Controlled hypertension in elderly individuals enrolled in the Family Health Strategy

Hipertensão arterial controlada em idosos cadastrados na Estratégia Saúde da Família

Hipertensión arterial controlada en los ancianos cadastrados na Estratégia Saúde da Família

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ABSTRACT: Objective: To analyze the prevalence of controlled hypertension and associated factors among elderly enrolled in the Family Health Strategy (FHS). **Methods:** This is a cross-sectional study, with elderly (60 years or older), enrolled in the FHS program of Campina Grande/PB. The sample consisted of elderly patients taking antihypertensive drugs (278 individuals). Prevalence of controlled hypertension and investigated association with variables demographic, socioeconomic, lifestyle and self-reported morbidity, were verified by means of Poisson regression. **Results:** 278 elderly were included in the present study. There was a low prevalence of controlled hypertension (34.5%, 95% CI: 28.9-40.1); no statistically significant association was found at the 5% level with the independent variables investigated in the multivariable analysis. **Conclusion:** The controlled hypertension presented low prevalence among the elderly of this study, however, without associated factors. The identification of low control hypertension is important for the specific targeting of health care and the investigation of associated factors contributes to the guarantee of effective treatment.
Keywords: Health of the Elderly; Hypertension; Risk Factors; Cross-Sectional Studies.

RESUMO: Objetivo: Analisar a prevalência de hipertensão arterial sistêmica (HAS) controlada e fatores associados entre idosos cadastrados na Estratégia Saúde da Família (ESF). **Métodos:** Trata-se de um estudo transversal, com idosos (60 anos ou mais de idade), cadastrados na ESF do

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município de Campina Grande/PB. A subamostra foi constituída por idosos em uso de medicamentos anti-hipertensivos. Foram verificadas prevalências de HAS controlada e investigada associação com variáveis demográficas, socioeconômicas, hábitos de vida e morbidade referida, por meio de regressão de Poisson. **Resultados:** Foram incluídos 278 idosos no presente estudo. Verificou-se baixa prevalência de HAS controlada (34,5%; IC95%: 28,9-40,1), não foi encontrada associação estatisticamente significativa ao nível de 5% com as variáveis independentes investigadas na análise multivariável. **Conclusão:** A HAS controlada apresentou baixa prevalência entre os idosos deste estudo, porém, sem fatores associados. A identificação do baixo controle de HAS é importante para o direcionamento específico do cuidado em saúde e a investigação de fatores associados contribui para a garantia de tratamento efetivo.
Palavras-chave: Saúde do Idoso; Hipertensão; Fatores de Risco; Estudos Transversais.

RESUMEN: Objetivo: Analizar la prevalencia de hipertensión arterial sistémica (HAS) controlada y factores asociados entre ancianos registrados en la Estrategia Salud de la Familia (ESF). **Métodos:** Se trata de un estudio transversal, con ancianos (60 años o más de edad), catastrados en la ESF del municipio de Campina Grande/PB. La sub-muestra fue constituida por ancianos en uso de medicamentos antihipertensivos. Se verificaron prevalencias de HAS controlada e investigada asociación con variables demográficas, socioeconómicas, hábitos de vida y morbilidad referida, por medio de regresión de Poisson. **Resultados:** Se incluyeron 278 ancianos en el presente estudio. Se verificó baja prevalencia de HAS controlada (34,5%, IC95%: 28,9-40,1), no se encontró asociación estadísticamente significativa al nivel del 5% con las variables independientes investigadas en el análisis multivariable. **Conclusión:** La HAS controlada presentó baja prevalencia entre los ancianos de este estudio, sin embargo, sin factores asociados. La identificación del bajo control de HAS es importante para el direccionamiento específico del cuidado en salud y la investigación de factores asociados contribuye a la garantía de tratamiento efectivo.
Palabras clave: Salud del Anciano; Hipertensión; Factores de Riesgo; Estudios Transversales.

INTRODUCTION

Systemic arterial hypertension is a chronic condition, multifactorial and multicausal, identified as one of the most important risk factors for the development of cardiovascular diseases[1]. It is considered a public health problem to be faced worldwide, due to its increasing prevalence and the socioeconomic consequences of its complications[2].

