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RESEARCH

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IMPACT OF POLYPHARMACY AND THE USE OF MEDICINES ASSOCIATED WITH THE RISK OF FALLS IN THE ELDERLY

*Impacto da polifarmácia e o uso de medicamentos associados ao risco de quedas de idosos**Impacto de la polifarmacia y el uso de medicamentos asociados al riesgo de caídas en los adultos mayores***Cristiane Regina Soares¹** **Meiry Fernanda Pinto Okuno²** 

ABSTRACT

Objective: to associate polypharmacy and medication classes with the risk of falls in the elderly. **Method:** cross-sectional and quantitative study, carried out in an outpatient clinic in the city of São Paulo – SP, with 117 elderly people, from March to November 2019. Data collection was carried out by full transcription of prescriptions and the Falls Risk Scale from Downton. The statistical tests used were the Mann-Whitney and Chi-Square, considering a significance level of 5% and a confidence interval of 95%. **Results:** the risk of falls presented significantly with the number of medications, an average of 5.8 per day ($p < 0.0001$) and the medication classes, antihypertensives ($p < 0.0001$), oral antidiabetics ($p = 0.027$), diuretics ($p < 0.0001$) and antidepressants ($p = 0.042$). **Conclusion:** therefore, the importance of evaluating factors related to the increased risk of falls is highlighted, to plan and implement strategies in the health care of the elderly.

DESCRIPTORS: Accidental falls; Aging; Polypharmacy; Health of the elderly;

^{1,2}Federal University of São Paulo, São Paulo, São Paulo, Brazil.

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Corresponding Author: Cristiane Regina Soares crissoares31@yahoo.com.br

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RESUMO

Objetivo: associar a polifarmácia e as classes medicamentosas com o risco de quedas de idosos. **Método:** estudo transversal e quantitativo, realizado em um ambulatório na cidade de São Paulo – SP, com 117 idosos, no período de março a novembro de 2019. A coleta dos dados foi realizada pela transcrição integral dos receituários e pela Escala de Risco de Quedas de Downton. Os testes estatísticos utilizados foram o Mann-Whitney e o Qui-Quadrado, sendo considerado um nível de significância de 5% e intervalo de confiança de 95%. **Resultados:** o risco de quedas apresentou correlação significativa com o número de medicamentos, média de seis ao dia ($p < 0,0001$) e as classes medicamentosas, os anti-hipertensivos ($p < 0,0001$), os antidiabéticos orais ($p = 0,027$), os diuréticos ($p < 0,0001$) e os antidepressivos ($p = 0,042$). **Conclusão:** portanto, ressalta-se a importância da avaliação dos fatores relacionados ao aumento do risco de quedas, para planejar e implementar estratégias no cuidado da saúde do idoso.

DESCRIPTORES: Acidentes por quedas; Envelhecimento; Polimedicação; Saúde do idoso;

RESUMEN

Objetivos: to associate polypharmacy and medication classes with the risk of falls in the elderly. **Method:** cross-sectional and quantitative study, carried out in an outpatient clinic in the city of São Paulo – SP, with 117 elderly people, from March to November 2019. Data collection was carried out by full transcription of prescriptions and the Falls Risk Scale from Downton. The statistical tests used were the Mann-Whitney and Chi-Square, considering a significance level of 5% and a confidence interval of 95%. **Results:** the risk of falls presented significantly with the number of medications, an average of 5.8 per day ($p < 0.0001$) and the medication classes, antihypertensives ($p < 0.0001$), oral antidiabetics ($p = 0.027$), diuretics ($p < 0.0001$) and antidepressants ($p = 0.042$). **Conclusion:** therefore, the importance of evaluating factors related to the increased risk of falls is highlighted, to plan and implement strategies in the health care of the elderly.

DESCRIPTORES: Accidental falls; Aging; Polypharmacy; Health of the elderly.

