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Prevalence, Control and Treatment of Arterial Hypertension in Nobres – MT

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Abstract

Background: Systemic Arterial Hypertension (SAH), considered a public health problem due to its high prevalence and difficult control, is also described as one of the most important risk factors for cardiovascular diseases.

Objective: This study aimed to determine the prevalence of SAH, as well as characteristics related to its control and treatment, among individuals aging between 18 and 90 years from the urban region of Nobres, MT.

Methods: Cross-sectional, population-based study, with random sampling and with replacement. For classification of SAH, criteria included blood pressure (BP) ≥ 140/90 mmHg or current use of antihypertensive drugs. Individuals were interviewed with standardized questionnaires previously tested. Variables were described as means ± standard deviations and frequencies. Means were compared with the Student´s t test and associations were determined with the Pearson chi-square test, with a significance level of 5%.

Results: SAH has a prevalence of 30.1% in the sample, composed of 1,003 individuals older than 18 years. Among hypertensive individuals (N = 302), 73.5% knew about their condition, 61.9% were under treatment and for 24.2% the BP was under control. A positive association was observed between SAH and age; illiteracy; less than 8 years education; BMI ≥ 25 kg/m²; high and very high waist circumference; waist-hip ratio (WHR) at risk level; sedentariness; and alcoholism.

Conclusions: This study showed that SAH represents an important public health problem even in a small district in the interior region of Brazil. Levels of control and treatment of hypertension in the population were higher than those observed in similar studies, but were considered not satisfactory. (Arq Bras Cardiol 2009; 93(6):622-628)

Key Words: Hypertension/therapy/epidemiology; control; prevalence.

Introduction

Systemic arterial hypertension (SAH) is the most frequent disease in Brazil[1,2], but its prevalence in the country is not known[3]. The role played by SAH in the development of cardiovascular diseases (CVD) stresses the importance of knowing its distribution in different Brazilian regions[4], where around 30 million individuals are affected by these diseases[5]. Blood pressure (BP) is a linear and continuous variable which presents a positive association with the risk for cardiovascular diseases[6], so that the relationship between cerebrovascular disease and BP is also continuous, increasing and significant in levels higher than 115-75 mmHg, for all age groups[7].

According to the Brazilian Guidelines for Arterial Hypertension, adult individuals are classified as hypertensive when the systolic blood pressure (SBP) reaches values equal to or higher than 140 mmHg, and/or when the diastolic blood pressure (DBP) is equal to or higher than 90 mmHg, in two or more occasions and in the absence of anti-hypertensive treatment. BP was considered as normal when lower than 130/85 mmHg, and optimal when lower than 120/80 mmHg[8].

Arterial hypertension is considered as a syndrome, for its frequent association to a number of metabolic disorders, such as obesity, increased insulin resistance, diabetes mellitus and dyslipidemias, among others. The existence of these risk factors and of lesions in target organs, when present, is important and must be considered for the stratification of individual risks, so that prognosis and therapeutic decisions may be correctly conducted[8].

Several population-based studies have shown that controlling arterial hypertension is of great importance to reduce cardiovascular morbidity and mortality[4,9]. The development of new drug technologies has not been seen to benefit the control of this disease[10], and it is estimated

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that only one third of hypertensive individuals in Brazil have controlled blood pressure[4]. Little information is available in Brazil about the true prevalence of SAH[3,11], as well as on the degree of treatment and control of the condition.

Population-based studies have shown SAH prevalence between 10.0% and 42.0% in several states in Brazil, according to the region, population subgroup and diagnostic criteria[11]. The prevalence and level of control of hypertension in the Central-Western region, particularly in the Mato Grosso (MT) state, are poorly known. This lack of information makes difficult the implementation of preventive, therapeutic and assistance programs in this region, which have been shown to reduce morbidity and mortality associated to CVD[12-14]. The present study analyzed and interpreted some epidemiological aspects of arterial hypertension in Nobres , with the objective of determining the prevalence, the main associated characteristics and the levels of awareness, treatment and control in the urban population aged 18 to 90 years.

