ORIGINAL ARTICLE

MANAGEMENT OF HYPERTENSION AND DIABETES *MELLITUS* IN THE ELDERLY IN PRIMARY CARE: CONTRIBUTION TO POLYPHARMACY, INAPPROPRIATE DRUGS USE AND DRUGS INTERACTIONS

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Highlights: (1) Polypharmacy is prevalent among elderly patients with hypertension or diabetes, especially women. (2) The most frequent PIM increases the risk of hypoglycemia, while the most common PDI favors hyperkalemia and kidney damage. (3) It is essential to promote prescribers' adherence to clinical protocols and PIM and PDI lists for the elderly.

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MANAGEMENT OF HYPERTENSION AND DIABETES *MELLITUS* IN THE ELDERLY IN PRIMARY CARE: CONTRIBUTION TO POLYPHARMACY, INAPPROPRIATE DRUGS USE AND DRUGS INTERACTIONS

ABSTRACT

This is a cross-sectional study analyzing the medical prescriptions of elderly people being treated for hypertension or diabetes *mellitus* at a Primary Health Care Unit in the Federal District, with the aim of identifying polypharmacy, potentially inappropriate medications (PIM), potential drug interactions (PDI) and the frequency of medications in continuous use according to clinical indication. Among the 1,245 prescriptions analyzed, 73.7% had polypharmacy, 95.6% contained at least one antihypertensive and 63.1% had an antidiabetic. In 301 (24.2%), a PIM or PDI was identified. The most frequent PIM was insulin, present in 13.7% (n=301; 56.5%). The most frequent PDI was between angiotensin II receptor blockers and potassium-sparing diuretics, present in 4.5% (n=301; 18.6%) of prescriptions. Polypharmacy was prevalent, especially among female patients. The most frequent PIM has an increased risk of causing hypoglycemia in the elderly, while the most identified PDI increases the risk of hyperkalemia and kidney damage. It is necessary to publicize and promote adherence to the clinical protocols and lines of care for controlling chronic diseases and to the lists of PIMs and PDIs for the elderly.

Keywords: Hypertension; Diabetes *mellitus*; List of Potentially Inappropriate Medicines; Polypharmacy; Primary Health Care.

INTRODUCTION

Like other developing countries, Brazil is undergoing a demographic and epidemiological transition, characterized by significant gains in the average life expectancy of its population and an increase in the incidence, prevalence and morbidity of noncommunicable diseases (NCDs), especially systemic arterial hypertension (SAH) and diabetes *mellitus* (DM)[1,2].

NCDs represent a set of health problems with multiple causes and risk factors, long latency periods and a prolonged course. At the same time, they are non-infectious in origin and can result in functional disabilities. These include cardiovascular diseases, diabetes mellitus, cancer and chronic respiratory diseases[3]. This demographic transition scenario creates new social demands, such as increased consumption of medicines and demand for health services. NCDs are irreversible and silent but are manageable if detected and treated early[1].

Age-related changes in body composition and renal and hepatic function also occur. These physiological changes cause pharmacokinetic and pharmacodynamic interferences with various drugs and, associated with patterns of drug use (polypharmacy) and disease, may lead to more

frequent adverse effects and drug-drug interactions with significant consequences for the elderly[4]. It should also be noted that the elderly are the population that consumes the most medicines and, as a result, it is common to find errors in prescriptions for these patients, resulting in drug-related problems (DRPs), which can reduce the effectiveness and safety of pharmacotherapy[1,5].

In view of the above, the aim of this study was to analyze the prescriptions of elderly patients being treated for SAH or DM at a Primary Health Care Unit in the Federal District (DF) and to identify the following indicators of medication use: polypharmacy, potentially inappropriate medication (PIM), potential drug interactions (PDI) and frequency of continuous medication according to clinical indication.

METHODS

This is an exploratory cross-sectional study involving the analysis of medical prescriptions with retrospective data collection. Prescriptions were collected and analyzed at a Primary Health Care Unit in the Southern Health Region of the Federal District Health Department.

The Primary Health Care Unit in the study has 11 Family Health Strategy teams, six Oral Health teams, a laboratory test collection point, a pharmacy, drugs, vaccine and treatment rooms, an x-ray room and a Multiprofessional Primary Health Care Team, currently made up of a physiotherapist, two nutritionists, two pharmacists and resident health professionals.