INTRODUCTION

The elderly population in Brazil is undergoing a vertiginous process of aging, with around 30 million Brazilians aged 60 or over, corresponding to 14% of the total population in 2020. By 2030, projections suggest that the number of elderly people will exceed that of children and adolescents aged 0 to 14 by around 2.28 million. By 2050, the geriatric population will account for around 30% of the Brazilian population and children and adolescents will account for around 14%.¹⁻³

Chronic Non-Communicable Diseases (CNCD), associated with the epidemiological transition of the population, will become one of Brazil's main challenges, due to the impairment they usually cause to the functionality of the elderly, being responsible for 72% of the causes of mortality, with a prevalence for cardiovascular diseases, in addition, chronic conditions have as possible consequences the occurrence of disabilities and increased dependence for carrying out activities of daily living.¹⁻³

According to the Brazilian Institute of Geography and Statistics (IBGE) in 2019, 58.3% of the elderly have more than one chronic disease and 34.4% have three or more CNCDs. The ten most prevalent chronic conditions are: Systemic Arterial Hypertension (SAH) (56.4%); chronic back problems (31.1%); Type 2 Diabetes Mellitus (DM2) (20.8%); arthritis or rheumatism (18.2%); cardiovascular diseases, such as Acute Myocardial Infarction (AMI), angina and Heart Failure (HF)) (13.1%); depression (11.8%); cancer (6.8%); cerebrovascular accident (CVA) (5.6%); asthma or asthmatic bronchitis (4.7%); and chronic diseases related to the respiratory system (eg: pulmonary emphysema,

chronic bronchitis or Chronic Obstructive Pulmonary Disease (COPD)) (3.0%).¹⁻³

The presence of chronic morbidities associated with the use of multiple medications can be factors related to the risk of falls, which can cause severe functional dependencies as a result of the physiological changes of ageing, since this population needs to use medications to control diseases, maintain health and quality of life.⁴⁻⁶

Accidents caused by falls are defined by the World Health Organization (WHO) as the situation of a person falling from a lower level, as well as bumping into and slipping from a level or height, i.e. an unexpected event of an individual remaining at rest on the ground, floor or lower level.⁷⁻⁸ The intrinsic factors associated with the occurrence of falls are physiological changes due to the aging process, frailty, gender, age, the effects of medication and morbidities; and the extrinsic factors are identified by the lighting of the environment, sedentary behavior, the use of walking aids, furniture in the room or bathroom and building structures.⁷⁻⁸

Polypharmacy is defined as the use of four or more drugs simultaneously by a patient, which can lead to health risks and damage, such as the associated occurrence of adverse events, accidents due to falls, longer hospital stays and mortality. However, poly medication can be clinically indicated for the treatment and control of comorbidities, i.e. the use of many drugs by the same patient is present in clinical practice, especially among the elderly.⁹⁻¹¹

Optimized assessment of multi-medication and drug classes can minimize damage to health, such as the risk of falls, control chronic diseases, increase life expectancy and improve quality of

life, i.e. the appropriate use of polypharmacy is correlated with increased life expectancy and the management of various health conditions, such as SAH and DM2. However, some inappropriate combinations can lead to Adverse Drug Reactions (ADRs), for example, increasing the risk of accidents due to falls, a harmful or undesirable and unintended effect, even if they are used in doses for prevention, diagnosis and treatment.⁹⁻¹¹

The literature strongly recommends medication conciliation with the identification of Fall Risk-Increasing Drugs (FRIDs) or Potentially Inappropriate Medications (PIMs), as they help to prevent falls. Therefore, the shared decision results from the implementation of strategies supported by health education for the elderly, family members and health professionals, taking into account the characteristics of the elderly person's health, especially including the most vulnerable, polypharmacy, morbidities, life expectancy, individual preferences and other geriatric syndromes.¹²⁻¹⁴

In view of the above, investigating the risk of falls, pharmacotherapy and the correlation of drug classes that increase the risk of falls in elderly people attending an outpatient clinic is relevant, as it contributes to defining and developing strategies that can have a positive impact on the prevention and clinical management of pharmacotherapy associated with the increased risk of falls. For this reason, the aim of this study was to associate polypharmacy and drug classes with the risk of falls in the elderly.

METHOD

This was a cross-sectional, descriptive and quantitative study, carried out in accordance with the recommendations of the STROBE Statement,¹⁵ from March to November 2019, in the city of São Paulo - SP, at an Ambulatório Médico de Especialidades (AME) for the Elderly in the Southeast region.

