

# Polypharmacy in Elderly Patients in a Community Pharmacy

Sónia Lopes, Clara Rocha and Rui Cruz

*ESTESC-Coimbra Health School, Polytechnic Institute of Coimbra, Coimbra 3046-854, Portugal*

**Abstract:** Introduction: The definition of polypharmacy is not consensual, but all authors refer it as the simultaneous use and the chronic way, of several drugs by the same person. Polypharmacy affects mainly the elderly and it is due to the high number of chronic diseases in this population and consequent need to take medications to control them. Aims: Characterization and quantification of polypharmacy in a rural elderly population. Materials and Methods: It carried out an observational, retrospective, transversal and analytical study in Farmácia Popular (Pombal). Total of 230 individuals aged 65 years old or more were surveyed and the data collection was made through a questionnaire prepared for this purpose, in time between February and April 2017. Results: The elderly took, on mean, 6.20 drugs daily. The prevalence of *Major* polypharmacy ( $\geq 5$  medications) was 70.4%. The most prescribed pharmacotherapeutics groups were cardiovascular and central nervous system. There were statistically significant differences between age and number of medicaments taken, as well between number of drugs and the way to identify the medication, the knowledge of the therapeutics indications, the occurrence of mistakes or take outside advised time, and the self-perception of health state ( $p \leq 0.05$ ). Conclusion: In view of the obtained results, it concludes that polypharmacy is very high in Portuguese population in study. It is the persons most aged who consume a greater number of drugs. The elderly with less academic qualifications are those who have more difficulty in identifying medication and respective therapeutics indications. It is necessary to adopt strategies in order to reduce polypharmacy, with the prescriber and the professionals of pharmacy a preponderant role in this task.

**Key words:** Polypharmacy, elderly, chronic medication.

## 1. Introduction

The increase of average life expectancy, associated with improvement of health care, results in an increase of chronic diseases and consequent need to use medications to control them [1]. Polypharmacy is right away considered a global public health problem, assuming a particular dimension in the elderly, the age group in which it is most prevalent, because they are the main consumers of medications [2-5]. According to the World Health Organization (WHO), the elderly are all individuals whose chronological age is 65 years old or older [6]. In Portugal, the number of the elderly people has been increasing progressively, representing more than 19% of the population [2, 7]. According to a study carried out by Antunes [8], more than 40% of the drugs were consumed chronically by the elderly.

Although there is no medical agreement about the definition of polypharmacy, all authors refer it as the simultaneous use and the chronic way, of several drugs by the same person [9]. More extensive definitions still include the overuse of drugs, administration of more drugs than clinically indicated, use of potentially toxic substances, or disrespect for the prescribed dose and frequency [2, 10, 11]. Due to that, the definition of a polymedicated person is also not consensual, varying the number of drugs prescribed, according the authors, between two to five or more [9].

Polypharmacy is influenced by a complexity of factors, which mainly focus on the patient (biological, psychological and social factors), but also involve the prescriber and the health system in which they are inserted [12]. The multipathology, associated with several physiological changes caused by age, makes difficult a safe prescription in the geriatric population [13]. Such alterations, like a decrease in renal and

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**Corresponding author:** Sónia Lopes, student, research field: pharmacy.

hepatic functions and albumin synthesis, and an increase in gastric pH and percentage of body fat, determine the pharmacokinetic and the pharmacodynamic [5, 14, 15].

The high number of chronic diseases in the elderly is the most important cause of the polypharmacy in this age group, but not the only one [16]. The need to take several drugs to control the same pathology and self-medication (linked to media publicity) are the main factors put forwarded [8, 10, 17]. In addition, the deterioration of cognitive and functional abilities leads to multiple administration errors, not only due to the similarity of colours or shapes of the pharmaceutical forms, but also due to the difficulty in reading and interpreting the labels of the packages or instructions noted therein [1, 10, 16]. In Portugal, many elderly people have not any academic qualifications, not being able to read or write, which makes it impossible to understand information about the right use of the medication [1]. This is corroborated by Silva et al. [9] study, in two health centres in Lisbon, which concluded that more than 11% of the elderly have not schooling. According to the same study, 39.6% of the elderly took two to four drugs daily, while 37.1% took five or more [9].

At the prescription level, it is also shown that the existence of more than a prescribing physician involved in patient care is a predictor of polypharmacy [13]. When a treatment is not taking effect, it is common for the users, who are unhappy, to look for another physician, who makes a new prescription [18]. Defensive prescribing, a patient's expressed wish to be medicated, omission of symptoms that may be due to adverse drug reactions (ADRs) or interactions, and lack to inform the physician of all the therapy they do, are examples of other factors leading to new prescriptions [1, 19]. On the other hand, the poor communication between patient and prescriber, the patient's lack of knowledge about when to stop taking a drug and the patient's concern about the consequences of this interruption can also be pointed out [13, 20].

Several studies corroborate the strong relation between polypharmacy and negative clinical consequences, namely the occurrence of ADRs and interactions, which are more frequent in geriatric patients because they are the most susceptible, due to physiological changes caused to the age [2, 3]. The risk of drug interaction increases according to the period of use of the drugs, the prescribed dose and the number of drugs taken, being 13% taking two drugs, 38% taking four and increasing to 82% with the taking of seven or more drugs [1, 16, 19]. Nevertheless, interactions are not limited to medicinal products, and it is also necessary to consider food-drug interactions and interactions with natural products [11]. The medical prescriptions are made, in most cases, unaware of the taking of herbal and homeopathic medicines, because they are products of natural source, the patients consider them innocuous to health, not informing the prescriber of all the medication they in fact take [18]. In the Silva et al. [9] study, 28.3% of the elderly admitted to consume natural products with the purpose of obtaining therapeutic effects.

