

## **The performance of the clinical pharmacist in pharmaceutical care and intervention in cases of polymedicated elderly people: an integrative review**

**A atuação do farmacêutico clínico na atenção e na intervenção farmacêutica em casos de idosos polimedicados: uma revisão integrativa**

**La actuación del farmacéutico clínico en la atención e intervención farmacéutica en casos de ancianos polimedicados: una revisión integrativa**

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### **Abstract**

The life expectancy of the population has increased and improved over the years due to the quality of living conditions, housing and health. However, it is understandable that the elderly are susceptible to multiple diseases due to a variety of factors. It is known that due to the high prevalence of non-communicable chronic diseases, the use of drugs has increased significantly, accompanied by higher incidences of polypharmacy. Therefore, pharmaceutical care in elderly and polydrug populations is extremely important for monitoring, not only to promote the rational use of drugs, but also to provide better adherence to treatment and, consequently, better clinical and economic results. In this way, the present research is an integrative review to analyze evidence in the literature regarding the role of the clinical pharmacist in pharmaceutical care, as well as their interventions and the impacts caused on polymedicated elderly. For this, data collection was carried out from secondary sources, through a bibliographic survey in national and international databases. 834 articles were found, and only 20 studies were used for the present research. The results obtained in this study can demonstrate that the performance of pharmaceutical care and its intervention in geriatric and polymedicated patients can adjust doses, reduce drug interactions and reduce costs, in addition to improving the quality of life of these patients.

**Keywords:** Clinical pharmacist; Pharmaceutical care; Elderly; Multimorbidity; Polypharmacy.

### **Resumo**

Expectativa de vida da população tem aumentado e melhorado ao longo dos anos devido à qualidade das condições de vida, moradia e saúde. No entanto, é compreensível que os idosos sejam suscetíveis a múltiplas doenças devido a uma variedade de fatores. Sabe-se que devido à alta prevalência de doenças crônicas não transmissíveis, o uso de medicamentos tem aumentado significativamente, acompanhado de maiores incidências de polifarmácia. Portanto, a atenção farmacêutica em populações idosas e polimedicadas é de extrema importância para o monitoramento, não apenas para promover o uso racional de medicamentos, mas também para proporcionar melhor adesão ao tratamento e, conseqüentemente, melhores resultados clínicos e econômicos. Desta forma, a presente pesquisa é uma revisão integrativa para analisar na literatura evidências referente a atuação do farmacêutico clínico na atenção farmacêutica, assim como suas intervenções e os impactos causados em idosos polimedicados. Para isso, foi realizada uma coleta de dados a partir de fontes secundárias, por meio de levantamento bibliográfico em bases de dados nacionais e internacionais. Foram encontrados 834 artigos, onde apenas 20 estudos foram utilizados para a presente pesquisa. Os resultados obtidos neste estudo são capazes de demonstrar que a atuação da atenção farmacêutica e sua

intervenção em pacientes geriátricos e polimedicados pode ajustar doses, reduzir interações medicamentosas e reduzir custos, além de melhorar a qualidade de vida desses pacientes.

**Palavras-chave:** Farmacêutico clínico; Atenção farmacêutica; Idosos; Multimorbidade; Polifarmácia.

### Resumen

La esperanza de vida de la población aumentó y mejoró en dos años debido a las condiciones de calidad de vida, vivienda y salud. Sin embargo, es comprensible que las personas mayores sean susceptibles a múltiples enfermedades debido a una variedad de factores. Se sabe que debido a la alta prevalencia de enfermedades crónicas no transmisibles, el uso de medicamentos ha aumentado significativamente, acompañado de mayores incidencias de polifarmacia. Por lo tanto, la atención farmacéutica en la población anciana y polifarmacia es de suma importancia para el seguimiento, no sólo para promover el uso racional de los medicamentos, sino también para proporcionar una mejor adherencia al tratamiento y, consecuentemente, mejores resultados clínicos y económicos. Así, esta investigación es una revisión integradora para analizar las evidencias en la literatura sobre la actuación del farmacéutico clínico en la atención farmacéutica, así como sus intervenciones y los impactos que provoca en ancianos polimedicados. Para ello se realizó la recolección de datos de fuentes secundarias, a través de un levantamiento bibliográfico en bases de datos nacionales e internacionales. Se encontraron 834 artículos, donde solo se utilizaron 20 estudios para esta investigación. Los resultados obtenidos en este estudio son capaces de demostrar que la actuación de la atención farmacéutica y su intervención en pacientes geriátricos y polimedicados pueden ajustar dosis, reducir interacciones medicamentosas y reducir costes, además de mejorar la calidad de vida de estos pacientes.

**Palabras clave:** Farmacéutico clínico; Atención farmacéutica; Mayores; Multimorbilidad; Polifarmacia.

## 1. Introduction

Aging is the result of the interaction of molecular and genetic processes that occur throughout life with various disease states and individual lifestyles. As the population ages, consideration should be given to improving the quality and longevity of a healthy life and deciphering the molecular aging process and the complex interaction of various factors can be an effective healthy aging strategy (Zole & Ranka, 2018).

The life expectancy of the population has increased and improved over the years, due to the quality of living conditions, housing, and health. These factors led to this expectation and the increase in the elderly population, which led to the development of measures and policies such as the Statute of the Elderly, the National Health Policy for the Elderly, and the National Policy for the Elderly (Souza et al., 2021).