Methods

Observation, analytical, cross-sectional study, which was population-based, with random sampling, with replacement and in multiple stages. This work is part of the "Central-Western Arterial Hypertension Project" conducted by Universidade Federal de Mato Grosso (Instituto de Saúde Coletiva and Faculdade de Ciências Médicas), in collaboration with Universidade Federal de Goiás (Faculdade de Medicina and Liga de Hipertensão Arterial). This collaborative study aimed at investigating the occurrence of arterial hypertension and associated factors in the cities of Cuiabá and Nobres (Mato Grosso), Goiânia and Firminópolis (Goiás). Informations on social-demographic variables and life habits of adult and aged individuals (18 to 90 years old), living in the urban region of the city of Nobres - MT, were collected during the period between January and March 2006 by the use of a standardized questionnaire answered at home. The sample was estimated in 1,003 individuals, randomly selected among 12,269 inhabitants[15] living in 3,619 residences, taking into consideration the population density of the several urban areas. The prevalence o arterial hypertension in the adult population was estimated in 20%[16], with a confidence level established at 95% and 2.5% design error. This study had the collaboration of participants of the Family Health Program (*Programa de Saúde da Família*, PSF) and Local Community Health Agents Program (*Agentes Comunitários Locais de Saúde*), whose activities reach 100% of the Nobres urban area.

The sample was randomized in four stages. In the first stage, samples were collected from census sectors of the urban area of Nobres – MT. The second stage comprised sampling by street blocks, the third by residences, and in the fourth stage individual residents were sampled. The participants were initially informed on objectives and procedures and were then invited to voluntarily participate of the study. Consenting individuals signed an informed consent form. If the randomized person was not at home when the study was performed, new visits were planned. After three unsuccessful visits, or in case of refusal to participate, another person was randomized in the next residence, following a clockwise direction. Non-residencial buildings (schools, hospitals, quarters), pregnant women, house maids and individual who refused to participate were excluded from the sample.

The research was conducted by the coordinator of the study in Mato Grosso, the coordinator and supervisor in Nobres, and by field investigators, who were divided in six pairs and trained to apply the standardized, pretested questionnaires and to measure anthropometric and blood pressure variables. Interviewers used a badge, T-shirts and bags marked with the project logotype, for ease identification.

All participants received informative material on blood pressure, hypertension and cardiovascular risk factors. When hypertension was detected, the individuals were referred to the closest health service. The quality of measurements (BP and anthropometric variables) was controlled by random sampling of cases in which means and dispersion of results collected by different investigators were analyzed by the coordinator of the study.

Participants completed at home the pretested questionnaire on sociodemographic and life-habit variables. Measurements included BP (sphygmomanometer, OMROM-HEM 705CP), weight (electronic scale, PLENNA LITHIUM GIANT), height (stadiometer, SECCA) and waist (nonextendable metric tape, CARDIOMED). The questionnaire included questions on the current treatment for hypertension, which was confirmed by presentation of the anti-hypertensive medicine. In these cases, the interviewer recorded whether the BP was controlled or not.

The OMROM HEM 705 CP sphygmomanometer is an automated, electronic oscillometric device validated by international institutions, and recommended for epidemiological studies[17,18]. BP was measured with the person in sitting position, feet placed on the floor, left arm relaxed and placed on the table at heart level and hand palm up. The person should have an empty bladder and should not have had moderate or intensive physical activity, smoked or drank alcohol during the previous 30 minutes. The cuff used for measurement was compatible with the arm circumference. For analysis, the last BP measurement was considered, as long as the difference between them was not larger than 5 mmHg. In case of larger differences, BP was measured two further times, with 3-minute intervals, and the last measurement was considered.

Waist circumference was measured with a nonextendable metallic metric tape, placed directly on the skin, adjusted to the body around the shortest trunk circumference, between the lower rib and the iliac crest.

The outcome was considered was presence of absence of arterial hypertension, defined according to the V Brazilian Guidelines for Arterial Hypertension[8], including hypertensive patients under current testified treatment. The following independent variables were considered:

1) *Independent sociodemographic variables:* a) age - in completed years, classified according to age groups from 18 to 90 years; b) gender - male or female; c) marital status - living

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with or without a partner at the time the study was conducted; d) education - number of years of study; e) *per capita* monthly household income - according to minimum wage values; f) number of inhabitants in the residence.

