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Competency framework for hospital pharmacy residency: a scoping review

Matriz de competências para residência em farmácia hospitalar: uma revisão de escopo

Matriz de competencias para la residencia en farmacia hospitalaria: revisión del alcance

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Abstract
The training and roles of pharmacists around the world are undergoing drastic changes. In the hospital environment, pharmaceutical care services must incorporate hospital pharmacy management necessities, which must consider the constant technological and process innovations. However, there is a scarcity of studies exploring how pharmacy residency programs real experiences in hospitals can improve these essential competencies. This scoping review allowed an overview of the pharmacy residency programs' competency framework's scientific production in the world. These documents review about training programs in the world showed that U.S. programs have teaching processes that evaluate resident's development to certify the program structure to qualify them. Australian and Canadian studies demonstrated advances in the search for pharmacy residents' qualifications with competency-based curricula. It highlighted that a structured and evidence-based approach to these programs' curricula is required and still has ample space in several countries to improve hospital pharmacists' training through residency programs. The most appropriate is that the programs are evaluated in terms of educational results by measuring residents' involvement by considering the course, tutors, and other program components.
Keywords: Pharmacy residencies; Professional competence; Pharmacy service, Hospital.

Resumo
O treinamento e as funções dos farmacêuticos em todo o mundo estão passando por drásticas mudanças. No ambiente hospitalar, os serviços de cuidado farmacêutico devem ser incorporados às necessidades da gestão da farmácia, que deve considerar as constantes inovações tecnológicas e de processos. No entanto, há escassez de estudos que explorem como experiências reais de programas de residência em farmácia hospitalar podem melhorar essas competências essenciais. Esta revisão de escopo permitiu uma visão geral da produção científica das matrizes de competências de programas de residência em farmácia no mundo. A revisão dos documentos mostrou que programas de residência dos EUA possuem processos de ensino que avaliam o desenvolvimento dos residentes para certificação da estrutura do programa para qualificá-los. Estudos australianos e canadenses demonstraram avanços na busca por qualificações de residentes de farmácia com currículos baseados em competências. A revisão destacou que uma abordagem estruturada e baseada em evidências para os currículos desses programas é necessária e ainda há amplo espaço em diversos países para melhorar o treinamento de farmacêuticos hospitalares por meio de programas de residência. O mais adequado é que os programas sejam avaliados em termos de resultados educacionais, através da medida do envolvimento dos residentes por meio da avaliação do curso, tutores, preceptores e outros componentes do programa.
Palavras-chave: Residências em farmácia; Competência profissional; Serviço de farmácia hospitalar.

Resumen
La formación y las funciones de los farmacéuticos de todo el mundo están experimentando cambios drásticos. En el ámbito hospitalario, los servicios de atención farmacéutica deben incorporarse a las necesidades de gestión de la farmacia hospitalaria, que debe tener en cuenta las constantes innovaciones tecnológicas y de procesos. Sin embargo, hay una escasez de estudios que exploren cómo las experiencias reales de los programas de residencia en farmacia hospitalaria pueden mejorar estas habilidades esenciales. Esta revisión de alcance permitió una visión general de la producción científica de las matrices de competencias de los programas de residencia en farmacia en el mundo. La

revisión de los documentos de los programas de capacitación en todo el mundo ha demostrado que los programas de Estados Unidos tienen procesos de enseñanza que evalúan el desarrollo de los residentes para certificar la estructura del programa para calificarlos. Los estudios australianos y canadienses han demostrado avances en la búsqueda de calificaciones para residentes de farmacia con planes de estudio basados en competencias. La revisión destacó que se necesita un enfoque estructurado y basado en evidencia para los planes de estudio de estos programas y todavía hay un amplio margen en varios países para mejorar la capacitación de los farmacéuticos hospitalarios a través de programas de residencia. Lo más adecuado es que los programas se evalúen en términos de resultados educativos, midiendo la implicación de los residentes a través de la evaluación del curso, tutores y otros componentes del programa.
Palabras clave: Residencias en farmacia; Competencia profesional; Servicio de farmacia en hospital.

1. Introduction

The residency programs have been training health professionals for a quality practical activity, as the medical residency, for almost a century. First called internships and approaches of some medical schools in the United States of America (USA), specialized medical practices were an option in the 1930s, but residency training became the norm over the following decades. Residencies drifted away from their original home in the medical school and university and moved into the world of hospitals, where residents became essential for the institutions' functioning (Howell, 2016).

Likewise, pharmacy residency programs started in the 1930s, where the first forms of training for pharmacists involved managing hospital pharmacies. The American Society of Hospital Pharmacists (ASHP) considers that Harvey A. K. Whitney conducted the first nonacademic residency program at the University of Michigan Hospital (ASHP, 1987).

In 1987, ASHP defined that residency programs exist primarily to train pharmacists in professional practice and management activities. Its educational model fosters an ability to conceptualize new and improved pharmacy services. Within a given residency program, there is considerable consistency in content for each resident (ASHP, 1987). In the same way, pharmacy residency programs emerged in the hospital scenario to reorganize pharmaceutical services focused on patient care's integrated practice. They allow pharmacists to insert themselves directly into the working environment, providing many opportunities to develop knowledge, skills, and attitudes (WHO, 1997).

In this sense, structuring essential competencies and strategic professional activities can consolidate the health professional's differentiated practices. One of the first health professions to apply these concepts universally for developing a global competency framework was medicine. The World Federation for Medical Education (WFME) has a priority to ensure that physicians' competencies are globally applicable, transferable, accessible, and transparent. According to the WFME, international standards can be defined for primary medical education, considering the variations of countries due to the differences in teaching, culture, socio-economic conditions, and health systems. Nonetheless, the scientific basis of medicine is universal (FIP, 2016). The medical category was a pioneer in this movement, and since the early 2000s, it was predicted that medical educators would remember it as the decade of competency-based medicine training (Grant, 1999). Medical education ended up being an era of consolidation from competency-based education (CBME) in many countries, which has evolved from an educational concept to regulations and legislation. Hundreds of thousands of professors, residents, and medical students worldwide are now so familiar with the language of competencies that it is as if it has always guided medical education. However, concepts and practice are two very different things. Changes in medical curricula, previously considered as difficult as moving a cemetery (Talbot, 2004), happen quickly in the second decade of this century, forced by society's demands and regulations, changes in clinical practice, changes in working day norms, and accumulation of scientific knowledge and advances technological (Brightwell & Grant, 2013; Brooks, 2008; Glass, 2014; Grant, 1999; Talbot, 2004).