The average number of patients seen at the AME is 288 per month. The sample was non-probabilistic for convenience, using a formula of $N = [(z\alpha + z\beta) \div C]^2 \div R^2 + 3$, where R = correlation coefficient, $C = 0.5 \times \ln[(1+r)/(1-r)]$, N = total sample, α = significance level (two-sided) and β = 1-power test. The values adopted were $Z\alpha = 95\%$, $Z\beta = 80\%$, $R = -0.248$.

The sample was obtained by correlating the Downton Falls Risk Scale (FDRS)¹⁶ with the continuous and categorical variables. Thus, by replacing the values in the formula, 117 elderly people would have to be included. The sample was representative of the place where the research was carried out, but it is not representative of the southeastern region of the city of São Paulo. A pilot sample of 20 patients was also carried out and calculated using Pearson's correlation coefficient, which was included in the study.

The inclusion criteria were elderly people aged 60 or over, attending the AME Idoso Sudeste, able to understand and answer the study questionnaires, with a Mini Mental State Examination (MMSE) score of more than 13 points for illiterate people and 18 points for those with more than one year's schooling and with therapeutic regimes starting with two drugs. The exclusion criteria were elderly

people who, after being included in the study, decided not to take part and those considered to be confused or with cognitive decline.

Sociodemographic and clinical data was collected through an individual interview between the participant and the researcher, which was recorded on a structured form, with information on age, gender, education, marital status, occupation, morbidities and medication in continuous use.

The risk of falling was assessed using the ERQD, which has been translated and validated into Portuguese, as well as an institutional license to use the instrument. The scale consists of five items, the first item being the occurrence of previous falls: if the answer is yes, a point is awarded, if the answer is no, no points are awarded. On the use of medication item, if no medication is used, no points are awarded; if tranquilizers/sedatives, diuretics, antihypertensives, antiparkinsonian drugs, antidepressants are used, one point is awarded for each class of medication used by the individual. In the presence of sensory deficits item (visual and hearing disorders), if there is no deficit, no points are awarded; impaired vision is awarded one point; impaired hearing is awarded one point.¹⁶

The scale includes the following possibilities in the mental state item, assessed using the MMSE, a scale that has been validated, translated and cross-culturally adapted for Brazil: if the individual is oriented, they do not score; if they are confused, according to the MMSE score of less than 24 points, they score one point. With regard to walking, if the individual has a normal gait, there is no score; if they use any equipment to help them walk, such as a cane or walker, and it is safe, there is no score; if they walk insecurely, with or without the aid of equipment, there is a score. The scale score ranges from zero to 11 and a score of three or more indicates a high risk of falls.¹⁷

The use of the MMSE was necessary to corroborate one of the items on the ERQD. In this study, the elderly were considered confused and scored one point on the ERQD in the mental state item when the score was greater than or equal to 13 points for illiterates, greater than or equal to 18 points for those with more than one year of incomplete schooling or up to eight years of incomplete schooling; and greater than or equal to 26 points if the elderly had eight years of complete schooling or more.¹⁶⁻¹⁷

Polypharmacy or the use of multiple drugs was defined in this study as the use of five or more drugs simultaneously by the elderly¹¹ and the drug classes were classified by the Anatomical Therapeutic Chemical (ATC) system,¹⁸ proposed by the World Health Organization (WHO), in which the active substances are divided by the organs or systems in which they act and their therapeutic, pharmacological and chemical priorities. The drugs are classified into five different levels, the first level is made up of the 14 main anatomical or pharmacological groups, called the following categories: A: Digestive system and metabolite, B: Blood system, C: Cardiovascular system, D: Dermatological agents, G: Genitourinary system and sex hormones, H: Preparations for the hormonal system excluding sex hormones and insulins, J: Antimicrobials, L: Antineoplastics and immunomodulatory agents, M: Musculoskeletal system, N: Nervous system, P: Antiparasitic agents and repellents, R: Respiratory system, S: Agents for sensory organs and V: Other. The second level is related

to the pharmacological or therapeutic subgroup, the third and fourth levels are related to the chemical, pharmacological or therapeutic subgroup and the fifth level is made up of the chemical substances.

