

# Prevalence of systemic arterial hypertension in users from a family health unit in northern Brazil

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**Abstract—** Objective: to determine the prevalence of systemic arterial hypertension in health users residing in micro areas covered by a Family Health Strategy in the North of Brazil. Method: Analytical, retrospective and transversal study of quantitative nature. Result: The sample consisted of 241 medical records of patients of both

sexes, 58.92% female and 41.08% male, so that the prevalence of SAH in the female population was significant. According to demographic and socioeconomic variables, the prevalence of SAH among men was significantly associated ( $p < 0.05$ ) with marital status, education and occupation. The prevalence of SAH among women was significantly associated ( $p < 0.05$ ) with marital status and education. However, from the PR calculations, it was found that the prevalence's were not significant, as verified by the 95% CI that included the value 1.0. The results indicated that the prevalence of SAH, in the FHS of Parque Amazônico I, was higher among women, aged 60 or over, with low education, sedentary and with low purchasing power. Conclusion: The results of the research in question show that the occurrence of SAH is more prevalent in females, in individuals over 60 years, who have less education and who do not perform any type of professional activity. The most prevalent associated factors in this research are physical inactivity, obesity and smoking. The most prevalent chronic morbidities reported are Chronic Kidney Disease in men and Coronary Artery Disease in women.

**Keywords—** Hypertension, Public Health, Epidemiology and Biostatistics.

## I. INTRODUCTION

Systemic arterial hypertension (SAH) is a chronic-degenerative disease of multifactorial character, most of the time asymptomatic and with slow and progressive evolution. It compromises the balance of the vasodilator and vasoconstrictor systems, increases pressure in blood vessels and can cause damage to noble organs such as the heart, brain, kidneys and eyes. It can also cause complications like stroke, heart failure and kidney failure<sup>1</sup>.

According to the criteria for the diagnosis of arterial hypertension of the Brazilian Society of Hypertension (SBH), it is considered hypertension when blood pressure levels are greater than or equal to 140/90mmHg, without previous use of antihypertensives<sup>2</sup>. In addition, this disease causes approximately 7,1 million deaths each year worldwide. Estimates from the past few years show that 1,400 million people suffer from the disease, of which only 14% can control it<sup>3</sup>.

In 2000, the prevalence of SAH in the world population was 25% and the estimate for the year 2025 is 29%<sup>4</sup>. For the Family Health Strategy (FHS), the frequency of control ranged from 30% to 53.9%, these rates among the elderly are worse, ranging from 27% to 44.6%<sup>5</sup>.

In this context, this study aims to determine the prevalence of systemic arterial hypertension in health users residing in micro areas covered by a Family Health Strategy in the North of Brazil.

## II. METHOD

Analytical, retrospective and cross-sectional study of a quantitative nature carried out in a FHS of Parque Amazônico I, located in the Terra Firme neighborhood, municipality of Belém do Pará, northern Brazil.

The sample universe consists of all patients monitored by the Hypertension and Diabetics Program (HIPERDIA) and residents in the areas covered by the FHS of Parque Amazônico I, corresponding to 538 health users diagnosed with hypertension and diabetes. The population sample included in this research was 241 users diagnosed with SAH, according to the scheduling worksheets, used in this service to monitor and schedule the return of hypertensive patients.

Patients diagnosed with SAH registered and followed up by the HIPERDIA program, regardless of gender, in the age group 18 to 79 years were included. Patients who abandoned the program, died, medical records with incomplete data, change of address and patients who presented only diabetes were excluded.

The statistical treatment sought to identify, by means of absolute and relative frequencies, if the data converge to any differential or if there is a trend in the distribution of these data. The comparisons between the distributions of the variables were made using the chi-square test of trend/adherence, symbolized by the  $\chi^2$ , because this test is a hypothesis that is intended to verify whether there is a trend or not in the distribution of the nominal variables and ordinals<sup>6</sup>, for this, a significance level of p-value  $< 0.05$  was adopted.

Statistical analyzes were performed using the Bioestat 5.4 program. To verify the association between the dependent variable (systemic arterial hypertension) and the independent variables of the study, that is, the prevalence ratios (PR) were estimated with respective 95% confidence intervals (95% CI).

Data collection took place between the months of August and October of the year 2016, through a careful analysis of the medical records of the selected patients, according to surveys carried out in the patient care records registered in the HIPERDIA program. A form containing

sociodemographic data was used to organize the data, containing the following study variables: sociodemographic (gender, age group, marital status), socioeconomic (education, monthly income, occupational activity), health-related behaviors (alcoholism, smoking, physical activity) and number of chronic morbidities reported.

