A Study on Systemic Hypertension in the City of Campo Grande, MS, Brazil

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Summary

Objectives: To detect the actual prevalence of systemic hypertension in the city of Campo Grande, State of Mato Grosso do Sul, Brazil, and frequent risk factors.

Methods: Cross-sectional study with a randomized sample of the adult population of the city of Campo Grande, MS, in a total of 892 individuals. A questionnaire on age, gender, level of education, smoking, alcohol consumption, and aspects of the treatment was applied. Anthropometric data (weight and height) were collected. According to the WHO, a BMI<25 kg/m² was considered normal weight; 25≥BMI<30 overweight; and BMI≥ 30 obesity. Criteria for hypertension were based on the VII JNC report, with blood pressure cut-off values of 140 x 90 mmHg.

Results: The prevalence of hypertension was 41.4%, varying with age (up to 29 years: 11.8%; 30-39: 24.8%; 40-49: 43.3%; 50-59: 42.4%; 60-69: 48.6% and ≥ 70: 62.3%). A higher prevalence was observed among men (51.8%), whereas among women the prevalence was 33.1%.Individuals with basic level of education tended to present higher rates. Among overweight and obese individuals, a higher prevalence of hypertension was observed: normal BMI (27.9%), overweight (45.6%) and obesity (58.6%). Above 60 years of age, a higher percentage of isolated systolic hypertension was observed, with 16.4% (60-69 years) and 24.6% (>70 years). Daily or weekly alcohol consumption was also related to a higher incidence, of 63.2% and 47.2%, respectively. Only 59.7% were known to be hypertensive. Of the hypertensive individuals, 57.3% were undergoing some type of treatment. Of those undergoing regular treatment, 60.5% presented hypertension.

Conclusion: The prevalence of hypertension was 41.4%, therefore higher than the average verified in some studies. This calls the attention for worsened epidemiologic conditions and cardiovascular repercussions, thus showing the need for higher public investment on education and orientation of these population groups as regards prevention.

Key words: Hypertension/prevalence; hypertension/epidemiology; risk factors.

Introduction

The World Health Organization reports that cardiovascular diseases are the leading cause related to death in the western societies, and hypertension is one of the three major diseases accounting for the deaths. The progressive increase in the prevalence of cardiovascular diseases imposes the need to develop and implement population strategies to prevent the multiple risk factors that lead to the primary endpoints related to these diseases[1].

In Brazil, estimates of the prevalence of Systemic Hypertension range from 22.3% to 44% according to the region studied[2]. A predominance of higher rates has been observed mainly in the most recent studies.

In Brazil, there are studies showing the association between hypertension and its epidemiological characteristics such as age, gender, socioeconomic level, alcohol consumption and obesity, and these studies were cited in the V Brazilian Guideline on Systemic Hypertension[2].

The objective of the present study was to assess the prevalence of hypertension in association with the risk factors previously mentioned in the city of Campo Grande, Brazil.

Methods

A cross-sectional analytic study was conducted in the city of Campo Grande, State of Mato Grosso do Sul, Brazil, in a total of 892 individuals analyzed based on a randomized sample[3], in a population estimated at 749,768 inhabitants in 2005, according to the IBGE[4]. The population was assessed in the urban perimeter in the year of 2005. Only individuals above 18 years of age and living in the city were included in the study. Data were collected in public places (supermarkets, urban bus terminals, leisure areas and trade areas).

The research was conducted using standard questionnaires containing data subject to collection (gender, age, race, level of education, occupation, previous awareness of being hypertensive, pattern of physical activity, alcohol consumption, smoking, treatment for hypertension, as well as regular use or

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not of medication). After the interview (of at least 10-minute duration), blood pressure was measured using the indirect method with aneroid sphygmomanometers, all of the same brand, periodically tested and duly calibrated. Blood pressure was measured in the sitting position, with the right arm resting on a table at the heart's height, ensuring that the patient was not on a full bladder, and that he/she had not practiced physical exercises, nor consumed alcohol beverages, coffee, food, or smoked up to 30 minutes prior to measurement taking. The brachial artery was located by palpation. The cuff was firmly placed 2 to 3 cm above the antecubital fossa, with the rubber bag centralized over the brachial artery. The criterion used to determine the systolic pressure was the moment when the first sound appeared (Korotkoff's phase I), which increases with increasing deflation speed; and the criterion used to determine the diastolic pressure was the moment when the sound disappeared (Korotkoff's phase V). The auscultation was maintained until approximately 20 mmHg to 30 mmHg below the last sound to confirm its disappearance, followed by a quick and complete deflation. If the beats persisted to zero level, the diastolic pressure was determined when the muffling of sound occurred (Korotkoff's phase IV). Rounding-off of pressure values was avoided. A second measurement was taken 3 minutes later to obtain the mean of the two values[5].