The variables gender, age, education, marital status, occupation, family income, morbidities, number of drugs used daily and drug classes were analyzed using descriptive statistics, showing frequencies, means, standard deviation and variation (minimum and maximum). The data collected was stored in an electronic spreadsheet using the Microsoft Office 2016 Excel® program and the program used for the analysis was the Statistical Package for the Social Sciences (SPSS), version 19.

The Mann-Whitney test was used to compare continuous variables with ERQD. The Chi-Square test was used to compare categorical variables with ERQD, and Fisher's Exact test was used when necessary. A significance level of 5% ($p \leq 0.05$) and a 95% confidence interval were used for all comparative analyses.

The study was carried out after analysis and approval by the Research Ethics Committee of the Federal University of São Paulo (UNIFESP) under CAAE: 03691418.3.0000.5505, opinion number 3.165.580 in 2019, after the agreement of the outpatient clinic and in accordance with resolution 466/12 for research with human beings of the National Health Council (CNS).¹⁹ The elderly were previously informed about the research and voluntarily consented to participate by signing an Informed Consent Form (ICF). The secrecy and confidentiality of the information collected was guaranteed.

RESULTS

The total number of participants was 117, the average age was 71.5 years, 108 (92.3%) were female, 44 (37.6%) were widowed, the average level of education among the elderly was six years, corresponding to incomplete primary education, 94 (80.3%) were retired or pensioners and had a family income of approximately two minimum wages. With regard to the risk of falls, 93 (79.5%) of the elderly were considered to be at high risk of falls. The main morbidities identified among the elderly were SAH with 88 (75.2%), followed by 51 (43.6%) dyslipidemia, 43 (36.8%) DM2, 32 (27.4%) chronic pain, 29 (24.8%) osteoporosis, osteopenia, arthrosis and arthritis and 9 (7.7%) depression.

The classes of medication used by the elderly participants in the survey were: for the digestive system and metabolites, 35 (29.9%) proton pump inhibitors, 42 (35.9%) oral antidiabetics and insulins and 51 (43.6%) vitamins; in the blood system, 33 (28.2%) platelet antiaggregants and anticoagulants; in the cardiovascular system, 85 (72.6%) antihypertensives, 45 (38.5%) diuretics and 66 (56.4%) lipid-modifying agents, statins; in the class of remedies for the hormonal system, 32 (27.4w%) synthetic thyroid hormones; in the musculoskeletal system, 53 (45.3%) analgesics and anti-inflammatories; and in the Central Nervous System (CNS), 22 (18.8%) antidepressants and benzodiazepines, following the ATC classification.

Table 1 - Frequency of the number of drugs per drug class, according to the ATC classification, among the elderly seen at a Specialty Medical Outpatient Clinic (n=675). São Paulo, SP, Brazil, 2019.

Drug classes	Total	
	n	%
A. Digestive System and Metabolism		
A02. Proton pump inhibitors	35	5,1
A10. Oral antidiabetics and insulins	79	11,7
A11. Vitamins	74	10,9
B. Blood System		
B01. Antiplatelet agents and anticoagulants	35	5,1
C. Cardiovascular System		

C02. Antihypertensives	130	19,2
C03. Diuretics	48	7,1
C10. Lipid modifying agents statins	69	10,2
H. Hormonal system preparations		
H03. Synthetic thyroid hormone	32	4,7
M. Skeletal Muscle System		
M01. Analgesics and anti-inflammatories	86	12,7
N. Nervous System		
N05/06 Antidepressants and benzodiazepines	27	4,5
V. Others	60	8,8
Total	675	100

Source: own elaboration. Research data.

Table 2 - Correlation between the risk of falls, morbidities and medication classes of elderly people treated at a Specialty Medical Outpatient Clinic (n=117). São Paulo, SP, Brazil, 2019.