For another career in the health area, the nurse lacks references on training by skills and represents a topic yet explored. The content taught often depends on the teachers' conceptions and does not have a specific discipline to be addressed (Morais Filho et al., 2017). The situation is even more worrying when associated with the scarcity of active learning

methodologies and practical experience opportunities for future professionals (Martins et al., 2014). It also has a lack of studies published in scientific journals specifically on competence in nurses' professional areas. According to Holanda, Castagnari, and Cunha (2015), the scarce studies on nurses' competency education have a theme often directed exclusively to the management area (De Holanda, Marra, & Cunha, 2015).

Considering that FIP Education Initiatives (FIPEd) believes such guidance is also possible for pharmacy (FIP, 2016), aligned with the trends in the health sector for clinical pharmacist profile and the particularities of hospital pharmacy services. There is a lack of studies published in scientific journals specifically on the pharmacist's professional hospital area competencies. These reasons ratify countries and organizations' efforts in education and health to qualify the teaching and training of these professionals.

This survey allowed us to identify a very different world scenario in terms of pharmacy residency programs´ format and standardization, as it involves multiple factors in each country. However, the search for parameters and standards of competencies seems to be a common purpose in several nations (ASHP, 2020a; España - Presidencia, 1998; Fundación Sanatorio Güemes, 2004; ONP, 2020; Osório-de-Castro CGS & Castilho SR (organizers), 2004; Presidência do Conselho de Ministros, 2020).

There are difficulties in measuring the quality of the various existing hospital pharmacists' training models through residency programs, and it has proved to be a challenge for most countries. To reduce this gap, especially in developing countries, where the organization and the essential structures of these residency programs still need significant advances, analyzing how the scientific community focused on this topic. The present work aims to map the scientific production on creating a competence framework for hospital pharmacy residents in the world.

2. Methodology

For the present work, a scoping review was chosen because we wanted to deepen the knowledge about hospital pharmacy residents´ training skills and observe scientific literature gaps. The PRISMA Extension for Scoping Reviews (PRISMA-ScR) (Tricco et al., 2018) was the methodology applied, *as* proposed by the Joanna Briggs Institute's (Joanna Briggs Institute, 2015). According to Peters and colleagues (Peters et al., 2020), this method allows mapping the main concepts, clarifying research areas, and identifying knowledge gaps. We also identify the main aspects discussed in scientific articles and documents of pharmaceutical organizations responsible for educating or monitoring processes quality of training for pharmacists.

For constructing the research question, the "PCC" mnemonic strategy was recommended as a guide to building a clear and meaningful title for a scoping review. The PCC mnemonic stands for the Population (P), Concept (C), and Context (C). The search in the literature applied the following PCC: "P" (residency program), "C" (training of professional skills), and "C" (hospital pharmacy service) (Joanna Briggs Institute, 2015).

Thus, the research question was: "How residency programs can assist in the development and or improvement of the skills needed for pharmacists in the processes of hospital pharmacies?"

A database search was conducted using five relevant databases: Latin American Literature and Caribbean Health Sciences (LILACS), Scopus, Web of sciences, Educational Resources Information Center - ERIC (educational), and Medline via PubMed; with a limitation of 10 years, from 2011 to March 2020, limited to articles published in Portuguese, English, French or Spanish.

Due to the diversity of integration of search strategies, the semantic expansion of terms, search expressions, and filters' applicability in the five scientific bases used, Table 1 was structured to present these strategies by the database.

In addition to the publications in the indexed databases, the Gray Literature was explored through Google Scholar and the studies' references, aiming to identify documents for potential inclusion (Joanna Briggs Institute, 2015; Melnyk & Fineout-Overholt, 2011). With these strategies, it was possible to retrieve government documents, specific legislation, guidelines established by societies and professional councils in the hospital pharmacy area, and Guidelines with standardized competence structure for pharmacy residents of international organizations to pharmacists, such as the American College of Clinical Pharmacy (ACCP), American Society of Health-System Pharmacists (ASHP), The Society of Hospital Pharmacists of Australia (SHPA) and Canadian Society of Hospital Pharmacists (CSHP).

A review team of three researchers independently assessed the remainder of these articles against inclusion and exclusion. The titles and abstracts of the articles retrieved, when available, were read and analyzed by two reviewers to identify those potentially eligible for the research. In situations of doubt, the reports remained for the next phase, which involved reading in full each of the papers selected independently by the two reviewers mentioned to confirm the review question's relevance. In case of disagreement between the two evaluators, the third author of this article was recruited for decision.

The evaluation of the level of scientific evidence followed the rules of the JBI (Joanna Briggs Institute, 2015) whose studies such as scope reviews do not exclude articles based on quality criteria. Despite this guidance from JBI, the selected papers were submitted to the Oxford Center for Evidence-Based Medicine (CEBM, 2009) for validation of the level of evidence.