The medicines dispensed at the Primary Health Care Unit are standardized by the Federal District Health Department and presented in the Federal District List of Essential Drug Products[6] as essential medicines for Primary Health Care.

In view of the scenario chosen, Ordinance No. 250 17 December, 2014[7] sets out the technical and administrative rules related to the prescription and supply of medicines and health products for the Basic Component of Pharmaceutical Services within the scope of the Federal District Health Department.

Above-mentioned Regulation[7] stipulates that prescriptions for drugs that can be used for prolonged or chronic treatment should be valid for a maximum of 180 days from the date of issued. However, due to the COVID-19 pandemic, the validity has been extended to 365 days[8].

The Ordinance[7] also determines that the supply of medicines and health products in the Federal District's public health network will be made according to the dosage, in sufficient quantity

for a maximum of 30 (thirty) days of treatment. This regulation requires patients to return to the Primary Health Care Unit every month to access their medication.

As the medicines analyzed are for continuous use and each patient returns every month, the prescriptions filled during the month of August 2022 were collected and analyzed. This strategy was adopted to avoid the repetition prescriptions, due to the scheduled monthly return of patients and due to the constant flow of appointments at the pharmacy chosen as the scenario in the month in question, as there were no holidays or interruptions in the operation of the health units or the pharmacy.

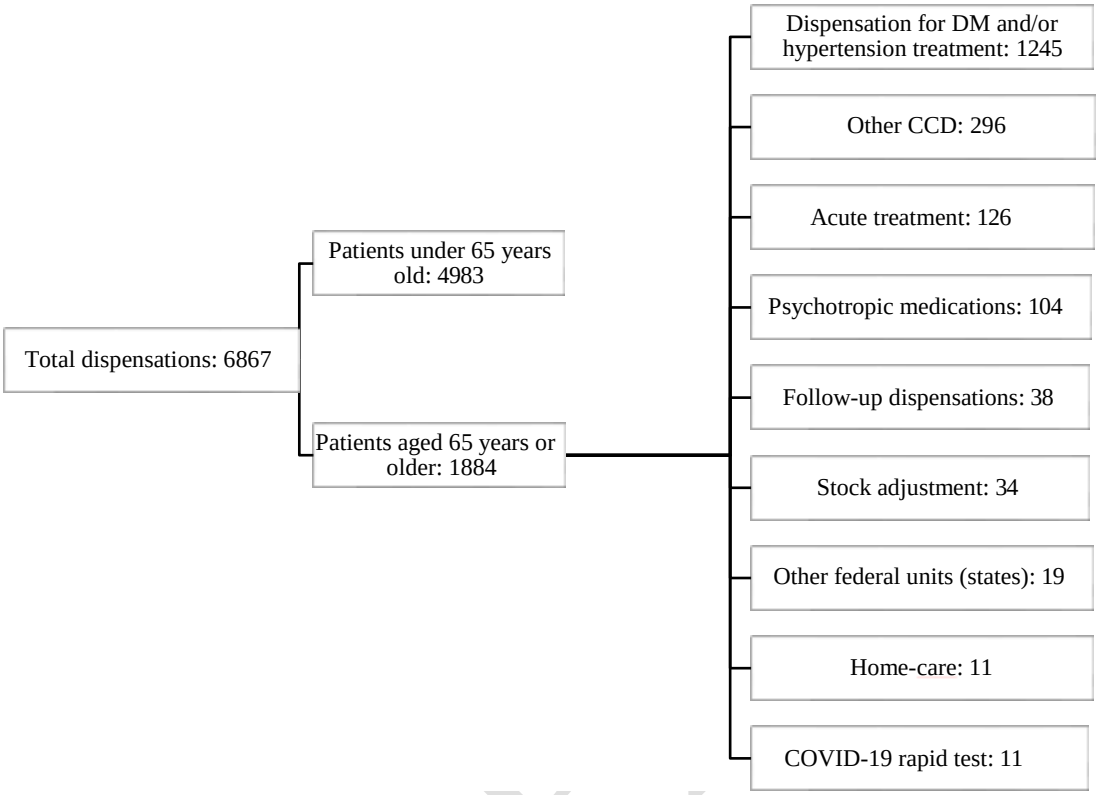
In accordance with the above-mentioned decree[7], medicines are dispensed in the health units of the Federal District Health Department takes place on presentation of two copies of the prescription, with the first copy being kept with the patient and the second retained in the pharmacy for filing. The second copy or copies were thus collected for analysis.