It is estimated that in 2014 systemic arterial hypertension affected 22% of adults (≥18 years of age) in the world[2]. Predictions indicate that, in 2025, 1,56 billion people (29% of the world's population) will be affected by systemic hypertension, being 75% of those concentrated in countries

of low and average income[3]. According to information of the World Health Organization, it is estimated that, in 2010, the increase in arterial pression caused 9,4 million deaths in the world, which represented 7% of the global burden of years of life lost adjusted by disabilities (*Disability Adjusted Life Years*)[1].

In Brazil, systemic arterial hypertension follows the global tendency since data from Pesquisa Nacional de Saúde 2013 identified a prevalence of the referred disease in adult population of 21,4%[4]. In elderly population these numbers tend to be higher (>44%)[4], because of the gradual accumulation of molecular and cellular damages over the years and the natural organic repercussions inherent to aging that may cause increases in blood pressure (increased arterial stiffness and peripheral vascular resistance as well as higher number of comorbidities)[5].

Arterial pressure control (BP below 140 x 90 mm Hg) is directly linked to the reduction of damage to health due to systemic hypertension[7]. Results from a meta-analysis of randomized studies on blood pressure reduction indicated that the reduction in blood pressure levels, and consequently the control of hypertension, is associated with a decrease in the occurrence of cardiovascular outcomes such as stroke and cardiovascular death, regardless of the medications used[7].

Despite the evidence that the decrease in blood pressure levels reduces the occurrence of cardiovascular, cerebrovascular and renal complications[1], a review study has identified that only a quarter of hypertensive patients have controlled blood pressure[8]. When analyzing the control of pressure levels in individuals under treatment and follow-up of the Family Health Strategy, it is observed that the percentage of blood pressure control among treated hypertensives is above 50% [9,10]. However, this result still raises concern regarding the existence of individuals at risk for complications from uncontrolled blood pressure.

The existence of individuals showing uncontrolled blood pressure, even in the face of drug treatment, is worrying and reveals the problem to be faced by the health services to combat the diseases caused by altered pressure levels.

In face of the need to reduce morbidity and mortality caused by hypertension, which is directly linked to blood pressure control, the present study aimed to analyze the prevalence of controlled hypertension and associated factors among elderly enrolled in Family Health Strategy in Campina Grande / Paraíba.

METHODS

This is a cross-sectional study, which is part of a larger study entitled "Multidimensional health assessment of health subscribers".

The target population was represented by individuals of 60 years or more, of both sexes, non-institutionalized, enrolled in the Family Health Strategy of the municipality. The elderly excluded from the study were the ones who: i) had severe clinical debility, with no therapeutic possibilities, that is, in the terminal phase; ii) who were absent from the municipality during the time of the field research in the area of coverage of the Family Health Strategy in which they were registered.

At the time of data collection, conducted in 2009-2010, there were 23,416 elderly registered in the 63 family health teams of the six health districts of the city. In order to calculate the sample of the larger study, a prevalence estimate of at least 25% of the outcomes was used (a population study conducted in Fortaleza/CE, Menezes TN, unpublished data), with a 95% confidence level, assuming an error of 6%. Due to the sample obtained by conglomerates, a sampling correction was performed (2.1), resulting in a sample of 420 in elderly, proportional to each Health District. It is important to note that for this study, only the elderly patients using a hypotensive medication were considered, 278 elderly.

For the selection of the elderly, a Basic Family Health Unit (BFHU) was drawn in each Health District. In each BFHU was carried out the survey of the total of elderly registered and later the random selection of them. The proportion of elderly individuals to be drawn in each BFHU was calculated in relation to the total number of elderly persons enrolled. Faced with this proportion, the number of elderly people to be interviewed per BFHU was defined. Thus, in the six BFHU selected, the following proportions (numbers) of the elderly were interviewed: 9.6% (40), 11.4% (48), 14.5% (61), 8.6% (36), 43.3% (182) and 12.6% (53), totalizing the 420 elderly.

In each BFHU the systematic selection of the elderly was carried out with the elaboration of a list with the names of all the elderly registered. The number of subjects to be skipped to obtain to the next subject of the list to be interviewed was defined as the ratio between the total number of individuals registered and the number of individuals to be interviewed in that BFHU, thus generating the number five. As the calculation was proportional, then the number of jumps in the list was the same in all BFHUs. Thus, for each elderly person selected, four seniors were skipped on the list. The 5th senior was the selected, and so on, in order to obtain a better distribution and assurance that the entire list was covered.