In the majority of elderly patients, the polypharmacy results in high costs, which may condition their adherence to therapy or lead to its partial accomplishment [3, 8, 10]. The number of drugs prescribed and adherence to therapy vary in opposite directions [16]. Adherence to therapy is still strongly influenced by social isolation and dependence on others, if the patient is unable to take the medication by oneself [1]. In consequence of that, because there is no effective clinical response due to non-compliance, the prescriber may decide to increase the initial dose or to introduce a second drug [17]. Consequently, there is an increased risk of interactions and ADRs, health costs, visits to emergencies and hospitalizations, malnutrition, decrease quality of life or even death [3, 10, 16, 17, 21]. In some cases, as a result of the high number of medications taken, the distinction between adverse effect, disease or symptom resulting from the natural aging process is not simple to define [22].

Duplication of therapy, caused mainly by the administration of the generic and the brand drug of the same active principle, and aggravated by the loss of cognitive functions, is also a very common consequence [2, 15, 23, 24].

Given the heterogeneity of the elderly population and the multiplicity of social, therapeutic and economic implications, the choice of the most appropriate drugs should be based on a complex clinical assessment, according to the specificity and needs of each patient [16]. In deciding to choose, interrupting or maintaining the intake of medications, physiological changes associated with aging must bear in mind in order to prevent drug iatrogenic [8, 16].

Thus, the objective of the present study is to characterize and quantify the chronic consumption of drugs in a rural elderly population. In addition, it is also proposed to identify the most prescribed therapeutic groups and associated pathologies, as well to verify if there is an association between polypharmacy and characteristics of the elderly (sociodemographic and clinical profile). The decision to develop this work in a rural area resulted from a fact to become scarcity of published studies about polypharmacy in this environment, where a great part of the population is geriatric.

## 2. Materials and Methods

It carried out an observational, retrospective, transversal and analytical study. The place of the study was the Farmácia Popular (FP), municipality of Pombal, and data collection was carried out between February and April 2017.

All persons aged 65 years old or more, non-institutionalized, FP clients, in total of 570 individuals were constituted the study population.

The probabilistic and accidental sample was calculated using the calculation formula for finite populations (for a 95% confidence level and a maximum error margin of 5%). Thus, the sample size was 230 individuals. The selection of the individuals

obeyed following criteria:

### (1) Inclusion criteria

(a) elderly patients who have gone to the FP during the period of data collection and who agreed to participate in the study voluntarily and through verbal informed consent;

(b) elderly users who took chronic medication, that is, prescribed for at least six months;

(c) for the purpose of polypharmacy, only the medication taken *per os* was counted.

### (2) Exclusion criteria

(a) patients under the age of 65;

(b) institutionalized elderly people who have gone to FP accompanied;

(c) all medicinal product not subject to medical prescription, subject to prescription for isolated treatment, and all dietary supplements prescribed in the chronic way were excluded.

All the information was collected through a questionnaire prepared for this purpose, which was subdivided into three sections: sociodemographic characterization, drug consumption and clinical profile. This method of data collection, in addition to the low cost, allows collecting and synthesizing in an organized and objective way a vast group of relevant clinical information.

Pharmacotherapeutic classification was made according to the *Prontuário Terapêutico* (PT), of 2013 [25]. The definition of polypharmacy as for the number of drugs prescribed was made according to the most consensual classification accepted by the medical community: *Minor* polypharmacy (1 to 4 drugs, inclusively) and *Major* polypharmacy (5 or more drugs) [26].

In the statistical treatment, descriptive tests as mean and standard deviation were used, and statistical inferential methods, such as Student's *t*-test for independent samples, *U* Mann-Whitney, Kruskal Wallis, Spearman's Rho and Qui-square test of independence. SPSS (Statistical Package for the Social Sciences), version 24, were used for data analysis.

Values of  $p \leq 0.05$  were considered as statistically significant differences. To make some graphs it also used the Microsoft Excel 2016.

To carry out the study, authors made a request of authorization to the Technical Director of the FP, and only the elderly who voluntarily accepted, through verbal informed consent, participated. All data collected were treated anonymously, and never individually. The confidentiality of the participants (as well as all personal data accessed during the study) will be maintained during and after data collection. The researcher has no financial or commercial interest in this study, and it is exclusively for academic and research purposes.

### 3. Results

#### 3.1 Sociodemographic Characterization

According to Table 1, the sample is formed mainly

by female subjects (50.9%), married (54.3%), who live accompanied (67%), who were retired (61.3%) and who consider their socioeconomic status as medium (47%) or low (42.2%). Concerning to academic qualifications, the low level of schooling of the sample is high: the percentage of individuals without schooling or who did not complete the first cycle (46.5%) is higher than the one that completed the first cycle of schooling (38.7%).

All interview participants were aged between 65 and 95 years old and had a mean age of  $77.62 \pm 7.53$  years. Age distribution by groups is described in Table 2. The most prevalent class was [80; 85[, in which 24.8% respondents were inserted, followed by the class [75; 80[, with 20.9%.