However, as the person's age group changes, the diseases that affect them change. Previously, when young, the predominant pathologies were infectious and parasitic. Today, with aging, chronic and degenerative diseases are part of a new reality, where they require precautions and continuous monitoring (Oliveira, 2019).

The elderly are more prone to morbidity and mortality from drug-associated harm due to age-related changes and pathologies; chronic disease comorbidities, such as cardiovascular disease and psychological disorders; and different pharmacokinetic and pharmacodynamic actions. As a result, the elderly are more likely to experience adverse drug reactions due to polypharmacy (Mortazavi et al., 2018).

Pharmaceutical care is extremely important for a care plan aimed at the client's quality of life. Studies suggest that clients who follow pharmaceutical follow-up have positive results, such as identifying and solving problems; decreasing drug costs and better adequacy in polypharmacy (Crealy et al., 2003).

### 1.1 Population-ageing

Aging is a process that occurs in all living things as they develop over time. It starts from conception and ends with death at the end of biological life. Biology and medicine define aging as the period of a person's life after maturity, when there is a decline in bodily functions and various changes in systems and organs (Dziechciaż & Filip, 2014).

Aging is a heterogeneous process and occurs on a personal level in all three areas of human experience: physical, psychological and social (Cosco et al., 2017). Advances in the field of health and technology have allowed the population

access to adequate public or private services, and a better quality of life in this phase (Miranda et al., 2016).

To ensure benefits for the quality of life, public policies and programs aimed at the elderly were instituted, such as the National Policy for the Elderly - NPE (Law n. 8.842/1994) whose purpose is to ensure rights, promoting autonomy, integration and participation effective in society, in addition to considering an elderly person to be over 60 years of age (Alcântara, 2016). And the Statute of the Elderly (Law n. 10.741/2003) which is now called the Statute of the Elderly Person – SEP amended by Law n. 14,423/2022, to ensure greater inclusion. It aims to ensure the rights of the elderly, in addition to ensuring “special” priority to people over 80 years of age (Ministério da Justiça, 2022).

The Ministry of Health, aiming at focused and specialized care for the elderly, created the National Health Policy for the Elderly - NHPE (Ordinance No. 2,528 of October 19, 2006), for the promotion or readjustment of programs of the Unified Health System - UHS so that the elderly can have more help in care and treatments, having attention so that there is better quality in population aging (Ministério da Saúde, 2006).

In recent decades, a large increase in the rate of population aging has been observed. According to estimates by the Brazilian Institute of Geography and Statistics (IBGE), the age group of 65 years or older, in Brazil, has been increasing significantly by 9.83% when compared to 2010, when this percentage was an increase of 7.32% (IBGE, 2020).

Several noticeable aspects of the body are transformed as we age. Some sensory modalities, such as smell, taste, or motor sense, are affected by age, while others, such as hearing, vision and balance, are severely affected. The effects of aging on balance, hearing and vision are even more pronounced, with important and even serious consequences at psychological and social levels. On the other hand, auditory and visual sensory deficits seem to be important reasons for the general decline in intellectual functioning (Ho et al., 2021).

One of the characteristics that make the epidemiological profile of the elderly particularly prominent is the predominance of chronic diseases, their gradual development and the ability to influence and reduce individual autonomy and independence (Porciúncula et al., 2014). The body's aging process affects the pharmacokinetic and pharmacodynamic changes of the drugs used by the elderly, resulting in the accumulation of toxic substances and difficulty in clearing metabolites (Dos Santos et al., 2021).

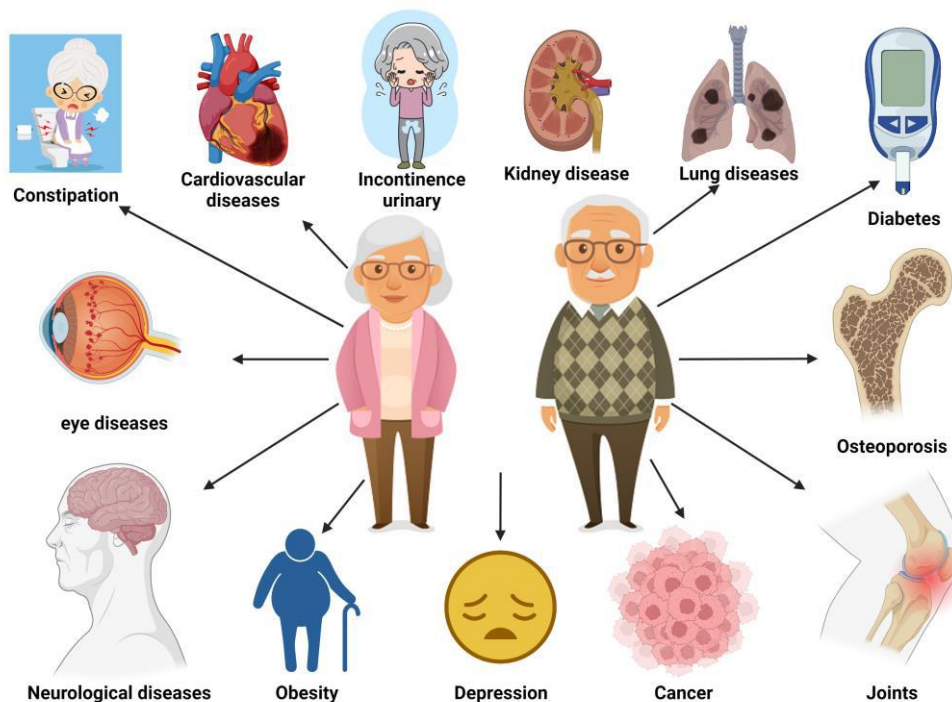
With the propensity for increased longevity, it is understandable that the elderly are susceptible to suffering multimorbidities, may have limited mobility, and are more likely to suffer from complex diseases. This promotes great demands for health care and other services, such as care and medication (Khan et al., 2019).