Table 1 - Search strategy for scientific publications on Competency framework for hospital pharmacy residency, syntax by database, from March 2010 to March, Rio de janeiro - Brazil 2020

Database	DeCS/MeSH	Research date
LILACS	Pharmacy Residencies OR Residency, Pharmacy OR Residencies, Pharmacy [Palavras] and Professional Competence OR Competence, Professional [Palavras] and Pharmacy Service, Hospital OR Pharmaceutical Service, Hospital OR Service, Hospital Pharmaceutical OR Hospital Pharmacy Services OR Pharmacy Services, Hospital OR Services, Hospital Pharmacy OR Service, Hospital Pharmaceutical OR Hospital Pharmacy Service OR Hospital Pharmaceutic Service OR Hospital Pharmaceutic Services OR Pharmaceutic Services, Hospital OR Services, Hospital Pharmaceutic OR Pharmaceutic Service, Hospital OR Hospital Pharmaceutical Service OR Hospital Pharmaceutical Services OR Pharmaceutical Services, Hospital OR Services, Hospital Pharmaceutical OR Service, Hospital Pharmacy [Palavras]	03/22/2020
SCOPUS	((TITLE-ABS-KEY (pharmacy AND residencies OR residency, AND pharmacy OR residencies, AND pharmacy AND professional AND competence OR competence AND professional AND pharmacy AND service, AND hospital OR pharmaceutical AND service AND hospital OR service AND hospital AND pharmaceutical OR hospital AND pharmacy AND service)))	03/22/2020
WEB OF SICENCE	TS=(Pharmacy Residencies OR Residency, Pharmacy OR Residencies, Pharmacy AND Professional Competence OR Competence, Professional AND Pharmacy Service, Hospital OR Pharmaceutical Service, Hospital OR Service, Hospital Pharmaceutical OR Hospital Pharmacy Services OR Pharmacy Services, Hospital OR Services, Hospital Pharmacy OR Service, Hospital Pharmaceutical OR Hospital Pharmacy Service OR Hospital Pharmaceutic Service OR Hospital Pharmaceutic Services OR Pharmaceutic Services, Hospital OR Services, Hospital Pharmaceutic OR Pharmaceutic Service, Hospital OR Hospital Pharmaceutical Service OR Hospital Pharmaceutical Services OR Pharmaceutical Services, Hospital OR Services, Hospital Pharmaceutical OR Service, Hospital Pharmacy)	03/25/2020
ERIC	Pharmacy+Residencies+OR+Residency%2c+Pharmacy+OR+Residencies%2c+Pharmacy+AND+Professional+Competence+OR+Competence%2c+Professional+AND+Pharmacy+Service%2c+Hospital+OR+Pharmaceutical+Service%2c+Hospital+OR+Service%2c+Hospital+Pharmaceutical+OR+Hospital+Pharmacy+Services+OR+Pharmacy+Services%2c+Hospital+OR+Services%2c+Hospital+Pharmacy+OR+Service%2c+Hospital+Pharmaceutical+OR+Hospital+Pharmacy+Service+OR+Hospital+Pharmaceutic+Service+OR+Hospital+Pharmaceutic+Services+OR+Pharmaceutic+Services%2c+Hospital+OR+Services%2c+Hospital+Pharmaceutic+OR+Pharmaceutic+Service%2c+Hospital+OR+Hospital+Pharmaceutical+Service+OR+Hospital+Pharmaceutical+Services+OR+Pharmaceutical+Services%2c+Hospital+OR+Services%2c+Hospital+Pharmaceutical+OR+Service%2c+Hospital+Pharmacy&ff1=dtySince_2011	03/24/2020

ERIC= Educational Resources Information Center. Source: Authors.

Table 1 - Search strategy for scientific publications on Competency framework for hospital pharmacy residency, syntax by database, from March 2010 to March, Rio de janeiro - Brazil 2020 (Continued)