To identify the prescriptions to be analyzed in the study, we first filtered through the dispensing system all the appointments made in August 2022 for patients aged 65 years or older to 31 July, starting from their date of birth. The Federal District Health Department pharmacies use the SIS-Materiais computerized logistics system, which allows information to be obtained about patients treated and stock movements of medicines, health products and other consumer goods[9]. Next, the medicines or health products dispensed in each recorded visit were analyzed, making it possible to select, from the second copies on file, the prescriptions of patients aged 65 and over. The study included documents issued within 365 days, in the public and private network in the Federal District, and containing at least one continuous medication used in the management of SAH or DM.

The following were excluded from the study: 1) prescriptions containing only special control drugs; 2) prescriptions containing only drugs related to other clinical conditions; 3) prescriptions issued more than 365 days ago, according to the date of issue on the document; and 4) prescriptions for patients who had not reached their 65th birthday by 31 July, 2022.

In August 2022, 6867 patients were seen, 1884 of whom were aged 65 and over (Figure 1).

Figure 1 - Number of dispensations in August 2022, in Santa Maria, DF.



Note: DM: diabetes *mellitus*; NCD: non-communicable diseases;

For 1245 patients (18.1%), prescriptions for drugs included in the treatment protocols for DM and/or SAH were recorded. These patients' prescriptions were selected for analysis.

In the case of patients who had more than one prescription, a joint analysis of all the prescriptions for each patient was performed, considering the date of issue and excluding duplicate drugs from the total number of prescriptions, thus counting them as a single prescription. This strategy was chosen because it is common for patients to be seen at different points in the Health Care Network or in private services, often by doctors with different specialties. Thus, there was a possibility that the elderly in the sample had prescriptions from multiple institutions and/or prescribers.

The selected prescriptions were analyzed according to the following indicators: 1) age and sex of the patient; 2) place of issue; 3) clarity of the information presented (time, form of use, concentration, dosage, dosage interval); 4) quantity of drugs for chronic use; 5) clinical indication

of drugs for chronic use; 6) presence of PIM or PDI.

The prescriptions selected for the study were analyzed using an adapted questionnaire proposed by Santana[10]. The items were selected to identify and account for all prescribed chronic drugs. Age and sex data of the patients were retrieved from the SIS-Materiais system, a program that records information on patients served at the Federal District Health Department pharmacies.

The distribution of continuously used drugs for the treatment of SAH and DM in the prescriptions was organized according to the *Anatomical Therapeutic Chemical* (ATC) classification system[11] and the number of drugs was analyzed according to the World Health Organization (WHO) definition of polypharmacy[12], which is the continuous and concomitant use of four or more drugs (with or without a prescription) by a patient, in this case adapted to the prescription of four or more drugs.

PIM and PDI were considered to be the drugs and potential interactions defined by the American Geriatrics Society and presented in the *Beers Criteria* (*AGS Beers Criteria*®)[13], published in 2019. All antihypertensive, antihyperglycaemic and hypoglycaemic drugs were evaluated according to the Beers Criteria, whether or not they were included in the Federal District List of Essential Drug Products[6].

As for antihypertensive pharmacological therapy, we considered the drugs and combinations recommended by the Brazilian Guidelines for SAH[14], published in 2020. As for oral hypoglycaemic agents, we considered the drugs (and therapeutic classes) included in the therapeutic regimen for the treatment of DM drawn up by the Brazilian Diabetes Society[15] and published in 2022.

The data collected were organized in a database in *Microsoft Excel*®, which allowed for descriptive statistical analysis and the creation of graphs. In addition, SPSS® (*Statistical Package for the Social Science*) software was also used to complete the statistical analysis.

Age and the number of drugs per prescription were analyzed based on the median with an interquartile range of 25 to 75% of the sample. The *Odds Ratio* (OR) analysis with a 95% Confidence Interval (95%CI) was performed to verify the occurrence of polypharmacy according to sex and the presence of PIM or PDI using the Chi-square association test (p- value).