## 1.2 Morbidities

Approximately 80% of all deaths in Latin America and Southeast Asia are caused by chronic non-communicable diseases (NCDs), such as cardiorespiratory diseases, cancer and diabetes. The most common cause of death in the very elderly is a circulatory disease, which can lead to poor self-rated health and decreased ability to function. As the population ages, there is an increase in CNCDs that may indicate disability (Silva et al., 2021). Regarding morbidities, it is evident that elderly people with a greater number of diseases have a worse quality of life (Tavares & Dias, 2012).

According to the World Health Organization (WHO), NCDs, also known as chronic diseases, tend to be long-lasting and result from a combination of genetic, physiological, environmental and behavioral factors. Furthermore, chronic diseases are considered 70% of the most common deaths worldwide (Figure 1), these are: cardiovascular diseases, diabetes mellitus, cancers and chronic lung diseases and disproportionately affect people in low- and middle-income countries, where they occur more than three-quarters of global deaths from NCDs (31.4 million) (WHO, 2021).

**Figure 1** - Common morbidities in elderly people.



Source: Prepared by the authors according to the article retrieval process in the databases.

Also according to WHO (2016), the causes of these diseases include rapid and unplanned urbanization, the globalization of unhealthy lifestyles and the aging of the population. An unhealthy diet and lack of physical activity can be seen in people with high blood pressure, high blood sugar, high blood lipids and obesity. These are known metabolic risk factors that can contribute to cardiovascular disease, the leading non-communicable disease that causes premature death.

Multimorbidity can lead to the impairment of major functional systems. This impairment can lead to various impairments, such as cognitive impairment, postural instability, immobility, urinary and sphincter incontinence or constipation, impaired communication, which can be exacerbated by iatrogenic and familial insufficiency, which is characterized by low social support and family ties (Salive, 2013; Clerencia-Sierra, 2015).

People who have multimorbidities are subject to premature death, have the potential for more frequent and prolonged hospitalizations, and can consult with a greater number of specialists, which, consequently, can profoundly affect the well-being and quality of life of patients themselves (Navickas et al., 2016).

To create prevention strategies and effective care planning, it is necessary to monitor health conditions, capable of favorably interfering in the natural history of the disease; anticipate the onset of complications and prevent exacerbations and complications of diseases; in addition to increasing the patient's involvement in self-care (Veras, 2009).

### 1.3 Polypharmacy

The single definition of polypharmacy is absent; however, the authors reconcile the idea of using 5 or more drugs (Arriagada et al., 2020). This type of practice can have unfavorable impacts on the pharmacological therapy of older patients, requiring active monitoring and, depending on the situation, even interventions.

As used in multiple combination regimens, these drug combinations can be counterproductive, as a result, the individual drug benefits are altered. This is especially the case in elderly people's homes, and among older people in end-of-life care circumstances (Wastesson et al., 2018). Older adults are also at greater risk of adverse drug reactions (ADRs) with

increased drug consumption. The ADR encounter also leads to cascading prescriptions, causing more side effects and resulting in a higher pill burden (Sinha et al., 2021).

Polypharmacy is considered a critical public health problem that is linked to drug-drug interactions, drug disease, and adverse drug events (Stattfort et al., 2021). Being more expressive in the elderly, due to the age factor and the combination of multiple diseases, may lead to the use of different medications for health control. However, the elderly public is subject to changes in pharmacokinetics and pharmacodynamics, given age, which disfavors the benefit/risk ratio of an undetermined amount of medication (Mouazer et al., 2022). There are several risks in using polypharmacy. These risk factors were described by Werder and Preskorn, 2003 (Table 1).

**Table 1 - Risk factors in Polypharmacy.**

<b>Demographic Variables</b>	<ul style="list-style-type: none"> <li>• Age over 65 years;</li> <li>• Ethnicity;</li> <li>• Women.</li> </ul>
<b>Psychosocial Variables</b>	<ul style="list-style-type: none"> <li>• Low socioeconomic status;</li> <li>• Low levels of schooling;</li> <li>• Habitation;</li> <li>• Unemployment;</li> <li>• Self-medication.</li> </ul>
<b>Clinical Disorders</b>	<ul style="list-style-type: none"> <li>• Chronic diseases;</li> <li>• Multimorbidity;</li> <li>• Obesity;</li> <li>• Diabetes;</li> <li>• Chronic hypertension;</li> <li>• Coronary artery disease.</li> </ul>
<b>Neurological Disorders</b>	<ul style="list-style-type: none"> <li>• Dementia;</li> <li>• Chronic pain;</li> <li>• Facial pain;</li> <li>• Headaches;</li> <li>• Insomnia;</li> <li>• Epilepsy.</li> </ul>
<b>Use of Medicines</b>	<ul style="list-style-type: none"> <li>• Cardiovascular agents;</li> <li>• Antipsychotics;</li> <li>• Mood Stabilizers;</li> <li>• Antidepressants.</li> </ul>

Source: Adapted from Werder and Preskorn (2003).