For data analysis, the confidence intervals for the prevalences were calculated using the formula: $P \pm 1.96\sqrt{(1-P/N)}$, where P is the prevalence and N is the total of the numbers studied[6], with a 95% confidence interval. The chi square test was used to analyze the statistical significance of the samples, by comparing the qualitative variables. The test for one proportion was also used. This test analyzes the difference between the proportions. The level of significance used was lower than or equal to 0.05. The interviewees agreed to participate in the study after receiving explanation on the objectives and procedures performed.

Results

The statistical results demonstrate a significant difference between the ages in relation to blood pressure (95% CI). Sample subjects in the age range between 40 and 49 years tended to have a higher prevalence of high blood pressure (Table 1), and a high degree of difference between the age ranges was also observed ($p<0.001$).

Of the 892 patients studied, 400 (44.8%) were males and 492 (55.2%) were females, most of them in the age range of 50 to 59 years (22.19%). A close relation between individuals older than 70 years and hypertension, with a prevalence of 62.3% in this age range is shown in Figure 1.

Distribution according to gender shows a higher proportion (51.8%) of men with high blood pressure at the moment of measurement taking, and a lower proportion among women (33.1%). The prevalence of high Blood Pressure in the population studied was 41.4% ($p<0.001$) (fig. 2).

Statistically, individuals with basic level of education tend to have a higher incidence of high blood pressure ($p<0.001$) (fig. 3).

When the sample subjects were distributed into BMI < 25 kg/m² (normal – 35.31%), 25 ≤BMI<30 (overweight – 48.43%), BMI≥ 30 (obese – 16.25%), those presenting

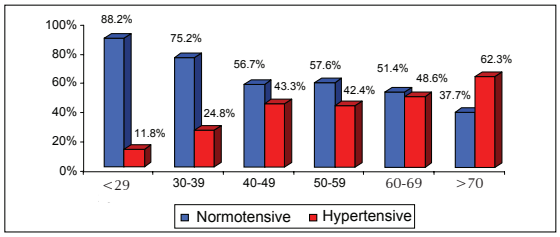

Fig. 1 - *Age range in relation to systemic blood pressure n = 892; p = <0.001; GL = 5 ; chi-square = 69.944.*

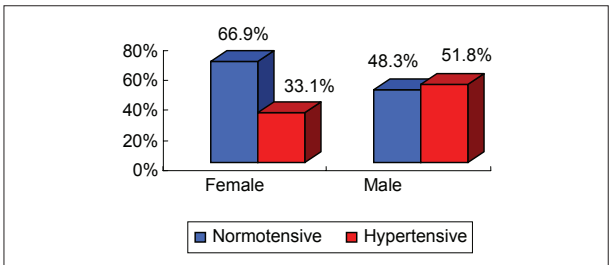

Fig. 2 - *Percentage of sample subjects according to gender in relation to blood pressure p = <0.001; GL = 1 ; chi-square = 31.512.*

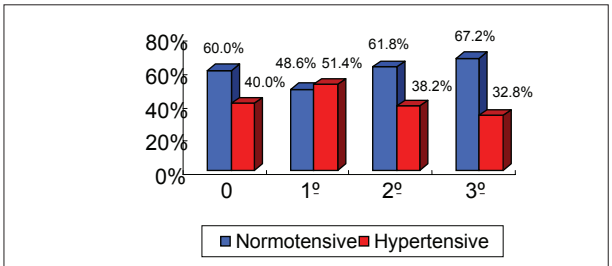

Fig. 3 - *Level of education in relation to systemic blood pressure n = 892; p = <0.001; GL = 3 ; chi-square = 22.431.*

Table 1 - Sample subjects according to age range in relation to blood pressure

n = 892	Up to 29	30 – 39	40 – 49*	50 – 59*	60 – 69*	Above 70*	Total	Is there a significant difference?
Not presenting	67	100	101	114	91	49	522	Yes, p<0.001
Presenting	9	33	77	84	86	81	370	
Total	76	133	178	198	177	130	892	

overweight and obesity had a statistically higher prevalence of high blood pressure when compared to those with a normal BMI, as shown in Figure 4 (p<0.001).

