An evaluation of elderly people's understanding of pharmacotherapy among those treated in the Primary Healthcare System in Belo Horizonte, Brazil

Isabela Vaz Leite Pinto [1]
Adriano Max Moreira Reis [2]
Celline Cardoso Almeida-Brasil [2]
Micheline Rosa da Silveira [2]
Marina Guimarães Lima [2]
Maria das Graças Braga Ceccato [2]

[1] Secretaria Municipal de Saúde, Prefeitura de Belo Horizonte. Av. Afonso Pena 2336, Funcionários. 30130-007 Belo Horizonte MG Brasil. isabelaleitepinto@ yahoo.com.br
[2] Faculdade de Farmácia, Universidade Federal de Minas Gerais. Belo Horizonte MG Brasil.

Abstract *There are a greater number of elderly people with diseases which has led to a greater use in medication and complexity in pharmacotherapy. The aim of this study was to understand the level of understanding on pharmacotherapy amongst the elderly and associated factors. An analytical transversal study was carried out in the Primary Health Care Units. Sociodemographic, clinical, and functional characteristics relative to the use of medication were explored. The level of understanding was obtained after a concordance analysis had been done based on the responses from the interviewees and the information on the medical prescriptions such as: name of medication, dosage, frequency, indication, precautions and side effects. The global level of understanding was classified as insufficient in cases where the discordance was ≥ 30%. Of the 227 elderly people interviewed, 51.1% showed an insufficient understanding in relation to their medication. We carried out multivariate logistic regression to observe the factors associated with an understanding of pharmacotherapy. We noted that those with a low level of education and a dependency on the use of medication showed insufficient understanding. (p < 0,05). It is necessary to implement strategies to increase the quality of the guidance given to the elderly and to ensure compliance.*

Key words *Comprehension, Patient medication knowledge, Drug therapy, Aged, Primary Health Care*

Introduction

The increase in the elderly population and general life expectancy that can be seen in Brazil and in the world and has been called the Longevity Revolution[1]. A policy that takes into account the longevity revolution ought to be accompanied by 4 key elements so that people can age well: primary health care (PHC), access to knowledge, financial conditions and support and care from family, friends and those close to the individual[2]. PHC is one of the essential strategies for the promotion of health for older people since aging is a dynamic process that brings vulnerabilities and greater incidents of morbidity. During the process of aging, morphological alterations occur as well as physiological, biochemical and psychological changes in the individual. This results in the progressive loss of capacity to adapt to the environment[3] and it explains the prevalence of the chronic diseases[4] and the use of various medications simultaneously[5].

The use of multiple medications can bring about clinical implications in relation to effectiveness, safety and adherence as well as having economic impacts[5]. In order for the medication to be adequate, it is necessary that the patient has the necessary information so that can use it in compliance with the medical prescription[6,7]. The person should know the dosage to take, the frequency and the importance of the medication that is being used[8].

The lack of effective strategies for the transmission of information from health care professionals to patients and/or the non-understanding of such information can bring serious consequences such as inadequate adherence, that can worsen the clinical state of the patients[9-11]. The non-understanding of the prescribed therapy can be a reason why the medication that has been recognized as effective under control conditions, becomes ineffective when used on the population at large[6].

The understanding of pharmacotherapy means that the patients should know: the name of the medication, indication, frequency of use, side effects or special instructions in relation to its use[12]. The understanding of pharmacotherapy can be influenced by different factors such as those related to the individual, the therapy itself, the health care professional and the health service[9]. The factors related to having the worse understanding of pharmacotherapy described in the research studies published are: being male[13-15], advanced age[15-18], low level of schooling[15-19], poor socioeconomic status[13,14], cognitive deficit[13,20], presence of comorbidities[17], use of multiple medications[18,19,21], great complexity of the pharmacotherapy[6,22] and low adherence to pharmacotherapy[15,22].

International research that studied the understanding of pharmacotherapy in the elderly doesn't show methodological homogeneity and presents varied results[21-24]. This makes it difficult to make comparisons and to come up with definitions that encapsulate the knowledge of therapeutic regimes. In Brazil, research that focuses on the aspects relative to the information obtained by patients on their prescribed medication and their understanding of this information is scarce. We weren't able to find publications exploring the understanding of the elderly in relation to medication[6,7,11,14,18,25].

In the context of assistance given through PHC, it is important to evaluate the understanding of the medical prescription by patients. However in research studies published, there is no consensus on what constitutes this knowledge of the therapeutic regime nor is there information on what to do in relation to measuring knowledge levels. Nevertheless, knowledge of the level of understanding of pharmacotherapy in patients that are elderly and who are attended to by the PHC and identifying the characteristics that influence this understanding, are central aspects in analyzing this area and intervening effectively in the process of using the medication.

In this way, this study aimed to evaluated the level of understanding of pharmacotherapy and the associated factors amongst older people in two Primary Health Care Units in Belo Horizonte.

Methods

A transversal analytical study was carried out in two Primary Health Care Units (PHUs) in the municipality of Belo Horizonte MG from November 2013 to April 2014. The following was the eligibility criteria for inclusion: being 60 years old or over, an user of the PHC in Belo Horizonte, receiving medication in the pharmacies of the PHUs that were studied and, at the moment of the interview, carry in their hands at least one medication. The receipt of the medication in the PHU pharmacy is only permitted if the person is a resident of Belo Horizonte. Also the patient must be: registered on the electronic system in municipality, have identification documentation and have a prescription from a professional that

works in the public or private health sector. The individuals were invited to participate in the research when they were in the queue in the pharmacy waiting to obtain their medication.