Data collection performed in the participant's home, by three doubles of interviewers undergraduate students from the health area, who were trained by the coordinating teacher of this

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study. A specific form structured as a face-to-face interview was used to record the information.

The dependent variable used in this study was considered for purposes of analysis and verification of possible associations was Controlled Systemic Hypertension, which was identified in elderly patients undergoing treatment for the disease using antihypertensive drugs. The choice of elderly patients using antihypertensive drugs was used to identify the control of the disease via medication. Elderly patients with systolic blood pressure <140 mm Hg and diastolic blood pressure <90 mm Hg were classified with controlled hypertension [6]. To obtain this information, blood pressure was measured using a mercury sphygmomanometer and a clinical stethoscope (BD®, Curitiba / PR , Brazil). The measurements, when necessary, were performed 30 minutes after the elderly had smoked, drunk coffee or eaten. Three measurements were performed, with an interval of two minutes. For analysis, the average value of the three measurements was used.

The independent variables used to study the possible associations were:

• Demographic and socioeconomic: sex (female, male), age group (60 to 69 years, 70 to 79 years, 80 years or more), skin color (white, non-white, including brown, black, indigenous, yellow), years of study (Illiterate, 1 to 4 years, 5 to 8 years and 9 years or more), marital status (single, married, widower, divorced), number of residents per household (alone, 2, 3 to 5, 6 or more). The socioeconomic level of the individuals was verified by means of the "Economic Classification Criterion" of the Brazilian Association of Advertisers, the National Association of Market Research Companies and the Brazilian Association of Market Research Institutes (ABA/ANEP/ABIPEME) formed by data such as educational level and family possessions. Each datum refers to a number of points and at the end a score is generated, which in the economic stratification scale corresponds to the economic class to which the elderly belongs (A1, A2, B1, B2, C, D, E)[11]. For statistical purposes, classification was redefined, with economic classes grouped as: A/B, C and D/E.

• Life habits: smoking (never smoked, current smoker, ex-smoker), alcohol consumption (never, daily, weekly, occasional or have consumed but no longer) and regular physical activity practice (no, yes). It was considered the elderly who never smoked the ones who reported never having made use of cigarette, current smoker the elderly who referred cigarette use (regardless of time and amount of use) and former smoker who reported having made use of the substance and during the study period did not use it anymore[12]. It was considered the elderly person who never consumed alcoholic the ones who reported never having ingested the substance (never smoked). The elderly who reported on ingestion of alcoholic beverages were classified according to the frequency of ingestion, being daily, weekly and occasional, regardless of time and volume ingested[13]. Those who reported having already made use of alcoholic beverage, but at the time of the research reported no longer consuming were considered currently abstinent. An active elderly person was considered one who practiced some kind of physical activity, at least three times a week, for at least thirty

minutes[14]. Thus, the elderly were classified as performing or not regular physical activity. It was considered physical activity, leisure activities such as gym, walking, running, cycling and water aerobics. Domestic activities were not considered.

- Number of reported morbidities: number of chronic noncommunicable diseases reported by survey participants, by questioning: "Did a physician or other health professional tell you that you have a particular disease?" Where the responses were limited to eight chronic diseases (hypertension, arthritis/arthrosis/rheumatism, heart problem, diabetes, osteoporosis, chronic lung disease, embolism/stroke and malignant tumor) (none, 1 to 3, 4 or more). For statistical purposes, the mentioned morbidity was redefined, having been grouped as: 0 to 3 NCDs and 4 or more. As a category of the independent variable, responses regarding the presence of hypertension were not considered.

The database was built using the Microsoft Office Excel application. The analysis and statistical information were obtained with the statistical software SPSS 22.0 software (SPSS Inc., Chicago, IL, USA). The prevalence of controlled hypertension and its respective confidence intervals (Wilson's CI, 95% 15) were initially checked in relation to the independent variables and, afterwards, a univariate analysis was performed using the Pearson's Chi-square test ($\chi2$) to observe the possible associations between these variables. For these analyses a significance level $\alpha = 5\%$ was adopted, and Yates correction was used when appropriate.

