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Implementation of clinical pharmacy services in Brazilian Hospitals: a Scoping Review

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Abstract

Objective: To map studies in the literature on the implementation of clinical pharmacy services in Brazilian hospitals. **Methods:** A scoping review was performed, following the recommendations described in the Joanna Briggs Institute Reviewer's Manual. A systematic search was carried out, in April 2023, in the PubMed/MEDLINE, Virtual Health Library, Web of Science, Embase and Google Scholar databases, using descriptors related to: "implementation science", "pharmacists" and "hospitals". Two reviewers independently analyzed the titles, abstracts, and full texts of the articles according to the eligibility criteria. Data from the included articles were extracted and presented descriptively. **Results:** Searches in the databases resulted in 323 articles, of which seven were included in this review. Most studies were carried out in the southeast of the country (n=4). As for the design of the studies, four was quantitative and observational and two was qualitative study. Most studies used the nomenclature "Clinical Pharmacy Service" to refer to the implemented service (n=5). Five studies did not describe in detail the method used for implementation and only one study used a framework to guide this process. As for the implementation results, most of the studies (n=4) aimed to quantify pharmaceutical interventions or the impact of the service, focusing on the impact of the pharmacist's performance. **Conclusion:** This scoping review highlighted the scarcity of studies investigating the implementation of clinical pharmacy services in Brazilian hospitals. Furthermore, most studies did not describe in detail the method used for implementation. Such findings indicate the need for further studies that explore this theme, using the bases of Implementation Science, to contribute to the benefits of clinical pharmacy services being translated into clinical practice.

Keywords: Brazil; Implementation Science; Pharmacists; Hospitals.

Implantação de serviços clínicos providos por farmacêuticos em hospitais brasileiros: uma revisão de escopo

Resumo

Objetivo: Mapear na literatura estudos sobre implantação de serviços clínicos providos por farmacêuticos em hospitais brasileiros. **Métodos:** Foi realizada uma revisão de escopo, seguindo as recomendações descritas no *Joanna Briggs Institute Reviewer's Manual*. Uma busca sistemática foi realizada, em abril de 2023, nas bases de dados *PubMed/MEDLINE*, Biblioteca Virtual da Saúde, *Web of Science*, *Embase* e *Google Scholar*, utilizando descritores relacionados a: "ciência da implementação", "farmacêuticos" e "hospitais". Dois revisores analisaram independentemente os títulos, resumos e textos completos dos artigos de acordo com os critérios de elegibilidade. Em seguida, os dados dos artigos incluídos foram extraídos e apresentados de forma descritiva. **Resultados:** As buscas nas bases de dados somaram 323 artigos, dos quais sete foram incluídos nesta revisão. A maioria dos estudos foi realizado no sudeste do país (n=4). Quanto ao delineamento dos estudos, destacam-se os de natureza quantitativa e observacional (n=4) e os de delineamento qualitativo (n=2). A maioria dos estudos utilizou a nomenclatura "Serviço de Farmácia Clínica" para se referir ao serviço implementado (n=5). Cinco estudos não descreveram em detalhes o método utilizado para a implantação e somente um estudo utilizou um *framework* para guiar este processo. Quanto aos resultados da implantação, boa parte dos estudos (n=4) visava quantificar as intervenções farmacêuticas ou o impacto do serviço, focando no impacto da atuação do farmacêutico. **Conclusão:** Esta revisão de escopo evidenciou a escassez de estudos investigam a implantação de serviços clínicos providos por farmacêuticos em hospitais brasileiros. Ademais, a maioria dos estudos não descrevia em detalhes o método utilizado para a implantação. Tais achados indicam a necessidade de mais estudos que explorem esta temática, utilizando as bases da Ciência da Implantação, de modo a contribuir para que os benefícios dos serviços clínicos por farmacêuticos se traduzam na prática clínica.

Palavras-chave: Brasil; Ciência de implementação; Farmacêutico; Hospitais.