In order to calculate the sample we used information from the pharmacy information system at the PHU (SISREDE). Based on this information, we found out that the monthly mean number of elderly people being served by the pharmacies in the PHU from January to October 2013 was 483 individuals. With this monthly service being carried out in the PHUs, we adopted the premise that those being seen were regulars to the pharmacies and attend the pharmacies once a month to receive the chronic use drugs. Considering the finite population of 483 individual, there was a prevalence of 50% for all of the characteristics observed, 5% level of significance, confidence interval (IC) of 95% and a 10% possibility of loss, the sample was estimated at 237 older people. The selection of the sample was done consecutively for convenience. The individuals that fulfilled the inclusion criteria were selected after signing a Consent Form. The project was duly approved by the Ethics Committee on Research in the institutions that were involved in this study.

The collection of data was based on the use of structured interviews with patients which were carried out from November 2013 to April 2014. The questionnaire contained questions covering: sociodemographic, clinical and functional characteristics and information related to the use of the medication. All of the interviews were carried out by a principal researcher, resident pharmacists and academics studying pharmacy and medicine who had been previously trained on the procedures to be used. With the objective of evaluating the inter-interviewer reliability, approximately 10% of the participants (n = 20) were re-interviewed 2 times by different interviewers. A consistency analysis was done which obtained a kappa value = 0.835.

The level of understanding of the elderly on pharmacotherapy was evaluated based on the proposal of Silva et al.[7] and Ceccato et al.[25]. This was done through questions in relation to all of the prescribed medication that the individual had in their hand at the time of the interview covering the following items: name of the drug, dosage, frequency of use, indication, side effects and precautions (Chart 1). Medication that was used based on self-medication was not evaluated. At the time of the interview the individual was permitted to look at the prescription or the med-

ication packaging or any notes that they had in their hands.

The responses to the questions were transcribed and interpreted by 2 revisers who evaluated concordance between the information provided by the patient with the instructions on the medical prescription, medical records and/or guidance from the National Therapeutic Form[26], for medication shown at the time of the interview. Where there was discordance amongst them, a third reviser was used. Differences in the technical and popular terminology were accepted as well as differences between the terminology on the medical prescription and the description given by the participant. The responses were considered as dichotomous (correct/wrong) and we adopted the following scoring for each item that was considered as correct: i. name of the drug, dosage and frequency of use = 2 points for each, whereas items considered of great importance for the safe use of the medication; side effects and precautions = 1 point for each of the aforementioned. "Zero" was given for cases where the participant didn't know the responses for the specific item or when the person responded incorrectly. The maximum score would be equal to 9 points where correct responses were given for all of the items. After this we calculated the level of understanding of the pharmacotherapy for each medication that was presented. Subsequently the global level of understanding on the treatment for each individual based on the mean values obtained for each medication. The level of global understanding of the prescription was classified as "insufficient" for individuals that obtained a score of less than 70.0% of the points (< 6.3 points) according to Ceccato et al.[25] proposition.

The investigated explicable variables were group namely: i. sociodemographic characteristics (gender, age, level of education, living alone, income measured in minimum salaries, marital status and race), ii. clinical characteristics (comorbidities, depression, self-perception of health, cognition), iii. functional characteristics (basic and instrumental activities of daily living) and iv. characteristics related to the use of the medication (number of medication, complexity of the pharmacotherapy, adherence, independence in administering the medication and guidance received from the health care professionals). We use validated scales and/or adapted scales for the Brazilian context for the evaluation of variables: depression - the Geriatric Depression Scale of 15 items[27] (individuals with symptoms of depression: ≥ 6 points), cognition -MiniMental

Chart 1. An evaluation tool for the understanding of pharmacotherapy in older people[*].

Question	Specification	Score
1. Do you know the name of this medication? IF YES GIVE ME THE NAME:	This question is answered correctly if: the respondent pronounces the word correctly or the generic name is given or the trade name given for the medication	2
2. Do you know QUANTITY of the medication that you must take each time? IF YES, STATE IT:	The correct answer is given when the respondent responds in accordance with what has been place of the medical prescription (grams, milligrams, milliliters, micrograms, number of tablets, capsules)	2
3. Do you know how many times in the day should you take the medication? IF YES, STATE IT:	A correct answer is given when the respondent answers in accordance with what has been placed on the medical prescription regarding the number of times in the day (ex: 2 times per day), the specific time in the day (ex: in the morning and at night, 8 in the morning and 8 at night) or in intervals between doses (ex: 12 in 12 hours)	2
4. Would you be able to explain why you need this medication? IF YES, STATE IT:	A correct answer is given when the respondent responds in accordance with the therapeutic information for their specific class of medication or in accordance with information on the National Therapeutic Formulary	1
5. Do you know whether using this medication can cause any side effects or undesirable consequences? IF YES, STATE IT:	The question is correctly answered when the respondent stateat least an adverse effect that could occur as mentioned in the National Therapeutic Formulary	1
6. Do you know whether special care should be taken in relation to this medication? IF YES, STATE IT:	The question is correctly answered when the respondent states the special care that should be taken as mentioned in the National Therapeutic Formulary	1

[*]Adapted by Silva et al.[7] and Ceccato et al.[25].