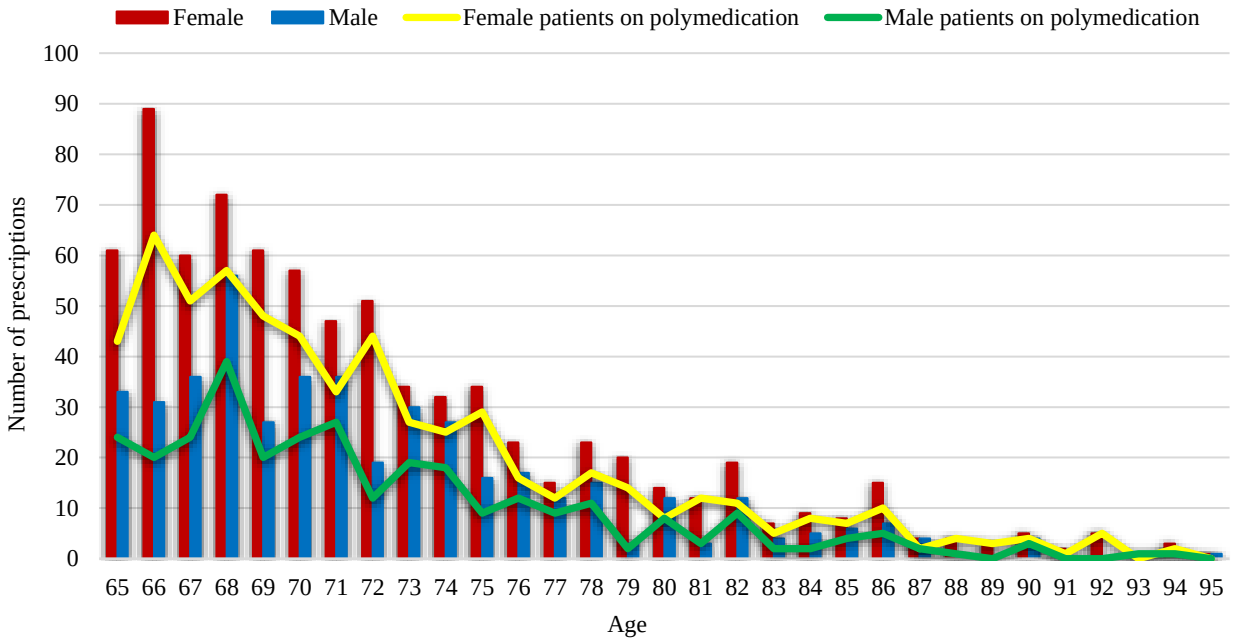
In accordance with Resolution 466 of 12 December, 2012 of the National Health Council, the project was approved by the Research Ethics Committee with a Certificate of Submission for Ethical Appraisal (CAAE) 66652722.9.0000.5553. This research was carried out in a way that

guaranteed the confidentiality of the data collected, ensuring the privacy and confidentiality of information from users and prescribers. Only technical information about the medicines in the prescriptions was collected. In addition, as the study did not involve direct contact with users, the Informed Consent Form (ICF) was not used.

RESULTS

The prescriptions analyzed belonged to 1,245 elderly patients being treated for SAH or DM, of whom 790 (63.5%) were female and aged between 65 and 95 years (Figure 2).

Figure 2 - Distribution of the sample by age, sex and polypharmacy (Santa Maria, DF, 2022).



The median age of the sample was 71 years, with an interquartile range (25-75%) of 68 to 75 years. The mode of age for female patients was 66 years (n= 89) and for male patients 68 years (n=56). The oldest patients were 95 years old (n=2).

Regarding the place of origin or issue, 90.6% of the collected prescriptions were issued in SUS facilities, such as general or specialized hospitals, polyclinics, specialized outpatient clinics or Primary Health Care Unit. About 3.1% of the prescriptions had incomplete or difficult to understand instructions for patients regarding dosage, form of use, etc.