Categorical Variables	ERQD [‡]			p-value
	No risk of falling	High risk of falling	Total Frequency (%)	
SAH**				
No	17 (58,6)	12 (41,4)	29 (100)	<0,0001*
Yes	7 (8)	81 (92)	88 (100)	

DM2^{||}

No	20 (27)	54 (73)	74 (100)	0,0221 [†]
Yes	4 (9,3)	39 (90,7)	43 (100)	

A. Digestive System and Metabolism**A10. Oral antidiabetics and insulins**

No	20 (26,7)	55 (73,3)	75 (100)	0,0276 [†]
Yes	4 (9,5)	38 (90,5)	42 (100)	

C. Cardiovascular System**C02. Antihypertensives**

No	17 (53,1)	15 (46,9)	32 (100)	<0,0001*
Yes	7 (8,2)	78 (91,8)	85 (100)	

C03. Diuretics

No	24 (33,3)	48 (66,7)	72 (100)	<0,0001*
Yes	0 (0%)	45 (100)	45 (100)	

N. Nervous System**N05/06. Antidepressants and benzodiazepines**

No	23 (24,2)	72 (75,8)	95 (100)	0,0423 [†]
Yes	1 (4,5)	21 (95,5)	22 (100)	

Source: own elaboration. Research data.

*Statistically significant difference by Fisher's exact test ($p < 0.05$); [†]Statistically significant difference by chi-square test ($p < 0.05$); [‡]ERQD: Downton Falls Risk Scale; **SAH: Systemic Arterial Hypertension; ^{||}DM2: Type 2 Diabetes Mellitus

The number of drugs ranged from two to 17 per elderly person. The average number of medicines used daily was six and the total number of medicines in the sample was 675. The total number of medicines per category was for the digestive system and metabolites, 35 (5.1%) proton pump inhibitors, 79 (11.7%) oral antidiabetics and insulins and 74 (10.9%) vitamins; in the blood system, 35 (5.1%) among platelet antiaggregants and anticoagulants; in the

cardiovascular system, 130 (19.2%) antihypertensives, 48 (7.1%) diuretics and 69 (10.2%) lipid-modifying agents statins; in the class of remedies for the hormonal system, 32 (4.7%) synthetic thyroid hormones; in the musculoskeletal system, 86 (12.7%) analgesics and anti-inflammatories; in the Central Nervous System (CNS), 27 (4.5%) antidepressants and benzodiazepines, following the ATC classification. (Table 1).

Table 3 - Correlation between the risk of falls, the number of medications and the number of medications per drug class of the elderly seen at a Specialty Outpatient Clinic (n=117). São Paulo, SP, Brazil, 2019.

Continuous Variables	ERQD [‡]			p-value
	No risk of falling	High risk of falling	Total	
Nº. of medicines				
Mean (SD ^{††})	3,63 (1,74)	6,35 (3,29)	5,79 (3,23)	<0,0001 [§]
Minimum-Maximum	1-7	1-17	1-17	
C. Cardiovascular System				
C03. Diuretics				
Mean (SD ^{††})	0 (0)	0,52 (0,58)	0,41 (0,56)	0,0267 [§]
Minimum-Maximum	0-0	0-2	0-2	
M. Skeletal Muscle System				
M01. Analgesics and anti-inflammatories				
Mean (SD ^{††})	0,71 (0,86)	0,74 (1,2)	0,74 (1,13)	0,0076 [§]
Minimum-Maximum	0-3	0-6	0-6	

Source: own elaboration. Research data.

§ Statistically significant difference by Mann-Whitney test ($p < 0.05$); [‡]ERQD: Downton Falls Risk Scale; ^{††}SD: standard deviation

ERQD showed a significant correlation with the morbidities, SAH ($p<0.0001$) and DM2 ($p=0.0022$), and the drug classes, antihypertensives ($p<0.0001$), oral antidiabetics and insulins ($p=0.027$), diuretics ($p<0.0001$) and antidepressants ($p=0.042$). Considering a significant relationship between SAH, DM2 and the drug classes of antihypertensives, oral antidiabetics, diuretics and antidepressants, with the high risk of falling (Table 2).

ERQD showed a significant correlation with family income ($p=0.031$), the number of medications ($p<0.0001$) and the average number of medications per drug class, diuretics ($p=0.026$) and analgesics and anti-inflammatories ($p=0.007$). This shows that the number of drugs and the average number of drugs per drug class have a relationship suggestive of a high risk of falls (Table 3).

DISCUSSION

The main morbidities identified among the elderly were hypertension, dyslipidemia, DM2, chronic pain, osteoporosis, osteopenia, arthritis and depression. The number of drugs used to treat these chronic conditions ranged from one to 17, and the average number of drugs used daily was six, considering the presence of polypharmacy among the population studied. The main drug classes identified were antihypertensives, statins, analgesics and oral antidiabetics and insulins.

