Uncontrolled blood pressure among hypertensive old people assisted in Primary Health Care

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Abstract

Objective: To investigate the prevalence of uncontrolled blood pressure (BP) and associated factors in hypertensive old people assisted by the Family Health Strategy in a municipality in Piauí, Brazil. *Method:* Cross-sectional study conducted with 384 hypertensive old people, selected by random sampling. A questionnaire included questions about sociodemographic aspects, health behaviors, the presence of comorbidities and treatment for hypertension. BP was measured using digital devices. To test the association between the independent variables (gender, age, education, alcohol consumption, smoking, presence of other diseases, adherence to drug treatment, and others factors) and uncontrolled BP, Poisson regressions with robust variance were performed in order to estimate the prevalence ratio (PR) and 95% confidence intervals (CI). *Results:* The prevalence of uncontrolled BP was 61.7% and 51.8% had low adherence to antihypertensive medication. The prevalence of uncontrolled BP was higher among participants with low medication adherence (PR=2.41; 95% CI: 1.96-2.97) when compared to those with high adherence. Statistically significant associations were not maintained for the other variables. *Conclusion:* The findings highlight the high prevalence of uncontrolled BP among hypertensive old people and the strong association between uncontrolled BP and low adherence to treatment. Efficient interventions for better control of hypertension continue to be necessary, as well as strategies for the adequate management of the disease in the scope of primary care, from prevention actions to appropriate treatment plans for each individual.

Keywords: Hypertension. Medication Adherence. Health of the Elderly. Primary Health Care.

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The authors declare there are no conflicts of interest in relation to the present study.

No funding was received in relation to the present study.

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Received: July 13, 2020
Approved: December 3, 2020

http://dx.doi.org/10.1590/1981-22562020023.200211

INTRODUCTION

In the last decades, systemic arterial hypertension (SAH) has stood out as an important modifiable risk factor for cardiovascular diseases[1] and the main cause of death worldwide[2], responsible for 18.1% of all deaths[3].

The increase in the prevalence of SAH has been observed mainly in low and middle income countries[4] and approximately two thirds of the global burden of SAH is found in developing countries[5]. In Brazil, population surveys have shown a prevalence of SAH over 30%, reaching about a quarter of the adult Brazilian population[6], becoming progressively more common with advancing age, with a prevalence above 60% in people in the above 60 years age group[7].

High blood pressure (BP) is the main global contributor to premature deaths, representing almost 10 million deaths and over 200 million years of life lost adjusted for disability, with systolic blood pressure ≥140 mmHg responsible for most of the burden of mortality and disability (approximately 70%)[8].

Adequate treatment of SAH requires adequate and regular clinical assessments that, in general, are less frequent in groups with a lower level of education and income or residents in areas of poorer social and health infrastructure[9].

On the other hand, the excess of common medications in the old people population, the high cost of medications, side effects, low adherence to changes in lifestyle and health behaviors, the low number of health consultations and non-adherence to medication treatments compromise adequate control of blood pressure levels[10].

Despite advances in the diagnosis of SAH and the multitude of treatment options available, a substantial part of the hypertensive population has uncontrolled BP and blood pressure control rates remain poor worldwide and far from satisfactory levels[11].

Many studies have been published on the prevalence of SAH among the adult population worldwide, but relatively little is known about the factors associated with SAH control among old people[12].

In this context, the Family Health Strategy (FHS) is presented as a priority policy for primary care with regard to the achievement of the goals of BP control (<140/90), due to its conformation and work process, in addition to more favorable conditions for the management of chronic non-communicable diseases, among them Arterial Hypertension[13].

The identification of factors associated with inadequate BP control can contribute to better management of this chronic disease. Thus, the present study aimed to investigate the prevalence of uncontrolled BP and associated factors in hypertensive old people assisted by the Family Health Strategy in a Brazilian city in the state of Piauí, Brazil.