In order to control the possible confounding factors and because it was a cross-sectional study, the data were modeled using the generalized linear modeling method with linear Poisson log modeling, in order to determine the crude prevalence ratio (PR) and their respective confidence intervals for the exposure variable. Considering the number of individuals evaluated, it would be possible to identify a PR of 1.5, with a power of 80.0%, keeping the proportion of cases exposed around 60.0%.

We used the hierarchical method[16] as a way of modeling and a significance level of 5%. Three adjusted models were created, considering the hierarchy among the variables, the first with the distal variables (demographic and socioeconomic), the second with distal and mesial variables (demographic, socioeconomic and life habits) and the final with all previous variables along with the proximal variable (number of self-reported morbidity) (Figure 1). In all models, variables were included independently of p value. After constructing all the analysis models, the variables with p value less than 0.05 were considered statistically significant. For variables that did not present a statistically significant association with the outcome, the statistical power was calculated.

Figure 1. Hierarchical analysis model
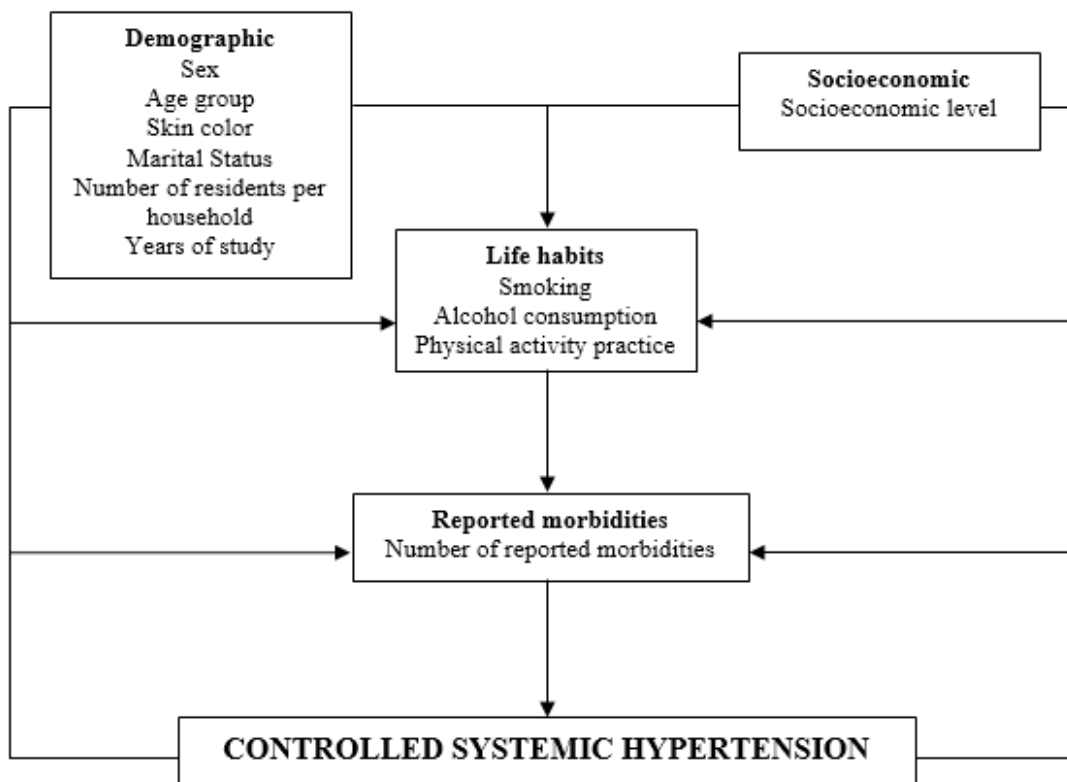
All the seniors signed the Informed Consent Term after receiving verbal and written explanations regarding the study. The major study, of which this one is part, was approved by the Research Ethics Committee of the State University of Paraíba (UEPB) (process No. 0228.0.133.000-08).

RESULTS

In the present study, 278 elderly people who were taking antihypertensive drugs (71.9% women) were included. The average age of participants was 72.2 years (SD=9.0), being the same for men and women.

Among the elderly in treatment, 51.1% were classified as white, 55.0% were married, 50.0% lived with 2 to 4 people at home, 45.3% had 1 to 4 years of schooling, 45, 3% belonged to socioeconomic status A/B, 46.0% were former smokers, 55.7% never smoked, 74.8% did not practice regular physical activity and 86.0% had 0 to 3 NCDs (Table 1).

