

# Polypharmacy, drug interactions, and iatrogenesis: a study on therapeutic challenges in elderly individuals<sup>1</sup>

## Polifarmácia, interações medicamentosas e iatrogenia: um estudo sobre desafios terapêuticos em indivíduos idosos

## Polifarmacia, interacciones medicamentosas e iatrogenia: un estudio sobre los retos terapéuticos en individuos mayores

Polifarmacia, interacciones medicamentosas e iatrogenia: un estudio sobre los retos terapéuticos en individuos mayores

[Research Article]

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## Abstract

This study aimed to comprehensively address therapeutic challenges in medication use among the elderly. The research utilized the Medication Use Instrument within the Falls Risk Assessment Battery (BARQ) to collect and analyze data on medication consumption. Sixty-three elderly individuals ( $\bar{X} = 67.40 \pm 6.62$  years) participated in the research. Results revealed that 20.63% were at high risk (score > 11), 3.17% at moderate risk (score 8-10), 15.89% at elevated risk (score 5-7), and 60.31% at low risk (score 0-4) of iatrogenic effects. Notably, a 16-week personalized exercise program led to a significant reduction in medication consumption, resulting in a decrease in high-risk participants ( $\Delta\Delta\% = -75.39$ ). In conclusion, this research highlights polypharmacy issues and associated complications in the elderly, emphasizing the potential for iatrogenic harm. Exercise programs show promise in mitigating these risks by reducing medication dependency and promoting overall well-being.

Key-words: elderly health, exercise, polypharmacy, iatrogenic disease

## Resumo

Este estudo teve como objetivo abordar de forma abrangente os desafios terapêuticos no uso de medicamentos em idosos. A pesquisa utilizou o Instrumento de Uso de Medicamentos dentro da Bateria de Avaliação de Risco de Quedas (BARQ) para coletar e analisar dados sobre o consumo de medicamentos. Sessenta e três indivíduos idosos ( $\bar{X} = 67.40 \pm 6.62$  anos) participaram da pesquisa. Os resultados revelaram que 20.63% estavam em alto risco (pontuação > 11), 3.17% em risco moderado (pontuação 8-10), 15.89% em risco elevado (pontuação 5-7) e 60.31% em baixo risco (pontuação 0-4) de efeitos iatrogênicos. Notavelmente, um programa de exercícios personalizado de 16 semanas levou a uma redução significativa no consumo de medicamentos, resultando na diminuição dos participantes em alto risco ( $\Delta\% = -75.39$ ). Em conclusão, esta pesquisa destaca questões de polifarmácia e complicações associadas em idosos, enfatizando o potencial de dano iatrogênico. Programas de exercícios mostram promessa em mitigar esses riscos, reduzindo a dependência de medicamentos e promovendo o bem-estar geral.

**Palavras-chave:** saúde do idoso, exercício, polifarmácia, doença iatrogênica

## Resumen

Este estudio tuvo como objetivo abordar de manera integral los desafíos terapéuticos en el uso de medicamentos en personas mayores. La investigación utilizó el Instrumento de Uso de Medicamentos dentro de la Bateria de Evaluación de Riesgo de Caídas (BARQ) para recopilar y analizar datos sobre el consumo de medicamentos. Sesenta y tres individuos mayores ( $\bar{X} = 67.40 \pm 6.62$  años) participaron en la investigación. Los resultados revelaron que el 20.63% estaba en alto riesgo (puntuación > 11), el 3.17% en riesgo moderado (puntuación 8-10), el 15.89% en riesgo elevado (puntuación 5-7) y el 60.31% en bajo riesgo (puntuación 0-4) de efectos iatrogénicos. Notablemente, un programa de ejercicios personalizado de 16 semanas condujo a una reducción significativa en el consumo de medicamentos, lo que resultó en una disminución de los participantes en alto riesgo ( $\Delta\% = -75.39$ ). En conclusión, esta investigación destaca los problemas de polifarmacia y las complicaciones asociadas en personas mayores, enfatizando el potencial de daño iatrogénico. Los programas de ejercicios muestran promesa en la mitigación de estos riesgos al reducir la dependencia de medicamentos y promover el bienestar general.