Multiple medications increase health care costs and risk of adverse drug events (ADEs), pleasurable medication, non-adherence, reduced functional capacity, and older geriatric syndromes. Several other negative consequences have been associated with the use of multiple medications, such as increased burden on functional capacity, higher healthcare costs, and increased risks of multiple geriatric syndromes (Maher et al., 2014).

It is important to evaluate any other illnesses or medications that the patient is taking to avoid complications. Teaching the patient and family about their medications in writing and verbally can also help improve adherence (Hajjar et al. 2007).

#### 1.4 Pharmaceutical care

The role of the pharmacist in promoting health, belonging to the multidisciplinary health team, has evolved a lot from the thinking of Mikeal et al., (1975) and later of Strand et al., (1990), so that the role of the pharmacist today is increasingly directed to the customer, as the focus and care of the pharmacist is the well-being of the patient (Barros Silva & Fegadolli, 2020).

Pharmaceutical care has evolved from an initial core view embedded in medicine to a more human end view as the care given to a given patient to ensure that it is effective, safe and meets the patient's needs. Drug-related, including indications (understanding), efficacy (expectation), safety (concerns), and convenience (non-adherence), to prevent or resolve drug-related problems. To improve health-related quality of life (Sevilla-Sánchez et al., 2020).

Pharmacists and their staff are on the front lines, maintaining a stock of medicines and providing necessary advice and information to patients. Demonstrating their protagonism as healthy people and empowering their patients (Koster et al. 2020). Pharmacists involved in clinical activities are in a favorable position to optimize drug therapy and reduce risk. It can detect and reduce the number of drug-related problems (DRPs) in elderly hospitalized patients. The most efficient intermediaries were achieved directly by pharmacists for patients (Samir Abdin et al., 2020).

Pharmaceutical assistance and a multidisciplinary approach can be beneficial for chronic patients, especially elderly patients, as they are at greater risk of undergoing inappropriate pharmacological treatments. In turn, it may bring a favorable outcome, to be complementary to appropriate actions (Marin-Gorricho et al., 2022).

### **1.5 Justification and problem of the study**

Population aging is a reality in Brazil and the world, however, aging is not the definition of quality of life. Just as the world is changing more and more, there are also many social, economic and cultural challenges. These factors may influence public health issues such as the incidence of CNCDs (Bezerra et al., 2021; Oliveira et al., 2018). It is known that the use of medication has grown significantly due to the high prevalence of CNCD, which has been accompanied by a higher incidence of polypharmacy (Henrique-Sanches et al., 2021).

Due to the increasing use of multiple medications for a variety of diseases, the elderly are physiologically susceptible to possible side effects and adverse reactions that may occur (Corrêa et al., 2021). Therefore, pharmaceutical care for the elderly and polypharmacy population is extremely important for monitoring, not only to promote the rational use of medicines but also to provide better adherence to treatment, leading to better clinical and economic results (De Sá Godoi et al., 2021).

Given this, the present work hypothesizes that studies are focusing on pharmaceutical care and their respective interventions in the care of polymedicated elderly people. Therefore, this study aimed to analyze studies in multiple databases through an integrative review to address relevant issues and discuss the role of the clinical pharmacist (CP) in this approach.

## **2. Methodology**

### **2.1 Study type**

This is an integrative review study, based on the collection of data from studies with different methodologies carried out from secondary sources and through a bibliographical survey (Souza et al., 2010). This research was constituted, according to Whittemore & Knafl (2005), in the following steps: identification of problems by formulating appropriate questions to investigate; bibliographic searches to select articles based on predetermined criteria; data evaluation by extracting data from each study's summary of results; data analysis and presentation of results.

### **2.2 P.I.C.O Strategy**

The P.I.C.O. for the construction of the guiding question of this research. This strategy is based on four elements: P (Patient); I (Intervention); C (Comparison); O (outcomes), where: P: Polymedicated elderly patients; I: Polypharmacy; C: Countries around the world; O: Pharmaceutical care.

These elements are fundamental for the construction of the question that will start the survey of bibliographic evidence data (Santos et al., 2007). Thus, the guiding question of this integrative review was: What scientific evidence

demonstrates the occurrence of pharmaceutical care in polymedicated elderly people and their respective interventions?

### **2.3 Survey of bibliographical data**

A search was carried out from July 2022 to August 2022. For the survey of articles, the search strategy was initially developed using the databases: Latin American and Caribbean Literature in Health Sciences (LILACS), Scientific Electronic Library Online (SCIELO) and PubMed.

### **2.4 Use of descriptors**

The following descriptors and their combinations in Portuguese and English were used to search for articles: “Atenção farmacêutica” e “Idosos polimedicados”, “Pharmaceutical care”, “clinical pharmacist”, “elderly polypharmacy”, “Polymedicated elderly people”, making use of the Boolean operators “or” and “and” in international data platforms.