Introduction

In recent decades, studies have shown the positive impact of clinical pharmacy services (CPS) on patients' health outcomes[1-4]. In Brazil, research carried out in hospitals has also shown the positive effect of the pharmacist's clinical work in reducing medication errors and promoting patient safety[5,6,7]. Despite these benefits, the literature highlights the challenges related to incorporating these services into clinical practice in an effective and sustainable way[8,9,10]. Thus, Implementation Science has helped professionals and organizations to incorporate services into clinical practice[11].

Implementation Science can be defined as the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice and, hence, to improve the quality and effectiveness of health services[12]. Thus, this science is important for evaluating the results of interventions, identifying important factors at the various levels of implementation, including actors such as patients, health professionals and managers[13].

Given the expansion of Implementation Science, studies have been published in recent years, especially internationally, to better understand this process[14,15,16]. More recently in Brazil, studies have begun to investigate this issue in environments such as community pharmacies[17,18], primary health care facilities or pharmacies that dispense specialized component medications[19,20,21]. However, to our knowledge, there is still no overview of how the implementation of CPS has been carried out in the hospital context. In view of this, the aim of this study was to map out studies in the literature on the implementation of clinical services provided by pharmacists in Brazilian hospitals.

Methods

Study design

A scoping review was carried out according to the recommendations of the Joanna Briggs Institute Reviewer's Manual and reported according to the criteria of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Scoping Reviews (PRISMA-ScR)[22,23].

Scope review question

To guide this scoping review, the following research question was developed: what has been published on the implementation of Clinical Pharmacy Services in Brazilian hospitals?

Based on this main question, two other questions of interest were developed:

(a) what methods have been used to implement Clinical Pharmacy Services in Brazilian hospitals?

b) What are the results of implementing Clinical Pharmacy Services in Brazilian hospitals?

Search strategy

The systematic search for studies was carried out in April 2023 in the following databases: PubMed/MEDLINE, Virtual Health Library, Web of Science and Embase. In addition, the study sources considered to be gray literature included Google Scholar. The search strategy was designed using MESH terms related to "Brazil", "implementation science", "pharmacist" and "hospitals" (supplementary material 1). No date limits were used in the search. In addition, the reference list of all included articles was examined to check for the possibility of including additional studies.

Eligibility criteria

The study's eligibility criteria were established according to the Population, Concept and Context framework[22]: a) Population: pharmacists; b) Concept: implementation of Clinical Pharmacy Services; c) Context: Brazilian hospitals.

Studies that met the following criteria were included: a) original articles; b) studies that addressed the process of implementing Clinical Pharmacy Services; c) studies carried out in Brazilian hospitals. Exclusion criteria were: a) studies with no full text available; b) meta-analyses, systematic reviews, narrative reviews, letters, editorials, commentaries, posters.

Study selection

The articles were entered into the Rayyan[24] platform to facilitate the screening process. Two reviewers (ALT and LXB) independently read and selected the titles and abstracts according to the eligibility criteria. The relevant studies were read in full and selected according to the eligibility criteria. Reasons for exclusion for the full-text assessment stage were recorded and reported in the scoping review. Disagreements were resolved by a third reviewer (KSSR).

Extracting data and summarizing results

Two reviewers (ALT and LXB) extracted the following data: authors, publication year, state where the study was carried out (Federative Unit of Brazil), objective and study design. Information was also collected on the implementation of Clinical Pharmacy Services, including implementation methods and results. The results were presented using a narrative summary, tables, and flowcharts.