METHOD

Cross-sectional, descriptive study with a quantitative approach, developed in Picos, Piauí, Brazil. The municipality has 36 Family Health Strategy Teams (FHS), 25 in the urban area and 11 in the rural area. The study included old people aged ≥60 years, accompanied by the FHS of the urban area of the city, of both sexes, with a medical diagnosis of hypertension and who used antihypertensive medication. Institutionalized and/or hospitalized old people were excluded.

To define the sample size, the number of hypertensive old people registered in the FHS of the urban area of the municipality was considered (N=3524). The sample was calculated based on the statistical formula for finite populations, with a 95% confidence level, a margin of error of 5% and a prevalence of 50% for the event of interest[14], plus 10% for possible losses, resulting in a minimum sample of 382 people. After losses and refusals, the final sample of this study was composed of 384 old people.

Participants were selected by stratified random sampling by FHS team, with proportional distribution to the number of hypertensive old people registered in each FHS team, so that everyone had the same probability of being included in the study and in order to determine representative samples of old people of the respective FHS areas. The randomly selected old people were located by the community

health agents of the reference FHS, informed about the objectives of the study and invited to participate.

A standardized questionnaire was applied containing questions related to socioeconomic and demographic aspects, health behaviors, clinical data, use of health services, presence of comorbidities and variables related to treatment for SAH.

Data collection took place from June to November 2019, using an interview technique conducted at home, in a private location, scheduled and agreed between the team of researchers and the participants. All data were collected by a team of researchers, nurses and nursing students from the State University of Piauí (UESPI) and Federal University of Piauí (UFPI), duly trained with a standardized protocol for the application of the questionnaire and BP measurement.

All interviewers participated in theoretical and practical training conducted in two stages. First, the questionnaire and scale of adherence to drug treatment were read, as well as the instructions for correct completion of the same, with clarification of doubts about the instruments and data collection. Subsequently, practical training and qualification of the collection team were carried out by filling in the instruments with an approach to the appropriate procedures for conducting the interview and the appropriate technique for measuring BP.

Systolic blood pressure (SBP) and diastolic blood pressure (DBP) were obtained using a digital tensiometer with automatic monitor (Model HEM-7130), properly tested and calibrated regularly according to the device's technical manual, and universal cuff (HEM-RML31) appropriate to the individual's arm circumference, according to standardized protocols, in order to avoid the occurrence of failures and errors and to guarantee the accuracy of the results obtained through the digital BP meter.

Three consecutive BP measurements were performed, with an interval of 2 minutes between measurements. The mean of the last two blood pressure measurements was used as a final measure. Hypertensive patients with uncontrolled BP were considered to be those with SBP values≥140 mmHg and/or DBP≥90 mmHg[13].

The independent variables included in the study were: sex, age group, education, skin color, marital status, family income, number of residents in the same household, consumption of alcoholic beverages, smoking, physical activity, presence of morbidities, time from the last consultation to monitor the treatment for hypertension, number of anti-hypertensive pills for continuous use and therapeutic regimens of drug treatment, where he usually obtains anti-hypertensive drugs and adherence to drug treatment.

Moderate alcohol consumption was defined as the average consumption of up to two daily doses of alcoholic beverages for men and up to one daily dose for women. One serving contains about 14g of ethanol and is equivalent to 350mL of beer, 150mL of wine and 45mL of distilled beverage[15]. Smokers (those who currently smoke), non-smokers (those who never smoked) and ex-smokers (those who stopped smoking more than 12 months ago) were considered.

The antihypertensive drugs used by the participants were classified into categories according to the 7th Brazilian Guideline on Hypertension and according to the main pharmacological action[16].

Adherence to medication for hypertension was assessed using the Brief Medication Questionnaire (BMQ), an instrument validated for the hypertensive population[17], composed of three domains that identify barriers to adherence in terms of regimen, beliefs and recall in relation to drug treatment. The BMQ allows individuals to be classified into four categories in relation to treatment adherence, according to the number of positive responses in any of the domains: high adherence (no positive response), likely high adherence (1), likely low adherence (2) and low adherence (3 or more). For analysis purposes, the results of the BMQ were categorized considering low adherence those with a score ≥ 2 points in the three domains.