State Examination[28,29] (individuals with cognitive incapacity: ≤ 13 points for illiteracy: ≤ 18 points for individuals with 1 to 8 years of schooling and ≤ 24 points for individuals with more than 8 years of schooling[29]), adherence - the therapeutic Scale of adherence with 8 items proposed by Moriskyet al.[30]; complexity of pharmacotherapy - *Medication Regimen Complexity Index*[31]; basic activities of daily living- Katz[32] Scale and the instrumental activities of daily life – Brody & Lawton Scale (independent individuals = 21 points)[33]. The medication present in the medical prescription which was shown by the individual was classified by the *Anatomical Therapeutic Chemical – ATC*[34], at the levels of 1º and 5º (the principal anatomical group and sub-chemical group respectively). The evaluation of the dependency on the use of medication was carried out using the following question: "Mr/Ms, do you rely on the support of

someone to take your medication?". It was considered dependent on the individual who answered "yes" to the question.

A database was created in the Epi Info Program version 3.5.4 (Center for Disease Control and Prevention, Atlanta, United States). We carried out quality control for the typing up of the data with the replication being 10% of that which was digitized. The analysis of the reliability of the typist was carried out using the kappa statistics where kappa = 1.0 would indicate excellent concordance.

In order to conduct a descriptive analysis of data, we determined the frequency, measurements of central tendency and dispersion for the studied characteristics. The continuous variables were dichotomized based on the median and Pearson's chi-squared test was applied to the comparison of proportions. The magnitude

of the association of the global level of understanding of the elderly people and the expected variables were estimated through the use of the Odds Ratio (OR) with the interval of 95% of confidence (IC95%) using the univariate logistic regression and multivariate analysis.

The variables that obtained p-value ≤ 0.25 in the Wald test in the univariate analysis were selected to the multivariate model. The variables that were clinically and epidemiologically relevant, were selected manually to start the multivariate model, using step by step procedures with the selections underlying our research. In the final model the variables that were obtained with the value of p < 0.05 were kept. We used the Likelihood Ratio test to compare the models. The adequacy of the final model was evaluated by the Hosmer-Lemeshow test. Statistical Analysis was done using the software *Statistical Package for Social Sciences*® (SPSS®) 21.

Results

Of the 230 elderly people that were invited to take part of the study, 3 of them were excluded as they didn't meet the inclusion criteria, which left 227 eligible participants. Of these, 221 (97.4%) responded to the questionnaire without any help from a caregiver. We observed that the majority of the respondents were women (70.9%), individuals that were aged up to 79 (84.1%), with up to 8 years of schooling (75.7%), who lived alone (76.2%) and with an income of up to 2 minimum salaries (60.9%) (Table 1). The mean age amongst the participants was 71.4 years old (DP = 7.5; Coefficient variation-CV = 10,6%).

In relation to clinical characteristics, 23% presented symptoms of depression. The self-referred health was as positive (excellent, very good or good) for 70% of the participants (Table 1). The illnesses that were most prevalent amongst the elderly were: systemic arterial hypertension (n = 196; 22.2%), dyslipidemia (n = 131; 14.8%); others cardiovascular diseases (n = 79; 8.9%), illnesses affecting the joints (n = 79; 8.9%), *Diabetes mellitus* (n = 74; 8.4%) and psychiatric disorders (n = 59; 6.7%).

In relation to the functional characteristics, 13.9% of the older people showed signs of cognitive incapacity. 76.5% were considered independent to do basic activities of daily living, 22.9% were considered to be independent to do instrumental activities of daily living and the rest of the participants shown to be partially dependent on someone to perform such activities (Table 1).

In relation to the use of medication, we identified a total of 1176 prescription drugs. The mean daily prescription drugs was 5.3 (DP = 2.3, CV = 44.1) and 58.6% (n = 133) of the individuals used 5 or more prescription drugs. The rate of complexity of the prescriptions had a mean value of 22.7 (DP = 10.9, CV = 48.0%) with a minimum of 4.0 and a maximum of 65.5. The most common medications used were medications for: cardiovascular system (50.4%; n = 593), alimentary tract and metabolism (17.1%; n = 201), nervous system (13.0%; n = 153) and blood system and blood forming organs (8.0%; n = 94). Amongst the different types of medications used the most common that were on the prescriptions were: hydrochlorothiazide (7.8%, n = 92), simvastatin (7.7%, n = 91), losartan (7.6%, n = 89), amlodipine (6.0%, n = 71) and acetylsalicylic acid (5.9%, n = 70).

In relation to the adherence to the pharmacotherapy, only 29.6% of the participants showed high levels of this. About 83% stated that they didn't need help to take their medication and 72.6% stated that they had already received guidance from a health care professional in relation to their pharmacotherapy. Amongst the professionals that gave guidance, the following were mentioned: doctors (n = 147), nurses (n = 12) and pharmacist (n = 11). When patients were asked about whether they understood the guidance, 84.7% (n = 144) of the participants stated that they understood everything or a lot. Out of all of the participants in the study, only 20.6% considered that they needed more information to understand the treatment with medication (Table 1).

The level of understanding was evaluated for a total of 629 drugs that were presented at the moment of the interview. Table 2 has the frequency of the correct answers for the items used in the evaluation of understanding referring to the medication presented by the participants. We observed a rate of concordance of 86.2% in relation to the doses, 84.4% for the indication, 82.7% for the frequency of administration, 75.8% for the name of the drug, 24.0% for the precautions with the medication and only 6.9% for the side effects.

116 elderly people (51.1%) presented insufficient understanding (< 6.3 points) in relation to the pharmacotherapy. The mean level of global understanding amongst participants was 6.02 (DP = 1.5, CV = 24.6%) which represents 66.9% of correct answers.

Table 1. Descriptive characteristics of the sample of the older people included in the study, Belo Horizonte – MG, 2014 (n = 227).