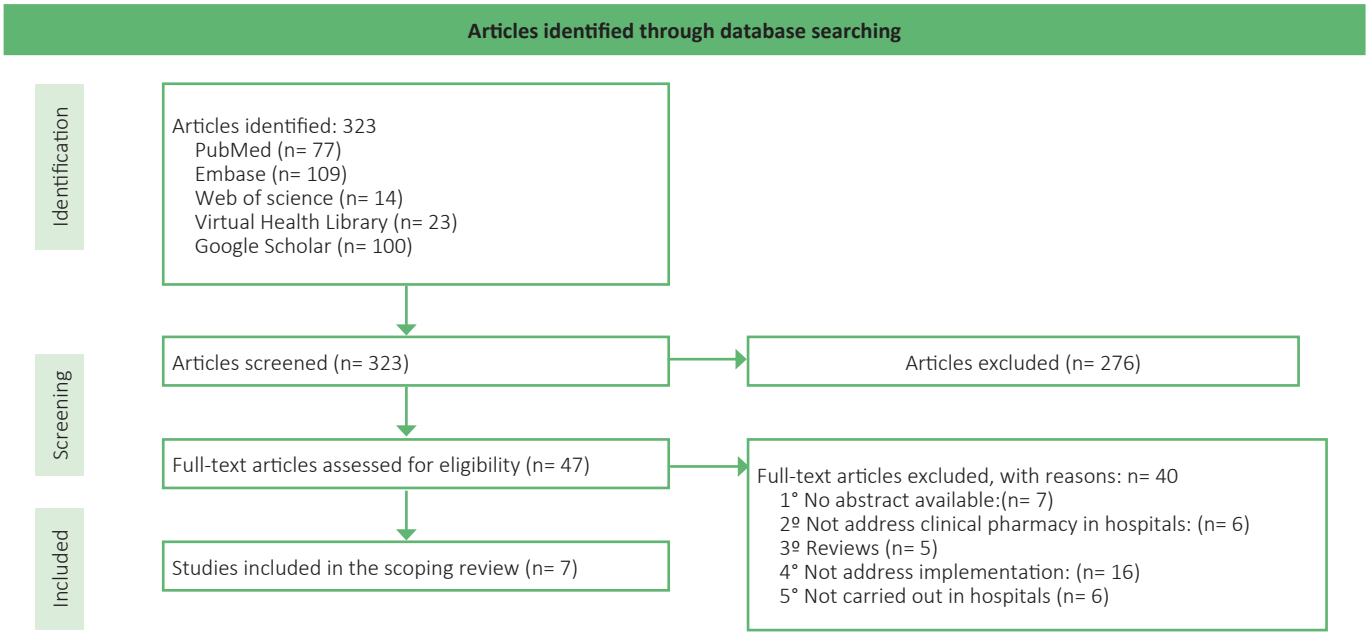
Results

A search of the databases identified 323 articles, 13 of which were duplicates. The screening of titles and abstracts excluded 276 articles which did not meet the eligibility criteria. Thus, 47 studies were eligible for full reading, of which 7 studies were included in this scoping review. A manual search was carried out on the bibliographical references of these seven studies, but no study met the eligibility criteria. The selection process is shown in Figure 1.

The characteristics of the seven studies are described in Table 1 and Table 2. Two articles were published in English[25,26] and five in Portuguese[27-31] between 2011 and 2022. In terms of design, four were observational[28-31], two were qualitative[25,26] and one was interventional[27].

The studies were carried out in different states, with a higher prevalence in the southeast of the country[26-30], two of which were in the state of São Paulo. The setting of the included studies varied, with three being carried out in intensive care units[28,29,31] and the others in different sectors of the hospital[25,26,27,30].

Figure 1. Search results and study selection and inclusion process .



Source: Adapted from Tricco and colleagues[23].