Database	DeCS/MeSH	Research date
Pubmed via Medline	((("pharmacy residencies"[MeSH Terms] OR ("pharmacy"[All Fields] AND "residencies"[All Fields]) OR "pharmacy residencies"[All Fields]) OR ("pharmacy residencies"[MeSH Terms] OR ("pharmacy"[All Fields] AND "residencies"[All Fields]) OR "pharmacy residencies"[All Fields] OR ("residency"[All Fields] AND "pharmacy"[All Fields])) OR ("pharmacy residencies"[MeSH Terms] OR ("pharmacy"[All Fields] AND "residencies"[All Fields]) OR "pharmacy residencies"[All Fields] OR ("residencies"[All Fields] AND "pharmacy"[All Fields]))) AND (("professional competence"[MeSH Terms] OR ("professional"[All Fields] AND "competence"[All Fields]) OR "professional competence"[All Fields]) OR ("professional competence"[MeSH Terms] OR ("professional"[All Fields] AND "competence"[All Fields]) OR "professional competence"[All Fields] OR ("competence"[All Fields] AND "professional"[All Fields]) OR "competence, professional"[All Fields]))) AND (("pharmacy service, hospital"[MeSH Terms] OR ("pharmacy"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields]) OR "hospital pharmacy service"[All Fields] OR ("pharmacy"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields]) OR "pharmacy service, hospital"[All Fields]) OR ("pharmacy service, hospital"[MeSH Terms] OR ("pharmacy"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields]) OR "hospital pharmacy service"[All Fields] OR ("pharmaceutical"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields])) OR ("pharmacy service, hospital"[MeSH Terms] OR ("pharmacy"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields]) OR "hospital pharmacy service"[All Fields] OR ("service"[All Fields] AND "hospital"[All Fields] AND "pharmaceutical"[All Fields])) OR ("pharmacy service, hospital"[MeSH Terms] OR ("pharmacy"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields]) OR "hospital pharmacy service"[All Fields] OR ("hospital"[All Fields] AND "pharmacy"[All Fields] AND "services"[All Fields]) OR "hospital pharmacy services"[All Fields]) OR ("pharmacy service, hospital"[MeSH Terms] OR ("pharmacy"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields]) OR "hospital pharmacy service"[All Fields] OR ("pharmacy"[All Fields] AND "services"[All Fields] AND "hospital"[All Fields]) OR "pharmacy services, hospital"[All Fields]) OR ("pharmacy service, hospital"[MeSH Terms] OR ("pharmacy"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields]) OR "hospital pharmacy service"[All Fields] OR ("services"[All Fields] AND "hospital"[All Fields] AND "pharmacy"[All Fields]) OR "services, hospital pharmacy"[All Fields]) OR ("pharmacy service, hospital"[MeSH Terms] OR ("pharmacy"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields]) OR "hospital pharmacy service"[All Fields] OR ("service"[All Fields] AND "hospital"[All Fields] AND "pharmaceutical"[All Fields])) OR ("pharmacy service, hospital"[MeSH Terms] OR ("pharmacy"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields]) OR "hospital pharmacy service"[All Fields] OR ("hospital"[All Fields] AND "pharmacy"[All Fields] AND "service"[All Fields])) OR ("pharmacy service, hospital"[MeSH Terms] OR ("pharmacy"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields]) OR "hospital pharmacy service"[All Fields] OR ("hospital"[All Fields] AND "pharmaceutic"[All Fields] AND "service"[All Fields])) OR ("pharmacy service, hospital"[MeSH Terms] OR ("pharmacy"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields]) OR "hospital pharmacy service"[All Fields] OR ("hospital"[All Fields] AND "pharmaceutic"[All Fields] AND "services"[All Fields])) OR ("pharmacy service, hospital"[MeSH Terms] OR ("pharmacy"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields]) OR "hospital pharmacy service"[All Fields] OR ("pharmaceutic"[All Fields] AND "services"[All Fields] AND "hospital"[All Fields])) OR ("pharmacy service, hospital"[MeSH Terms] OR ("pharmacy"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields]) OR "hospital pharmacy service"[All Fields] OR ("services"[All Fields] AND "hospital"[All Fields] AND "pharmaceutic"[All Fields])) OR ("pharmacy service, hospital"[MeSH Terms] OR ("pharmacy"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields]) OR "hospital pharmacy service"[All Fields] OR ("pharmaceutic"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields])) OR ("pharmacy service, hospital"[MeSH Terms] OR ("pharmacy"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields]) OR "hospital pharmacy service"[All Fields] OR ("hospital"[All Fields] AND "pharmaceutical"[All Fields] AND "service"[All Fields]) OR "hospital pharmaceutical service"[All Fields]) OR ("pharmacy service, hospital"[MeSH Terms] OR ("pharmacy"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields]) OR "hospital pharmacy service"[All Fields] OR ("hospital"[All Fields] AND "pharmaceutical"[All Fields] AND "services"[All Fields]) OR "hospital pharmaceutical services"[All Fields]) OR ("pharmacy service, hospital"[MeSH Terms] OR ("pharmacy"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields]) OR "hospital pharmacy service"[All Fields] OR ("pharmaceutical"[All Fields] AND "services"[All Fields] AND "hospital"[All Fields])) OR ("pharmacy service, hospital"[MeSH Terms] OR ("pharmacy"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields]) OR "hospital pharmacy service"[All Fields] OR ("services"[All Fields] AND "hospital"[All Fields] AND "pharmaceutical"[All Fields])) OR ("pharmacy service, hospital"[MeSH Terms] OR ("pharmacy"[All Fields] AND "service"[All Fields] AND "hospital"[All Fields]) OR "hospital pharmacy service"[All Fields] OR ("service"[All Fields] AND "hospital"[All Fields] AND "pharmacy"[All Fields]))) AND ("2010/03/29"[PDat] : "2020/03/25"[PDat])	03/25/2020

Source: Authors.

The following data were extracted from articles and guidelines: production (year, country, and journal, for example); the type of the publication (empirical or theoretical study); and, if empirical research, the design, and characteristics of the participants. In each publication, the main focuses involved in proposing the problem, arguments, methods (in empirical studies), discussions, and conclusions were identified and extracted. The main principles were evaluated, from which categories of analysis were identified what we're allowed to synthesize the findings narratively.

3. Results

The search strategy made it possible to find 2595 citations in the mentioned databases and Guidelines, whose distribution is shown in Table 2.

Table 2 – Number of publications according to the bibliographic databases and gray literature, Rio de janeiro – Brazil, 2020.