#### 3.2 Drugs Consumption

Number of drugs taken daily by the sample varied

**Table 1** Sociodemographic characterization of the sample.

Variables		n	%
Gender	Male	113	49.1
	Female	117	50.9
Marital status	Married	125	54.3
	Single	16	7.0
	Widower	84	36.5
	Other	5	2.2
Family	Live alone	76	33.0
	Live accompanied	154	67.0
Academic qualifications	Do not read neither write	54	23.5
	1st incomplete cycle	53	23.0
	1st cycle	89	38.7
	2nd cycle	19	8.3
	3rd cycle	9	3.9
	Secondary education	4	1.7
	Higher education	2	0.9
Professional situation	Active	3	1.3
	Unemployed	1	0.4
	Housewife	80	34.8
	Retired	141	61.3
	Other	5	2.2
Socioeconomic status	High	13	5.7
	Medium	108	47.0
	Low	97	42.2
	Do not know/Do not answer	12	5.2
	Total	230	100

**Table 2** Age distribution by classes.

Classes	n	%
[65; 70[	38	16.5
[70; 75[	45	19.6
[75; 80[	48	20.9
[80; 85[	57	24.8
[85; 90[	29	12.5
[90; 95]	13	5.7
Total	230	100

**Table 3** Number of prescription drugs taken daily.

Medium	6.20
Standard deviation	2.91
Amplitude	14.00
Maximum	1.00
Minimum	15.00

**Table 4** Prevalence of *Minor* and *Major* polypharmacy by gender.

Polypharmacy	<i>Minor</i>		<i>Major</i>	
	n	%	n	%
Male	36	15.7	77	33.4
Female	32	13.9	85	37.0
Total	68	29.6	162	70.4

between 1 and 15, and the mean daily intake was  $6.20 \pm 2.91$  medications (Table 3).

The prevalence of *Major* polypharmacy was 70.4%, that is, 162 of the respondents took at least five different drugs daily. There were differences between the genders, with the female presented a higher prevalence of *Major* polypharmacy (37.0%), while the male presented the highest prevalence of *Minor* polypharmacy (15.7%) (Table 4).

Relating to the concomitant taking of drugs with the same or similar therapeutic indication (Fig. 1), it was verified that 149 individuals (64.8%) took several drugs for the same pathology, being the majority female (79 women, corresponding to 34.3%).

Table 5 abridges the prevalence of prescriptions by pharmacotherapeutic groups and subgroups. In the *Various* group were counted all the drugs that were not included in the others groups, as well other administration routes, with inhalation being the most expressive.

The most prescribed groups were those that have an effect in the cardiovascular system and Central

Nervous system (CNS): 36.9% and 21.3%, respectively. The high percentage of the cardiovascular group was conferred not only by the anti-dislipidemics (taken by 51.3% of the respondents), but also by the antihypertensives. The most commonly used antihypertensives were ACE inhibitors (37.4%), followed by diuretics and others, which presented the same prevalence (34.8%). Regarding the CNS group, the high percentage of psychotropic drugs, which have an effect at various pathologies, was chronically taken by more than half of the respondents (52.2%). The subgroup *Other drugs with action in the CNS* was also pointed out, taken by 27.8% of the elderly.

The third most prevalent group was the blood group, being anticoagulants and antithrombotics most used subgroups, taken by 41.3% of the elderly. In the digestive tract group, the high percentage of gastric secretion modifiers taken (39.6%) is also noteworthy, mainly due to the proton pump inhibitors.

Of the 230 respondents, 27 elderly patients (11.7%) admitted to take one, two or three medications in addition to that prescribed by their physician, being that

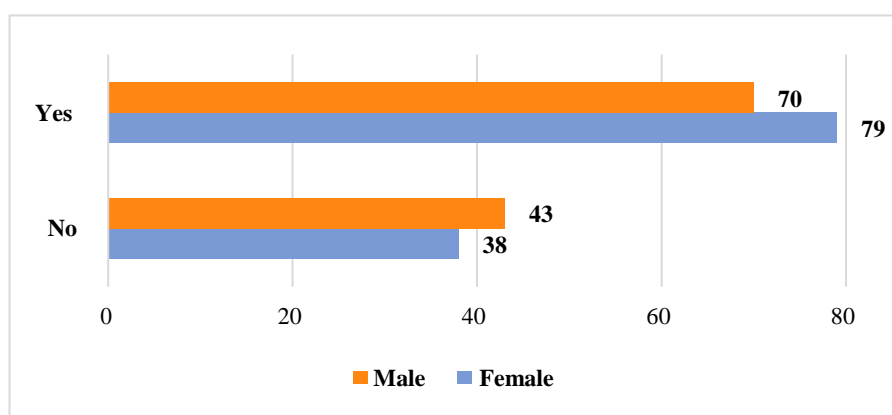


Fig. 1 Distribution by gender of the drug taking for the same pathology.

Table 5 Prevalence of drug prescription by pharmacotherapeutic group and respective subgroups.

Groups	Therapeutic subgroups	n	%	% Total of group
CNS	Antiparkinson	26	11.3	21.3
	Antiepileptics and anticonvulsants	32	13.9	
	Antiemetics and antivertiginous	23	10.0	
	Psychopharmaceuticals	120	52.2	
	Others with CNS action	64	27.8	
Cardiovascular system	Cardiotonics and antiarrhythmics	17	7.4	36.9
	Diuretic antihypertensives	80	34.8	
	ACE inhibitors	86	37.4	
	ARA's antihypertensives	51	22.2	
	Other antihypertensives	80	34.8	
	Vasodilators and venotropics	27	11.7	
	Anti-dyslipidemic	118	51.3	
Blood	Antianemic	33	14.3	10.3
	Anticoagulants and antithrombotics	95	41.3	
Respiratory system	Antiasthmatics and bronchodilators	13	5.7	1.0
Digestive system	Gastric secretion modifiers	91	39.6	8.8
	Others with action in the digestive system	18	7.8	
Genitourinary system	Medications used in genitourinary dysfunction	41	17.8	3.3
Hormones and drugs used to treat endocrine diseases	Corticosteroids	6	2.6	8.2
	Thyroid hormones and anti-thyroid hormones	13	5.7	
	Oral antidiabetic agents	64	27.8	
	Insulins	17	7.4	
	Oral antidiabetic agents + insulin	2	0.9	
	Sex hormones	1	0.4	
Locomotor system	Gout treatment	38	16.5	3.9
	Treatment of arthritis	3	1.3	
	Bone-acting and calcium metabolism drugs	8	3.5	
Various	Others	29	12.6	6.3
	Others routes of administration	49	21.3	

the majority taking only one medicinal product not subject to medical prescription (23 people) (Table 6 and Fig. 2).