Table 1. Characteristics of the studies included in the scoping review

Author and publication year	Design	State	Objective	Sector
Alcântara et al., 2018[25]	Qualitative study	Sergipe	To understand the perceptions of a group of hospital pharmacists and other professionals about the implementation of clinical pharmacy in a highly complex public hospital in Brazil.	Not reported
Fernandes et al., 2022[26]	Qualitative case study	Espírito Santo	To explore the constructs that influenced the implementation of the medication reconciliation process conducted by pharmacists in a university hospital and to analyze the magnitude and effectiveness of this influence.	Cardiology and Gastroenterology Wards at a University Hospital
Farias et al., 2016[27]	Interventional study	South of Brazil	To implement a clinical pharmacy service focused on the clinical review of antineoplastics used in the treatment of hematological diseases, characterizing the most common drug-related problems, including their clinical impact and the characteristics of the patients involved, as well as the main pharmaceutical interventions carried out.	Not reported
Ferracini et al., 2011[28]	Prospective study	São Paulo	To demonstrate quantitatively and qualitatively the evolution of clinical pharmacy in a large tertiary hospital.	Intensive Care Unit
Magalhães et al., 2016[29]	Descriptive observational study	Minas Gerais	To evaluate the results obtained at the beginning of the implementation of the clinical pharmacy service in the Intensive Care Unit of the João XXIII Hospital for the identification, evaluation, and prevention of drug-related problems .	Intensive Care Unit
Oliveira et al., 2022[30]	Descriptive study with an experience report	São Paulo	To describe the experience of implementing pharmaceutical care in a geriatric hospital unit and to propose an instructional protocol for the practice.	Geriatrics
Okumura et al., 2016[31]	Cross-sectional study	Paraná	To describe the application and results of a CPS[1] for pediatric intensive care unit patients in a Brazilian setting.	Pediatric Intensive Care Unit

Subtitle:CPS: Clinical Pharmacy Services[1].

Table 2. Implementation characteristics of the studies included in this scoping review

Author and publication year	Implemented services	Method used for implementation	Implementation results
Alcântara et al., 2018[25]	Clinical Pharmacy Service	Although no method was described, it was pointed out that out of mutual interest, a partnership was established between the Laboratory of Teaching and Research in Social Pharmacy at the Federal University of Sergipe and the hospital. This partnership acts as an advisory and training body for pharmacists and pharmacy staff, with the aim of promoting clinical pharmacy services (e.g. medication reconciliation, prescription analysis, pharmacotherapeutic monitoring and medication review) in the hospital's pharmacies. In 2016, the study was in the diagnostic analysis phase to assess both the group's expectations and the need to implement clinical services in this institution. This assessment directed the training sessions in communication skills, laboratory test interpretation, medication administration and clinical pharmacy services.	Not described
Fernandes et al., 2022[26]	Medication Reconciliation	Post-positivist qualitative research was carried out, with a case study as the methodological strategy, involving semi-structured interviews and participant observation, with data collection guided by the Consolidated Framework for Implementation Research (CFIR).	Based on the analysis of the participants' statements and the field diary, 18 CFIR constructs were identified as influencing the implementation of Medication Reconciliation. The constructs that most influenced the implementation of the service were "Inner Setting", "Individual Characteristics" and "Intervention Characteristics". The participating evaluation professionals showed little knowledge of medication reconciliation and had different views on its scope, weakly relating the service to patient safety. The tools used to carry out medication reconciliation were adapted to the needs of the hospital, facilitating their implementation.
Farias et al., 2016[27]	Clinical pharmaceutical service focused on the clinical review of antineoplastics used in the treatment of hematological diseases	Not described.	The study reports the results of the implemented service, namely: more than 13,000 prescriptions were analyzed during both periods included in this study, with 7,894 prescriptions validated in period A and 5,671 prescriptions in period B. There was a 106.5% increase in the detection of DRPs[1], as 73 were detected in the absence of the CPS[2], were detected in the absence of the CPS and 112 DRPs[1] in the presence of the service.
Ferracini et al., 2011[28]	Clinical Pharmacy	Not described.	It was observed that, with the participation and expansion of the clinical pharmacy in the hospital, there was an increase in the number and types of pharmaceutical interventions carried out on medical prescriptions between 2003 and 2010, which could have a positive impact on patient safety. Some studies carried out to evaluate pharmaceutical interventions have found that the majority of interventions (92.8% to 99%) were accepted by the medical team (12-14). In the service, similar adherence was observed, reaching 99.5% in 2010.