The data obtained were organized in the Epi Info version 3.4.3® program, by means of double entry and subsequent validation, and all statistical analyzes were performed using software R version 3.6.1, both open access. The description of the study sample was presented through frequencies in absolute numbers and percentages. Pearson's chi-square test was used

for nominal categorical variables and Linear Trend for ordinal categorical variables. Poisson regression analyzes with robust variance were used to estimate crude and adjusted prevalence ratios (PR) and the respective 95% CI.

The multiple regression analyzes considered the inclusion of three blocks of variables: 1) sociodemographic; 2) behavioral; and 3) adherence to treatment. Each block of variables was composed of those with p <0.20 in the crude analysis. In the adjusted analysis, gender, age and education were considered confounding variables and maintained in the final model, regardless of the p value; for the other variables, associations with a p-value <0.05 were considered statistically significant.

This study was approved by the Research Ethics Committee of the National School of Public Health Sergio Arouca - Fiocruz, under opinion No. 3,307,403, of May 12, 2019, and all participants signed the Informed Consent Form (ICF), respecting the ethical and legal aspects of research involving human beings in accordance with Resolution 466/2012 of the National Health Council.

RESULTS

Among the 384 hypertensive old people, the majority (64.3%) were female and the age of the participants ranged from 60 to 93 years (mean=71.7±7.90 years). More than half of the hypertensive individuals had only elementary education and an income of 1 to 2 minimum wages and 46.9% declared themselves to be brown. It was found that 57% were married and just over half lived with 1 to 2 residents in the same household (Table 1).

Table 1. Characteristics of the hypertensive old people in the sample (n=384). Picos, PI, 2019.

Variables	n (%)
Sex	
Female	247 (64.3)
Male	137 (35.7)
Age group (years)	
60 to 69	178 (46.4)
70 to 79	139 (36.2)
80 and over	67 (17.4)
Education	
Fund. Complete / Incomplete	258 (67.2)
High School Complete / Incomplete	102 (26.6)
Superior and over	24 (6.2)
Family Income (Minimum Wage)	
Less than 1	32 (8.3)
1 to 2	217 (56.5)
2 to 3	69 (18.0)
> 3	66 (17.2)
Skin color	
Black	70 (18.2)
White	134 (34.9)
Brown	180 (46.9)
Marital status	
Married / Companion	219 (57.0)
Not married	27 (7.0)
Widower	109 (28.4)
Separated / Divorced	29 (7.6)

to be continued

Continuation of Table 1

Variables	n (%)
Number of Residents	
None	41 (10. 7)
1-2	205 (53.4)
3-4	106 (27.6)
5 and over	32 (8.3)
Alcohol consumption	
None	333 (86.7)
Low	27 (7.0)
Moderate / High	24 (6.3)
Smoking	
Never smoked	180 (46.9)
Current smoker	40 (10.4)
Smoked and stopped	164 (42.7)
Physical activity	
Yes	157 (40.9)
No	227 (59.1)
Diabetes	
Yes	116 (30.2)
No	268 (69.8)
Cardiac insufficiency	
Yes	55 (14.3)
No	329 (85.7)
Dyslipidemias	
Yes	156 (40.6)
No	228 (59.4)
Last consultation	
<30 days	84 (21.9)
1 to 3 months	92 (24.0)
3 to 6 months	70 (18.2)
> 6 months	138 (35.9)
Medications per day	
1	206 (53.7)
2	153 (39.8)
3 and over	25 (6.5)
Where do you usually get your medicines	
SUS	110 (28.7)
You need to buy them	224 (58.3)
Part in SUS and another part buys	50 (13.0)
Treatment adherence	
Adherent	185 (48.2)
Non-adherent	199 (51.8)
Controlled Blood Pressure	
Yes	147 (38.3)
No	237 (61.7)

