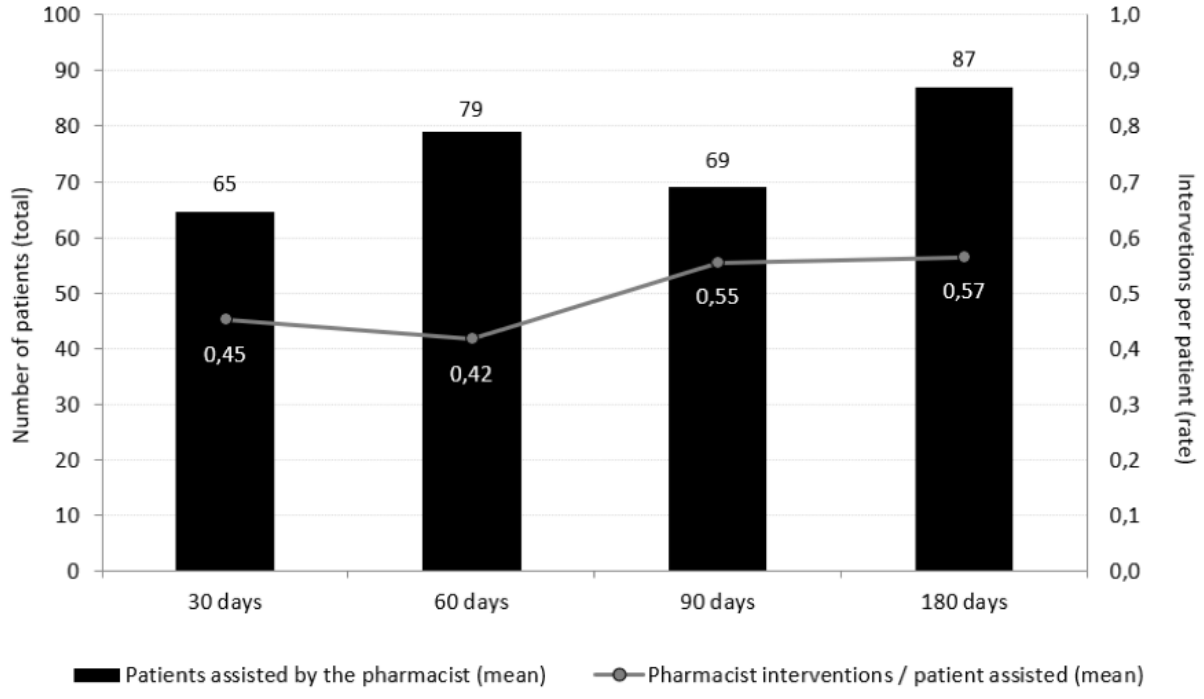
clinical pharmacy. In addition, there are only 10 cardiology pharmacy residency programs in Brazil [4] . Moreover, CVDs are the leading causes of death in Brazil (27.3%), which has been increasing over the last decades, a result of population aging [5] , and being responsible for high health costs [6,7] . Remarkably, CVD burden is unequal towards different Brazilian regions, varying according to their socioeconomic status [8] . In addition, despite the access to CVD pharmacotherapy being publicly funded and provided for free to patients, limited health literacy remains a challenge to overcome.

Pharmacists have an important role in adherence improvement [9] , and patients with CVDs are essentially at significant risk for medication errors and adverse drug events due to their poly-pharmacy [10] . Previous studies demonstrated the potential of patient education, discharge orientation and reconciliation performed by pharmacists, on cardiovascular clinical outcomes [11] . (Ho *et al.*, 2014). Whether achieving blood pressure control, reducing heart failure hospitalizations or improving CVD risk factor management [12,13,14] ; pharmacists are uniquely positioned to play a role in the management of such challenging patients and contribute to multidisciplinary cardiology teams.

To amplify pharmacists' contribution in the cardiovascular outcomes, specific training is needed. In the United States, for example, cardiology specialization is a board certified field of specialization and strategies are being promoted to share opportunities for integrating clinical pharmacists into a team-based care model (Dunn *et al.*, 2015). The International Pharmaceutical Federation has defined the Advanced and Specialist Development as the Development Goal number 4 for the decade ahead, aiming to globally have *"education and training infrastructures in place for the recognised advancement of the pharmaceutical workforce as a basis for enhancing patient care and health system deliverables"* (International Pharmaceutical Federation, 2022).

To achieve this, one of the mechanisms is the systematic use of professional programs, systems and structures as markers of advancement and expertise. In this case report, we present a proposal of an in-service training, focused on utilizing the expertise already developed inside an institution, valuing the expertise of professionals who have been in the area for a few years to train and mentor new colleagues without prior experience: a 5-year experienced professional trained two other clinical pharmacists in a 3-phase 60-days training programme and the results of trainee's pharmacotherapy recommendations were analyzed. Because the subjects did not have previous experience in the area, no measurements were taken prior to

**Figure 2. Pharmacist participation on drug adjustments and pharmacotherapy interventions in 30, 60, 90 and 180 days following Cardiology In-Service Training**



training, for comparison purposes. However, we observed that after the end of training, the higher are PI ratios, data that can possibly infer a higher empowerment of pharmacists on cardiovascular care and treatments (Figure 2).

## CONCLUSION

The proposed in-service training program presented in this study represents a feasible option to the general pharmacist's need for training in cardiology, focused on graduated pharmacists with no previous experience in the area. New studies can be carried out to verify the effectiveness of this proposed training program to other clinical pharmacy areas, or even in cardiology subspecialties.

*Conflictos de intereses: Los autores declaran no tener conflictos de intereses.*

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