Table 2. Implementation characteristics of the studies included in this scoping review

Author and publication year	Implemented services	Method used for implementation	Implementation results
Magalhães et al., 2016[29]	The clinical pharmacy service involved the following activities carried out by the pharmacists: daily technical analysis of prescriptions; collection of information in the system and in medical records, such as data from laboratory and clinical tests, clinical anamnesis, evolutions of health professionals; active search for adverse reactions; participation in bed races together with the multidisciplinary team; clinical monitoring of patients and carrying out pharmaceutical interventions regarding the DRPs[1] identified by the prescription analysis.	Not described	The study reports on the results of the service implemented: A total of 80 patients were monitored. 447 medical prescriptions were analyzed, of which 257 received pharmaceutical intervention. 371 pharmaceutical interventions were carried out, 202 interventions were communicated directly to the medical team, 106 of which were accepted and 96 were not accepted. 154 educational interventions were carried out.
Oliveira et al., 2022[30]	Pharmacotherapeutic monitoring services, including medication reconciliation and pharmacotherapy review. Technical-pedagogical activities were also carried out for patients and healthcare staff.	A Manual for the Practice of Pharmaceutical Care in Geriatrics was proposed in three topics: 1. Situational diagnosis; 2. Adequacy of the procedure and provision of the service; 3. Practice.	The study reported good acceptance by the participants.
Okumura et al., 2016[31]	The SFC[2] consisted of a systematic service dedicated to: participating in clinical visits, drawing up institutional protocols, Therapeutic Monitoring of antiepileptic drugs, reviewing each of the dosages of the medications prescribed, the indications, the duration of treatment, drug interactions, relative and absolute contraindications and intravenous drug incompatibilities.	Not described	The study reports the results of the implemented service, namely: A total of 141 DRPs[1] were found in 35 patients, in which the most common interventions made to improve medication therapy were: prevention of incompatible intravenous solutions (21%) and a composite of inadequate doses (17% due to low, high, and unimproved doses).

Subtitle: DRP: Drug related problem[1]. CPS: Clinical Pharmacy Services[2]

The research objective of these studies also varied, but most of them aimed to describe the implementation result, quantifying pharmaceutical interventions or the impact of the service[27,28,29,31]. As for the CPSs that were set up, most of them used the nomenclature "Clinical Pharmacy Service"[25,27,28,29,31] and others didn't use any specific terminology, but rather described the pharmacist's clinical work[26,30].

In relation to the method used to implement the CPS, five studies did not describe the method in detail[25,27,28.29,31]. Of the two that described these methods[26,30], only one used a framework available in the literature, the Consolidated Framework for Implementation Research[26]. As for the implementation results, most of the studies focused on the impact of the pharmacist's work, especially in terms of identifying and solving drug-related problems[27].

Discussion

This scoping review identified a low number of studies dealing with the CPS implementation in Brazilian hospitals. This can be explained by the fact that it is a relatively recent topic in Brazil, since the articles included in this review were published from 2011 onwards. Similarly, in other practice settings, such as community pharmacies, there are records of implementation studies published from 2015 onwards[17,18,19], suggesting that this type of study and practice is still recent in the country. Furthermore, it is possible that pharmacists and managers are implementing CPS and are not publicizing this process through scientific articles. This highlights the need for more studies on implementation in hospitals and to encourage the reporting of this type of study in the country.

In relation to the CPS implemented, it can be seen that most of the studies used the term "Clinical Pharmacy" to refer to the clinical services implemented. Other studies did not define a specific service, but only reported the activities carried out by pharmacists. This shows that there was no standardization of terminology and definitions of the services implemented. This lack of homogeneity between the studies could be a reflection of the lack of harmony in the designation of terms for the clinical area in the country[32].