### **2.5 Inclusion and exclusion criteria**

The inclusion criteria defined for the selection of articles were: articles with polymedicated elderly and that portray the pharmaceutical intervention, being published in English, Spanish and Portuguese; full articles that portray the theme analyzed in question, which was studies of the character of systematic reviews, descriptive, exploratory, retrospective and cohort studies and articles published and indexed in the aforementioned databases in the last five years (2017 - 2022). Exclusion criteria are studies that do not fit the established period and theme.

### **2.6 Data analysis**

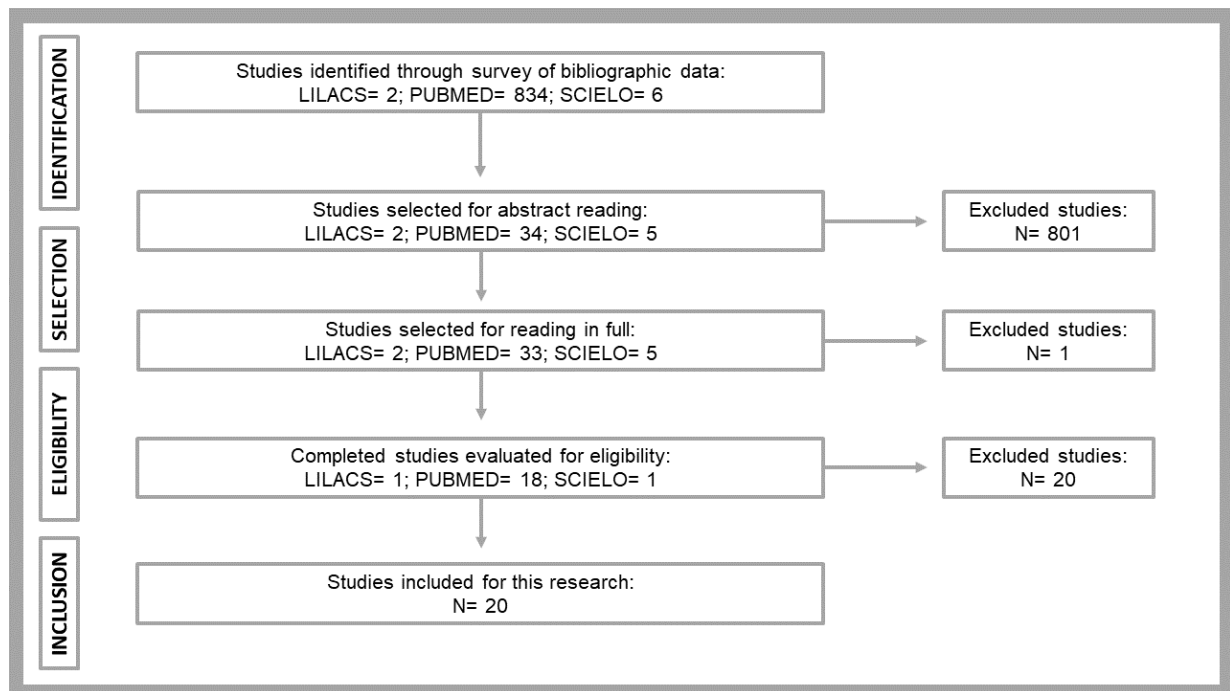
The articles were analyzed using the content analysis technique described by Bardin, (1977). Initially, the pre-analysis of the articles found in the referred search tools consisted of a brief reading of them, followed by the selection of the documents, a preliminary reading of the data and interpretation of the material obtained. Articles are selected based on their compatibility with established search strategies.

The analysis of the selected studies and the synthesis of the data extracted from the articles were carried out descriptively, making it possible to observe, tell and describe, to gather the knowledge produced on the theme explored in the review. The results were described according to Prisma Statment (Moher et al., 2015), through the flowchart Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), for organization and relevance of the study.

## **3. Results**

Through the PRISMA flowchart (Table 2), a survey of bibliographic data was carried out, according to the search strategy described in the methodology, where a total of 842 articles were retrieved for evaluation through the bibliographic survey and retrieval strategy, and only 20 articles were selected for this research.

**Table 2** - Flowchart according to the PRISMA protocol for search strategy.



Source: Prepared by the authors according to the article retrieval process in the databases.

The distribution of the selected articles (Table 3) was determined in descending order, starting from the publication of the most recent study. Studies were obtained from LILACS databases (n=1); PUBMED (n=18) and SCIELO (n=1). Regarding the bibliographic production, of the 20 articles, 1 was published in 2017, 3 in 2018, 7 in 2019, 3 in 2020, 4 in 2021 and 2 articles in 2022.