In 70.4% of the cases, the take was made by indication of the pharmacy professional, while 25.9% of the cases were on their own initiative, that is, in a self-medication regimen (Fig. 3).

### 3.3 Clinical Profile

Concerning the way to identify the medication, only 70 of the elderly (30.4%) admitted to recognize all drugs by their name, either International Non-Proprietary Name (INN) or by brand name. Of the remaining 160 respondents, 80 (34.8%) only recognize the medication through packaging, while the other 80 elderly admitted to recognize some drugs by name and others only by packaging (Fig. 4).

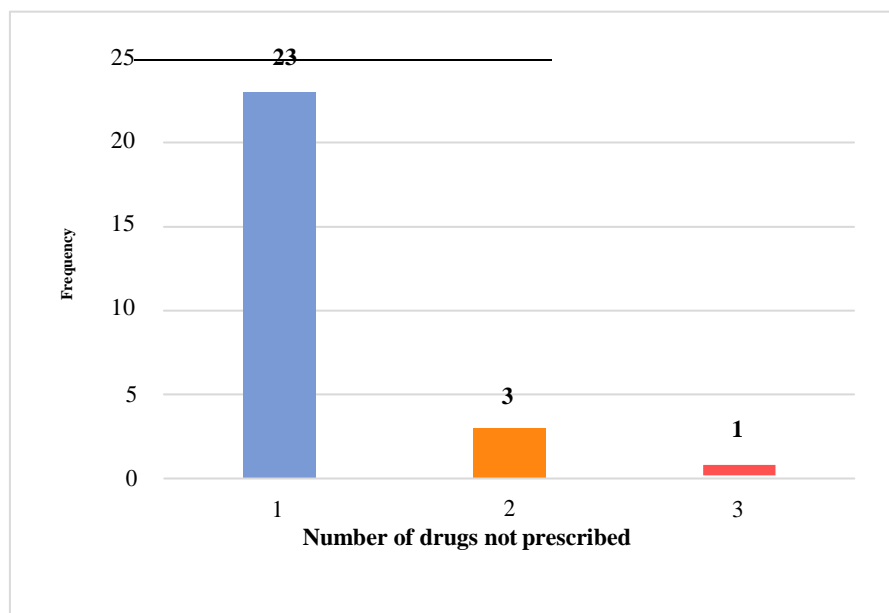
As shown in Fig. 5, 154 of the participants (67.0%) admitted do not know therapeutic indications of all

drugs taken daily. It was also observed that 90.4% of the surveyed elderly patients have a practice of providing information about chronic medication they take daily, when they have an appointment with another prescriber (Fig. 6).

The Fig. 7, referring to errors in medication take, such as forgetfulness (omissions of take) and carelessness (mistakes or out-of-hours recommended take), discloses that 107 of the participants (46.5%) have already forgotten to take medication, while 75 admitted to be careless (32.6%). As shown in Fig. 8, it was also observed that the majority of the elderly did not interrupt the recommended therapy when they felt symptoms improved: only 18 of individuals (7.8%) affirmed to have stopped treatment after improvement of the clinical symptomatology. On the other hand, the percentage of the elderly people who have already stopped treatment after worsening symptoms is higher: 19.1%, which corresponds to 44 individuals.

**Table 6** Taking of medical product not subject to medical prescription.

Medical product not subject to medical prescription	n		%
	Yes	No	
	27	203	11.7
			88.3



**Fig. 2** Number of drugs not prescribed taken.

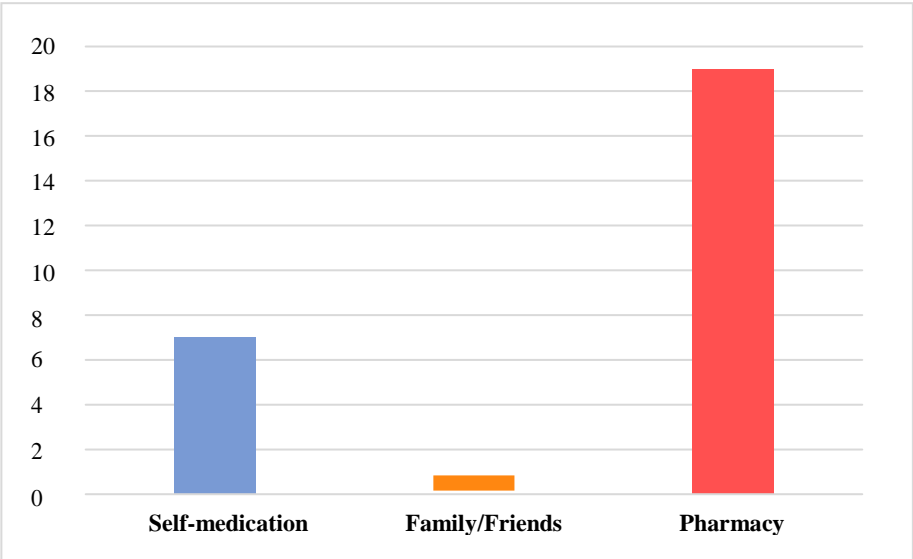


Fig. 3 Indication of medicinal product not subject to medical prescription.