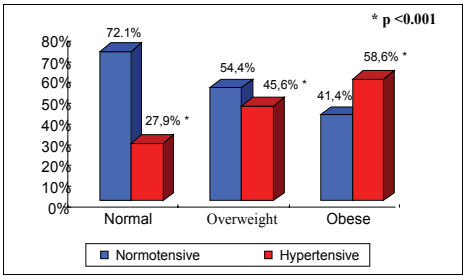

Fig. 4- *BMI in relation to systemic blood pressure n = 892; p<0.001; GL = 2; chi-square = 44.377.*

Of all hypertensive individuals, 20.3% presented isolated systolic hypertension (p<0.001). Using the chi-square test, individuals above 60 years of age were observed to have a statistically higher percentage of isolated systolic hypertension (ISH), with a higher repercussion on the 8th decade of life (fig. 5).

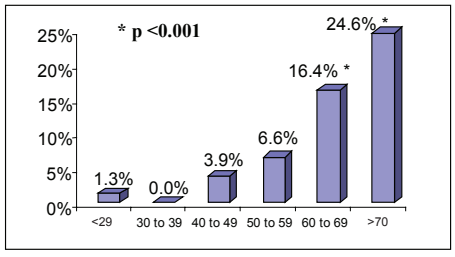

Fig. 5 – *Isolated Systolic Hypertension according to age n = 370; p<0.001 ; GL = 5 ; chi-square = 74.657.*

Sample subjects with daily or weekly habit of alcohol consumption tended to have a statistically higher incidence of high blood pressure (p value = 0.001), thus reflecting a significant difference between alcohol consumption and the presence of high blood pressure (fig. 6).

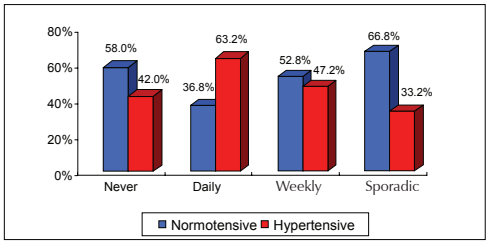

Fig. 6 - *Alcohol consumption in relation to systemic blood pressure n = 892; p<0.001; GL = 3; chi-square = 16.019.*

In our population of hypertensive individuals (n=370), only 69.18% (64.2% to 73.9%) were aware of being hypertensive (p<0.001) (fig. 7).

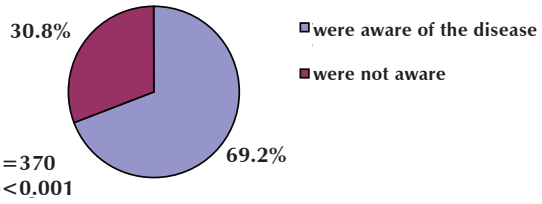

Fig 7 – *Awareness of the disease.*

Of the hypertensive individuals, 57.3% were undergoing treatment (Table 2) (p<0.006).

Of those who were aware of being hypertensive, 78.6% were undergoing treatment (74.4% to 82.4%). Of these, 90.2% were undergoing daily treatment (86.5% to 93.2%) (p<0.001). A higher prevalence of increased high blood pressure was also observed in the group of individuals who were aware of being hypertensive and who were undergoing daily treatment with antihypertensive drugs, with levels compatible with mild to moderate hypertension in 60.5% (54.8% to 66.1%; p<0.001).(fig. 8).