Polypharmacy was identified in 917 (73.7%) elderly people, considering only the number of drugs contained in the prescriptions. This analysis considered all the chronic medications present in the prescriptions evaluated for each patient. The median was 5.0 with an interquartile range (25-75%) of 3 to 7 drugs per prescription.

Polypharmacy prescriptions for female patients accounted for 48.7% of the documents analyzed, meaning that women were more likely to be polypharmacy patients than men (OR=1.5; 95%CI: 1.2-2.0; p-value: 0.001).

The identified continuous-use drugs were organized and classified according to the ATC system[11] and distributed according to the frequency of prescriptions. Table 1 shows that 95.6% of the prescriptions contained at least one drug with antihypertensive action.

Table 1 - Distribution of continuous- use drugs by frequency of prescription (Santa Maria, DF, 2022).

ATC AND NAME	%*
A - Digestive system and metabolism	
A02: Antacids, inhibitors of gastric secretion and treatment of ulcers A04: Antiemetics and antinauseants A06: Laxatives	3,1
A10: Drugs used in Diabetes	
A10A: Insulins and analogues	13,7
A10B: Blood glucose lowering drugs, excl. insulins	49,4
A11/A12: Vitamins, mineral supplements and associations	14,9
B - Blood and blood forming organs	
B01: Antithrombotics agents	39,4
C - Cardiovascular system	
C01: Cardiac therapy	3,8
C02: Antihypertensives C03: Diuretics C04: Peripheral vasodilators C07: Beta-blockers agents C08: Calcium channel blockers C09: Agents acting on the Renin-Angiotensin System	95,6
C05: Vasoprotectors	2,3
C10: Lipid modifying agents	54,0

H - Systemic hormone preparations H03: Thyroid treatment	9,2
L - Antineoplastic and immunomodulatory agents L04: Immunosuppressants	0,2
M - Musculoskeletal system M02: Antiinflammatory and antirheumatic products M03: Muscle relaxants	3,1
M04: Antigout preparations	0,3
M05: Drugs for treatment of Bone Diseases	5,2
N - Nervous system N02: Analgesics	3,1
N04: Anti-Parkinson drugs	0,2
R - Respiratory system R06: Antihistamines for systemic use	0,5

*- The sum of the percentages is greater than 100% because the prescriptions had different drugs and classes.

In terms of medications for glycaemic control, 49.4% included at least one oral antidiabetic and 13.7% had any type of insulin.

There were 39.4% of prescriptions with at least one anticoagulant, antiplatelet or thrombolytic drug and 54.0% of prescriptions contained at least one drug used to control the lipid profile. Among the 1245 prescriptions analyzed, 301 (24.2%) contained at least one PIM or PDI.

The initial frequency analysis sought to see if there were any prescriptions in the sample with more than one drug or combination that were considered inappropriate. It was found that 277 (22.2%) prescriptions contained only one PIM and 24 (1.9%) had more than one, giving a total of 301 prescriptions.

When analyzing the prescriptions that contained some PIM or PDI (n=301). The most common PIM was insulin (Table 2), found in 56.5% of these prescriptions, representing 13.7% of all those analyzed (N=1245).

Table 2 - Inappropriate medications or potential drug-drug interactions used by the elderly, according to the *Beers* Criteria (Santa Maria, DF, 2022).

	n	% of total prescriptions with PIM or PDI (n=301)	% of total prescriptions (N=1245)
Presence of inappropriate medication or interaction in the prescription			
Yes	301	-	24,2
No	944	-	75,8
Distribution and frequency of PIM			
Insulin	170	56,5	13,7
α2-adrenergic agonists: Clonidine	20	6,6	1,6
Long-acting sulphonylurea: Glibenclamide	12	4,0	1,0
Non-dihydropyridine BCC: Verapamil	11	3,7	0,9
α2-adrenergic agonists: Methyldopa	8	2,7	0,6
Dihydropyridine BCCs: Nifedipine (immediate release)	6	2,0	0,5
α1 adrenergic antagonists: Doxazosin	6	2,0	0,5
Non-dihydropyridine BCC: Diltiazem	6	2,0	0,5
Thiazolidinediones/Glitazones: Pioglitazone	4	1,3	0,3
Distribution and frequency of LMI			
ARB + K-sparing diuretic^{+}			
Losartan + Spironolactone	56	18,6	4,5
Association of Sacubitril and Valsartan + Spironolactone	7	2,3	0,6
Olmesartana + Spironolactone	2	0,7	0,2
Association of Sacubitril and Valsartan OR Losartan + Spironolactone	1	0,3	0,1
Valsartan + Spironolactone	1	0,3	0,1
ACEI + K-sparing diuretic^{+}			
Enalapril + Spironolactone	12	4,0	1,0
ARB + ACEI			
Losartan + Enalapril	2	0,7	0,2
Losartan + Captopril	1	0,3	0,1