**Table 3 - Distribution of selected articles.**

ORDER	AUTHORS	TITLE	STUDY TYPE	MAIN RESULTS
ARTICLE 1	STUHEC & ZORJAN, 2022.	Clinical pharmacist interventions in ambulatory psychogeriatric patients with excessive polypharmacy.	Pre-post multicenter retrospective observational study.	Acceptance of clinical pharmacist recommendations reduced the total number of medications by 7.5% per patient and improved adherence to treatment guidelines for antidepressants and antipsychotics.
ARTICLE 2	DAGNEW et al., 2022.	Clinical Pharmacist Intervention on Drug-Related Problems among Elderly Patients Admitted to Medical Wards of Northwest Ethiopia Comprehensive Specialized Hospitals: A Multicenter Prospective, Observational Study.	Multicenter prospective observational study.	In the study there were 389 participants included in the study. About 266 (68.4%) of the participants had at least one medication-related problem. About 503 drug-related problems were found. Of the interventions practiced, (84.7%) were accepted by the prescribers. Among all drug-related problems, (67.4%) were completely resolved.
ARTICLE 3	MARIN-GORRICO et al., 2021.	Impact of pharmaceutical care in polymedicated patients admitted to a geriatric ward.	Experimental intervention study.	53.6% of pharmaceutical interventions were accepted; potentially inappropriate prescribing according to the STOPP and START criteria was reduced by 49.7 and 22.1%, respectively; The PRM decreased by 60.1%.
ARTICLE 4	KIM et al., 2021	Pharmacist-Led Collaborative Medication Management for the Elderly with Chronic Kidney Disease and Polypharmacy.	Retrospective descriptive study.	The medication management service implemented and led by pharmacists improved the quality of medication use and reduced the use of potentially inappropriate, chronic, CNS-active and anticholinergic medications.
ARTICLE 5	MARTÍNEZ-SOTELO et al., 2021.	Adecuación de la prescripción en pacientes mayores polimedados en atención primaria. Ensayo clínico controlado aleatorizado por grupos PHARM-PC.	Randomized study.	The proportion of patients with Potentially Inappropriate Medications (PIM) decreased by 13.7% after the intervention. The mean number and mean cost of MPI/patient decreased by 0.43. Confidence Interval (CI) is 95%.
ARTICLE 6	SZILVAY et al., 2021.	Analysis of interaction risks of patients with polypharmacy and the pharmacist interventions performed to solve them-A multicenter descriptive study according to medication reviews in Hungarian community pharmacies.	Multicentric descriptive study.	A total of 984 Drug-Related Problems (DRPs) were recorded during the survey, most of which (62.6%) were non-quantitative safety issues. The incidence of types of interaction risk resolved especially by pharmacists (31.1%).
ARTICLE 7	HAILU et al., 2020.	Drug related problems in admitted geriatric patients: the impact of clinical pharmacist interventions.	Prospective intervention study.	380 (81.5%) Medication-Related Problems (DRPs), and 670 interventions were performed. The prescriber's acceptance of interventions by the clinical pharmacist was (91.7%). More than half of the problems were solved (65.8%).
ARTICLE 8	SAMIR ABDIN et al., 2020.	Impact of pharmacists' interventions on the pharmacotherapy of patients with complex needs monitored in multidisciplinary primary care teams.	Pre/post intervention study.	Attending physicians accepted 263 recommendations regarding these DRPs, representing 87.7% of all DRPs detected.
ARTICLE 9	CALDAS et al., 2020.	Perceptions of pharmaceutical services among elderly people on poly medication.	Qualitative study.	After the interviews, the category "Pharmaceutical consultation as an educational instrument for the self-care of polymedicated elderly" was observed to receive a higher positive frequency by the evaluated ones, after evaluation and pharmaceutical care.
ARTICLE 10	CAMPINS et al., 2019.	Reduction of pharmaceutical expenditure by a drug appropriateness intervention in polymedicated elderly subjects in Catalonia (Spain).	Randomized, multicenter clinical trial.	The group accompanied by a clinical pharmacist and physician decreased spending on medication by 14.3% compared to the control group.
ARTICLE 11	LEE et al., 2019.	Pharmacist services in nursing homes: A systematic review and meta-analysis.	Systematic review.	It demonstrated that pharmacist-led services reduced the average number of medications, mortality, and hospitalizations among nursing home residents.
ARTICLE 12	ERTUNA et al., 2019.	Evaluation of pharmacist interventions and commonly used medications in the geriatric ward of a teaching hospital in Turkey: a retrospective study.	Review reports.	The acceptance rate of the pharmacist's interventions was 85.41% by the geriatrician.
ARTICLE 13	STUHEC et al., 2019.	Evaluation of a collaborative care approach between general practitioners and clinical pharmacists in primary care community settings in elderly patients on polypharmacy in Slovenia: a cohort retrospective study reveals positive evidence for implementation.	Retrospective observational study.	The Clinical Pharmacist (CP) suggested 625 interventions, of which 304 were accepted by General Practitioners (GPs), almost half (48.6%). At the end of medication reduction an average of, respectively, 11.2% and 10.86%. The number of Potential Type X Drug Interactions was reduced by 50% (3 cases). The number of Potentially Inappropriate Medications (PIMs) prescribed was