The risk of falls showed a significant correlation with hypertension, DM2 and the drug classes of antihypertensives, oral antidiabetics and insulins, diuretics and antidepressants, i.e. elderly people with pharmacological treatment for chronic diseases have an increased risk of falling. In this sample, the risk of falls was also associated with family income, polypharmacy and the average number of diuretics, analgesics and anti-inflammatory drugs used, i.e. elderly people with polypharmacy and a higher number of these drugs were more likely to be at risk of falls.

In this respect, a retrospective cohort study carried out in Pennsylvania in the United States (USA) with 343 elderly people identified an average of 3.8 morbidities per participant, the main one being SAH. The average number of drugs prescribed was 3.99 among elderly people who did not fall during the period and 4.33 among those who did. The main drug classes found were the Renin-Angiotensin-Aldosterone System (RAAS), beta-blockers, diuretics, Calcium Channel Blockers (CCBs) and antidepressants. The study showed a significant correlation between the risk of falls and polypharmacy and the drug class associated with an increased risk of falls was antidepressants ($p<0.05$).²⁰

Corroborating the data found in this study, a cross-sectional study carried out in primary care in East Malaysia with 269 participants identified a prevalence of falls of 32.2% among elderly people with **SAH, the majority of falls (48.9%) occurred within the home, 73.3% of elderly fallers used four to five medications a day, polypharmacy ($p=0.004$) and the use of diuretics ($p=0.003$) were significantly associated with a higher risk of falls. Balance and gait ($p=0.037$) and the number of antihypertensive drugs ($p=0.000$) were correlated with a low incidence of risk of falls.²¹ Demonstrating that the appropriate use of pharmacological

therapy and the probable encouragement of interventions for gait and balance can reduce the risk of falls.

A retrospective, cross-sectional study carried out in a community in Texas in the USA, with 99 participants who had had at least one fall in the last month, identified in this sample the use of more than four drugs a day and among the drug classes were those acting on the RAAS (55%), statins (55.6%) and non-steroidal anti-inflammatory drugs (13.1%). The study pointed out that guidance on orthostatic position symptoms and the adverse events of the drugs used can reduce the occurrence of falls.²²

Similar to the findings on the risk of falls associated with polypharmacy, a cross-sectional study carried out in Guangdong province in China identified 5,374 elderly people, with an average age of 69.3 years, of whom 640 had fallen at least once in the last year, 456 had suffered injuries, and the most common were bruises and scratches (40%) and fractures (15.5%). The analysis showed that women, advanced age, low balance capacity and polymedication were associated with the risk of falls. The single or combined effects of medication on multiple complex systems can affect balance and gait and, consequently, lead to falls.²³

With regard to the consequences of the use of multiple medications and the geriatric population, a cross-sectional study carried out in five primary health care units in the city of Fortaleza in the state of Ceará, with 384 elderly people, showed an association with vulnerability, the presence of comorbidities ($p=0.007$), SAH ($p=0.001$) and DM2 ($P=0.001$), and taking five or more medications a day ($p=0.001$), i.e. the likelihood of the elderly being vulnerable increases more than twofold if they have SAH and there is a 30% increase in the chance of vulnerability for each additional medication.²⁴

Frailty, assessed among 133 elderly people considered vulnerable, identified that the most prevalent condition for the elderly to be considered frail were the regular use of five or more medications and having five or more chronic diseases. There was a correlation between frail elderly people and multiple comorbidities ($p<0.001$). The presence of morbidities ($p=0.020$) and polypharmacy ($p=0.001$) was significant for the development of clinical-functional vulnerability.²⁷ Confirming results related to the presence of frailty in the health of elderly people associated with polypharmacy and chronic diseases.²⁵

A literature review on T2DM and the use of drug therapy in the geriatric population found a higher frequency of hypoglycemic events and poor glycemic control due to the excessive use of antidiabetic drugs in vulnerable elderly people with increased frailty, thus probably causing an imbalance between the benefits of drugs and the signs and symptoms of T2DM.²⁶ Other outcomes related to patients with DM2 and polydrugs are those related to the risk of syncope, accidental falls and the effects of DM2's autonomous neuropathy, which can be exacerbated by the concomitant use of other drugs such as antihypertensives and beta-blockers and benzodiazepines, thereby increasing the risk of falls. In addition, patients taking multiple medications are more likely to experience hypoglycemic events, which is an additional predisposing factor to falls and syncope.²⁶