The research was submitted to and approved by the Research Ethics Committee of the Institute of Health Sciences of the Federal University of Pará (CAAE: 56846016.5.0000.0018), according to resolution 4.66/2012 of the National Health Council of Ministry of Health. This resolution incorporates, from the perspective of the individual and the communities, the four basic references of bioethics: autonomy, non-maleficence, beneficence and justice, aiming to guarantee the rights and duties that concern the scientific community, the research subjects and the study.

### III. RESULTS

The sample consisted of 241 medical records of patients of both sexes, 58.92% female and 41.08% male, so that the prevalence of SAH in the female population was significant. Most patients were 60 years of age or older, that is, there was a 95% probability that most patients were 60 years of age or older. It was found that the proportion of married people was higher, but not significant. Elementary education was the level of education, significantly, predominant among patients.

As for monthly income, it is observed that 17.01% of patients received up to 1 minimum wage, but this trend was not significant. Regarding the occupational situation of the patients, it was observed that the highest frequency of patients aged 60 years or older received government resources, but there was a significant predominance of two other categories: self-employed and paid, as shown in Table 1.

Table 1 – Sociodemographic and socioeconomic characteristics of hypertensive men and women registered at the FHS of Parque Amazônico I, Belém, PA, 2016.

Variables	N	%	P-Value <sup>(1)</sup>
<b>Sex</b>			
Feminine	142	58,92	0.0056*
Male	99	41,08	
<b>Age Range</b>			
18-29	0	0,00	<0.0001*
30-59	97	40,25	
≥60	144	59,75	
<b>Marital Status</b>			
Not married	18	7,47	0.1622
Married	49	20,33	
Separate	21	8,71	
Widower	38	15,77	
Not mentioned	115	47,72	
<b>Education</b>			
Illiterate	25	10,37	<0.0001*
Elementary School	78	32,37	
High school	18	7,47	
University education	3	1,24	
Not mentioned	117	48,55	
<b>Monthly Income</b>			

Variables	N	%	P-Value <sup>(1)</sup>
Up to 1 minimum wage	41	17,01	0.1176
> 1 salary	28	11,62	
Not mentioned	172	71,37	
<b>Occupational Activity</b>			
Employee	32	13,28	0.0048*
Unemployed	13	5,39	
Self-employed	35	14,52	
Self-employed	38	15,77	
Not mentioned	123	51,04	

Source: Research protocol (2016).

<sup>(1)</sup>Pearson's Chi-square test for trend. (P-Value <0.05).

\*The proportions differ significantly.

According to demographic and socioeconomic variables, the prevalence of SAH among men was significantly associated (p<0.05) with marital status, education and occupation. The prevalence of SAH among women was significantly associated (p<0.05) with marital status and education, as shown in Table 2. However, from the PR calculations, it was found that the prevalence's were not significant, as seen by the 95% CI that included the value 1.0.

Regarding marital status, it was observed that separated men had a higher prevalence in relation to singles. It was found that separated women had a lower prevalence compared to single women. Regarding education, men with higher education had a lower prevalence compared to illiterates, and women with elementary education had a lower prevalence compared to illiterates (Table 2).

Regarding the occupation variable, it was observed that self-employed men had a lower prevalence of hypertension compared to the unemployed. There was no significant association between the prevalence of hypertension among women with an occupational category. However, it was observed that employed women had a lower prevalence of hypertension compared to unemployed women.

It is noteworthy that among men, the frequency of SAH was associated with married (45%), elementary school (62%), employees (33.93%), in addition to those who received help (33.93%). Among women, the prevalence of SAH was associated with married women (36.05%), widows (36.05%) and primary education (63.51%), as shown in Table 2.

Table 2 – Estimates of the prevalence ratio for arterial hypertension in men and women, according to socio-demographic and socioeconomic variables, Belém, PA, 2016.