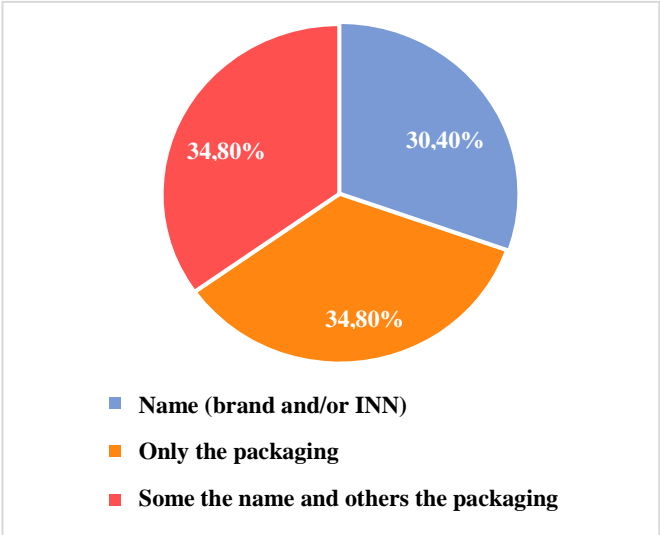


Fig. 4 Way to identify medication.

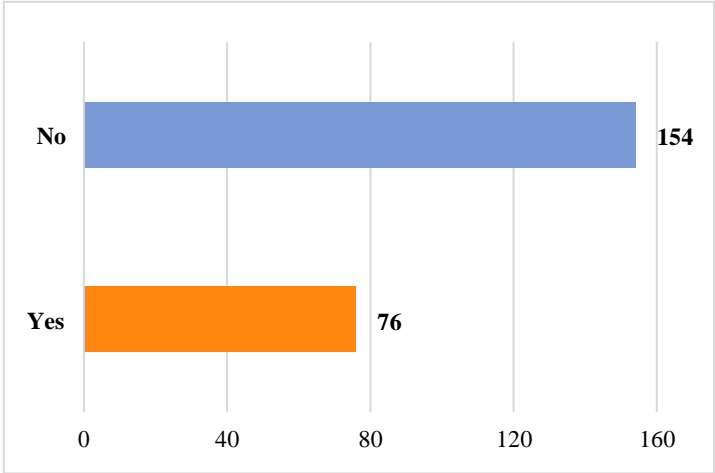
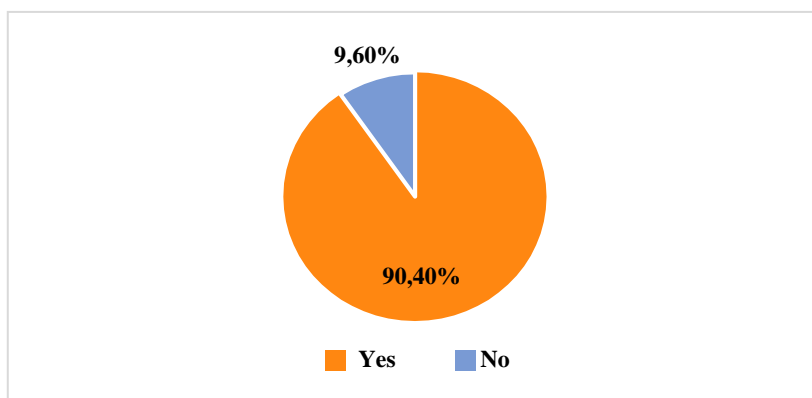
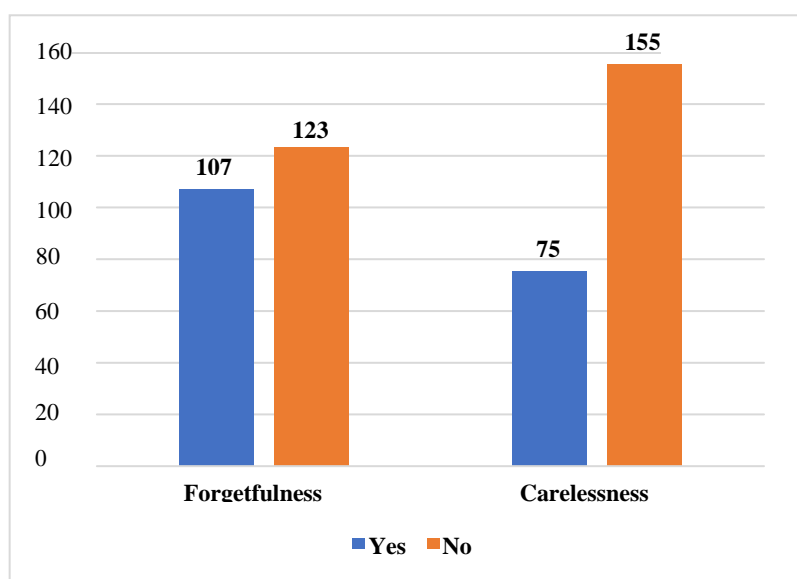


Fig. 5 Knowledge of the therapeutic indications of all drugs taken.