To this end, the Federal Pharmacy Council published the document "Pharmaceutical services directly aimed at the patient, family and community: contextualization and conceptual framework" " in 2016, and the "Origin of Clinical Pharmacy in Brazil, its development, related concepts and perspectives"", in 2019, with the aim of harmonizing terms and concepts used in the clinical area[32,33]. Therefore, future studies can use this theoretical and conceptual framework to guide the implementation and provision of clinical pharmacy services and procedures aimed at the patient, family and community.

It is important to note that most of the studies have implemented CPS in intensive care units. This can be explained by the fact that this sector is complex due to its multiple interactions[34]. In this scenario, adverse drug reactions rates increase exceptionally in patients taking four or more drugs, changes in clinical status can occur rapidly, and there are high rates of medication errors and the use of High-Alert Medications[35,36]. Thus, this can be an important scenario for the clinical pharmacist to contribute to the multi-professional team and improve clinical, humanistic, and economic outcomes for patients and the hospital. Faced with these needs, legislation has been published to strengthen the pharmacist's role in this scenario, such as Resolution No. 675/2019, which deals with the presence of a clinical pharmacist in the intensive care units[37], and is therefore an interesting field for the implementation study.

In this review, most of the studies included did not describe in a detailed and reproducible way how the implementation process took place, focusing instead on the implementation results. This can be explained by the fact that traditional clinical research in health requires the need for measurable data, such as evaluating the impact of an intervention on patient health outcomes[13]. However, in recent years there has been concern about whether the results of studies translate into an impact on public health, since it is estimated that it takes a mean of 17 years for research results to be incorporated into clinical practice and that only around half of them reach widespread clinical use[13,38]. Therefore, whilst it is important to generate more evidence on the impact of CPS, it is also necessary to invest in projects involving the "real world". Implementation science can help us understand what, why and how interventions (public policies, programs, or professional practices) occur in the "real world" and test approaches to improve them.

As for the implementation process, only one used a consolidated tool in the literature, the Consolidated Framework for Implementation Research, to understand and explain influences on the process of implementing a service. Similarly, the scoping review published by Brandt et al. (2019)[41], showed that only nine of the 47 studies included used a theory, model or framework in their research to test hypotheses or explain findings in the implementation of the medication review service in community pharmacies. Studies discuss the importance of using these tools, as they can provide more in-depth insight into which implementation strategies or interventions are most promising for improving service implementation[15,41].

In this review, it was observed that the results of the implementation focused most on describing the impact of the pharmacist's work, especially in terms of identifying and resolving DRPs. Although these process indicators are important, future studies could explore other outcomes such as clinical, humanistic, and economic ones. In addition, future studies could adopt outcomes measured in implementation research. Proctor et al. (2011)[42] defined implementation outcomes as "the effects of deliberate and purposive actions to implement new treatments, practices, and services", whose purpose is to serve as indicators of implementation success. These outcomes include acceptability, feasibility and sustainability.

Our study has some limitations. The choice of the descriptors "Implementation Science" and "Brazil" may have limited our search, since articles related to the implementation of pharmacy services may not have used these descriptors. In addition, articles that are not indexed in the databases we used may have been left out of our analysis.

Conclusion

This scoping review showed that few studies address the implementation of CPS in Brazilian hospitals. The studies that have addressed the issue have shown little clarity about the methods used for implementation, which can hinder the reproducibility of the studies. Therefore, it is suggested that there is a need for well-designed Brazilian studies, with more robust methods and well-structured and reported interventions in order to achieve more reliable results. In addition, the use of frameworks and tools to conduct future studies on the CPS implementation in Brazilian hospitals is recommended.

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Collaborators

ALT; LXB; KSSR: study design, search for studies in databases, data extraction, data analysis and interpretation, writing of the article. HRVJ; GASJ; DCSAA; KSSR: analyzing the data, interpreting the data, writing the article, final revision, and approval of the version to be published.

Conflict of interest declaration

The authors declare no conflicts of interest in relation to this article.

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