Variable	Men			Women		
	N (%)	p <sup>(1)</sup>	PR (IC 95%)	N (%)	p <sup>(1)</sup>	PR (IC 95%)
<b>Marital Status</b>		<b>0.0293*</b>			<b>0.0008*</b>	
Not married	6 (15,00)		1,00	12 (13,95)		1,00
Married	18 (45,00)		1.10 (0.37 - 3.21)	31 (36,05)		0.94 (0.40 - 2.23)
Widower	7 (17,50)		0.55 (0.16 - 1.88)	31 (36,05)		1.22 (0.51 - 2.92)
Separate	9 (22,50)		1.28 (0.38 - 4.31)	12 (13,95)		0.85 (0.30 - 2.37)
<b>Education</b>		<b>&lt;0.0001*</b>			<b>&lt;0.0001*</b>	
Illiterate	11 (22,00)		1,00	14 (18,92)		1,00
Primary school	31 (62,00)		0.90 (0.39 - 2.05)	47 (63,51)		1.07 (0.50 - 2.27)
High school	7 (14,00)		0.88 (0.28 - 2.72)	11 (14,86)		1.09 (0.40 - 2.95)

Variable	Men			Women		
	N (%)	p <sup>(1)</sup>	PR (IC 95%)	N (%)	p <sup>(1)</sup>	PR (IC 95%)
University education	1 (2,00)		0.75 (0.07 - 8.11)	2 (2,70)		1.19 (0.17 - 8.00)
<b>Occupation</b>		<b>0.0065*</b>			<b>0.2921</b>	
Employee	19 (33,93)		2.57 (0.64 - 10.20)	13 (20,63)		0.48 (0.17 - 1.34)
Unemployed	3 (5,36)		1,00	11 (17,46)		1,00
Self employed	15 (26,79)		1.85 (0.46 - 7.48)	20 (31,75)		0.67 (0.25 - 1.78)
Aid	19 (33,93)		2.16 (0.55 - 8.53)	19 (30,16)		0.59 (0.22 - 1.56)

Source: Research protocol (2016).

<sup>(1)</sup>Pearson's Chi-square test for trend. (p-value <0.05).

\*There is a trend between the proportions.

N: absolute number; PR: prevalence ratio; 95% CI: 95% confidence interval.

In both men and women, it was observed that the factors associated with SAH and Referred Chronic Morbidities were relevant (p <0.05). PR was calculated for the factors associated with SAH in men and it was found that the prevalence of SAH is not relevant, seen by the 95% CIs that include the value 1.0, except in the case of men with a sedentary lifestyle, which has a lower prevalence of SAH in relation to men who consume alcohol (table 3).

Among women, PR was calculated for factors associated with SAH and it was found that prevalence's are relevant among obese women and among sedentary women, as seen by 95% CIs that do not include the value 1.0. Therefore, these women are about three times more likely to have SAH. Smoking women had a lower prevalence of SAH compared to women who consume alcohol (Table 3).

In addition, a PR was calculated for Chronic Morbidities in men and it was found that the prevalence is nonspecific, as verified by the 95% CI, which includes the value 1.0. Men with Diabetes Mellitus (DM) and with a lower prevalence of SAH compared to men with stroke, the PR was in Chronic Kidney Disease (CKD), as shown in Table 3.

For women, PR was calculated to identify Chronic Morbidities, it was found that the prevalence is not significant, seen by the 95% CI that includes the value 1.0. Women with CKD had a lower prevalence of SAH compared to women with stroke. In addition, it was observed that DM is the most frequent in both men and women, as shown in Table 3.

Table 3 – Estimates of the prevalence ratio of arterial hypertension, in men and women, according to variable factors associated with SAH and referred chronic morbidity, registered at the FHS of Parque Amazônico I, Belém, PA, 2016.

Variable	Men			Women		
	N (%*)	Value p <sup>(1)</sup>	PR (CI 95%)	N (%*)	Value p <sup>(1)</sup>	PR (CI 95%)
<b>Factors associated with SAH</b>		<b>0.0007*</b>			<b>&lt;0.0001*</b>	
Alcoholism	19 (19,59)		1,00	5 (4,59)		1,00
Obesity	15 (15,46)		0.47 (0.20 - 1.10)	25 (22,94)		3.00 (1.01 - 8.88)
Smoke	25 (25,77)		0.80 (0.36 - 1.77)	14 (12,84)		1.72 (0.55 - 5.39)
Hyper Sodium diet	13 (13,40)		0.54 (0.22 - 1.32)	17 (15,60)		2.72 (0.87 - 8.44)
Sedentary lifestyle	23 (23,71)		0.42 (0.19 - 0.90)	46 (42,20)		3.20 (1.13 - 8.99)
Others	2 (2,06)		0.63 (0.10 - 3.82)	2 (1,83)		2.40 (0.34 - 16.89)
<b>Referred Chronic</b>		<b>&lt;0.0001*</b>			<b>&lt;0.0001*</b>	