**Palabras clave:** salud del anciano, ejercicio, polifarmacia, enfermedad iatrogénica

## Introduction

The increase in life expectancy, in association with the growing prevalence of chronic diseases, such as high blood pressure and diabetes mellitus, favors greater exposure of the elderly to polypharmacy, which, normally, can give rise to iatrogenesis, generating several consequences for the previously mentioned public (de Almeida Condé et al., 2022). The term iatrogenesis derives from the Greek (iatros = doctor / gignesthai = to be born, which derives from the word genesis = to produce) and means any pathological change caused in the patient by poor medical practice. (Pereira et al., 2000).

Taking into account the large elderly population in Brazil, which, in the year 2021, was estimated at 31.2 million (IBGE, 2022), the analysis of the use of medications and their possible interactions will make it possible to have an insight more reliable overall health of these citizens and the interventions necessary to obtain a better quality of life (Dascalu et al., 2023).

Deprescription was also an issue addressed in the present study, evaluating its impact on the health of elderly people. This is a very important topic to be discussed, given that patients using polypharmacy, as already seen, can be the result of iatrogenesis and, therefore, there is an urgency to identify potentially inappropriate medications and remove them in an appropriate manner controlled and safe (Pliego et al., 2022).

Also, the practice of physical exercise was investigated as a mechanism potentially capable of reducing the excessive use of drugs, mainly because this is a group of patients with chronic diseases and, therefore, presenting polycomplaints and multiple comorbidities (Verde et al, 2019, Perdomo & Cuervo, 2019, Estrada, 2020).

Considering the public reference, with its specialties, and the concepts of polypharmacy and iatrogenesis, the debate regarding the prescription of approved medications for a consistent clinical need of this group is emphasized, that is, the problematization is based on ascertaining whether the numerous medications used by the elderly, being correctly evaluated regarding their pharmacological interactions (Bonnet-Zamponi, 2019).

The theory that these substances may be combined incorrectly is compatible with iatrogenesis. However, despite the possibility that these individuals are exposed to questionable polypharmacy, the main question is to explore the consequences, confirming whether the elderly are actually more exposed to clinical repercussions when they use more medications (Salinas-Rodríguez et al., 2020).

Therefore, this article aims to establish the possible relationship between polypharmacy and iatrogenesis, in addition to establishing whether there is a greater clinical risk when these patients are taking an excessive number of medications.

## **Methodology**

### **Study Model**

This study was developed in a quantitative, cross-sectional, descriptive, quasi-experimental manner with a group of elderly individuals through data collection and analysis.

### **Population, Sampling, and Sample**

The study's population consisted of elderly individuals receiving care at Basic Health Units (UBS) in the city of Aracaju, in the following neighborhoods: Aeroporto, Atalaia, Castelo Branco, Coroa do Meio, Farolândia, Grageru, Inácio Barbosa, Jabotiana, and Ponto Novo. The UBSs included in the study were: UBS Antônio Alves; UBS Augusto Franco; UBS Augusto César Leite; UBS Ávila Nabuco; UBS Dona Sinhazinha; UBS Dr. Max de Carvalho; UBS Fernando Sampaio UBS Geraldo Magela; UBS Hugo Gurgel; UBS Madre Tereza de Calcutá; and UBS Manoel de Souza Pereira.

Initially, visits were made to the aforementioned UBSs, and the elderly individuals who frequented them were invited to participate in an introductory lecture held at the Farolândia Campus. During the lecture, the project, ethical aspects, and any questions that might arise from the audience were explained. At the end of the lecture, the elderly individuals were invited to participate in the project.

Volunteers were asked to provide a referral from the UBS they belonged to, as well as their identification and CPF, to the Laboratory of Biosciences of Human Motricity – LABIMH.

At LABIMH, participants were selected based on inclusion criteria (being over 60 years old and committing to participate in the research by signing the Informed Consent Form) and exclusion criteria (non-commitment to the research by providing their data).