It was verified that the prevalence of controlled hypertension was 34.5% (95% CI = [28.9,40.1]), 37.2% among elderly men, 39.8% between the age group 70 to 79 (39.8%), 39.4% among white individuals, 40.0% among single individuals, 38.9% among the elderly living with 5 or more persons at home, 38.9% among individuals aged 1 to 4 years of schooling, 35.0% among those belonging to the socioeconomic level C, 38.3% among former smokers, 36.8% in those who never

smoked, 40.0% among elderly who had 4 or more NCDs (Table 1).

Table 1. Prevalence of controlled systemic arterial hypertension in elderly enrolled in the Family Health Strategy according to demographic, socioeconomic variables, life habits and self-reported morbidity. Campina Grande, Paraíba, Brazil. (n=278) (continues)

Variables	n (%)	Controlled hypertension	
		n (%)	95% CI
TOTAL	278 (100)	96 (34,5)	
Sex			
Male	78 (28,1)	29 (37,9)	27,3 - 48,3
Female	200 (71,9)	67 (33,5)	27,3 – 40,3
Age Group			
60 to 69 years	121 (43,5)	34 (28,1)	20,9 – 36,7
70 to 79 years	103 (37,1)	41 (39,8)	30,9 – 49,5
80 years or older	54 (19,4)	21 (38,9)	27,0 – 52,2
Skin color			
White	142 (51,1)	56 (39,4)	31,8 – 47,6
Non-White	136 (48,9)	40 (29,4)	22,4 – 37,5
Marital Status			
Married	153 (55,0)	56 (36,6)	29,4 – 44,5
Single	15 (5,4)	6 (40,0)	19,8 – 64,2
Widowed	94 (33,8)	30 (31,9)	23,4 – 41,9
Divorced	16 (5,8)	4 (25,0)	10,2 – 49,5
Living in the household			
2	71 (26,0)	20 (28,2)	19,0 – 39,5
1	13 (4,6)	4 (30,8)	12,7 – 57,6
3 to 5	139 (50,0)	51 (36,7)	29,1 – 44,9
6 or more	54 (19,4)	21 (38,9)	27,0 - 52,2
Years of study			
Illiterate	72 (25,9)	21 (29,2)	19,9 – 40,5
1 to 4 years	126 (45,3)	49 (38,9)	30,8 – 47,6
5 to 8 years	59 (21,2)	18 (30,5)	20,2 – 43,1
9 years or more	21 (7,6)	8 (38,1)	20,7 – 59,1
SEL			
A/B	126 (45,3)	43 (34,1)	26,4 – 42,8
C	120 (43,2)	42 (35,0)	27,0 – 43,9
D/E	32 (11,5)	11 (34,4)	20,4 – 51,7
Smoking			
Never smoked	125 (45,0)	38 (30,4)	23,0 – 38,9
Current smoker	25 (9,0)	9 (36,0)	20,2 – 55,5
Former smoker	128 (46,0)	49 (38,3)	30,3 – 46,9

Table 1. Prevalence of controlled systemic arterial hypertension in elderly enrolled in the Family Health Strategy according to demographic, socioeconomic variables, life habits and self-reported morbidity. Campina Grande, Paraíba, Brazil. (n=278) (conclusion)

Variables	n (%)	Controlled hypertension	
Alcohol consumption			
Never	155 (55,7)	57 (36,8)	29,6 – 44,6
Daily	1 (0,4)	0 (0,0)	0,0 – 79,3
Weekly	3 (1,1)	1 (33,3)	6,1 – 79,2
Occasional	34 (12,2)	11 (32,3)	19,1 – 49,2
Have consumed but no longer	85 (30,6)	27 (31,8)	22,8 – 42,3
RPA			
Yes	70 (25,2)	28 (40,0)	29,3 – 51,7
No	208 (74,8)	68 (32,7)	26,7 – 39,3
Number de NCDs			
0 to 3	239 (86,0)	81 (34,0)	28,3 – 40,3
4 or more	39 (14,0)	15 (38,5)	24,9 – 54,1

CI: confidence interval; SEL: socioeconomical level; RPA: regular physical activity; NCDs: non-communicable chronic disease

In the crude analysis, there was a statistically significant association between controlled hypertension and smoking (p = 0.030). It was verified that elderly people who reported never smoked presented a 126.0% higher prevalence of controlled hypertension (PR = 2.26, 95% CI: 1.14-4.47) when compared to the elderly who reported being former smokers (Table 2).