In view of this and other adverse events related to the use of multiple medications, there is a need to frequently review medications, glycemic and normotensive targets and possible medication reconciliations individually based on a global assessment, thus considering the social context and the ability to self-manage antidiabetic and drug therapy, because it requires adjustments to insulin doses based on blood glucose monitoring and observation of the occurrence of hypoglycemic or hypotensive events, which can lead to accidents due to falls, and these adjustments can be especially challenging for patients with multiple chronic conditions.²⁶

In this regard, recognizing adverse events and the impact of medications on the use of pharmacotherapy for vulnerable elderly people, as well as assessing adherence to the appropriate use of medications and the barriers to their use, are key factors for health professionals, health services at primary, secondary and tertiary levels, and also in the community, especially when associated with the use of hypoglycemic or hypotensive medications, community, especially when associated with the risk of falls, since drug treatment is necessary for elderly people with multiple chronic conditions, i.e. there is a need to implement multidisciplinary interventions to reduce the challenges related to the use of medication associated with a high risk of falling.²⁶

Information and communication technologies can enable and assist the multi-professional team in reviewing medications, identifying electronic alerts for the administration and checking of drugs, in order to carry out an appropriate prescription with the support of information on drug interactions, drugs that are inappropriate for the elderly and adverse events, based on specific criteria for the geriatric population and the transition of drug therapy in a coordinated and organized manner from the hospital to the home.¹¹

The American Geriatrics Society (AGS) Beers Criteria® and Screening Tool of Older Persons Prescriptions (STOPPFall) are tools for screening prescriptions for older adults at high risk of falls. In particular, the AGS Beers Criteria® aims to identify drugs for which the potential harm outweighs the expected benefit and should be avoided for older people. These criteria provide a list for specific situations, such as when treating CNCs, syndromes, potentially inappropriate IMs and dosages to be adjusted based on renal function.^{11,27-28}

Health actions to achieve intervention practices focused on the appropriate use of medicines include multidisciplinary conferences, the implementation and application of therapeutic protocols, ward rounds, workshops, evidence-based information, training for the healthcare team, management of drug therapy by telephone, specialized drug scheduling tools, for example, monitored dosage systems and the use of information leaflets during medication reviews, and the use of information and communication technologies. In the community, the literature characterizes the use of pharmaceutical care services, including medication reviews, patient interviews and counselling.^{11,29-31}

Medicines reconciliation makes it possible to improve communication between all those involved in the medicines use

process, such as dispensing, administration, monitoring in all environments and stages of care, including the patient. In addition, this intervention can help reduce transcription errors, improve the monitoring of prescriptions, refine the use of information technology systems and reorganize the provision of healthcare.³¹⁻³²

CONCLUSION

In summary, helping to increase patient safety through collaboration and communication between the multi-professional team, with the aim of identifying polypharmacy and the main drug classes that can increase the risk of falls, makes it possible to change drugs that in combination would harm the geriatric population. This study reinforces that the use of information and communication technologies, for the detection of such medications can be effective in recognizing them and the risks to which the elderly may be exposed. In other words, interventions to reduce polypharmacy, through the use of strategies that rationalize medications, such as medication reconciliation, will act to reduce adverse events, such as falls and their consequences, especially in the most vulnerable and fragile groups.

The study therefore contributes to the discussion and reflection on the actions of nurses, especially as educators, providing guidance to families, caregivers and the elderly with the aim of planning and implementing falls risk assessment and drug therapy. Nurses are also responsible for medication reconciliation, contributing to patient safety by identifying prescribed medications and swapping out medications which, when combined, would be harmful to the elderly person's health, with the support of the multi-professional team.

The main limitations were the fact that it was carried out in a single center, with care only provided to patients from the public health system, which may not represent other realities. Therefore, the results cannot be generalized. It was also a cross-sectional study, and longitudinal studies with larger samples are needed to monitor the difficulties encountered by the elderly in terms of preventing the risk of falls and the use of medication, and to suggest future interventions for clinical practice.

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