### **Sample Size Calculation**

The sample size determination was based on the results obtained from a pilot project conducted from September to December 2022, which involved a sample of 39 elderly individuals from the UBSs in Farolândia, Augusto Franco, and Orlando Dantas. According to Fontelle et al. (2010), for studies with unlimited populations, a pilot study can be conducted with a random sample of at least 31 individuals from the population. The standard deviation (s) of this sample can be calculated and used (replacing  $\sigma$  with s) (TRIOLA, 2017). A confidence interval of 95% was considered. The formula used for sample calculation is shown below:

$$n = \frac{s^2}{(\underline{x} - \mu)^2} x(z_{\alpha/2})^2$$

Where:

$z_{\alpha/2}$  = Value of z on the normal curve based on the value  $\alpha$ .

S<sup>2</sup> = Variance based on the standard deviation of the pilot study.

$\mu$  = Maximum estimated difference between the sample mean and the true population mean.

n = Population size (sample)

Based on the formulas presented and considering the results from the pilot study for each of the variables studied, the calculation indicating the largest "n" sample size was chosen, resulting in a sample size of 87 elderly individuals.

Taking into account potential losses that could affect the sample's representativeness, approximately 10% was added, totaling 96 elderly individuals.

### **Research Ethics**

This study adhered to all ethical principles outlined in the Helsinki Declaration (WMA, 2022), as well as Resolution 466/12 of the National Health Council dated 12/12/2012 (BRAZIL, 2012).

As an initial step, approval was obtained from the Coordination of the Center for Permanent Health Education (CEPES), facilitating access to the UBSs. Subsequently, each UBS received an Information to the Institution Form (TII) specifying all procedures, precautions, and risks.

Each volunteer expressed their consent by signing the Informed Consent Form (ICF), which included the same information as the TII and provided a balanced consideration of the risks and benefits. The social relevance of the research and its advantages for the study subjects were duly explained to the elderly volunteers.

The research was previously approved by the Research Ethics Committee with Human Subjects of the Tiradentes University on March 26, 2020, with opinion number 3.936.886 - CAAE: 26524719.4.0000.5371. In July 2022, a new amendment related to the sample of elderly women and new introduced variables was added to the project. This version is currently under review.

### **Materials and Methods**

After conducting preliminary procedures (participant recruitment, ethical precautions, and participant safety considerations, stratification into groups), all participants in the experimental study group underwent diagnostic assessment to measure the dependent variables of the study.

### **Diagnostic Assessment**

All dependent variables were assessed using the tools described below and administered during the project.

### **Health Assessment**

To assess the participants' health status, a questionnaire in the form of an Anamnesis was used. It collected information such as identification, training days, gender, ethnicity, educational level, marital status, daily activities performed, hours spent on these activities, occupation, and monthly income. Health-related indicators were also collected, including comorbidities, medications in use, smoking and alcohol consumption (and related quantities), stress self-control level, family history of stroke, acute myocardial infarction, hypertension, diabetes mellitus, obesity, and other heart diseases.

### Medication Use

For the analysis of medication use in elderly individuals, a questionnaire from the Fall Risk Assessment Battery (BARQ) was used, which included assessments of medication use, presence of side effects with drug use, and use of 4 or more prescribed medications. For those using 1 to 3 prescribed medications, the medication name, reason for use, and side effects were recorded.

The evaluation of medications used by the sample group was performed according to the drug "families" presented in Table 1:

**Table 1: Classification of Medications Used**

Name of Medication Generic (Brand)	Drug Class	Name of Medication Generic (Brand)	Drug Class
Inhibitors of ACh II	E5,H	Clonidine (Catapres(R))	E1
Inibidores da ACh II	E4,H	Clorazepate (Tranxene(R))	G1
Acebutolol (Sectral(R))	E2,H	Codeine and derivatives (Paracetamol (R), Vicodin(R), Percocet (R),Oxycotin (R)	A1
Alpha Blockers	D	Cyclobenzaprine (Flexeril(R))	I
Alprazolam (Xanax(R), Niravam(R))	G2	Desipramine (Norpramin(R))	C1
Amitriptyline (Elavil(R))	C1	Diazepam (Valium(R))	G1
Amiodarone (Cordarone(R))	H	Diclofenac (Voltaren(R) Cataflam (R)	A2
Amilodipine (Norvasc (R))	E8, H	Diflunisal (Dolobid(R))	A2
Amilodipine & Telmisartan (Twaynsta (R))	E8, H	Digoxin	H
Antihistamines	D	Diltiazem (Cardizem(R))	E8,H
Aripiprazole (Abilify (R))	F2	Diphenhydramine (Aler-Drryl (R), Allergia-C (R), Allermax (R), Altaryl (R)	D1
Asenapine Maleate (Saphris(R))	F2	Disopyramide (Norpace (R))	H
Atenolol (Tenormin(R))	E2,H	Doxazosin (Cardura (R))	E3
Baclofen (Lioresal(R))	I	Doxepin (Adapin (R), Sinequan (R))	C1
Barbiturates	B	Duloxetine (Cymbalta (R))	C3
Benazepril (Lotensin(R))	E4,H	Enalapril (Renitec(R), Vasotec(R))	E4,H
Benzodiazepines	G	Escitalopram (Lexapro (R))	C2
Beta Blockers	E2,H	Estazolam (ProSom (R))	G2
Bisoprolol (Zebeta(R))	E2,H	Zopiclone (Lunesta (R))	J
Bumetanide (Bumex(R))	E7,H	Etodolac (Lodine (R))	A2
Bupropion (Wellbutrin(R))	C3	Famotidine (Allegra (R))	D3
Calcium Channel Blockers	E8,H	Fentanyl (Duragesic (R)), Actiq (R)	A1
Candesartan (Atacand(R))	E5,H	Fexofenadine (Allegra (R))	D2
Captopril (Capoten(R))	E4,H	Fluvoxamine (Luvox (R))	C2
Carbamazepine (Tegretol(R))	B	Fluoxetine (Prozac (R))	C2
Carisoprodol (Soma(R))	I	Flurazepam (Dalmadorme (R))	G1

Carteolol (Cartrol(R))	E2,H	Fosinopril (Monopril (R))	E4,H
Carvedilol (Coreg(R), Procardial (R))	E2,H	Furosemide (Lasix (R))	E7, H
Cetirizine (Zyrtec(R))	D2	Gabapentin (Neurotin (R))	B
Chloral Hydrate	J	Haloperidol (Haldol (R))	F1
Chlordiazepoxide (Librium (R))	G1	Hydrochlorothiazide/HCTZ (HydroDIURIL (R))	E6,H
Polaramine	D1	Hydroxizine (Vistral (R), Atarax (R))	D1
Chlorpromazine	F1	Ibuprofen (Motrin (R), Tofranil (R))	A2
Chlorthalidone	E6,H	Imipramine (Tofranil (R))	C1
Chlorzoxazone (Parafon Forte (R))	I	Indomethacin (indocin (R))	A2
Cimetidine (Tagamet(R))	D3	Irbesartan (Avapro (R))	E5, H
Citalopram (Celexa(R))	C2	Isosorbide dinitrate (Isordil (R))	H
Clonazepam(Klonopin(R))	G1, B	Ketoprofen (Orudis (R))	A2
Lamotrigine (Lamictal(R))	B	Prazosin (Minipress (R))	E1
Lisinopril (Zestril (R), Prinivil(R))	E4, H	Propoxyphene (Darvon (R), Darvocet N = 100 (R))	A1
Loop Diuretics	E7, H	Propranolol (Inderal (R))	E2, H
Loratadine (Claritin (R))	D2	Quazepam (Doral (R))	G1

For evaluation, answering "yes" to the first question resulted in one point. In response to questions 2 and 3, indicating dizziness was worth three points, drowsiness two points, and weakness one point. For the fourth question, a "yes" response was worth six points. In the fifth question, if the medication used was a Psychotropic (Classes C, F, and G), the evaluator received 5 points; in the case of Antiarrhythmic Medication and Digoxin/Lanoxin (Class H), they received 3 points, and the use of Diuretics (Classes E6, E7, E9) resulted in an allocation of 2 points.