Variable	Men			Women		
	N (%*)	Value p <sup>(1)</sup>	PR (CI 95%)	N (%*)	Value p <sup>(1)</sup>	PR (CI 95%)
<b>Morbidity</b>						
Stroke	19 (19,59)		1,00	13 (11,93)		1,00
PAD/CAD	0 (0,00)		-	3 (2,75)		2.46 (0.43 - 13.81)
HF	2 (2,06)		0.84 (0.14 - 5.04)	2 (1,83)		1.23 (0.20 - 7.56)
AMI	14 (14,43)		1.07 (0.44 - 2.57)	8 (7,34)		0.89 (0.31 - 2.51)
CKD	3 (3,09)		1.26 (0.25 - 6.26)	1 (0,92)		0.61 (0.06 - 6.04)
DM	23 (23,71)		0.59 (0.28 - 1.24)	42 (38,53)		1.59 (0.74 - 3.37)

**Source:** Research protocol (2016).

<sup>(1)</sup>Pearson's chi-square test for trend. (p-value <0.05).

\*There is a trend between the proportions.

N: absolute number; PR: prevalence ratio; 95% CI: 95% confidence interval.

**Note:** Cerebrovascular accident (stroke); Peripheral Arterial Disease (PAD) or Coronary Artery Disease (CAD); Heart failure (HF); Acute Myocardial Infarction (AMI); Chronic Kidney Disease (CKD); Diabetes Mellitus (DM).

#### IV. DISCUSSION

The results indicated that the prevalence of SAH, in the FHS of Parque Amazônico I, was higher among women, aged 60 or over, with low education, sedentary and with low purchasing power. Similar findings were observed in the National Health Survey, highlighting that the prevalence of SAH in the FHS is predominant among women with socioeconomic difficulties<sup>7</sup>.

Despite the prevalence of SAH among women, an observational and analytical study showed that among patients with SAH, women were more controlled than men, especially younger women, with shorter illness time, who knew the importance of practitioners exercise, with less interruption of treatment, who took the medication at the right time and who received less antihypertensive medication<sup>8</sup>.

In women, the level of blood pressure can be influenced by situations such as the use of contraceptives, polycystic ovary syndrome, pregnancy, hormone replacement and menopause, situations that can lead to a significant increase in blood pressure and the development of SAH. Despite this information, the mechanisms responsible for the differences in pressure regulation between the sexes are not yet fully understood, but they may be involved with the effects of sex hormones in the manipulation of sodium by the renal system<sup>9</sup>.

Other situations may justify this increase in blood pressure in women, such as insertion in the domestic and professional universe. The level of female stress has been

increasing due to the greater participation of women in the labor market, leading to an overload of professional demands with household chores, which may explain the higher levels of stress in women when compared to men, being an important factor for increase blood pressure<sup>10</sup>.

In conducting this research, the age group variable showed an association statistically related to SAH in which he is over 60 years old, findings that corroborate data from the World Health Organization<sup>11</sup>. In continuity, a cross-sectional study with data from the National Health Survey, carried out with 10,211 participants aged 60 or over, found a prevalence of SAH of 66.7%, mainly in women aged 70 or over, with one or more chronic diseases, with overweight and with high waist circumference<sup>12</sup>.

In a review of the panorama of hypertension control in Brazil, in population-based studies, the rate varies from 10% to 57.6%. For the FHS, the frequency of control ranged from 30% to 53.9%, and for the elderly, worse rates were observed, ranging from 27% to 44.6%<sup>5</sup>. This estimate leads us to consider that the elderly population has a greater chance of manifesting SAH, compared to the other age groups, according to what the research hypothesis describes.

The present study shows that the education of men and women greatly influences the occurrence of the disease. Thus, among the markers of socioeconomic level, education is the one that best correlates with the frequency and intensity of cardiovascular risk factors<sup>10</sup>.

In continuity, it is observed that men with higher education and women with less education have a prevalence of acquiring the reduced disease when compared to the illiterate. Thus, regarding the level of education, the data are similar to the research carried out in a Family Health Unit in Campina Grande, Brazil, where a significant number of hypertensive users (61.2%) with up to five years of schooling were observed, in addition to the fact that the low level of education of the elderly represents high levels of vulnerability to other diseases and infections<sup>13</sup>.

Regarding occupational activity, it was observed in this research that the prevalence of SAH is high in men who work, a situation that suggests that SAH is more prevalent in people who perform some type of occupational activity. Therefore, Braga<sup>14</sup> reports that the highest prevalence of SAH has been observed among unskilled workers, with lower pay and belonging to the secondary and tertiary sectors of the economy.