SUS= Unified Health ySUS= Brazilian National Health System

As for life habits, it was found that 13.3% consumed alcohol, 10.4% smoked and less than half practiced physical activity. In addition, it was observed that a little more than a third reported that the time of the last consultation was more than 6 months and most of the interviewees used only one antihypertensive medication. Among these drugs, more than half were purchased and almost 30.0% were obtained from the public SUS network. More than half of the hypertensive individuals reported low adherence to treatment and 61.7% had uncontrolled hypertension (Table 1). The classes of drugs most frequently used to treat hypertension were: diuretics (31.0%), angiotensin II antagonists (25.3%), and angiotensin converting enzyme inhibitors (12.6%) (Table 2).

There was a higher prevalence of uncontrolled BP among men among the older and less educated. The prevalence of higher uncontrolled BP was also observed among participants with moderate/high alcohol consumption, ex-smokers, who do not practice physical activity and do not adhere to the treatment of SAH, as shown in Table 3.

Table 4 shows the multiple regression models for the association between uncontrolled BP and sociodemographic, behavioral characteristics and adherence to the treatment of SAH. In Model 1, statistically significant associations were observed between male gender and uncontrolled BP (PR=1.23; 95% CI:1.06-1.44). In Model 2, after the inclusion of the variables alcohol consumption, smoking and physical activity, sex remained associated with the outcome. It is observed that men have 18% (PR =1.18; 95% CI: 1.01-1.38) higher prevalence of uncontrolled pressure in relation to women. Low alcohol consumption (PR =1.38; 95% CI: 1.10-1.73) and ex-smokers (PR=1.25; 95% CI:1.05-1.47) were also significantly associated with uncontrolled BP. However, in model 3, when adherence to treatment was included, there was a loss of statistical significance for the other variables. Hypertensive old people with low adherence to drug treatment showed 2.4 (95% CI:1.96-2.97) times the prevalence of uncontrolled BP when compared to those with high adherence to treatment (Model 3).

Table 2. Use of antihypertensive drugs by classes and combinations of drugs used by hypertensive old people. Picos, PI, 2019.

Antihypertensive drug classes and combinations	n (%)
Diuretics	194 (31.0)
Angiotensin II antagonists	158 (25.3)
Angiotensin converting enzyme inhibitors	79 (12.6)
Beta-blockers	54 (8.6)
Calcium channel blockers	51 (8.2)
Beta-blockers + Angiotensin converting enzyme inhibitors	20 (3.2)
Angiotensin converting enzyme inhibitors + Diuretics	16 (2.6)
Calcium channel blockers + Diuretics	11 (1.8)
Beta-blockers + Angiotensin converting enzyme inhibitors + Diuretics	08 (1.3)
Calcium channel blockers + Angiotensin converting enzyme inhibitors	07 (1.1)
Beta-blockers + Calcium channel blockers + Diuretics	05 (0.8)
Beta-blockers + Calcium channel blockers + Angiotensin converting enzyme inhibitors	05 (0.8)
Calcium channel blockers + Angiotensin converting enzyme inhibitors + Diuretics	04 (0.6)
Beta-blockers + Diuretics	04 (0.6)
Others	09 (1.4)
Total	625 (100%)

Table 3. Crude associations between uncontrolled blood pressure (BP) and socioeconomic, demographic characteristics, health behavior, comorbidities and adherence to treatment in hypertensive older adults monitored in the Family Health Strategy (n=384). Picos, PI, 2019.