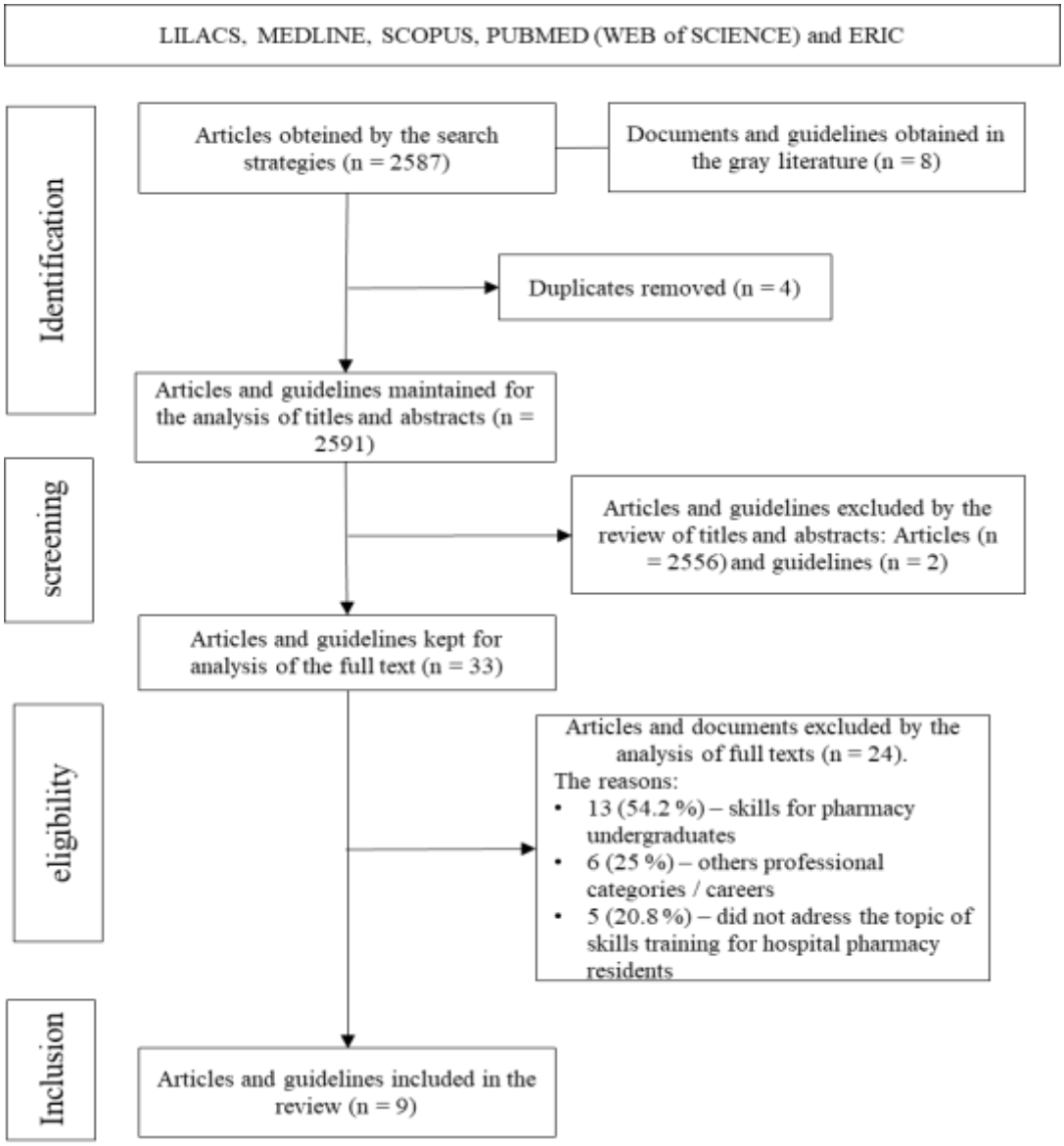
PUBLICATIONS FOUND IN THE DATABASES AND GUIDELINES						
Total LILACS publications	**Total Medline (PUBMED) publications**	**Total WEB OF SCIENCE publications**	**Total ERIC publications**	**Total SCOPUS publications**	**Total Guidelines**	**Total**
0	25	2446	105	11	8	2595
SELECTED PUBLICATIONS AFTER READING TITLE AND ABSTRACT						
LILACS	**PUBMED**	**WEB OF SCIENCE**	**ERIC**	**SCOPUS**	**Guidelines**	**Total**
0	1	24	0	2	6	33
SELECTED PUBLICATIONS AFTER INTEGRAL READING OF THE ARTICLES AND GUIDELINES						
LILACS Articles	**PUBMED Articles**	**WEB OF SCIENCE Articles**	**ERIC Articles**	**SCOPUS Articles**	**Guidelines**	**Grand Total**
0	1	2	0	1	5	**9**

Source: Authors.

The selection of the studies took place according to the inclusion and exclusion criteria previously established. After reading the titles and summarizing the studies, then reading the full texts, we obtained the sample of included tasks in this scoping review. The search and selection processes for the review are presented in the flowchart (Figure 1), according to JBI recommendations, from a checklist adapted from the Preferred Reporting Items for Systematic Reviews and Meta-Analyzes – PRISMA (Peters et al., 2020).

Among the 2595 references found in the indexed databases and four articles were duplicated. After exhaustive reading of the articles and guidelines' titles and abstracts, 33 were selected for a full analysis. Among those, 24 papers were excluded because they did not relate to the study question. The reasons for the exclusion were because most articles (54.2 %) referred only to the skills for pharmacy undergraduates, six (25 %) were about the formation of other categories of residency, and five (20.8 %) because they did not address the topic of skills training for pharmaceutical residents in the hospital area. The remaining four articles and five guidelines were analyzed and included in the research.

Figure 1 - Stepwise process for selection of papers concerning in the review. Adapted from PRISMA. Rio de janeiro, Brazil – 2020.



Source: Authors.

The nine articles and guidelines included in this review were from 2011 to March 2020; six were published in the United States of America, two in Canada, and Australia's last. Among them, four are scientific articles and five international pharmacy society guidelines that defined competencies frameworks, Accreditation Standards for Pharmacy Practice Residencies, goals, and educational objectives for residency in pharmacy. Table 3 summarizes the studies and guidelines on the theme.

Table 3 - Studies found according to year of publication, authorship, journal / institution, title and country of study. Rio de janeiro, Brazil - 2020

ARTICLE (A)	YEAR	AUTHOR (S)	SCIENTIFIC JOURNAL/ORGANIZATION	TITLE	COUNTRY
A1	2017	Starosta K, Davis SL, Kenney RM, Peters M, To L, Kalus JS.	Am J Health Syst Pharm. 2017;74(6):389-396. doi:10.2146/ajhp160138	Creating objective and measurable postgraduate year 1 residency graduation requirements	USA
A2	2019	Kary SJ, Dumont Z, Tangedal K, Bolt J, Semchuk WM	Can J Hosp Pharm. 2019;72(5):343-352.	Measuring Competency of Pharmacy Residents: A Survey of Residency Programs' Methods for Assessment and Evaluation	Canada
A3	2017	Host BD, Stewart WS, Anderson MJ	Am J Health Syst Pharm. 2017;74(6):382-388. doi:10.2146/ajhp160063	Development of a novel longitudinal postgraduate year 1 residency training model	USA
A4	2019	Fruhling L, LaFever M, Erstad B	Am J Pharm Educ. 2019;83(10):7099. doi:10.5688/ajpe7099	Enhancing Educational and Leadership Opportunities for Second-Year Pharmacy Residents	USA
GUIDELINE (G)	**YEAR**	**AUTHOR (S)**	**SCIENTIFIC JOURNAL/ORGANIZATION**	**TITLE**	**COUNTRY**
G1	2017	American Society of Health-System Pharmacists – ASHP	American Society of Health-System Pharmacists - ASHP	Required competency areas, Goals, and Objectives for Postgraduate Year One (PGY1) Pharmacy Residencies	USA
G2	2019	Society of Hospital Pharmacists of Australia – SHPA	SHPA Residency Program	SHPA Residency Program Competency Framework	Australia
G3	2016	American Society of Health-System Pharmacists – ASHP	American Society of Health-System Pharmacists - ASHP	Accreditation Standards for PGY1 Pharmacy Residencies - ASHP	USA
G4	2017	American Society of Health-System Pharmacists – ASHP	American Society of Health-System Pharmacists - ASHP	Accreditation Standards for PGY2 Pharmacy Residencies - ASHP	USA
G5	2018	Canadian Society of Hospital Pharmacists – CSHP	Accreditation Standards © 2018 Canadian Society of Hospital Pharmacists - CPRB	CPRB Accreditation Standards for Pharmacy (Year 1) Residencies	Canada