α1 adrenergic antagonists + loop diuretics			
Doxazosin + Furosemide	1	0,3	0,1

Note: PIM: potentially inappropriate medicines; PDI: potential drug-drug interaction; CCB: calcium channel blockers; ACEI: angiotensin-converting enzyme inhibitors; ARB: angiotensin II receptor blockers; N: total number of prescriptions analyzed in the study; n: total number of prescriptions with inappropriate drugs or drug interactions identified in the study.

Next, clonidine and glibenclamide were identified in 6.6% and 4.0% of prescriptions, respectively.

The interaction between angiotensin II receptor blockers (ARBs) and/or angiotensin-converting enzyme inhibitors (ACEIs) and/or K-sparing diuretics^{+} was the most common PDI, identified in 27.2% of prescriptions, or 6.6% of all prescriptions.

Finally, the occurrence of PIM or PDI was analyzed, stratified by polypharmacy and sex (Table 3).

Table 3 - Analysis of the occurrence of PIM or PDI in prescriptions in relation to polypharmacy and sex (Santa Maria, DF, 2022).

Factors	PIM or PDI* (n=310; 24,2%)	No PIM or PDI* (n=935; 75,8%)	OR (95% CI)	p-value
Polypharmacy* (n=311; 73,7%)				
Yes	285 (22,9%)	632 (50,8%)	8,8 (5,2-14,8)	<0,001
No	16 (1,3%)	312 (25,1%)		
Polypharmacy in women* (n= 606; 48,7%)				
Yes	174 (14,0%)	432 (34,7%)	5,3 (2,9 -9,6)	<0,001
No	13 (1,0%)	171 (13,7%)		
Polypharmacy in men* (n= 311; 25,0%)				
Yes	111 (8,9%)	200 (16,1%)	26,1 (8,1-88,3)	<0,001
No	3 (0,2%)	141 (11,3%)		

*- Percentages calculated on the basis of the total number of prescriptions analyzed in the study.

Note: n: number of prescriptions included in the factors described. PIM: potentially inappropriate medication; PDI: potential drug interaction; OR: *Odds Ratio*; $CI_{95\%}$: 95% Confidence Interval.

DISCUSSION

The higher prevalence of women in the group analyzed is due to various factors, including the "feminization of old age"[16,17], which is related to higher life expectancy at birth than that of men[17].In addition, there is a much higher mortality rate among older people (80 years and over) due to circulatory diseases and neoplasms, due to greater exposure to risk factors, and there is an increase in the proportion of deaths caused by diseases that are almost exclusively affecting the elderly, such as dementia, falls and aspiration pneumonia[18].

In terms of place, the findings of the Brazilian Longitudinal Study of the Health of the Elderly (Elsi-Brasil) corroborate these results. Elsi-Brasil found that 75% of elderly Brazilians only use only the SUS[19].

The results showed that a small percentage of prescriptions did not provide the essential information that guarantees the safe and effective use of medicines. However, according to Elsi-Brasil[19], he level of education among older Brazilians is still low.

The basic skills of reading, writing and mathematics applied to the health area are recognized as functional literacy, which is essential for patients affected by a disease to be able to participate in the planning and implementation of therapy, and is crucial for successful treatment. Low levels of schooling among older people are associated with inadequate functional health literacy, which makes it difficult for patients to understand instructions, read prescriptions and package leaflets, which are necessary for adherence to pharmacotherapeutic regimens, and to consider disease prevention and health promotion interventions[20].

This study found a high rate of polypharmacy (more than seven out of every ten prescriptions). The WHO recommends that the average number of drugs per prescription should be equal to or less than 2.0, considering 2.4 as a tendency towards polypharmacy[21]. The high average found in this study indicates that there is a higher risk of adverse reactions.