Description	n*	%	Description	n*	%
Sociodemographic characteristics			Functional Characteristics		
Gender	161	70.9	Cognition		
Female	66	29.1	Preserved Cognition	192	86.1
Male			Suspicion of cognitive incapacity	31	13.9
Age	101	44.5	Basic activities of daily living		
60-69 years old	90	39.6	Independent	173	76.5
70-79 years old	36	15.9	Dependent on someone to did the minimum of one activity	53	23.5
≥ 80 years old			Instrumental activities in daily living		
Level of Education	18	8.0	Independent	52	22.9
Illiterate	98	43.4	Partial dependency	175	77.1
Up to 4 years of formal education	55	24.3	Characteristics relative to the use of medication		
Up to 8 years of formal education	55	24.3	Number of medication		
> 8 years of formal education			≤ 4	94	41.4
Live alone	54	23.8	5 to 9	133	58.6
Yes	173	76.2	Adherence		
No			High	67	29.6
Income in minimum salaries*	131	60.9	Average	98	43.4
≤ 2	84	39.1	Low	61	27.0
> 2			Independence in the use of medication		
Marital Status	86	38.4	Yes	188	82.8
Married/Stable Union	67	29.9	No	39	17.2
Widower	48	21.4	Received guidance from health care professionals on medication		
Single	23	10.3	Yes	162	72.6
Separated/Divorced			No	61	27.4
Race	86	37.9	Consider the need for more guidance on medication		
Mixed-race	84	37.0	Yes	42	20.6
White	44	19.4	No	162	79.4
Black	13	5.7			
Others*					
Clinical Characteristics					
Symptoms of depression					
Yes	50	22.5			
No	172	77.5			
Self-perception of health					
Excellent or Very good	53	23.5			
Good	105	46.5			
Regular	60	26.5			
Bad	8	3.5			

* Total varied in accordance with the ignored information, * value of the minimum salary that was in existence = R$724,00.

In Table 3 we observed the distribution of the level of understanding of the classes of medication in accordance with the ATC 1 classification level and the 20 medicines presented with the greatest frequency. The highest scores were observed for the classes of drug that act on the sensory organs and the blood as well as for the drugs: metformin, acetylsalicylic acid, atenolol and clonazepam. The medicines acetaminophen, carvedilol, glyburide and ibuprofen presented the worse mean scores. The classes of the anti-infectives and dermatological medications presented the lowest scores.

In the univariate analysis, insufficient understanding was associated with having only been in formal education up to 4 years, presenting symptoms of depression, having a partial dependency for the instrumental activities of daily living, using 5 or more medications, mean or low adherence to the treatment and being dependent on the use of the medication (Table 4). The clinical and/or epidemiologically relevant variables were

Table 2. Frequency in the right answers given for the items used in the evaluation referring to the medication presented by the participants, Belo Horizonte - MG, 2014.

Item	n	%*
Dose	542	86.2
Indication	531	84.4
Frequency	518	82.7
Name	477	75.8
Precaution	150	24.0
Side effects	43	6.9

* percentage was defined in relation to the medication presented n = 629, the total varied in accordance with the ignored information.

included: age, the index of complexity, cognition and the receipt of guidance from health care professionals. After the adjusted analysis, individuals with up to 4 year of education had double the chances of having insufficient understanding in relation to those with more than 4 years of education. In addition, for those that did not have independence in the use of their medication, they had 3 times more chances of having insufficient understanding (Table 4).

Discussion

It was identified in the study that more than half of the participants (51.1%) presented a level of

Table 3. Level of understanding on the pharmacotherapy for every ATC 1 ° level class (principal anatomical group) and for the 20 medications presented with greater frequency by the participants, Belo Horizonte – MG, 2014.

ATC Class	Mean score of the class	Mean score for the medication
A –Alimentary Tract and Metabolism drugs	6.02	
Glyburide		4.67
Insulin		5.86
Metformin		6.86
Omeprazole		6.18
B- Blood and Blood Forming Organs Drugs	6.46	
Acetylsalicylic Acid		6.64
C- Cardiovascular System Drugs	6.11	
Amlodipine		6.23
Atenolol		6.58
Carvedilol		4.64
Enalapril		6.20
Furosemide		6.13
Hydrochlorothiazide		6.14
Losartan		5.83
Propranolol		6.50
Simvastatin		6.25
D - Dermatologicals Drugs	5.00	
H - Systemic Hormonal Preparations except Sex Hormones and insulin	5.80	
Levothyroxine		5.96
J - Anti-infectives for systemic use drugs	5.00	
M Musculo-Skeletal System Drugs	5.55	
Alendronate		6.00
Ibuprofen		4.80
N - Nervous System Drugs	5.81	
Clonazepam		6.56
Diazepam		5.86
Fluoxetine		6.27
Acetaminophen		3.90
R- Respiratory System Drugs	5.27	
S - Sensory organs Drugs	7.50	

Table 4. Univariate and multivariate analysis of the factors associated with an insufficient understanding of the pharmacotherapy in the sample of older people included in the study, Belo Horizonte – MG, 2014 (n = 227).