The risk assessment of the study participants is presented in Table 2. According to the questionnaire, most of the population was classified as low risk (n=38). The sample's mean was evaluated at 5.60, with a standard deviation of  $\pm 5.90$ .

### Intervention

The participants underwent a strength training protocol, starting with two weeks of familiarization and followed by 16 weeks of training, twice a week. Strength exercises (weightlifting) were prescribed based on the perceived effort scale of OMNI-Res. Cardiovascular training was also analyzed based on the Borg's perceived exertion scale, with levels 2 and 3 in the initial phase and 7 to 8 in the higher-intensity training.

The exercises were conducted in a circuit format, respecting the individuality and conditioning of each participant. Flexibility training was performed before and after the workouts, with intensity assessed using the PERFLEX perceived effort scale.

Participants were supervised by Physical Education and Physical Therapy professionals, who ensured that intensity levels and volumes were respected. Data on heart rate (before training), blood pressure, perceived effort in cardiovascular training, neuromuscular training, and flexibility (all after training) were collected daily.

### Summative Assessment

At the end of data collection, an analysis of the influence of these drugs was conducted through diagnostic assessment and a comparison with existing data in the current literature.

### Descriptive Statistics

To characterize the research's sample universe, Descriptive Statistics techniques were applied. Measures of central tendency and dispersion were used to describe the collected data. Regarding

central tendency, the mean ( $\bar{x}$ ) and median (Md) were calculated, which are measures responsible for identifying the center location of the dataset. Measures of dispersion consider the variability in the data. Thus, the coefficient of variation (CV%), standard deviation (s), and standard error were estimated. Within-group comparisons were made using the Student's T-Test, while between-group comparisons were made using the Scheffe Post Hoc procedure, with a significance level of  $p < 0.05$  and an acceptance rate of 80%.

## Results

The sample contains 96 people, 15 men and 81 women, all living in the state of Sergipe, with an average age of 67.40 years  $\pm$  6.62 (te minimum being 48 and the maximum 85 years). The sociodemographic characteristics are described in Table 2.

**Table 2. Identification of the study sample**

<b>Variant</b>	<b>N (number)</b>	<b>% (percentage)</b>
<b>Sex</b>		
Feminine	81	84.37%
Masculine	15	15.62%
<b>Age</b>		
< 60 years	6	6.25%
60 to 65 years	25	26.04%
65 to 70 years	34	35.41%
70 to 75 years	17	17.70%
75 to 80 years	9	9.37%
80 to 85 years	5	5.20%
<b>Ethnicity</b>		
White	36	38.3%
Black	27	28.7%
Brown	30	31.9%
Indigenous	1	1.1%
<b>Marital status</b>		
Married	37	38.9%
Widower	22	23.2%
Single	24	25.2%
Divorced	12	12.6%
<b>Education</b>		
Have never studied	4	4.2%
Incomplete elementary school	26	27.4%
Complete elementary school	7	7.4%
Incomplete high school	8	8.4%
Complete high school	30	31.6%
Incomplete higher education	5	5.3%
Complete higher education	13	13.7%
Postgraduate	2	2.1%

Aiming to analyze the rates of polypharmacy and iatrogenesis in the population, the Medication Use form from the Fall Risk Assessment Battery (BARQ in Portuguese) was used.

The results are presented in descriptive form in tables 3 and 4.

**Table 3: Descriptive Statistics**

<b>Diagnostic</b>	<b>Summative</b>
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<b>Mean</b>	6.19	5.60
<b>Median</b>	2	4
<b>Standard Deviation</b>	7.21	5.89
<b>Maximum Value</b>	22	18
<b>Minimum Value</b>	0	0
<b>IQR</b>	12.25	6

A descriptive analysis of the data shows a decrease in the use of medication, which is a considerable result when associated with training.