Corroborating this high prevalence of polypharmacy in this study, it was observed that in other studies carried out in the Brazilian municipalities of Pelotas – (Rio Grande do Sul)[22], Ribeirão Preto – (São Paulo)[23], Campina Grande – (Paraíba)[24] and Itaguaí – (Rio de Janeiro)[25] the prevalence of polypharmacy was lower. This difference may be due to the differences between the samples, because due to comorbidities and physiological changes typical of ageing, the elderly are the age group that consumes the most medication[1] and the studies cited also involved participants of other ages[22-25]. At the same time, DM and SAH are the NCDs most related to the consumption of various medications and, consequently, the practice of polypharmacy[26]. In addition, the findings of polypharmacy in this study may also be reflect an engaged health care team that performs medication reconciliation at the time of prescription, thus increasing the occurrence of polypharmacy.

Studies carried out in the Brazilian municipalities of Anápolis – (Goiás)[27], Rondonópolis – (Mato Grosso)[28] and Quixadá – (Ceará)[28] also identified a predominance of polypharmacy in female primary care patients.

The high prevalence of polypharmacy associated with women can be explained by the fact that women have a longer life expectancy and, consequently, a higher incidence of chronic degenerative diseases associated with ageing. They are also more aware of their health; they find it easier to express signs and symptoms, use health services more often for diagnosis and treatment, and there are more health programmes aimed at women[29].

It is important to point out that the actual number of medicines used daily may be higher, as there is the possibility of consuming medicines that can be bought without a prescription (self-medication). In addition, the drugs indicated in the prescriptions, based on the dosage, for acute treatment, were not counted. In addition, the central-acting drugs prescribed to these patients, because they follow the relevant legislation, are presented in their own prescriptions and were not considered in this study.

Although the majority of polypharmacy prescriptions are for female patients, a higher risk of PIM or PDI was identified in prescriptions for male patients on a polypharmacy regimen. This contradictory situation is explained by the heterogeneous factors that can cause the use of PIMs or PDIs among patients, i.e. there are differences among patients that often do not justify their use among the groups analyzed. Differences between patients are found when the associations between gender, frequency of outpatient and emergency care, number of medications used and the use or non-use of a PIM or PDI for the elderly are analyzed. As a result, many studies fail to find or justify the assossiation found[30].

The chronic use of antilipidemics and antithrombotics in elderly people with hypertension and diabetes is justified by the associated comorbidities and the development of cardiovascular disease as these metabolic syndromes progress. This practice is associated with metabolic risk factors of cardiovascular and renal disease, such as hypertension, dyslipidaemia, abdominal obesity, glucose intolerance and DM[15].

Insulin and glibenclamide are associated with a higher risk of severe prolonged hypoglycaemia in the elderly. Hypoglycaemia is characterized by blood glucose levels below 70 mg/dL and one of the risk factors in the elderly is the use of sulfonylureas and insulin and polypharmacy[13,15,31,32].

There are specific characteristics of DM treatment in the elderly, such as the greater number of comorbidities, the presence of varying degrees of sarcopenia and frailty, the frequent appearance of cognitive changes, polypharmacy, the greater potential for drug-drug interactions and the less

effective counterregulatory hyperglycaemic response, all of which contribute to a greater risk of hypoglycaemia[31].

Elderly people with hypoglycaemia have a higher risk of falls due to reduced visual acuity and the occurrence of hypoglycaemia with neuroglycopaenic manifestations, a higher risk of urinary incontinence, dehydration, hypovolemia, urinary infections and reduced visual capacity, as well as an increased risk of cardiovascular events, especially arrhythmias and myocardial ischaemia[31].

Because blood pressure control involves various reflex mechanisms of a neural and hormonal nature, most patients need more than one drug to manage their hypertension. In view of this, a predominance of PIMs or PDIs was identified in the prescriptions used to control blood pressure.

The use of α2-adrenergic agonists, such as clonidine, in the elderly involves a high risk of bradycardia, orthostatic hypotension, depression and sedation[33], while verapamil has the potential to promote fluid retention and worsen heart failure and can aggravate constipation[13,32].