reduced by 20% (p = 0.069).				
<b>ARTICLE 14</b>	OOI, 2019.	Evaluation of a pharmacist-led intervention on polypharmacy.	Retrospective observational study.	The number of medications decreased to 6.0 after the consultation, and the average number of medications decreased by 1.2. Overall, 67.3% of polypharmacy patients had prescriptions for 6 or more drugs before the consultation, but 53.7% after the consultation.
<b>ARTICLE 15</b>	HAZEN et al., 2019.	Non-dispensing pharmacists' actions and solutions of drug therapy problems among elderly polypharmacy patients in primary care.	General cross-sectional observational study.	83% of the guidelines were complied with, with (35%) corrective actions, precaution (57%), and (64%) of the corrective guidelines actually solving the therapy problem.
<b>ARTICLE 16</b>	WANG et al., 2019.	Effect of Pharmacist Intervention on a Population in Taiwan with High Healthcare Utilization and Excessive Polypharmacy.	Retrospective observational study.	After the pharmacist's intervention, 287 cases consumed fewer types of medication, representing 61.6% of the total number of cases. Furthermore, there were 572 fewer drug interactions, a decrease of (19.90%). In particular, the level of contraindicated drug interactions decreased (27.27%) and severe drug interactions decreased (21.75%).
<b>ARTICLE 17</b>	LIN et al., 2018.	Economic outcomes of pharmacist-physician medication therapy management for polypharmacy elderly: A prospective, randomized, controlled trial.	Prospective, randomized, controlled study.	There was a decrease in the group's medical expenses after the pharmaceutical intervention.
<b>ARTICLE 18</b>	YASU et al., 2018.	Association between polypharmacy and clinical ward pharmacy services in hospitals in Tokyo.	Qualitative study.	Clinical pharmacy services contributed to reducing the incidence of polypharmacy in patients upon admission.
<b>ARTICLE 19</b>	WHITMAN et al., 2018.	Pharmacist-led medication assessment and deprescribing intervention for older adults with cancer and polypharmacy: a pilot study.	Pilot study.	73% of potentially inappropriate medications were overprescribed by the pediatric pharmacist and oncologist.
<b>ARTICLE 20</b>	SNELL et al., 2017.	Patient views about polypharmacy medication review clinics run by clinical pharmacists in GP practices.	Qualitative study.	80% of patients who participated in the medication review service by a clinical pharmacist understood their medications better and had changes about their treatment, which resulted in positive responses in these patients.

Source: Prepared by the authors according to the article retrieval process in the databases.

#### 4. Discussion

The results obtained in the present study are capable of demonstrating how to present polypharmacy in the elderly and that the performance of pharmaceutical care and its intervention in geriatric and polymedicated patients can adjust doses, reduce drug interactions and reduce costs, in addition to improving quality of life for these patients.

The clinical pharmacist (CP) must be able to accurately assess patients, and drug therapy, develop or initiate a therapeutic plan, and monitor the results achieved, to promote patient-oriented care (Saseen et al., 2017). Pharmaceutical care is a planned, documented and performed the action with users and health professionals to address or prevent problems that interfere or may interfere with drug therapy and is an integral part of the drug therapy follow-up process. Health Interventions (HI), which are part of Pharmaceutical Intervention (PI), are also conducted by clinical pharmacists in Pharmaceutical Care (PC) (Ivama et al., 2002).

Haynes et al., (2008), developed an extensive bibliographic review with several results of randomized clinical trials that had interventions with the aim of improving adherence to the treatment of patients, whether in the short or long term. Interventions included information, reminders, self-monitoring, reinforcement, counseling, family therapy, psychological therapy, crisis intervention, manual telephone follow-up, and supportive care. In an analysis of the clinical pharmacy service by Yasu et al., (2018) in polymedicated elderly patients from 13 hospitals, clinical pharmacy services contributed to the reduction in the incidence of polypharmacy in patients on admission.

In this sense, the present work sought to investigate the pharmaceutical interventions carried out by the PC in polymedicated elderly people. All studies raised the benefits obtained by pharmaceutical follow-up and pharmaceutical interventions when accepted by physicians.

The acceptance of PI by physicians is essential for promoting the rational use of medications, adequate pharmacotherapy for the patient, analysis of adverse reactions, cost reduction and better therapeutic follow-up. Thus, having better patient-oriented care (Reis et al, 2013).

In a pre/post-intervention study by Samir Abdin et al., (2020), assistant physicians accepted 263 recommendations regarding these Drug-Related Problems (DRPs), representing 87.7% of all detected. In a recent (multicenter prospective observational) study by Dagneu et al., (2022), of the practiced intervention, 84.7% were accepted by the prescribers. Among all drug-related problems, 67.4% were completely resolved.

In a prospective intervention study by Hailu et al., (2020), prescriber acceptance of clinical pharmacist interventions was 91.7%. Problems were solved in 65.8%, that is, more than half. To a lesser extent in the quasi-experimental intervention study in patients Marin-Gorricho et al., (2021), 53.6% of the pharmaceutical precautions were accepted; the DRP suffered 60.1%.

In the same year, three different articles on pharmaceutical interventions by prescribers ranged from excellent professional interventional acceptance to positive impacts such as problem-solving and improved adherence: Ertuna et al., (2019), the acceptance rate of pharmacist interventions by geriatricians was 85.41%. In a general cross-sectional observational study, by Hazen et al., (2019), 83% of the pharmaceutical guidelines were complied with, with (35%) of corrective actions, and precautions (57%), (64%) of the corrective guidelines solved the problem of therapy. In the retrospective observational study by Stuhec et al., (2019), of the Clinical Pharmacist (PC) interventions, almost half (48.6%) were accepted by General Practitioners (GCs). In the end, a reduction of 11.2% (drugs) and 10.86% (average). The number of Potentially Inappropriate Medications (PIMs) prescribed has been reduced by 20%. The PC recommendation improved adherence to heart disease treatment guidelines.