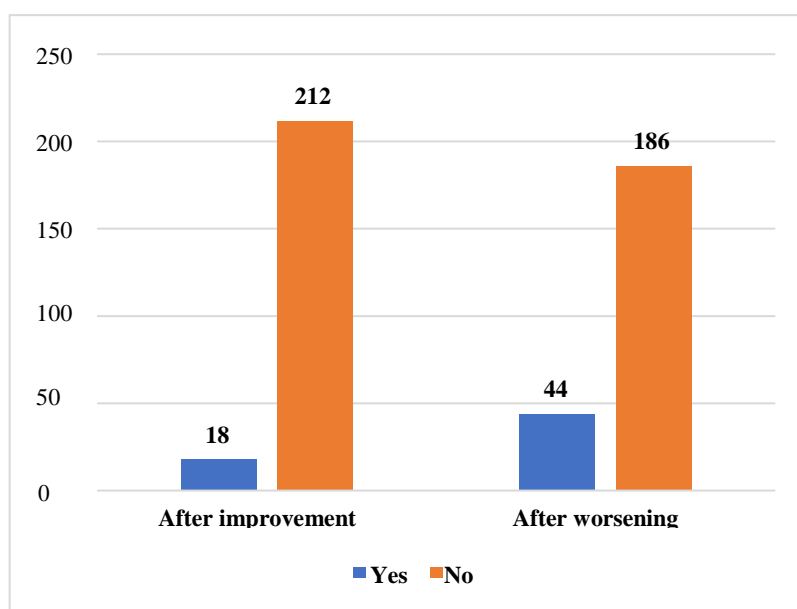




**Fig. 6** Providing information about chronic medication when to see another doctor.



**Fig. 7** Medication administration errors.



**Fig. 8** Interruptions of medication intake.

About the self-perception of health of the elderly participants, 46.1% considered their health to be reasonable, while 28.3% had weak perception and 13.9% considered their health very weak (Table 7). The results show that it was elderly men who presented a better self-perception of health status, being this statistically significant difference between genders ( $p = 0.039$ ).

Relating the age of the respondents and the number of drugs taken daily, there was a weak association, statistically significant and in the positive direction between these two variables ( $p = 0.043$  and  $r = 0.133$ ), that is, the older taken biggest number of drugs.

Table 8 shows the relation between the number of prescribed drugs and several study variables.

The mean daily consumption of drugs was higher in females than in males:  $6.48 \pm 3.06$  and  $5.92 \pm 2.74$ , respectively. However, applying Student's *t*-test to two independent groups, there were no statistically significant differences ( $p = 0.146$ ).

There were also no significant associations between the remaining sociodemographic characteristics and the number of medications taken daily ( $p > 0.05$ ). It should be noted that the elderly who completed secondary education had the lowest mean daily consumption ( $5.75 \pm 2.50$ ), while those who completed the 3rd cycle are those who take, on mean, more medications ( $7.89 \pm 3.37$ ). It was also observed that individuals with a lower socioeconomic level had the highest mean drug consumption ( $6.59 \pm 3.33$ ), while those who considered themselves to be at the highest level, presented the lowest mean ( $5.85 \pm 2.03$ ). Even so, there was no significant association between these two variables ( $p = 0.739$ ).

The evaluation of relation between age and the need to take several drugs for the same pathology revealed no relation between the two variables ( $p = 0.947$ ). On the other hand, there was a statistically significant association between the taking of several drugs for the same pathology and the number of drugs prescribed

**Table 7 Self-perception of health status or the sample.**

	Gender	Female	Male	Total	%	<i>p</i>
Self-perception of health	Very good	1	2	3	1.3	0.039
	Good	11	13	24	10.4	
	Reasonable	44	62	106	46.1	
	Weak	40	25	65	28.3	
	Very weak	21	11	32	13.9	

**Table 8 Relation between the number of prescribed drugs and variables with significant relation.**

Variables	Groups	Mean $\pm$ standard deviation	<i>p</i>
Taken of several drugs to control same disease	Yes	$7.26 \pm 2.71$	0.000
	No	$4.26 \pm 2.19$	
Way to identify medication	Name	$5.25 \pm 2.68$	0.001
	Packing	$6.30 \pm 3.21$	
	Name and/or packing	$6.93 \pm 2.58$	
Knowledge of all therapeutic indications	Yes	$5.41 \pm 2.66$	0.000
	No	$7.82 \pm 2.74$	
Errors (carelessness)	Yes	$6.80 \pm 3.00$	0.031
	No	$5.92 \pm 2.84$	
Self-perception of health	Very good	$3.33 \pm 2.52$	0.000
	Good	$3.50 \pm 2.47$	
	Reasonable	$5.27 \pm 2.00$	
	Weak	$7.49 \pm 2.66$	
	Very weak	$8.97 \pm 2.97$	

**Table 9** Relation between academic qualifications and variables with significant relation.

Variables		Way to identify medication			Knowledge of all therapeutic indications	
		Name	Packing	Name and/or packing	Yes	No
Academic qualifications	Do not read neither write	0	51	3	26	28
	1st incomplete cycle	11	15	27	39	14
	1st cycle	37	13	39	65	24
	2nd Cycle	11	1	7	12	7
	3rd cycle	5	0	4	6	3
	Secondary education	4	0	0	4	0
	Higher education	2	0	0	2	0
	<i>p</i>	0.000			0.027	

( $p = 0.000$ ). The analysis in Table 8 shows that elderly people who require two or more medications to control one pathology take, on mean, 3 more drugs daily, compared to those requiring only one.

In the sample surveyed, there were also significant relationships between the number of medications taken and their mode of identification ( $p = 0.001$ ). The individuals who affirmed to know the name of all drugs are those who, on mean, take them in a smaller number ( $5.25 \pm 2.68$ ), while the patients who identify some by the packaging and others by their name are those who, on mean, take more drugs ( $6.93 \pm 2.58$ ). In addition, the elderly who referred to not know the therapeutic indications of all medications take, on mean, more drugs than those who know them:  $7.82 \pm 2.74$  and  $5.41 \pm 2.66$ , respectively ( $p = 0.000$ ).

Regarding the administration errors, only a statistically significant difference was observed for the elderly who revealed to be careless to take the medication ( $p = 0.031$ ). It was verified that the individuals who commit the most errors are those who, on mean, take more drugs ( $6.80 \pm 3.00$ ).

As described in Table 8, there was also a statistically significant relation between the self-perception of health status and the number of drugs taken ( $p = 0.000$ ). The elderly with a very good perception of their health are those who present a lower mean daily drug value ( $3.33 \pm 2.52$ ), while those with very weak self-perception are those who take a larger number daily ( $8.97 \pm 2.97$ ).