In addition, another survey compared women, economically active and inactive, and revealed that in the municipality of João Pessoa and Campina Grande, 68% and 67.2%, respectively, of active women had SAH. Among economically inactive women, this percentage was higher with 75.6% in João Pessoa and 81% in Campina Grande<sup>15</sup>. Based on these findings, it is highlighted that the domestic stress transmitted by domestic activities, the obligation to care for children, emotional distress due to lack of income and submission to the husband can cause changes in the patterns of the sociodemographic profile of the hypertensive women analyzed.

Another significant variable in the present study was sedentary lifestyle, which is related to a higher prevalence of the disease in both sexes, in this case, the trend among women with a sedentary lifestyle was more likely to present SAH compared to men. Like these findings, other studies revealed that more than 50% of hypertensive individuals did not practice physical exercises, but among them, a study showed the prevalence of sedentary lifestyle among women, with a percentage of 57.5%<sup>16</sup>. In addition, this research showed that physical inactivity is the factor that influences survival in hypertension among men, although smoking is more prevalent, as highlighted by a study conducted in Paraná, in which the association avoided and previously dissipated with SAH<sup>17</sup>.

In addition, in a study that evaluated the profile of users of three basic health units in southern Brazil, overweight and obesity were present in more than 70% of hypertensive patients, but without distinction between genders<sup>18</sup>. The relationship between weight gain and SAH

is directly proportional, that is, the excess of body fat represents the largest single factor related to the elevation of blood pressure<sup>19</sup>. In addition, weight gain results in increased sympathetic activity, insulin resistance and hyperinsulinemia. At the renal level, hyperinsulinemia promotes tubular reabsorption of sodium and water and, consequently, vasoconstriction and hypertension<sup>20</sup>.

This research showed that, among the chronic comorbidities mentioned, Diabetes Mellitus is more frequent in men and women with SAH. The possibility of an association between arterial hypertension and diabetes mellitus is around 50%. Therefore, this condition requires the management of both diseases in the same user, aggravated by the fact that their concomitance potentiates micro and macrovascular damage, causing high cardiac, cerebral and vascular morbidity<sup>20</sup>.

Kidney disease is associated with hypertension and can worsen kidney dysfunction, in which case, hypertension can take on both the underlying cause and complication of the disease. In the past decade, the incidence of kidney disease attributed to SAH has increased significantly. Therefore, it is evident that strict control of arterial hypertension is important to minimize the progression of CKD, in addition to helping to reduce the risk of cardiovascular diseases frequently associated<sup>21</sup>.

In this sense, without proper identification and treatment, there is a great chance that SAH will maintain its role as an important cause of CKD. Among the factors that can collaborate to increase the incidence of hypertension as a cause of CKD, the following stand out: aspects associated with population aging, increased life expectancy of the population at each age, higher incidence and prevalence of SAH in the elderly population and the increase the average age of patients who start treatment<sup>22</sup>.

In addition, this research found an important association between SAH and the risk of coronary heart disease among the patients surveyed. These findings are similar to a meta-analysis carried out from 61 studies with more than 1 million adults, in which it was found that patients who had a 20 mmHg increase in systolic blood pressure and 10 mmHg in diastolic risk, the risks fatal episodes related to coronary heart disease were twice as high<sup>23</sup>. In addition, in the study by Brunori et al<sup>24</sup>, it was observed that SAH is an important predictor of coronary risk. Therefore, these findings corroborate studies that claim that arterial hypertension represents the greatest independent risk factor for the development of coronary artery disease<sup>25</sup>.

## V. CONCLUSION

The results of the research in question show that the occurrence of SAH is more prevalent in females, in individuals over 60 years, who have less education and who do not perform any type of professional activity. The most prevalent associated factors in this research are physical inactivity, obesity and smoking. The most prevalent chronic morbidities reported are Chronic Kidney Disease in men and Coronary Artery Disease in women.

In this context, health professionals who follow the HIPERDIA program must know and be trained with these modifiable and influential risk factors for the occurrence of the disease. Non-drug treatment should be valued and included in the routine of these professionals, who must also address strategies for this population to adopt these habits. The proposition of strategies must contemplate the local reality, and it is essential that the health team creates a bond so that there is an extension of care. Professionals should also be supported by health management, to assess local and state needs, to reduce the incidence of the disease.

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