The interactions between losartan + spironolactone and enalapril + spironolactone were among the most frequent in other studies[34]. Clinical studies indicate that the occurrence of hyperkalemia related to the adverse events of these drugs is frequent, as it induces alterations in potassium homeostasis. Frequent cases of hyperkalemia can also lead to acute renal failure, due to K^+ overload in renal filtration[35].

The pharmacodynamic interaction between drugs action on the renin-angiotensin-aldosterone system and K^+ sparing diuretics increases the risk of hyperkalemia[13]. Hyperkalemia is a hydroelectrolytic disorder, defined by a serum K^+ level above 5.5mmol/L, according to the *European Resuscitation Council*. It is usually asymptomatic, but in severe cases, symptoms (muscle weakness, altered heartbeat and difficulty breathing)[35] may be seen. Elderly patients who are dehydrated or have kidney disease, DM or advanced heart failure are more susceptible to developing hyperkalemia during the use of these drugs[34].

This study found that many patients actually use prescriptions from different points in the Federal District's healthcare network. As a result, the prescriptions analyzed for these patients show discrepancies, mainly therapeutic duplication and potential drug interactions, leading to the use of PIM or PDI.

Communication failures within the network or between professionals can result in errors and

harm to patient care[36]. At the same time, pharmaceutical services for drug reconciliation and pharmacotherapy review in Primary Health Care are still limited[37]. Clinical pharmacy services and active involvement in the assessment and development of the Singular Therapeutic Plan enable users to gain several benefits, such as prevention, identification and resolution of DRPs, in order to ensure that the medicines used by the patient are correctly indicated, effective, safe and convenient[37-39].

The results presented in national studies show a wide variety of prevalences related to IPM, ranging from 24.60% to 82.6%. The differences between the data collection sites and the sample size justify the wide variety of results found[40].

However, this study focused on chronic medicines used to treat specific NCDs. If other acute and chronic clinical conditions are included and the analysis is widened, the frequency of PIMs and PDIs will be higher, as the list of Beers Criteria is extensive. At the same time, the majority of older patients have multimorbidity and are on polypharmacy. Further studies are therefore needed to assess the prescription of other PIMs and PDIs for older people treated in Primary Health Care, especially those indicated for continuous use.

As described in the methods, the version of the Beers Criteria published in 2019 was used. However, an updated version was published by the American Geriatrics Society in May 2023, which included new medications and is therefore a limitation of this study. Other limitations identified were the collection of drugs use by clinical indication, which restricted the analysis by class, pharmacological group and active ingredient, and the inclusion of insulin without classification by time of action.

No medical records or other documents were analyzed, which restricted the inclusion of PIM or PDI that are correlated with biochemical parameters and the evaluation of the use of medicines dispensed at other levels of care of the Federal District Health Department that were not present in the prescriptions analyzed.

CONCLUSION

The review of prescriptions showed that polypharmacy is prevalent among elderly people with hypertension or diabetes, especially among women. The results, according to the distribution of drugs in the prescriptions, led to the conclusion that most patients were being treated to control hypertension. This scenario was also evident when identifying the predominance of

antihypertensive drugs among the most common PIMs and PDIs.

When analyzing of the identification and frequency of prescriptions for PIMs and PDIs, it was observed that a proportion of prescribers are unfamiliar with clinical protocols for the management of NCDs. This was evident from the frequency of prescriptions with associations between drugs action on the renin-angiotensin-aldosterone system and K+- sparing diuretics. This interaction has been described in several studies and the combination is contraindicated. It is therefore necessary to publicize and promote adherence to the clinical protocols and guidelines of care for the control of NCDs and the lists of PIMs and PDIs for the elderly. Furthermore, it is important for pharmacists to work in primary care, given the possibility of integrating pharmaceutical services in the care of chronic patients, especially the elderly.

It is essential to frequently inform professionals about the list of essential medicines, such as the Federal District List of Essential Drug Products, and the list of medicines made available by the Brazilian Popular Pharmacy Programme, in order to present all the options of medicines available in the SUS and facilitate the substitution of PIMs or PDIs that may cause DRPs. Together, it is necessary to promote dialogue, and raise awareness about the prescription of medicines available from the Federal District Health Department or the Brazilian Popular Pharmacy Programme and the flow of access.

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