Academic qualifications have been shown to have an

influence on the elderly's knowledge about medication, and it has been verified that they have the lowest qualifications, who has less knowledge about the medication they take ( $p = 0.027$ ). It was also verified that the academic qualifications condition the way in which the participants identify the medication ( $p = 0.000$ ). The majority of the elderly who cannot read or write, only identify the drugs by their packaging; according to the increase of academic qualifications, the way of identification progress in the following order: packaging, packaging and/or name, name (Table 9).

#### 4. Discussion and Conclusions

The increase in the average life expectancy which, on the one hand, results from a continuous evolution of health systems, techniques and treatments, on the other hand, is a challenge for professionals. Medical and scientific progresses, associated with the growing number of available drugs, require health professionals to make increasingly difficult and complex therapeutic decisions, especially when applied to polymedicated individuals.

Regarding academic qualifications, it was verified that about a quarter of the participants (23.5%) did not have any level of schooling, 38.7% completed the first cycle, while 23.0% did not complete this level of education; that is, of the elderly respondents, 85.2% have, at the most, the first cycle of schooling. These results differ considerably from those obtained by Silva et al. [9] in a study carried out in Lisbon, in which only

18.8% of the elderly had, at the most, the first cycle of schooling, in spite of the group of individuals who completed the first cycle was similar (38.7% in FP and 44.6% in the cited study) [9]. These divergences are mainly due to the context and environment in which the studies were carried out. Although the time difference would have expected a positive evolution of education, increasing the number of elderly people with increasingly higher qualifications, this has not occurred. The FP, because it is situated in a rural environment, the main concerns during the children and adolescence of the respondents were to work in the countryside and to support the numerous families that, allied with the scarcity and distance of the educational establishments, made it difficult to access the education. On the other hand, the study by Silva et al. [9] focused on the populations of a capital, a more developed region that offered a wide range of opportunities to their inhabitants.

In this study, there was a statistically significant and positive association between age and the number of drugs prescribed, although the correlation was weak ( $r = 0.133$ ). This means that the increase in the age of the users is accompanied by an increase in the number of drugs prescribed. However, it should be noted that correlation does not mean that the increase in age is responsible for the increase in the number of medications taken, representing only the existence of an association between these two variables.

The elderly surveyed in FP took, on mean, 6.20 drugs daily, whereas in the study by Silva et al. [9], the mean was inferior ( $3.9 \pm 0.2$  drugs). This can be explained by the time difference between the two studies, that reflects the increase in the average life expectancy: in spite of weak correlation, it is the most aged people who consume more drugs. On the other hand, this daily mean is much closer to that found by Salve et al. [2] in an investigation conducted a hospital in Puducherry (India). Patients admitted to the city hospital, during the study period, consumed  $7.61 \pm 3.38$  drugs daily, although their mean age was six years lower ( $71.64 \pm$

6.51 years) [2]. This may be due to the different level of development of the countries and consequent shortage of care and medical supervision given to patients.

In this study, although the mean daily consumption of drugs was higher in females than in males ( $6.48 \pm 3.06$  and  $5.92 \pm 2.74$ , respectively), there was no statistically significant relation between the female gender and the number of prescribed drugs ( $p = 0.146$ ), contrary to other studies [9]. Women who are the most concerned about health and the main consumers of health care are, usually, those present a higher prevalence of polypharmacy. However, in the present study, this tendency did not verify. One of the possible reasons is that, given the rural environment where the sample lives, the male members are those who had the most demanding and physically gruelling jobs and who, at the geriatric age, need to consume more drugs to diminish the consequences of the job.

The Martins et al. [27] study, carried out in twelve community pharmacies in the district of Lisbon, obtained resembling conclusions to those of FP: the elderly was also between 65 and 95 years old and had a mean age of 74.99 years old. The patients consumed, on mean, 7.23 drugs, whereas in the masculine gender the consumption was lower than in the feminine ( $6.78$  and  $7.45$ , respectively) [27]. Despite the evident similarities in the results of the two studies, slightly higher values in Martins et al. [27] may be justified with the geographical region in which the study was carried out. In the Lisbon district, the provision of medical care is much larger and more varied. This ease of access increases the consumption of medical care, which is reflected in the number of medicines taken daily.

In the present study, there was a high prevalence of *Major* polypharmacy (70.4%), as corroborated by other studies. Also, the Eiras et al. [14] study in a Family Health Unit in Oporto showed a high percentage of *Major* polypharmacy: 59.1% of respondents took 5 or more different drugs daily. This percentage difference

between the studies can be justified with the different age distribution of the constituent individuals of the respective samples and strengthen with the statistically significant association between age and the number of drugs prescribed. In FP, 45.7% of the elderly were aged between 75 and 84 years old; in Eiras et al. [14], this age group represented only 37.1% of the respondents and almost half of the elderly (49.4%) were between 65 and 74 years old.

Although it is not a relation with statistical significance, it is important to point out that it was the elderly who considered their socioeconomic level lower than those who take more medication, although they are the ones with the least financial capacity to pay the costs associated with taking many drugs. This may be due to late access to medical care and the consequent irreversibility of simple pathological conditions and the need to take more medication.

The relation between age and the need to administer more than one drug for the treatment of one pathology was also not significant. The adoption of an unhealthy and unregulated lifestyle, accompanied by risk behaviours at an earlier age, which affect the health of people and the need to take drugs to minimize the consequences of these behaviours represent a possible justification.

On the other hand, the relation between the number of medications taken and the taking of several drugs to control the same pathology was statistically significant ( $p = 0.000$ ), according to expected. As more drugs needed to take only for one disease, the greater the number of drugs consumed, thus justifying the relation with statistical significance.

In the present study, it was also observed that the number of medications taken is strongly related to the knowledge that the elderly have about them and how to identify them.