Description	Understanding Insufficient n[a] (%)	Univariate analysis		Multivariate analysis[*]	
		OR (IC 95%)	p value	OR (IC 95%)	p value
Sociodemographic characteristics					
Gender					
Female	82 (50.9)	1			
Male	34 (51.5)	1.02(0.58-1.82)	0.936	----	-----
Age in years					
≥ 70	54 (47.4)	1			
>70	62 (54.9)	1.35(0.80-2.28)	0.258	----	-----
Level of education in years					
Up to 4	74 (63.8)	2.85(1.66-4.8)	0.000	2.40(1.38-4.19)	0.001
> 4	42 (38.2)	1			
Live alone					
Yes	26 (48.1)	0.86(0.47-1.58)	0.619	----	-----
No	90 (52.0)	1			
Income in minimum salaries[**]					
≤ 2	70 (53.4)	1.32(0.76-2.29)	0.316	----	-----
> 2	39 (46.4)	1			
Living with a partner					
Yes	40 (46.5)	1			
No	74 (53.6)	1.33(0.78-2.28)	0.300	----	-----
Race					
White	39 (46.4)	1			
Black and Mixed-race	69 (53.1)	1.31(0.75-2.26)	0.342	----	-----
Clinical Characteristics					
Depression					
Yes	29 (58.0)	1.45(0.77-2.73)	0.254	----	-----
No	84 (48.8)	1			
Self-perception of health					
Positive Perception	77 (48.7)	1			
Negative Perception	38 (55.9)	1.33 (0.75-2.36)	0.324	----	-----
Functional Characteristics					
Cognition					
Preserved Cognition	98 (51.0)	1			
Suspicion of cognitive incapacity	15 (48.4)	0.90 (0.42-1.92)	0.784	----	-----
Basic activities of daily living					
Independent	85 (49.1)	1			
Dependent on someone to do the minimum of one activity	30 (56.6)	1.35 (0.73-2.51)	0.341	----	-----
Instrumental activities in daily living					
Independent	20 (38.5)	1			
Partial dependency	96 (54.9)	1.94 (1.03-3.66)	0.038	----	-----

it continues

understanding of their pharmacotherapy that was considered insufficient which triggered our attention to the consequences concerning the effectiveness and safety in the use of medication for older people in the context of primary health care. In spite of the lacuna found, for the understanding of patients, the majority of them thought that they understood a lot or everything concerning the guidance received from the health care professionals and that they didn't need further information on their medication. In this way, it was observed that the participants, in their

Table 4. continuation

Description	Understanding Insufficient n[a] (%)	Univariate analysis		Multivariate analysis[*]	
		OR (IC 95%)	p value	OR (IC 95%)	p value
Characteristics related to the use of medication					
Number of medicines					
<5	43 (45.7)	1			
≤ 5	73 (54.9)	1.44 (0.85-2.45)	0.175	----	-----
Index of Complexity					
> 20 points	51 (47.2)	1			
≥ 20 points	65 (54.6)	1.35 (0.80-2.27)	0.265	----	-----
Adherence					
High	30 (44.8)	1			
Mean and Low	85 (53.5)	1.42 (0.80-2.51)	0.233	----	-----
Independence in the use of medication					
Yes	86 (45.7)	1			
No	30 (76.9)	3.95 (1.78-8.78)	0.000	3.02(1.33-6.88)	0.030
Received guidance from health care professionals on medication					
Yes	84 (51.9)	1			
No	29 (47.5)	0.84 (0.47-1.52)	0.566	----	-----
Consider the need for more guidance on medication					
Yes	22 (52.4)	1.07 (0.54-2.12)	0.839	----	-----
No	82 (50.6)	1			

[a] Total vary in accordance with ignored information; [*] Hosmer-Lemeshow test: $\chi 2$= 2.205; df = 2; p= 0.332. [**] value of the minimum salary at the time = R$724,00; OR: *odds ratio*; IC: interval of confidence.

great majority, didn't have an adequate perception of their own knowledge regarding the use of their medication.

Older people use medication extensively and as a result have a higher risk of suffering adverse reactions to the medication because of pharmacokinetics and pharmacodynamic alterations when aging[3]. Aside from this, there was a higher prevalence of cognitive incapacity amongst people in this age group, which made understanding difficult as well as hindering the adherence to the pharmacotherapy. This makes the use of medication amongst older people a critical situation[20]. A fact worth highlighting is that the characteristics found in the present study are similar to the sociodemographic characteristics of Brazilian elderly[35,36].

We compared the percentage of concordance between the information related to the medical prescription and the information given by the patient for the medication presented at the moment of the interview. Amongst the items considered to be very important for the use of medication –

name, dose and frequency – it was observed that there was a low proportion of concordance for the medicine's name. The proportion of the low concordance for the name of the medication (24.4%) was about 2 times greater than what was found for the dosage (13.8%) and about 1.5 times greater than what was found for the frequency (17.3%). This fact was found in previousstudies[7,25] and it probably owes itself to the great complexity of the names of the drugs. Frequently, the names are not similar to any word in the patient's vocabulary. They are not familiar with the names and they have difficulties in memorizing and pronouncing them. It's important to state that in this study we accepted differences amongst the technical and popular terminology, and the participant could look at either the medication packaging, the medical description or any notes that they had in their hands during the interview. There was low concordance for the side effects item which was the case for other similar studies[6,11,19,25]. This situation can be explained, in part, by the fact that health care professionals, many times, did not

write down any information on the prescriptions for fear of alarming the patients and this led to non-adherence to the treatment[19]. Aside from this, the medical appointments were short in terms of time which meant that the health care professional gave priority in providing information such as: name, dose and frequency of use of the medication, at the detriment of information on possible side effects[12,19]. The low amount of knowledge of the side effects is a worrying fact that requires attention. Patients that are not familiar with such effects present a greater risk of having serious complications since some of these side effects can lead to the person being hospitalized and they may even die[19]. It is important to emphasize that knowledge of the side effects may contribute to relations being improved between health care professionals and patients since patients will have the liberty to inform the health care professional when one of the such effects occurs.