**Table 4. Risk assessment using the Medication Use form.**

<b>Category</b>	<b>Score</b>	<b>% (percentage)</b>
Maximum risk	> 15	20.63%
Moderate risk	9-14	-
High risk	5-8	19.06%
Low risk	0-4	60.31%

For evaluation, the answer "yes" in the 1st question resulted in one point. In the answer to questions 2 and 3, the indication of dizziness was worth three points, drowsiness two points and weakness one point. In the 4th question, the answer yes was worth 6 points. In the 5th question whether the medicine used is a Psychotropic (Classes C, F and G) the subject received 5 points; in the case of Antiarrhythmic Medication and Digoxin / Lanoxin (Class H), it received 3 points and the use of Diuretics (Classes E6, E7, E9), resulted in the award of 2 points.

The risk assessment of the study members is shown in Table 4. Using the form, based on the diagnostic and summative assessments carried out, the majority of the population was classified as low risk (60,31%). The sample mean was evaluated at 5.60, with a standard deviation of  $\pm 5.90$ .

When the Shapiro-Wilk test was carried out, it was observed that the samples were not normal, so the Mann-Whitney test was used, which did not identify a significant difference between the means, with  $p > 0.05$ . 05 ( $U=1598.5$ ;  $p > 0.05$ )  $p = 0.825016737$ .

## **Discussion**

Although prescription and over-the-counter medications can improve a wide range of health problems, they can also cause or contribute to harm, especially in older adults. Current medication regimens for chronic health conditions are often complex, and this complexity has the potential to cause negative consequences (Martinelli, 2021).

According to the World Health Organization (WHO), polypharmacy is defined as the concomitant use of several medications by the same person or the administration of an excessive number of medications. Most studies consider the limit of 5 or more concomitant medications, with excessive polypharmacy or hyper polypharmacy being considered when 10 or more medications are prescribed (Delgado et al., 2022; Kim, J. & Parish, 2017; Pliego et al., 2022 ; Svensson et al., 2024).

Among the main associated problems, we highlight the increase in pharmacological interactions, lack of therapeutic adherence, the greater probability (one in 5 patients) of receiving an inappropriate medication and the increase in adverse drug reactions (ADRs). The latter can generate negative consequences for the health of the elderly group. Its manifestations include tiredness, falls, and the events most frequently involved in these episodes come from commonly used medications (antithrombotics, antihypertensives, hypoglycemic and adverse medications) (Pliego et al., 2022).



Thus, iatrogenesis is characterized as unintentional pathological changes that are harmful to the patient, which lead to adverse reactions or complications due to inadequate practices by health professionals. This situation affects the elderly, especially when it comes to polypharmacy (de Almeida Condé et al., 2022).

Furthermore, in older individuals, pharmacokinetic changes occur that fundamentally affect drug elimination and pharmacodynamic modifications that reflect changes in receptor sensitivity and body homeostasis (Bonnet-Zamponi, 2019; O'Shea et al., 2022)

In this sense, frail elderly people tend to develop unintentional weight loss, weakness and use excessive medications, factors that can lead to the development of sarcopenia. Its presence contributes to adherence to polypharmacy. The loss of muscle mass, in turn, tends to make elderly people more susceptible to dependence and functional incapacity, increasing the chances of the individual suffering falls, fractures and being hospitalized. (VIEIRA, 2023)

The analysis of the results found that, among the 63 elderly people who responded to the questionnaire on the Use of Battery Medications to Assess the Risk of Falls, 38, that is, 60.31%, were classified as a low-risk group for iatrogenesis due to polypharmacy. Furthermore, 20.63% were classified as maximum risk and 15.89% as high high risk. Therefore, it is important to highlight that all drugs prescribed for the elderly must be evaluated by risk-benefit, as the drugs have the function of helping with functional activity, but can also compromise it, with symptoms that increase the risk of falls. and, consequently, the occurrence of fractures. (Vieira, 2023).