Subtitle 1: Publication type – A1 to A3 - Scientific article; A4 - Commentary (report); G1 to G5 – Guideline. Source: Authors.

The main results described in the four selected articles show that pharmacy residency training is an evolving field with various organizations committed to developing appropriate residency training standards. The article's choice shows this diversity. Article A1 portrayed how the leaders of a PGY1 residency program at an academic hospital developed graduation criteria that are objective, measurable, and linked to the residency's goals and objectives to help standardize performance assessments and track residents' progress toward quarterly progress targets. Implementing this system allowed the seamless integration of the training plan into the standards recommended by ASHP to track progress and specified graduation requirements.

Paper A2 pointed out how the Canadian Pharmacy Residency Board (CPRB) specifies the skills that pharmacy residents must achieve and the need for assessment and evaluation. A survey with coordinators of hospital pharmacy residency programs showed from the 37 eligible residency programs, 20 individual responses (54 %) were received. All respondents were general practice programs (100 %) in predominantly multicentre organizations (70 %) and similar in terms of assessment components used. The unity of the results provided a summary of national practices. It will allow existing and developing programs to examine their assessment and evaluation approach for alignment with national standards.

Study A3 showed the redesign of the Baptist Health Lexington residency program to implement a longitudinal structure for all learning experiences. Residents started to cycle the processes every two weeks during the program. These shorter and more frequently varied learning experiences allow residents to complete meaningful work in the pharmacy department and develop independent practice skills as they learn how to manage the daily tasks and workflow of a decentralized pharmacist within the institution. The change from a rotational model to a longitudinal design has allowed the earlier realization of resident independence, allowing trainees to focus on their individual professional growth and skills development. The revised program structure has allowed the integration of the PGY1 program into departmental activities.

The last article focuses on developing leadership, which is a critical aspect of residency training. However, little guidance is provided in the literature regarding the practical implementation of leadership training to develop skills within residency programming. Programming was developed within a second-year (PGY-2) critical care residency program to meet the residents' educational and leadership needs. There is an excellent opportunity for leadership development with the residents taking the lead in the biweekly educational sessions. Similar programming can strengthen residency experiences in other programs and help define actions to acquire this ability.

Although the scoping review covered both quantitative, qualitative, and quali-quantitative studies, and with similar goals on how residency programs can and have contributed to the training of hospital pharmacists' skills, coincidently, the methodology of all publications at final selection was qualitative.

The nine selected texts analysis identified each publication´s main focus, organized into categories, associating the type of report, and experimental design, as shown in Table 4.

Table 4 - Distribution of publications regarding the type of report, experimental design, and the category. Rio de janeiro, Brazil – 2020

DOCUMENT	TYPE OF REPORT	EXPERIMENTAL DESIGN	CATEGORY
A1	Empirical	experience report	Use of accreditation standards
A2	Empirical	survey research	Use of accreditation standards
A3	Empirical	experience report	Training model for skills development
A4	Commentary	experience report	Training model for skills development
G1	Theoretical	Grounded theory	Competency framework
G2	Theoretical	Grounded theory	Competency framework
G3	Theoretical	Grounded theory	Accreditation Standards
G4	Theoretical	Grounded theory	Accreditation Standards
G5	Theoretical	Grounded theory	Accreditation Standards

Subtitle: A = Article; G = Guideline. Source: Authors

The empirical studies selected in this research reported strategies or tools on pharmacy residents´ skills. These skills are developed in hospital practice.

Academic documents are established by pharmacy organizations in three countries: the USA, Canada, and Australia. The guidelines aim to inform accreditation standards or a panel of competencies, goals, and educational objectives recommended in training residents.

The focus categories will be presented below through thematic analysis.

Use of Accreditation Standards

The two empirical studies included in this category allowed assessing how the residency program's use of accreditation standards can assist in training skills in pharmacy residents at two hospital institutions.

In study A1, Starosta and colleagues (2017) aimed to create a framework that more closely linked residents of Henry Ford Hospital, Detroit, MI. It is progress tracking with graduation requirements. They abandoned the previously used list of goals and objectives to achieve a list of skills that the resident must demonstrate. On the resulting "graduation requirement criteria" list, the competencies are all linked back to specific objectives from the 2014 ASHP standard (ASHP, 2017). This system's implementation allowed an integration linking the training plan, the progress tracking system, and the graduation requirement criteria (Starosta et al., 2017).

The study A2 was carried out with hospital pharmacy residency coordinators with a Canadian Pharmacy Residency Board (CPRB) accreditation or pending accreditation. It collected information on how to determine the curricular components used for assessment and evaluation of residents' competencies; to describe the tools used for assessment and evaluation; to characterize the scheduling, frequency, and repetition of valuations; and determine the individuals´ groups involved in the assessment. The assessment and evaluation strategies reported by programs were congruent. For authors, results summarize national practices and allow existing and developing courses to examine their assessment and evaluation approach for alignment with national standards (Kary, Dumont, Tangedal, Bolt, & Semchuk, 2019).