Table 2 - Individuals with high blood pressure in relation to treatment

Variables	N	Proportion	Is there a significant difference?
Undergoing treatment	212	57.3%	Yes, p-value = 0.006
Not undergoing treatment	158	42.7%	
Total	370	100%	

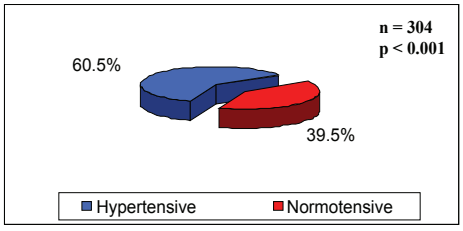

Fig. 8 – *Prevalence of HBP among those who were aware of being hypertensive and were undergoing daily treatment.*

Discussion

According to the V Brazilian Guideline on Hypertension[2] of 2006, using the current criterion for the diagnosis of hypertension (140/90 mmHg), prevalence rates in the Brazilian urban adult population in selected studies range from 22.3% to 44% (Araraquara 1990 – 43%; São Paulo 1990 – 22%; Piracicaba 1991 – 33%, Porto Alegre 1994 – 26%, Cotia 1997 – 44%, Catanduva 2001 - 32%, Cavange 2003 – 36.5% and Rio Grande do Sul 2004 – 33.7%). In

the present study, we verified a prevalence of hypertension in 41.4% of the population studied, and 51.8% were males and 33.1 were females.

Changes related to aging make individuals more susceptible to the development of HBP, and this is the major chronic disease in our population. An epidemiological study with elderly people residing in the city of São Paulo found a prevalence of HBP of 62%[7]. In our study, this result is similar, with a prevalence of 48.6% in the age range from 60 to 69 years, and of 62.3% among individuals older than 70 years, thus showing a higher number of hypertensive individuals in this age range in comparison with normotensive individuals.

Based on the results found in this study, 36.4% of the hypertensive patients had a basic level of education. The INCA[8], in a study conducted in Brazilian capitals with hypertensive patients followed up in an outpatient basis also showed similar results: the prevalence of hypertension, in relation to the level of education, in 15 capitals and the Federal District, ranged from 25.1% to 45.8% for interviewees with incomplete basic education, and from 16.5% to 26.6% for interviewees with at least complete basic education. Based on the analysis of the results of our study, we can observe that the prevalence of hypertension was significantly lower among those with higher levels of education (fig. 3).

However, the lower prevalence of hypertension detected among interviewees with higher levels of education cannot be interpreted as an association between level of education and prevalence of hypertension, since this disease occurs in older cohorts which have lower levels of education in Brazil.

Epidemiological evidences demonstrate a strong association between alcohol consumption and the prevalence of HBP, independent of gender, age, physical activity, BMI, smoking, and sodium intake, and dependent of the amount of alcohol consumed and of the exposure time[9]. Our study also showed a direct relation between alcohol consumption and hypertension. Among the individuals assessed, those who consumed alcohol daily or weekly, tended to have a statistically higher incidence of high blood pressure. Among the interviewees, 33.2% of those who consumed alcohol sporadically and 42 of those who did not consume alcoholic beverages presented BP alterations. Among those who consumed alcoholic beverages at least once a week, the prevalence of hypertension increased to 47.2%, and to 63.2% among those who used alcoholic beverages daily. Some studies, such as that conducted by the Universidade Federal do Rio Grande do Sul in 2005[9], reported a casual association of 10% to 30% between alcohol consumption and Systemic Hypertension. Epidemiological studies are consistent as regards systolic (SBP) and diastolic (DBP) blood pressure elevation when the individuals consume three or more drinks (30g of alcohol per day), with a higher elevation for the systolic blood pressure[9].

The population is ageing, and individuals are reaching the eighth decade of life increasingly more frequently. Isolated systolic hypertension is known to be more common with ageing because of structural changes in the arteries, especially those with a larger diameter[10]. This tendency is also observed in cross-sectional studies in almost all populations, which show linear increases in the mean levels of systolic blood pressure as of 50 years of age, whereas the diastolic pressure tends to drop after 55 years of age[10]. The increase in blood pressure and in the prevalence of isolated systolic hypertension in the elderly is not a benign situation, as was thought in the past, and is now considered an abnormal process of ageing[10]. The Framingham study[11] demonstrated that the systolic pressure increases continuously with ageing in all groups, whereas the diastolic pressure increases until 60 years, to decrease from then on. Data from a 30-year follow-up of the Framingham study clearly showed an increase in the risk of cardiovascular events with increases in systolic pressure, particularly in the elderly[10]. In our study, the data confirmed that as of 60 years of age, individuals had a higher prevalence of isolated systolic hypertension, with a 16.4% prevalence in individuals between 60 and 69 years, and 24.6% in individuals above 70 years, in contrast with the low rates found in the other groups.