The understanding of every class of medication in accordance with the first ATC level presented a low score for medication frequently used in acute conditions or used sporadically such as ibuprofen, paracetamol, or anti-infectives or dermatological drugs. In past studies[6], it was observed that less knowledge was associated with the use of anti-infective medication and drugs for the respiratory system. Also, found that there was greater knowledge of medication used for chronic problems when compared to medication used in a sporadic way[10]. Probably, it occurs because the medication used for chronic problems are used for a prolonged period of time and as a consequent the patient becomes more familiar with it and their understanding of it is better.

The index of complexity for the pharmacotherapy is an important tool since the simple acting of counting the medication in itself is not sufficient to measure the complexity of the medication usage regime[37]. In previous studies, an association of low understanding of pharmacotherapy with the greater complexity of the problem was found[6, 22]. This occurs because the greater the quantity of information to be assimilated, greater the difficulty in memorizing the instructions[6]. It is important to highlight that the tool for evaluating the complexity used in this study[31] was presented as a continuous variable. The mean found for the index of complexity of the pharmacotherapy in the sample studied, was close to a study carried out on older people in the United States[38]. However, what was not clear was the score that ought to be reached for a prescription to be considered complex.

A low level of education and the dependency on the use of medication were factors independently associated with an understanding of the pharmacotherapy. The association of the level of education with the understanding of the pharmacotherapy was demonstrated in previous studies with adults[6,14,15,18] and older people[19]. Patients with a low level of education showed difficulties in reading, memorizing and understanding the instructions as well as having a poor understanding of the information given by the health care professionals[6,14]. Health Literacy means having the ability to obtain, process and understand basic information and services that are necessary in order to take adequate decisions regarding health care[39]. Health literacy can be worse than general literacy. An individual may be able to understand a material of something that is common to them but have to major effort to understand materials in vocabulary or concepts that are unfamiliar to them, such as those used in medical prescriptions[39]. The worse health literacy is associated with low levels of knowledge related to health and a poor control of chronic diseases[24]. Therefore it is recommended that the medical team be attentive to the patients with little education. They should be prepared to serve them individually using accessible vocabulary that is written legibly and when necessary, strategies for improving understanding of the pharmacotherapy should be implemented with the use of designs, colors and symbols. One important action to improve the knowledge of older people in relation to medication is the insertion of pharmacists in the multi-professional health care team. It is known that the guidance given by pharmacist contributes to increasing understanding and as a consequence, increases the compliance with medication treatment[11,16,25]. In 2008 pharmaceutical assistance was included as one of the strategic areas for the actions of the *Núcleos de Apoio à Saúde da Família*, a team of professionals that act as support for the PHCTeams[40]. The pharmaceutical professional in NASF should develop focused actions in patient care and they should not be limited to administrative activities[41]. In spite of important advances, the number of pharmacist in PHC is incipient with only one responsible professional for a population that has approximately 20 to 40,000 people[42]. This low number of pharmacists in the PHC may explain the fact that these professionals have not been mentioned much as responsible for giving guidance in relation to medication. The pharmacist, for being the reference for various PHC

teams[42], often carries out clinical appointments with individual patients that are a part of specific risk groups. Therefore, the insertion of pharmacists in sufficient numbers in the health services can contribute to improving the adherence and understanding of pharmacotherapy and thus contribute to the reaching of the objectives of the pharmacotherapy.

It was noted in one study that the 55 and over who had good functional capabilities, presented the best knowledge on the pharmacotherapy[17]. In this study, the older people that used medicines in an independent way had a better understanding of the medication treatment. The probably explanation for this is the fact that when the individual depends on the help of a caregiver to administer the drug, he possibly will make less of an effort to understand the pharmacotherapy and as a result will have less understanding. Thus we highlight the importance of health care professionals providing guidance in relation to the medication of caregivers of older people as they are often responsible for the pharmacotherapy of older people. In the face of this scenario what emerges as a perspective is an investigation of the understanding of caregivers on treatment with medicines.

The understanding of pharmacotherapy is not described as a single concept in research studies published. It is looked on as embracing different aspects of pharmacotherapy that are not equivalent, in order to get a representation of the overall concept[9,12]. It is evident that there is a tendency for the inclusion in the studies of evaluating understanding of pharmacotherapy and the relative aspects such as: indication, frequency, name and dose of the medication. These items are considered essential for the safe use of medication. In the studies, the approach of the questions relative to conduct covers: what to do when forget a dose, safety, duration of the treatment, storage and medication interaction are reduced. These items can be judged as being relevant for the rational use of the medication. One point to be evidenced is that in spite of having various studies that evaluate understanding of pharmacotherapy, none of them used valid tools. The validation of a tool for the measurement of understanding of the pharmacotherapy is relevant for clinical and epidemiological research as it permits the obtaining of results that are more reproducible and there would be uniformity in the methodologies that would contribute to a wider level of knowledge. A valid tool can be applied to clinical practices with the provision of resources with the assurance of the detection of patients at risk of not understanding the pharmacotherapy.

It is important to highlight that this study is one of the first in Brazil that deals with the evaluation of understanding of pharmacotherapy amongst older people. In the international medical journals, such studies are scarce with few variables being analyzed[13,19, 20,21,22,2334]. The covering of the evaluated items in the definition from Ascione et al.[12], was highlighted.

A limitation of this study was the evaluation of understanding of pharmacotherapy for medication that individuals carried with them at the moment of the interview. In this case, the participant could not always have, to hand, all of the drugs that they normally used. We obtain a sample of convenience on the assumption that all elderly people were the same.

The findings of this study are useful for general research purposes and for practical clinical ones since it brings to the attention of health care professionals, managers and researchers the lack of knowledge in the elderly population concerning medication. Interventions need to be carried out so that the existing lacuna can be reduced between the information that the patient really knows and the information that he ought to know in order to safe use of medicines. The elderly that has little education should be prioritized for pharmaceutical clinical services. Guidelines with the focus on the older person should be implemented.