Variables	Uncontrolled BP n (%)	PR_{crude} (95%CI)	p-value
Sex			0.006 [a]
Female	140 (56.7)	1	
Male	97 (70.8)	1.25 (1.07-1.46)	
Age group (years)			0.138[b]
60 to 69	105 (59.0)	1	
70 to 79	85 (61.2)	1.04 (0.86-1.24)	
80 and over	47 (70.1)	1.19 (0.97-1.45)	
Education			0.065[b]
Basic	168 (65.1)	1.20 (0.82-1.76)	
High school	56 (54.9)	1.01 (0.67-1.52)	
Superior and over	13 (54.2)	1	
Family income			0.261[b]
Less than 1 MW	23 (71.9)	1.25 (0.92-1.68)	
1 to 2 MW	134 (61.8)	1.07 (0.85-1.35)	
2 to 3 MW	42 (60.9)	1.06 (0.80-1.40)	
> 3 MW	38 (57.6)	1	
Self-reported skin color			0.901[a]
White	82 (61.2)	1	
Black	43 (61.4)	1.00 (0.79-1.26)	
Brown	112 (62.2)	1.02 (0.85-1.21)	
Marital Situation			0.639 [a]
Married/Companion	135 (61.6)	1	
Single	17 (63.0)	1.02 (0.75-1.39)	
Widower	65 (59.6)	0.97 (0.80-1.17)	
Separated/Divorced	20 (69.0)	1.12 (0.86-1.46)	
Number of Residents			0.318[b]
Lives alone	24 (58.5)	0.81 (0.58-1.14)	
1-2	125 (61.0)	0.84 (0.66-1.07)	
3-4	65 (61.3)	0.85 (0.65-1.11)	
5 and over	23(71.9)	1	
Alcohol consumption			0.030[a]
None	197(59.2)	1	
Low	21(77.8)	1.31(1.05-1.64)	
Moderate/High	19(79.2)	1.34(1.07-1.67)	
Smoking			0.021[a]
Never smoked	99(55.0)	1	
Current smoker	24(60.0)	1.09(0.82-1.45)	
Smoked and stopped	114(69.5)	1.26(1.07-1.49)	

to be continued

Continuation of Table 3

Variables	Uncontrolled BP n (%)	PR_{crude} (95%CI)	p-value
Physical activity			0.140[a]
Yes	90(57.3)	1	
No	147(64.8)	1.13(0.96-1.33)	
Diabetes			0.747 [a]
Yes	73(62.9)	1.03(0.87-1.22)	
No	164(61.2)	1	
Cardiac insufficiency			0.359 [a]
Yes	37(67.3)	1.11(0.90-1.36)	
No	200(60.8)	1	
Dyslipidemias			0.713 [a]
Yes	98(62.8)	1.03(0.88-1.21)	
No	139(61.0)	1	
Last consultation			0.492[b]
< 30 days	47(56.0)	1	
1 to 3 months	55(59.8)	1.07(0.83-1.38)	
3 to 6 months	44(62.9)	1.12(0.86-1.46)	
> 6 months	91(65.9)	1.18(0.94-1.47)	
Medications per day			0.252[b]
1	122(59.2)	1	
2	98(64.1)	1.08(0.92-1.27)	
3 or more	17(68.0)	1.15(0.86-1.54)	
Where do you usually get your medicines			0.741[a]
SUS	69(62.7)	0.98(0.82-1.17)	
You need to buy them	138(61.6)	0.96(0.73-1.25)	
Part in SUS and another part buys	30(60.0)	1	
Treatment adherence			<0.001[a]
Adherent	64(34.6)	1	
Non-adherent	173(86.9)	2.51(2.05-3.09)	

[a]Chi-square test; [b]Linear Trend Test; MW=Minimum wage; PR=Prevalence ratio; 95% CI=95% Confidence Interval.

Table 4. Factors associated with uncontrolled blood pressure in hypertensive older adults followed up in the Family Health Strategy (n=384). Picos, PI, 2019.