In the multivariate analysis, no variables were associated with a hypertension outcome in the final model (Table 2).

The statistical power calculation of the non - significant variables, but of epidemiological relevance, indicated that the absence of association may have occurred due to the sampling proportion (smoking - sample power = 57.0%; alcohol consumption - sample power; age group - sample power = 53.0%, number of NCDs - sample power = 27.3%, SEL - sample power = 63.0%).

Table 2. Gross and adjusted models of the association between controlled hypertension and demographic, socioeconomic variables, life habits and self-reported morbidity in the elderly enrolled in the Family Health Strategy. Campina Grande, Paraíba, Brazil. (n = 277) (continues)

Variable	Gross PR (95% CI)	p value	Distal model PR(95% CI)	p value
Distal co-variables				
Sex				
Male	1,23(0,59-2,60)	0,731	1,13(0,70-1,82)	0,669
Female	1,0		1,0	
Age group				
60 to 69 years	0,52(0,23-1,18)	0,054	0,68(0,36-1,25)	0,117
70 to 79 years	0,99(0,45-2,18)		1,03(0,57-1,84)	
80 years or more	1,0		1,0	
Skin color				
White	1,70(0,96-2,98)	0,068	1,32(0,86-2,03)	0,169
Non-White	1,0		1,0	
Marital status				
Married	1,48(0,96-2,98)	0,338	1,35(0,46-3,93)	0,431
Single	1,38(0,25-7,62)		1,43(0,38-5,42)	
Widowed	1,24(0,32-4,90)		1,24(0,41-3,74)	
Divorced	1,0		1,0	
Living in the household				
2	0,54(0,23-1,24)	0,152	0,64(0,33-1,24)	0,260
1	0,81(0,18-3,60)		0,81(0,25-2,60)	
3 to 5	0,79(0,38-1,64)		0,79(0,46-1,38)	
6 or more	1,0		1,0	
Years of study				
Illiterate	0,43(0,12-1,54)	0,119	0,64(0,25-1,68)	0,339
1 to 4 years	0,94(0,31-2,89)		0,91(0,39-2,09)	
5 to 8 years	0,88(0,28-2,79)		0,81(0,34-1,94)	
9 years or more	1,0		1,0	
SEL				
A/B	0,70(0,27-1,84)	0,277	0,79(0,38-1,65)	0,492
C	0,76(0,31-1,84)		0,87(0,44-1,73)	
D/E	1,0		1,0	
Mesial co-variables				
Smoking				
Never smoked	2,26(1,14-4,47)	0,030		
Current smoker	2,55(0,88-7,37)			
Former smoker	1,0			
Alcohol consumption				
Never	1,71(0,81-3,58)	0,147		
Daily	0,00(0,00-.)			
Weekly	0,59(0,04-8,86)			
Occasional	0,94(0,37-2,39)			
Have consumed but no longer	1,0			
RPA				
Yes	1,53(0,83-2,85)	0,178		

No	1,0	
Proximal co-variables		
Number of NCDs		
0 to 3	0,86(0,40-1,87)	0,700
4 or more	1,0	

Table 2. Gross and adjusted models of the association between controlled hypertension and demographic, socioeconomic variables, life habits and self-reported morbidity in the elderly enrolled in the Family Health Strategy. Campina Grande, Paraíba, Brazil. (n = 277) (conclusion)