Under this bias, the descriptive analysis of the study data also shows a decrease in the use of medications, a considerable result when associated with training. It is possible to relate polypharmacy and iatrogenesis, especially when associated with medications that can increase the risk of falls and fractures (SANTANA et al., 2019).

It is listed, then, that among the adverse drug reactions caused by the side effects of medications, the risk of falling (some drugs cause lethargy), the need to go to the bathroom more often, reduced reflexes, postural hypotension and vertigo . It is emphasized that all these symptoms favor the risk of falls and, as a result, the occurrence of fractures (SANTANA et al., 2019).

Furthermore, in a cross-sectional study carried out by Chiabai et al. (2023), with 18 elderly people monitored by a healthcare team from Espírito Santo, participants with polypharmacy had a 37% higher risk of falling in the last year than elderly people who used less than four medications. Therefore, the importance of regular assessment of medications in use and the need for careful monitoring of elderly people by health professionals is reinforced, so that falls are avoided.

In other words, the presented research provided data that indicates that polypharmacy is a risk factor for falls and iatrogenesis. In line, Masumoto et al. (2018) also add that the combination of potentially inappropriate medications and polypharmacy aggravate the risk of falling, and the interaction between

these drugs should be mainly assessed as the primary cause of risk for these patients, not forgetting, however, the physiological change itself caused by the aging that tends to the development of sarcopenia, a factor that limits and adds risk to the daily mobility of the elderly. (MAYER, 2023).

Another point to be highlighted is the fact that the majority of the group was classified as low risk for iatrogenesis (it goes against the trend that includes the elderly and polypharmacy in the factors already mentioned, such as a higher prevalence of chronic diseases in the group (Bonnet-Zamponi, 2019). However, a total of 36.52% of people were still classified as maximum and high risk. This percentage is considered dangerous due to the complications that can occur due to iatrogenesis, demonstrating the need for deprescription measures for means of therapeutic guidance (Pliego et al., 2022)

Furthermore, deprescription is defined by Le Coteur et al. such as stopping long-term treatment under medical supervision. In a broader sense, deprescribing includes other terms, such as a systematic medication review, which may result in the reduction, change, or withdrawal of a medication dose. In some countries, this process is already being better achieved. As an example, current regulations in Greece already allow the repeated dispensing of prescription medicines for a maximum of 6 months without renewing the prescription (Pliego et al., 2022).

Finally, studies demonstrate the benefits that physical activities have on elderly people in maintaining their health. Dance has been attributed to the ability to help preserve physical and mental health, being a favorable measure for healthy aging and reducing the use of medications. Furthermore, good body composition through regular exercise has also been highlighted in reducing morbidity and mortality, preventing chronic diseases such as Alzheimer's and the resulting polypharmacy, which ultimately helps reduce the risk of falls. (Perdomo & Cuervo, 2019, Estrada, 2020).

## **Conclusion**

Taking into account the concepts of iatrogenesis and polypharmacy, a significant relationship between the two is evident, which favors a greater risk for the elderly. As previously mentioned, the elderly are more subject to pharmacokinetic changes that fundamentally affect drug clearance and pharmacodynamic changes that reflect changes in the sensitivity of receptors and the body's homeostasis.

It is concluded that polypharmacy represents a significant threat to health, to the point of being labeled as the first iatrogenic epidemic, but that these data are largely invisible in most standard measures of the quality of population care or health risks.

When analyzing this entire context, it is observed that the greater the number of drugs in use, the greater the potential risk of causing iatrogenesis and consequent falls. In other words, there is greater exposure of the elderly to dangerous situations. According to the results obtained in the present study, this thesis was confirmed, showing a greater risk, regardless of the degree, for patients using medications. The risk classification categories that prevailed were low and maximum risk for the risk of falls, an extremely relevant finding for greater attention to be given to this public, who is generally already in a very vulnerable health situation.

In this sense, the deprescription process, as a systematic review of medications, is being increasingly accepted and applied in countries with the aim of interrupting drug interactions that result in increased morbidity and mortality.

Related to this, physical and bodily care is encouraged through activities capable of reducing the need to use medications, with the ultimate objective of reducing polypharmacy.

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