Conclusion

The insufficient understanding of pharmacotherapy was high in this study, principally amongst older people with low levels of education and a dependency in the use of medication. The insufficient understanding on the part of the older person can compromise the rational use of any medication, creating problems in relation to effectiveness and safety. Elderly extensively use medication and are more sensitive to adverse reactions. The services and the health care professionals ought to be prepared to attend to and guide elderly people in relation to medication, principally those that have low formal education.

Collaborations

IVL Pinto, MGB Ceccato, AMM Reis contributed to the concept of the project: collecting, analyzing and interpreting data. They also drafted and critically reviewed the relevant content of the article and was responsible and accompanied for all aspects of the work in ensuring accuracy and integrity in this paper. CC Almeida-Brasil contributed to the analysis and interpretation of the data and approved the final version. MR Silveira and MG Lima contributed to the conception of the project. They also critically reviewed and approved the final version.

Acknowledgements

References

1. Kalache A. Respondendo à revolução da longevidade. *Cien Saude Colet* 2014; 19(8):3306-3307.

2. Minayo MCS, Gualhano L. Cuidados frente à revolução da longevidade. *Cien Saude Colet* 2014; 19(8).

3. Rocha CH, Oliveira APS, Ferreira CF, Faggiani, CF, Schroeter G, Souza ACA, DeCarli GA, Morrone FB, Werlang MC. Adesão à prescrição médica em idosos de Porto Alegre-RS. *Cien Saude Colet* 2008; 13(Supl.):703-710.

4. Instituto Brasileiro de Geografia e Estatística (IBGE). Coordenação de População e Indicadores Sociais. Indicadores sociodemográficos e de saúde no Brasil: 2009/IBGE. Rio de Janeiro: IBGE; 2009. [acessado 2015 jan 05]. Disponível em: http://www.ibge.gov.br/home/estatistica/populacao/indic_sociosaude/2009/

5. Jyrkkä J, Enlund H, Korhonen MJ, Sulkava R, Hartikainen S. Patterns of drug use and factors associated with polypharmacy and excessive polypharmacy in elderly persons: results of the Kuopio 75+ study: a cross-sectional analysis. *Drugs Aging* 2009; 26(6):493-503.

6. Fröhlich SE, Dal Pizzol TS, Mengue SS. Instrumento para avaliação do nível de conhecimento da prescrição na atenção primária. *Rev Saude Publica* 2010; 44(6):1046-1054.

7. Silva T, Schenkel EP, Mengue SS. Nível de informação a respeito de medicamentos a pacientes ambulatoriais de hospital universitário. *Cad Saude Publica* 2000; 16(2):449-455.

8. Hope CJ, Wu J, Tu W, Young J, Murray MD. Association of medication adherence, knowledge and skills with emergency department visits by adults 50 years or older with congestive heart failure. *Am J Health-Syst Pharm* 2004; 61(19):2043-2049.

9. Ceccato MGB, Acúrcio FA, Cesar CC, Bonolo PF, Guimarães MDC. Compreensão de terapia anti-retroviral: uma aplicação do modelo de traço latente. *Cad Saude Publica* 2008; 24(7):1689-1698.

10. Chau I, Korb-Savoldelli V, Trinquart L, Caruba T, Prognon P, Durieux P, Piketty C, Sabatier B. Knowledge of oral drug treatment in immunocompromised patients on hospital discharge. *Swiss Med Wkly* 2011; 141:w13204.

11. Oenning D, Oliveira BV, Blatt CR. Conhecimento dos pacientes sobre os medicamentos prescritos após consulta médica e dispensação. *Cien Saude Colet* 2011; 16(7):3277-3283.

12. Ascione FJ, Kirscht JP, Shimp LA. An assessment of different components of patient medication knowledge. *Med Care* 1986; 24(Supl.):1018-1027.

13. Guénette L, Moisan J. Elderly people's knowledge of the purpose of their medicines. *Am J Geriatr Pharmacotherapy* 2011; 9(1):49-57.

14. Cruzeta APS, Dourado ACL, Monteiro MTM, MartinS RO, Calegario TA, Galato D. Fatores associados a compreensão da prescrição médica no sistema único de saúde de um município do sul do Brasil. *Cien Saude Colet* 2013; 18(12):3731-3737.

15. Okuyan B, Sancar M, Izzettin FV. Assessment of medication knowledge and adherence among patients under oral chronic medication treatment in community pharmacy settings. *Pharmacoepidemiol and Drug Saf* 2013; 22(2):209-214.

16. Ponnusankar S, Surulivelrajan M, Anandamoorthy N, Suresh B. Assessment of impact of medication counseling on patients' medication knowledge and compliance in an outpatient clinic in south India. *Patient Educ Couns* 2004; 54(1):55-60.

17. Gallagher R, Warwick M, Chenoweth L, Stein-Parbury J, Milton-Wildey K. Medication knowledge, adherence and predictors among people with heart failure and chronic obstructive pulmonary disease. *J Nursing Healthcare Chronic Illness* 2010; 3(1):30-40.

18. Motter FR, Olinto MTA, Paniz VMV. Conhecimento sobre a farmacoterapia por portadores de hipertensão arterial sistêmica. *Cien Saude Colet* 2013; 18(8):2263-2274.

19. Chan FW, Wong FY, So WY, Kung K, Wong CK. How much do elders with chronic conditions know about their medications? *BMC Geriatrics* 2013; 13:59.