The prevalence of obesity has increased alarmingly, with characteristics of a real epidemic, and obesity is currently considered one of the 10 major risk factors related to morbidity, disability and mortality by the World Health Organization[12]. Obesity is an important risk factor for hypertension, and can be pointed out as the cause of this disease in more than 30% of hypertensive individuals[13]. According to the V Brazilian Guidelines on Hypertension[2], excess body mass is a predisposing factor for hypertension, and may account for 20% to 30% of the cases of hypertension; 75% of men and 65% of women present hypertension directly attributable to overweight and obesity.

In our study, 58.6% of the obese individuals, 45.6% of the overweight individuals, and 27.9% of the normal-weight individuals presented hypertension. Thus, obesity is certainly one of the leading factors responsible for systemic hypertension. Similar results were found in the Framingham study, where 70% of the new cases of hypertension were related to excess body fat. In a study conducted in the city of Catanduva[14], State of São Paulo, Brazil, similar results were obtained, where 55.81% of individuals with morbid obesity (Body Mass Index – BMI $\geq$ 40), 44.86% of individuals with BMI between 30 and 39.9 kg/m^2 and only 20.64% of those with BMI between 20 and 24.9 were hypertensive. In addition to this fact, there have been constant increases in obesity rates, thus reaching alarming levels in the past decade. One hundred million overweight individuals are currently estimated to exist worldwide[15]. According to Galvão & Kohlmann[16] (Brazilian Journal of hypertension), the prevalence of hypertension increases among overweight patients, in a proportion that seems to be directly related to the degree of body fat and to the pattern of predominantly visceral distribution. The meta-analysis of 25 randomized clinical trials demonstrated a mean reduction of 1.05mmHg in the systolic blood pressure and of 0.92mmHg in the diastolic pressure for each 1-kg reduction in body weight, regardless of gender, race and age[17].

Blood pressure control below values of 140/90mmHg, as recommended by the V Brazilian Guidelines on Hypertension[2] and main international consensus[5,13], was below our expectations. Only 39.5% of the hypertensive patients analyzed who were undergoing daily treatment with anti-hypertensive drugs showed pressure levels within normal limits. Freitas et al[18] conducted a cross-sectional study with patients from the

city of São Paulo and obtained a 20.9% level of therapeutic efficacy, and Freitas et al[14] in a cross-sectional study with a similar methodology obtained a pressure control rate of 27.6% among hypertensive individuals in the city of Catanduva – SP. Fuchs et al[19] found a 35.5% rate of controlled hypertensive individuals in a study conducted in the State of Rio Grande do Sul, and other Brazilian authors[20,21] showed control rates of 32 and 50%, respectively. However, although our study identified pressure control levels more satisfactory than in other Brazilian regions – and considering the difficulties to compare results of this nature between the different studies, the difficulty to control blood pressure is clear. Several factors may contribute to this poor control, including patient adhesion to the treatment proposed, medication distribution by the Unified Health System to each region, and treatment efficacy itself.

Conclusions

The prevalence of Systemic Hypertension in the city of Campo Grande, Brazil (41.4%) surpassed the mean detected in other studies conducted in Brazil. Therefore, and consistent with other Brazilian studies on this issue, our study demonstrates a progressive increase in the prevalence of systemic hypertension directly proportional to the increase in longevity of the Brazilian population. However, no significant improvement was observed in the rates of treatment efficacy in hypertensive patients. Despite the constant pharmacological development and optimization of antihypertensive drugs, the control of the disease remains poor (39.5%) among those who are already undergoing daily drug treatment, thus showing the need for a multifactorial approach (behavioral, pharmacological and cultural) of these patients. From this perspective, and consistent with the data compared, we presented statistical results of variables related to Hypertension that directly influence this control, such as linear increase of Isolated Systolic Hypertension with age, direct relation with obesity, chronic alcohol consumption, and poor schooling.

Thus, we propose that the therapeutic approach of Hypertension should prioritize the constant orientation on these factors which, in addition to making the treatment more difficult, also increase the risk of cardiovascular complications, thus showing the need for higher public investments regarding orientation and education of these population groups as regards prevention.

Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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