	Model 1		Model 2		Model 3	
Variables	$PR_{Adjusted}$ (95%CI)	*p-value*	$PR_{Adjusted}$ (95%CI)	*p-value*	$PR_{Adjusted}$ (95%CI)	*p-value*
Sex						
Female	1	0,011	1		1	
Male	1.23(1.06-1.44)		1.18(1.01-1.38)	0.023	1.05(0.92-1.20)	0.702
Age group (years)						
60 to 69	1		1		1	
70 to 79	1.01(0.84-1.20)	0.964	1.00(0.83-1.19)	0.988	1.04(0.89-1.21)	0.802
80 and over	1.14(0.93-1.39)	0.468	1.09(0.90-1.33)	0.620	1.11(0.94-1.30)	0.576
Education						
Basic	1.21(0.83-1.75)	0.515	1.19(0.82-1.72)	0.553	1.17(0.87-1.59)	0.583
High school	1.05(0.71-1.57)	0.869	1.02(0.69-1.52)	0.944	1.05(0.76-1.46)	0.877
Superior and over	1		1		1	
Alcohol consumption						
None			1		1	
Low			1.38(1.10-1.73)	0.016	1.20(0.98-1.47)	0.426
Moderate/High			1.26(0.98-1.63)	0.348	1.16(0.94-1.43)	0.557
Smoking						
Never smoked			1		1	
Current smoker			0.99(0.76-1.31)	0.981	1.04(0.82-1.33)	0.858
Smoked and stopped			1.25(1.05-1.47)	0.010	1.11(0.96-1.28)	0.465
Physical activity						
Yes			1		-	-
No			1.15(0.97-1.35)	0.320	-	-
Treatment adherence						
High adhesion					1	
Low adhesion					2.41(1.96-2.97)	<0.001

PR = prevalence ratio; 95% CI = 95% Confidence Interval; Model 1: Inclusion of variables in the sociodemographic block; Model 2: Inclusion of variables in the behavior block; Model 3: Inclusion of the variable of adherence to drug treatment.

DISCUSSION

The results of the present study show a high prevalence of uncontrolled BP among hypertensive old people, estimated at 61.7%, comparable to that found in other studies[14,18]. As in this investigation, the International Study on Mobility in Aging (IMIAS) also showed that although more than 80% of older patients were undergoing treatment, control rates were low: 37.6% in Manizales (Colombia); 29.5% in Kingston (Jamaica); 26.5% in Saint-Hyacinthe (Canada); 24% in Tirana (Albania) and 22% in Natal (Brazil)[12].

Previous studies reveal that advanced age is an independent predictor of uncontrolled hypertension[19]. The high prevalence of uncontrolled BP in this population, at least in part, may suggest resistance to treatment. In addition, this result can be partially explained by the increase in arterial stiffness and the fact that age may reflect the time that other factors may take to influence the development of uncontrolled hypertension[20].

In addition, with advancing age, blood pressure levels tend to increase progressively, which makes it

difficult to control blood pressure levels even with the use of antihypertensive medication[21]. Firmo et al[22] also emphasize that older age is related to lower attendance at medical appointments and greater irregularity in the use of medications.

The results that express high rates of uncontrolled BP found in the participants can also be explained by socioeconomic and sociocultural factors of the population. Although low education[23] and low income[24] are recognized as factors that can influence BP control, in the present study no statistically significant associations were found with the outcome, which can be explained, among other aspects, by the homogeneity of the population in this study.

In the present study, the statistically significant associations observed in the multiple model between uncontrolled BP and being male, having low alcohol consumption and being a former smoker have also been found in other studies. The relationship between males and uncontrolled BP shows similar results to those of Sousa et al[25]. On the other hand, other authors found no differences between genders[26]. Although not fully understood, sex can affect both the prevalence and the rate of hypertension control[27]. The difference can be explained, among other aspects, by the higher level of attention to health care and adherence to the treatments proposed among women[28] or the concern with health[27].

With regard to alcohol consumption, recent epidemiological and clinical studies have shown that excessive alcohol consumption is associated with inadequate control of hypertension[29]. In contrast to this result, this study showed no association between inadequate control of BP levels and moderate/high alcohol consumption. It is important to note, however, that only 24 old people reported moderate/high alcohol consumption, which may not have been sufficient to show differences in the analyzes performed.