Training model for skills development

The A3 and A4 studies showed the adoption of two training models to develop skills and improve the respective competencies based on an American certification organization's accreditation standard.

Article A3 showed how a Kentucky hospital, Baptist Health Lexington, changed the design of the PGY1 program from a rotational model to a longitudinal design. This project aligned the development of residents' skills with departmental goals and accelerated residents' independence. The changes aimed to meet accreditation standards for first-year pharmacy residency programs (PGY1) published by the American Society of Health-System Pharmacists (ASHP). The purpose of these standards is to establish criteria for training pharmacists to achieve professional competence in providing patient-centered care assistance and pharmacy services (Host, Stewart, & Anderson, 2017).

The text A4 deals with the standards published by ASHP, the leading U.S. accreditation organization, which consolidates pharmacy residency training standards. Among these, clinical education and leadership are essential areas of skills development for pharmacy residents during training. This study presented the activity developed in the second year of a pharmacy residency program (PGY-2) in intensive care to meet residents' educational and leadership needs. The "Erstad Hour" model allowed a total improvement in training experience for developing leadership competencies following ASHP. However, it is a challenging aspect of accreditation standards in the area of leadership (Fruhling, Lafever, & Erstad, 2019).

Competency Framework

The documents G1 and G2 present two guides showing the competence structures of pharmaceuticals societies, respectively, in the USA and Australia. These texts illustrate the establishment of criteria for training pharmacists to achieve professional competencies in delivering patient-centered care and pharmacy services.

Guideline G1(ASHP, 2017) presents the framework by areas of competence, goals, and objectives to be used with the ASHP Accreditation Standard for First-Year Graduate Pharmacy Residency Programs (PGY1). Four essential skill areas (mandatory) and others classified as elective have been described. The vast majority of hospital pharmacy residency programs in the US, Canada, and Australia adopt this model to certify their programs and assist in training competent pharmacists.

Another document (G2) (SHPA, 2012) describes the Society of Hospital Pharmacists of Australia (SHPA) residency program competency framework. The SHPA Advanced Training Residency (ATR) provides a two-year structured workplace training program supporting pharmacists in advancing their professional practice towards Advancing – Stage II (Consolidation Level) performance of the National Competency Standards Framework Pharmacists in Australia 2016. Under the Australian Pharmacy Council's auspices, SHPA may accredit continuing professional development (CPD) for pharmacists. Accredited CPD activities must meet requirements outlined within the Pharmacy Board of Australia's guidelines to the CPD Registration Standard. This model of a competency framework, in which knowledge, skills, and experience are acquired for the individual to be accepted as an expert, is subsidized by the standards of the Australian National Competency Standards Framework for Pharmacists 2016 (PSA, 2016), for which Expert Professional Practice is claimed.

Accreditation Standards

The documents G3 to G5 present models for organizations that certify hospital pharmacy residency programs, two in the USA and the last is from Canada. In countries where pharmacy residency programs´ certification exists, it takes place through the professional category Society's assessment. It provides means to guarantee applicants for residency that a program meets specific requirements and, therefore, is a proper place for postgraduate training in the practice of pharmacy and healthcare services.

Guidelines G3 and G4 describe the ASHP accreditation standards for PGY1 and PGY2, respectively. In general, the purpose of the ASHP accreditation program is to identify and grant public recognition to practice sites having pharmacy residency training programs that have been evaluated and found to meet the qualifications of one of the Society's residency accreditation standards.

The document G3 showed the stated purpose of the American Society of Health-System Pharmacists (ASHP) accreditation standard for postgraduate year 1 (PGY1) pharmacy residency programs. These texts establish criteria for pharmacists training in the delivery of patient-centered care and pharmacy services. Furthermore, the standard indicates that the 2-fold purpose of the PGY1 residency is to build upon doctor of pharmacy degree education and contribute to the development of clinical pharmacists' responsibilities(ASHP, 2016).

Guideline 4 introduced PGY2 Program Purpose: PGY2 pharmacy residency programs build on Doctor of Pharmacy (PharmD) education and PGY1 pharmacy residency programs to contribute to clinical pharmacists' development in specialized practice areas. PGY2 residencies allow residents to function independently as practitioners by conceptualizing and integrating accumulated experience and knowledge and incorporating both into the provision of patient care or other advanced practice settings. Residents who complete an accredited PGY2 pharmacy residency are prepared for advanced patient care, academic, or different specialized positions, along with board certification, if available.

The document G5 described the Canadian Pharmacy Residency Board (CPRB) that defines a year one residency in pharmacy practice, subsequently referred to as a "pharmacy residency", as an organized, directed, accredited program that builds upon competencies of an accredited entry-to-practice professional degree program in pharmacy. For CPRB, the pharmacy residency should include patient care, management and improvement of medication-use systems, leadership, control of one's practice, provision of medication- and practice-related education, and project management. Canadian pharmacy residencies have their roots in hospital pharmacy practice; however, contemporary pharmacy residences are delivered in diverse practice settings. Pharmacy residencies develop clinical, interprofessional, and leadership skills applicable to any position in any practice setting. It should be noted that this document is an authorized adaptation by the ASHP Accreditation Commission of its guidelines to the Canadian context (CSHP, 2018).

4. Discussion

Since the mid-20th century, the residency program has been an essential driver of excellence, serving as a bridge between education and practice. This training model, originally for physicians, was later extended to other health professionals. For pharmacists, this type of post-graduation has also gained strength, being adopted and improved in several countries worldwide.

The focus of most of the studies analyzed in this review was the US system. This country was a pioneer globally in adopting this model focused on training in-service practitioners for pharmacists, especially in hospitals. ASHP has realized this gold standard in the USA, the only nationally recognized non-governmental, non-profit pharmacy association accrediting pharmacy residencies since 1962 (Matthews A, Fowler P, & Dooley, 2017). The three American scientific articles, two experiences report, and one commentary described the resident training programs' improvements following the ASHP methodology, competence framework, and accreditation standards refer to the American residence system (Fruhling et al., 2019; Host et al., 2017; Starosta et al., 2017). These studies' results align with the three ASHP guidelines (G1, G3, and G4) found in the survey. It is identified that the use of this Society's accreditation standard for Residency Programs (from now on the Standard), which aims to establish criteria for training pharmacists in reaching professional competencies providing patient-centered care and pharmacy services, was attended to (ASHP, 2020b).