Mesial model		Final model	
PR (95% CI)	p value	PR (95% CI)	p value
1,11(0,63-1,97) 1,0	0,808	1,13(0,63-2,01) 1,0	0,780
0,68(0,36-1,26) 1,00(0,55-1,82) 1,0	0,125	0,68(0,36-1,27) 1,01(0,55-1,84) 1,0	0,122
1,37(0,89-2,13) 1,0	0,150	1,36(0,88-2,11) 1,0	0,161
1,29(0,44-3,82) 1,20(0,31-4,70) 1,15(0,38-3,48) 1,0	0,420	1,32(0,45-3,92) 1,22(0,31-4,80) 1,20(0,39-3,67) 1,0	0,427
0,68(0,35-1,31) 0,89(0,27-2,88) 0,86(0,49-1,50) 1,0	0,262	0,68(0,35-1,31) 0,888(0,27-2,85) 0,86(0,49-1,51) 1,0	0,260
0,60(0,23-1,61) 0,97(0,41-2,28) 0,93(0,38-2,27) 1,0	0,220	0,61(0,23-1,62) 0,98(0,41-2,31) 0,95(0,39-2,33) 1,0	0,215
0,80(0,37-1,71) 0,84(0,42-1,68) 1,0	0,388	0,79(0,37-1,69) 0,84(0,42-1,67) 1,0	0,370
1,66(0,999-2,81) 1,78(0,79-4,00) 1,0	0,078	1,65(0,98-2,79) 1,77(0,79-3,97) 1,0	0,085
1,40(0,78-2,49) 0,00(0,00-0,00) 0,74(0,90-6,01) 0,97(0,47-2,02) 1,0	0,236	1,41(0,79-2,51) 0,00(0,00-0,00) 0,73(0,90-5,94) 0,98(0,47-2,04) 1,0	0,231
1,30(0,81-2,08) 1,0	0,290	1,31(0,82-2,11) 1,0	0,278
		0,89(0,49-1,61) 1,0	0,726

PR: prevalence ration; CI: confidence interval; SEL: socioeconomical level; RPA: regular physical activity; NCD: non-communicable chronic disease

DISCUSSION

In order to verify the health status of the elderly enrolled in the Family Health Strategy in relation to the control of SAH, it was possible to observe in this study that few elderly patients presented blood pressure levels within normal limits, even when they were being treated for the disease. These findings corroborate other studies that identified low prevalence of hypertension control in Brazil[17-19] as well as in other countries[20,21].

A population study conducted in Brazil[18] identified an extremely low prevalence of individuals with controlled hypertension (10.1%), even though they were being treated for the disease. In a study carried out with individuals registered by the Family Health Strategy, blood pressure control was also low (32.3%), even in the face of drug treatment[19]. This situation is of concern in view of the cardiovascular, cerebrovascular, renal and cardiac complications that may occur in the organism due to high blood pressure.

These low prevalence of control of hypertension indicate an alert to health professionals to search for reasons for not controlling blood pressure levels even though the individuals are being treated for the disease. Some researchers have attempted to explain the reasons for not controlling blood pressure, even under treatment, relating the problem to factors such as: lack of knowledge about the disease[22,23], non-adherence to the prescribed treatment[22] and problems during the provision of care[22,23] and / or health system[22]. Regardless of the reasons, it is imminent that they are well established, so that the control of hypertension occurs quickly and permanently.

This study aimed to identify which factors would be associated with the control of hypertension among the elderly. It was observed in the univariate analysis that the smoking variable presented a statistically significant association with the control of hypertension. It was verified that non-smokers had a higher prevalence of disease control when compared to former smokers. This result evidences the importance of the observation of life habits during the hypertense elderly care, considering that the adoption of healthy lifestyles corroborates with the improvement of the quality of life and interferes positively in the control of the hypertension[17]. After multivariate analysis, it was not possible to identify statistically associated variables.

Research that aimed to verify the factors associated with the control of hypertension among individuals taking antihypertensive medication evidenced the existence of a relationship between the sex variable and the control of hypertension. This result was observed by a survey carried out in São Paulo/SP with individuals followed by health units that verified that women had greater control of the disease (52.6%) when compared to men (30.9%)[17]. A similar result was observed in a study carried out in the city of Novo Hamburgo/RS with individuals attended by basic health units which verified, in the crude analysis, that the control of blood pressure was associated with the female sex[24].

Discussions about the greater control of hypertension among women relate to a more accurate perception of their health condition due to a greater search for health services due to their attributes and reproductive functions and less availability of time and activities directed to health of men when compared to women. Research carried out on health care in the view of man has identified that the lowest search of the man for health care in part is associated with the socio-cultural construction of masculinity, but also the disregard of health professionals to the sex specificities[25].

A possible explanation for greater control of blood pressure levels among men when compared to the women observed in this study is the fact that the individuals participating in this research are part of the Family Health Strategy, a strategy to reorganize the care model to health in Brazil, which focuses on work, among other actions, on men health. Therefore, the monitoring of hypertensive individuals has led to a better involvement of men in the treatment of hypertension.