It was verified that the greater the number of drugs, more difficult it is to identify them: the elderly who identify all medications by name take them in smaller number than those who only recognize them by their

packaging. Nevertheless, it is concluded that it is not the elderly who only identify the packages that take more drugs daily, but those that recognize some by name and others by the packaging ( $6.30 \pm 3.21$  and  $6.93 \pm 2.58$ , respectively). One of the possible reasons may be to focus on the academic qualifications of the sample. There were no significant associations between academic qualifications and number of drugs taken, but between academic qualifications and the way of identifying the medications ( $p = 0.000$ ). None of the elderly without schooling admitted to be able to identify all drugs by name. However, according the schooling increase, the way of identifying medication also progresses in favourable form: in the 2nd class, only one participant identifies all drugs by their packing, and this mode of identification is not recorded at higher levels of schooling.

The association between the number of drugs and the knowledge of the therapeutic indications of all of them is also significant, and, as expected, the elderly who take less drugs are those who know the clinical uses of all of them. Even so, stands out the high percentage of the elderly people who do not know the therapeutic indications of all the medication they do daily (67%).

The knowledge or lack of knowledge of drug indications is also connected with academic qualifications ( $p = 0.027$ ). It was verified that it is the elderly with less qualifications who are most ignorant of the medication they take. On the other hand, at higher levels, such as secondary and higher education, all the elderly know the indication of the all administered drugs.

Regarding the errors of administration and interruptions of the therapy, only a significant relationship was observed between the number of drugs taken and the careless (mistakes or out-of-hours recommended take). This positive result, like the fact that only 22 elderly people (9.60%) did not reference the chronic medication taken when consulted by another prescriber, reveals the concern and care that individuals have, in spite of their physical and mental

weaknesses, to comply in full the treatments recommended in order to improve or maintain their health condition.

In terms of self-perception of health status, the most prevalent class was *reasonable* (46.1%), and a statistically significant association was found between the male gender and this self-perception. These results are resembling to Silva et al. [9] study, in which the *reasonable* class was the most prevalent (41.5%), and also the men who presented better health self-perceptions compared to women. In addition to the fact that men consume less drugs than women (evidenced by different studies), another possible justification may be the greater unconcern that men have in relation to health.

The most commonly prescribed pharmacotherapeutic groups were cardiovascular (36.9%), followed by the CNS (21.3%). Martins et al. [27], in a study with 213 elderly patients, also concluded that the most prevalent groups were cardiovascular and CNS, with 35.4% and 22.6%, respectively. These two groups were also the most prevalent in Eiras et al. [14] study, with 571 and 421 prescriptions, respectively. The high use of drugs with action in the cardiovascular system is easily explained, taking into account the data presented by the Direção Geral de Saúde: in Portugal, the mortality rate for cardiovascular diseases is one of highest in Europe and in the world. Over the years, the healthy Mediterranean diet has been replaced by a large number of risk behaviours that increase and aggravate cardiovascular morbidity and early mortality, such as high salt, fat and calorie intake, excessive alcohol consumption, and unruly smoking in ever-growing youngsters and sedentary [28]. Thus, it can be deduced that a large percentage of drugs consumed and drug costs could, in part, be avoided with simple changes in lifestyle. On the other hand, and regarding prescriptions for CNS, according to the Mental Health Report (2001) of WHO, one person in four people will be affected throughout by a mental disorder. The same report also refers that

the risk of developing mental disorders increases with age, which takes on a larger dimension given the global aging of the population. Nowadays, it is also known that mental diseases result not only from biological factors but from a combined interaction of biological, psychological and social factors [29]. Thus, the high prevalence of prescribing drugs acting in the CNS is not only due to physiological changes due to age, but also to the cultural and economic environment in which people are inserted.

Against the above, it is necessary to adopt strategies that reduce the polypharmacy in the elderly, and the rationalization of prescription should be a priority in health systems. Thus, originated the term *deprescribing*, which designates the suspension of a specific drug under the supervision of a physician [30]. Drugs that contribute to prolong life and maintain normal physiological functions may, on the other hand, affect the quality of life of the elderly, and therefore require a careful evaluation of their risk-benefit. It should be noted that the consequences of chronicity of the polypharmacy are due not only to the high number of drugs taken, but to their long-term use [17]. Other strategies, such as The Beers Criteria, the START/STOPP method (Screening Tool to Alert Doctors/Screening Tool of Older Persons' Potentially Disabled Prescriptions), the MAI (Medication Appropriateness Index), the PRISCUS List, the FORTA method (Fit for the Aged Criteria), among others, have already been proposed to attenuate polypharmacy, although they are hardly incorporated into daily clinical practice in order to optimize the therapeutic regimens [31].

Pharmacy professionals may also take a leading role in therapeutics through activities such as medication review, identification of drug interactions, and pharmacotherapeutic monitoring. In addition, the pharmacy technician plays a key role in adherence to therapy on the part of the patients, because it is the last health professional with who they contact before administering the medication.

Given the results obtained and the statistically significant relations found between the number of drugs prescribed daily and the various variables, it is concluded that the objectives of the study were, in general, achieved. However, it is also important to mention main limitations that mainly focus on the sampling technique used. Accidental sampling does not allow all individuals in the population the same probability of being selected. In this study, this means that the results presented only reflect the medication habits of the relatively autonomous and independent elderly, with the capacity and means to go to the FP, thus not including the most debilitated elderly, in which cases they are the family and neighbours to buy the drugs in the community pharmacy. In addition, the fact that the data collection is done in a pharmacy increases the probability of selecting elderly with more pathologies and more medicated with the population in general. The possibility for participants not to remember all the pharmacological information required to complete the questionnaire, and in cases where the elderly was not accompanied by the medical prescription at the time of the interview, was easily skirted by accessing their customer card.

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