In this sense, skills training benefits through pharmacist residency programs are perceived in different corners of the world. In Argentina, the leaders of a hospital pharmacy residency program believe that "The residency program guides the competencies that will be acquired by the resident throughout their journey training, recognizes areas and levels of responsibility and establishes the expected common profile for all residents of the same specialty. Continuous updating of the program guarantees the incorporation of all the new elements necessary to optimize the pharmacist's profile, thus generating a professional with proven capabilities to respond to demanding requirements of current health systems". Furthermore, the program constitutes a document essential to guide the indispensable resources that the services receive residents and frame the training capacity accreditation processes. To the same as occurs with the launch of any curriculum development, the residency program must be subject to a continuous monitoring and evaluation process that allows all those involved to guarantee its permanent adjustment and updating (Fundación Sanatorio Güemes, 2004).

The importance of specifying the skills that pharmacy residents should achieve in the residency program and the need for assessment and evaluation was also discussed in the scientific article by Kary et al., (2019) using the Canadian Pharmacy Residency Board (CPRB)'s competency framework and accreditation standards. The Canadian Society of Hospital Pharmacists (CSHP) is an organization that acts in training processes. Its objectives are to consolidate an initial education and develop the novice pharmacist towards advanced practices like it is preconized by International Pharmaceutical Federation (FIP, 2016).

In Australia, although the lack of formal or structured post-registration (post-licensing) experimental training programs has been a barrier to strengthening and expanding the roles and scopes of practice for pharmacists, this country has been rapidly advancing to structure and qualify residency programs for pharmacists. Besides, the Australian Pharmacy Council requires that all professionals who assess students/residents are suitably qualified, experienced, and prepared for their role and have appropriate guidance and support (SHPA, 2020). Australian pharmaceutical education system, following FIP guidelines, published in the document "Pharmaceutical Workforce Development Goals 2016" (FIP, 2016), the Society of Hospital Pharmacy of Australia (SHPA) for residency programs created the guideline “Advanced Training Residencies Common Framework” found in this review. The document describes how SHPA Advanced Training Residency provides a two-year structured workplace training program. It supports pharmacists in advancing professional practice towards Advancing – Stage II performance (Consolidation Level) from National Competency Standards Framework for Pharmacists in Australia 2016 (PSA, 2016).

Another positive signal of the Australian system, according to FIP’s ‘Pharmaceutical Workforce Development Goals’(FIP, 2016), SHPA founded a member organization in 2017. The SHPA's Foundation is Australia’s first and only structured, formalized, supported, and accredited national pharmacy residency program (SHPA, 2020).

Although a limited sample was obtained in this review study, it can be seen that while some countries are more developed in this diverse universe of residency programs for pharmacists, following pioneering models such as those adopted in the USA. However, there are still nations with educational systems that need to accelerate the process of organizing quality parameters and defining the competency framework in domains for hospital pharmacy residency.

Although Brazil has several pharmacy residencies programs, whether multi-professional or professional, we did not find any articles or guidelines related to the present study's aim. In this sense, since 2004, the project "Diagnosis of Pharmacy Hospital in Brazil " identified the hospital pharmacy professionals' low level of qualification. Also, structural problems, lack of specialized human resources, and work routines, distant from what could be considered the gold standard, were found (Osório-de-Castro CGS & Castilho SR (organizers), 2004). Fifteen years later, in 2019, research by the Brazilian Federal Council of Pharmacy originated the report "Profile of Pharmacists Graduated from Residency Programs in Brazil" (CFF, 2014). This specific study showed structural and process heterogeneity between residency programs and the necessity that minimum

standards must be considered to train specialist pharmacists by assessing the places of practice (presence of a preceptor, schedules, disciplines, and other activities).

Following the strategies adopted in the USA, Canada, and Australia, the Brazilian Society of Hospital Pharmacy and Health Services - SBRAFH presented a document (SBRAFH, 2017b). This report aims to contribute to the full development and solidification of pharmacists' training through residences programs and rescues different pioneer programs' trajectories. This Brazilian Society also established the minimum standards for Pharmaceutical Residences in hospitals and other health services (SBRAFH, 2017a). Thus, it is undoubtedly an evolutionary mark in the improvement of pharmacy residency programs, bringing a positive expectation on hospital pharmacists' training, being the basis for certification by SBRAFH of Residency Programs in Brazil.

About the study limitations, the terms applied in the searches were the most comprehensive as possible. However, given the vast universe of publications, studies that did not explicitly use these terms in the fields searched may not have been retrieved. According to the methodology followed in this study, from Joanna Briggs Institute (2015), the scope reviews do not provide articles excluded based on quality criteria. However, the assessment of the level of scientific evidence by the Oxford Center for Evidence-Based Medicine (CEBM, 2009) selected articles were classified with the level of evidence 4 (low quality).

5. Conclusion

This scoping review detected a scarcity of published literature compiling and comparing the strategies used by residency programs. Despite the broad scope of the selected papers, there are essential aspects involving multiple criteria for pharmacy residency programs that may have been neglected in scientific production. Those aspects could have contributed to a better understanding of competency-based education for residency undertaken in different countries. The culture, the time of existence of the programs, the deepening of the standards description, the preceptors' quality and training, and the elements that involve the types of residency processes and training units/services, were little discussed. The scoping review allowed an overview of the scientific production of the competency framework for pharmacy residency programs. The authors discuss this production, expand the debate, open possibilities of innovative and more advanced models in quality standards, train residents for countries in less developed phases, and indicate knowledge gaps. Future studies should explore these gaps and propose strategies for improving the competency-based teaching process in pharmacy residency programs.

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