It was observed in this study that the elderly of white color presented a greater prevalence of control of the disease when compared to those of non-white color. This result corroborates the findings of a study carried out with data from a multi-ethnic population study on atherosclerosis in the United States, which verified a lower control of hypertension on non-white individuals in relation to those of white color[26].

The relationship between hypertension control and skin color, according to data from the *Centers for Disease Control and Prevention*[27], is linked to the presence of several characteristics such as socioeconomic conditions, lifestyle, social environment and access to health services. It is known that due to social inequalities in the country, it is possible that non-white individuals in this research have difficulties accessing health services and continuous treatment for an effective control of hypertension.

It was verified, in this research, that elderly people with less than five years of schooling had a higher prevalence of controlled hypertension when compared to those with higher educational level. This result differs from the findings found by a study by Jaddou *et al*.[20] that found a higher prevalence of hypertension control (52.0%) in individuals with more years of schooling when compared to those with less schooling.

The higher prevalence of control of hypertension among elderly people with lower level of schooling in this study may be associated with the inclusion of the Family Health Strategy in regions of greater social vulnerability. The possibility of greater access to health services, as well as actions for health promotion and disease prevention contribute to a better perception of their health status and greater care among individuals. However, as pressure control levels are still not very representative, it is important to recognize the existence of difficulties related to adherence to treatment for hypertension and to consider this difficulty during health planning.

To be aware that as the individual ages the organism presents a physiological fragility that hinders the maintenance of the organic functions is fundamental for the therapeutic planning that seeks to control the pressure levels. It is evident that health services, especially the Family Health Strategy, need to systematically monitor the elderly with hypertension, since physiological changes may influence the control of the disease.

This systematic monitoring contributes to the identification of the needs and peculiarities of the subjects, which allows a more effective approach on the elderly with hypertension and their participation in the treatment. A study conducted in Joinville/SC with the objective of identifying the prevalence of blood pressure control in hypertensive patients verified therapeutic inertia as a possible cause of the low rate of control of pressure levels in which health professionals do not make the appropriate therapeutic changes and / or individuals do not adhere to therapy[28], which may be related to the systematic and shared non-accompaniment of care.

Although strategies for coping with NCDs around the world, including hypertension, detection, treatment and control of the disease are still inadequate. The difficulties faced for the care with the hypertension go through all levels of health care, but with special attention the level of primary care[1].

Therefore, it is important to institute changes in health care so that professionals can act with quality in therapeutic management, with possibilities for simplification of drug regimens and with fundamental participation and empowerment of the subjects[29].

Among the limitations observed in this study, it can be considered that the use of a sub-sample of the original study compromises the external validity of the findings; in view of the non-use of a prevalence of the specific endpoint for controlled hypertension and the use for analysis of only the elderly under hypotensive medication, conditions that influenced the sample size of the study and its statistical power.

It was observed in this study a low prevalence of control of hypertension among the elderly, a worrying situation due to the risks of complications and injuries due to the non-control of pressure levels. No factors associated with low blood pressure control among the elderly were identified after multivariate analysis, a situation that differs this study from other studies performed with this theme, which points to the need for other studies that search for the reasons for the difficulty of controlling hypertension among those being treated, as well as with larger samples to increase power to identify associations.

The identification of individuals who, even in treatment for hypertension, do not present control of blood pressure levels becomes important, since it reveals that the health care of the elderly with NCDs based on access to drug treatment is not enough to protect these individuals of possible complications. The knowledge of this information contributes to the health care planning of individuals with SAH, since they direct the specific health care, guaranteeing that groups with greater vulnerability obtain guidance on the factors involved in the control of the disease and in the prevention of more serious situations.

We have in the Family Health Strategy, priority and strategic actions related to the health of the elderly that need to be effectively implemented for the treatment and control of hypertension. These actions should consider the risk factors inherent to the individual and that cannot be modified, but mainly, they should address the modifiable characteristics of the individual, which are risk factors for the appearance of various comorbidities.

In addition, planning health care must go beyond medication prescription, so that effective control of hypertension is achieved. Thus, it is necessary to invest in health education that considers regional and local specificities and that aim at controlling the risk factors involved with the disease (overweight/obesity, excessive consumption of salt and fat, physical inactivity, smoking and alcohol consumption) and that allow the joint work among all those involved.

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