In fact, several reports have already shown that regular and moderate alcohol consumption is associated with a decrease in the overall risk of cardiovascular disease. This decrease is due to the beneficial effects of wine on lipoproteins and clotting factors. However, it is important to note that frequent alcohol consumption has no positive effect on BP values, but is associated with increased hypertension[30].

Regarding smoking, a study by Rajati et al.[31] also found a statistically significant association between smoking (ex-smokers) and uncontrolled BP. Evidence shows that the relationship between smoking and hypertension is more related to smoking time and cigarette consumption throughout life than being a current smoker[32]. In our study, the higher prevalence of uncontrolled BP among older ex-smokers in relation to smokers can be explained by the fact that these old people were instructed to adopt a healthier lifestyle. Due to medical advice, due to the damage caused by smoking, the group of ex-smokers may have given up smoking due to the treatment of hypertension. Thus, prevalent cases of uncontrolled BP have stopped smoking after medical advice, which represents a reverse causality.

In the present study, the loss of statistical significance in associations of uncontrolled BP with sex, alcohol consumption and smoking after the inclusion of the treatment adherence variable in the regression model reinforces the importance of this variable for the outcome. The statistically significant association between low adherence to antihypertensive medication and uncontrolled BP is consistent with estimates found in other studies[33]. This congruence is in accordance with the literature, where it is emphasized that good adherence to antihypertensive medication is essential to control hypertension and reduce BP[34].

An important finding in this study is that most participants reported that they need to buy antihypertensive drugs. In cases where drugs are not available on the SUS network, patients need to obtain them from other sources, which requires financial resources for direct payment for these drugs and further increases the possibility of non-adherence due to low income.

It is also known that old people with less financial, intellectual and social resources face old age with difficulties in daily activities, with conformism and

as being a phase associated with losses, which can also justify non-adherence to treatment, as this requires commitment and understanding on the part of the sick person[35].

The strength of this study is in the investigation of sociodemographic, economic and clinical factors, including assessment of adherence to drug treatment that allows addressing a greater variability of factors associated with uncontrolled BP and, thus, supporting health professionals for better management and control of the disease. In addition, blood pressure measurements were obtained by direct measurement, performed at the participants' homes, by a team of trained interviewers, aspects that contribute to the quality and greater reliability of the data.

The limitations of the study include its cross-sectional design that does not allow establishing cause and effect relationships, as well as the possibility of false response bias when collecting socioeconomic and lifestyle data, such as income per household, consumption of alcohol, tobacco and physical activity. Another limitation is related to the fact that the study was carried out with a specific sample of hypertensive old people, mostly with low education and income, attended in primary care in the central south of the state of Piauí, which may limit the generalization of results. In addition, other important factors of relevance for BP control, such as therapeutic inertia and resistant hypertension, were not evaluated in the present study.

CONCLUSION

In conclusion, it is highlighted that among the sociodemographic, behavioral and adherence-related factors, our results show that there is a strong association between uncontrolled BP and low adherence to drug treatment.

These results emphasize the need for efficient FHS interventions for better BP control in hypertensive old people. In the context of primary care, strategies for the proper management of hypertension, which include prevention and monitoring actions, as well as better management of the disease, with treatment plans adjusted and appropriate for each individual, are essential to obtain treatment benefits and harm reduction and health complications.

The data have implications for several important aspects to be addressed in future studies in order to understand the factors associated with inadequate BP control in this population. Thus, the study brings contributions that can support the improvement of strategies for monitoring hypertension and, therefore, adequate care for the health of old people. Future research to investigate risk factors for uncontrolled BP in hypertensive patients, considering an age-specific approach is essential to clarify many of the challenges related to public health, since hypertension is an important contributor to the global burden of diseases.

Edited by: Yan Nogueira Leite de Freitas

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