Drug interventions carried out by clinical pharmacists and accepted by physicians can provide benefits not only for health but also economically (Renaudin et al., 2021; Chen et al., 2020; De Grégori et al., 2020). Campins et al., (2019),

analyzed the reduction in pharmaceutical costs of a randomized and multicenter clinical trial in polymedicated elderly patients, where the control group continued their therapeutic routine and the other group had the pharmaceutical intervention. In their results, they could observe that both experienced a decrease in spending on medicines, however, the pharmaceutical intervention group has a significant decrease when compared to the control (-14.3% vs.-7.7%).

In their prospective, randomized, controlled study, Lin et al., (2018), observed that the group accompanied by a clinical pharmacist and physician achieved significant savings in medical expenses compared to the group that was only accompanied by a physician, in addition to the rate of mortality reduction.

A systematic review and meta-analysis performed by Lee et al., (2019), analyzed the pharmaceutical services offered in nursing homes and their respective pharmaceutical interventions in six databases. The researchers demonstrated that the interventions and follow-up by the pharmacist-led to a decrease in the residents' falls, mortality rates, frequency of hospitalizations and the quality of prescriptions received.

Another benefit that the acceptance of pharmaceutical interventions can offer was presented by Snell et al., (2017), through a qualitative study. Another benefit that the acceptance of pharmaceutical interventions can offer was presented by Snell et al., (2017), through a qualitative study. 819 patients aged  $\geq 75$  years and using  $\geq 15$  medications underwent a medication review performed by clinical pharmacists. Interventions, education and signage were provided by the PC. After the procedures, a questionnaire was carried out, where 80% who participated in the action understood their medications better and had changes in their treatment, which resulted in positive responses in these patients.

Another study was that of Caldas et al., (2020), also of a qualitative nature, where their results showed that pharmaceutical care was positively accepted by elderly patients and that monitoring and interventions brought benefits to them. In a recent randomized study by Martínez-Sotelo et al., (2021), the proportion of patients with Potentially Inappropriate Medications (PIM) decreased by 13.7% after the intervention. The mean number and mean cost of PIM/patient decreased by 0.43 95% confidence interval (CI).

In the current pre-post multicenter observational study by Stuhec and Zorjan, (2022), acceptance of clinical pharmacist recommendations reduced the total number of medications by 7.5% per patient and also improved adherence to treatment guidelines for antidepressants and antipsychotics. Such explained results validate and demonstrate the benefits that pharmaceutical intervention provides for the elderly in terms of well-being and the economy.

Certain factors can influence the level of drug consumption in the elderly, one of which can be highlighted is the chronic multimorbidities that affect them. Polypharmacy is a consequence and a reality for many elderly people, and may be constant and growing due to the high rate of population aging (PEREIRA et al., 2017).

About IP, studies such as that of Wang et al., (2019), who investigated, through an observational study, changes in the amounts of medication in polymedicated elderly people after intervention and pharmaceutical follow-up, were able to show that before the PI, there were 2,874 cases (95.9%) of drug interactions due to polypharmacy and after the PI, around 287 cases used fewer types of medication, representing 61.6% of the total number of cases. In addition to 572 fewer drug interactions, a decrease of 19.90%.

In a study conducted in Japan by Ooi, (2019), patients aged 65 years and older were referred to home or outpatient clinics from September 2018 to November 2018 (3 months). The number of medications decreased to 6.0 after the consultation, and the average number of medications decreased by 1.2. In addition, 67.3% of polypharmacy patients had prescriptions for 6 or more drugs before the consultation, but 53.7% after the consultation, that is, a reduction of 13.6%.

Alhusein et al., (2018), explore, through a multi-method approach, the need for pharmaceutical care and service delivery to polymedicated elderly people with sensory impairment. Their results showed that the elderly have great difficulty in identifying medications, especially when the presentation (color, shape, name) of the medication is modified. Such results

corroborate the need to support medication management and care for these patients.

Based on a recent retrospective descriptive study by Kim et al., (2021), the medication management service implemented and led by pharmacists improved the rational use of medication about the quality of medication use and reduced the use of potentially inappropriate, chronic, CNS-active, and anticholinergic medications.

Another study of the same year of the multicenter descriptive type by the authors Szilvay et al., (2021). A total of 984 Drug-Related Problems (DRPs) were recorded during the survey, most of which (62.6%) were non-quantitative safety issues. The incidence of types of interaction risk resolved especially by pharmacists (31.1%). A total of 599 pharmacist interventions were used to address the 531 interaction risks located by pharmacists.

## 5. Final Considerations

Pharmaceutical care is a very effective way to promote the rational use of medicines. The results obtained demonstrate the importance of clinical pharmacy and the benefits obtained through pharmaceutical intervention. The clinical pharmacist is very important in monitoring elderly people who use polypharmacy, as it ensures that the patient receives adequate and safe prescriptions, in addition to closely monitoring their treatment, confidently for the health, economy and well-being of the patient.

Pharmaceutical Care is the pharmaceutical practice that develops skills in disease prevention, health promotion and recovery, in an integrated manner with the health team. It focuses on the drug user, developing skills for health education, pharmaceutical guidance, measurement and evaluation of results, with the aim of obtaining pharmacological therapeutic efficacy. However, there is still a need for more and more research aimed at pharmaceutical intervention in various sectors and target audiences, in order to elucidate its impacts on promoting the rational use of medicines and the lives of patients in a clinical and economic way.

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