20. Sela-Katz P, Rabinowitz I, Shugaev I, Shigorina G. Basic knowledge of the medication regimen correlates with performance on cognitive function tests and diagnosis of dementia in elderly patients referred to a geriatric assessment unit. *Gerontology* 2010; 56(5):491-495.

21. Modig S, Kristensson J, Ekwall AK, Hallberg IR, Midlov P. Frail elderly patients in primary care-their medication knowledge and beliefs about prescribed medicines. *Eur J Clin Pharmacol* 2009; 65(2):151-155.

22. Spiers MV, Kutzik DM, Lamar M. Variation in medication understanding among the elderly. *Am J Health-Syst Pharm* 2004; 61(4):373-380.

23. Tordoff JM, Bagge ML, Gray AR, Campbell AJ, Norris PT. Medicine-taking practices in community-dwelling people aged ≥ 75 years in New Zealand. *Age and Ageing* 2010; 39(5):574-580.

24. Mosher HJ, Lund BC, Kripalani S, Kaboli PJ. Association of health literacy with medication knowledge, adherence, and adverse drug events among elderly veterans. *J Health Commun* 2012; 17(Supl. 3):241-251.

25. Ceccato MGB, Acurcio FA, Bonolo PF, Rocha GM, Guimarães MDC. Compreensão de informações relativas ao tratamento anti-retroviral entre indivíduos infectados pelo HIV. *Cad Saude Publica* 2004; 20(5):1388-1397.

26. Brasil. Ministério da Saúde (MS). Secretaria de Ciência, Tecnologia e Insumos Estratégicos. Departamento de Assistência Farmacêutica e Insumos Estratégicos. *Formulário Terapêutico Nacional 2010*. 2ª ed. Brasília: MS; 2010.

27. Paradela EM, Lourenço RA, Veras RP. Validação da escala de depressão geriátrica em um ambulatório geral. *Rev Saude Publica* 2005; 39(6):918-923.

28. Lourenço RA, Veras RP. Mini-exame do estado mental: características psicométricas em idosos ambulatoriais. *Rev Saude Publica* 2006; 40(4):712-719.

29. Bertolucci PH, Brucki SMD, Campacci SR, Juliano Y. O mini-exame do estado mental em uma população geral: impacto da escolaridade. *Arq Neuropsiquiatr* 1994; 52(1):1-7.

30. Oliveira-Filho AD, Barreto-Filho JA, Neves SJF, Lyra-Junior DP. Relação entre a escala de adesão terapêutica de oito itens de Morinsky (MMAS-8) e o controle da pressão arterial. *Arq Bras Cardiol* 2012; 99(1):649-668.

31. Melchiors AC, Correr CJ, Fernández-Llimos F. Tradução e validação para o português do *Medication Regimen Complexity Index. Arq Bras Cardiol* 2007; 89(4):210-218.

32. Lino VTS, Pereira SRM, Camacho LAB, Ribeiro-Filho STR, Buksman S. Adaptação transcultural da escala de independência em atividades da vida diária (escala de Katz). *Cad Saude Publica* 2008; 24(1):103-112.

33. Santos RL, Virtuoso-Junior JS. Confiabilidade da versão brasileira da escala de atividades de vida diária. *RBPS* 2008; 21(4):290-296.

34. World Health Organization (WHO). ATC/DDD Index 2014. [acessado 2014 mar 01]. Disponível em: http://www.whocc.no/atc_ddd_index/

35. Loyola-Filho AI, Uchoa E, Lima-Costa MF. Estudo epidemiológico de base populacional sobre uso de medicamentos entre idosos na região metropolitana de Belo Horizonte, Minas Gerais, Brasil. *Cad Saude Publica* 2006; 22(12):2657-2667.

36. Victor JF, Ximenes LB, Almeida PC, Vasconcelos FF. Perfil sociodemográfico e clínico de idosos atendidos em Unidade Básica de Saúde da Família. *Acta Paul Enferm* 2009; 22(1):49-54.

37. Mansur N, Weiss A, Beloosesky Y. Looking beyond polypharmacy: quantification of medication regimen complexity in the elderly. *Am J Geriatr Pharmacother* 2012; 10(4):223-229.

38. Linnebur SA, Vande-Griend JP, Metz KR, Hosokawa PW, Hirsch JD, Libby AM. Patient-level medication regimen complexity in older adults with depression. *Clin Ther* 2014; 36(11):1538-1546.

39. Passamai MPB, Sampaio HAC, Dias AMI, Cabral LA. Letramento funcional em saúde: reflexões e conceitos sobre seu impacto na interação entre usuários, profissionais e sistema de saúde. *Interface (Botucatu)* 2012; 16(41):301-314.

40. Brasil. Ministério da Saúde (MS). Portaria nº 154, de 24 de janeiro de 2008. Cria o Núcleo de Apoio à Saúde da Família – NASF. *Diário Oficial da União* 2008; 25 jan.

41. Brasil. Ministério da Saúde (MS). Secretaria de Ciência, Tecnologia e Insumos Estratégicos. Departamento de Assistência Farmacêutica e Insumos Estratégicos. *Serviços farmacêuticos na atenção básica à saúde*. Brasília: MS; 2014.

42. Brasil. Ministério da Saúde (MS). Portaria nº 2.488, de 21 de outubro de 2011. Aprova a Política Nacional de Atenção Básica, estabelecendo a revisão de diretrizes e normas para a organização da Atenção Básica, para a Estratégia Saúde da Família (ESF) e o Programa de Agentes Comunitários de Saúde (PACS). *Diário Oficial da União* 2011; 22 out.