2) *Life-habit independent variables:* a) dietary - use of salt, fat consumption; b) smoking - current smoker, any number of cigarettes/day; former smoker or never smoked; c) excessive consumption of alcohol - presence or absence; d) practice of physical activity - daily or systematic, at work and/or at leisure; sedentary, or light, moderate or intensive physical activity; e) presence of arterial hypertension - if knowing to be hypertensive, in treatment and BP under control.

3) *Anthropometric independent variables:* a) normal weight - defined by body mass index (BMI) (weight/height^2) ≥ 18.5 kg/m^2 and < 25 kg/m^2; b) overweight - BMI ≥ 25 kg/m^2 and < 30 kg/m^2; c) obesity - BMI ≥ 30 kg/m^2 of body surface; d) central obesity - defined by cutoff points for waist circumference (WC) > 88 cm for men and > 84 cm for women.

Informations were recorded twice, with the establishment of two database which were compared for correction of eventual inconsistencies. Hypertension prevalence ratios, 95% confidence intervals (CI) and association were determined for the sample as a whole, stratified by gender, and for independent variables. Continuous variables were analyzed as means and standard deviations, and categorical variables as absolute and relative frequencies.

Associations between independent variables and the outcome (presence or absence of hypertension) were analyzed by the Pearson chi-square test for proportions and Student´s t test for means. Data were analyzed with the EPI INFO-2000 software, version 3.3.2, and SPSS software, version 9.0.

This project was approved by the Research Ethics Committee of Hospital Universitário Júlio Müller, from Universidade Federal de Mato Grosso. All participants signed an informed consent form

Results

The sample was composed of 1,003 individuals, with mean age 42.6 ± 15.4 years and 51.3% (N = 515) men. The most frequent age groups were 18 to 29 years (26.0%; N = 261) and 30 to 39 years (24.1%; N = 242). The frequency of individual younger than 40 years and older than 60 years were 50.1% (N = 503) and 18.0% (N = 180), respectively. Considering education level, 46.6% (N = 497) concluded the first level, and 10.9% (N = 109) were illiterate. Individuals living with a partner comprised 62.2% of the sample (N = 624), and 52.3% (N = 525) lived in residences with a total of four to seven inhabitants. In almost all cases (98.3%; N = 986) the *per capita* monthly household income was lower than five current minimum wages. These characteristics are presented in Table 1.

The analysis of blood pressure and use of anti-hypertensive drugs showed that, among individual under anti-hypertensive treatment (N = 73), 30.3% of men (N = 20) and 47,7% of women (N = 53) had normal blood pressure, which means

Table 1 - Social and demographic characteristics of the sample: gender, age group, education level, marital status, number of inhabitants in the residence and *per capita* income, Nobres, MT, 2006*.

Social and demographic characteristics	N	%	95% IC
Gender			
Male	515	51.3	48.2 - 54.5
Female	488	48.7	45.5 - 51.8
Age group			
18 to 29 years	261	26.0	23.4 - 28.9
30 to 39 years	242	24.1	21.5 - 26.9
40 to 49 years	187	18.6	16.3 - 21.2
50 to 59 years	133	13.3	11.3 - 15.6
60 to 69 years	99	9.9	8.1 - 11.9
70 years or over	81	8.1	6.5 - 10.0
Education			
Illiterate	109	10.9	9.0 - 13.0
First degree	497	49.6	46.4 - 52.7
Second degree	291	29.0	26.2 - 31.9
Third degree	57	5.7	4.4 - 7.3
Other	49	4.9	3.7 - 6.5
Marital status			
With partner	624	62.2	59.1 - 65.2
Without partner	379	37.8	34.8 - 40.9
Number of inhabitants in the residence			
1 toa 3	448	44.7	41.6 - 47.8
4 to 7	525	52.3	49.2 - 55.5
8 to 11	28	2.8	1.9 - 4.1
12 to 15	2	0.2	0.0 - 0.8
***Per capita* income (minimum wages)**			
No income	2	0.2	0.0 - 0.8
Up to ½ minimum wage	263	26.2	23.5 - 29.1
½ to 1 minimum wages	325	32.4	29.5 - 35.4
1 to 2 minimum wages	315	31.4	28.6 - 34.4
2 to 4 minimum wages	76	7.6	6.1 - 9.4
4 or more minimum wages	22	2.2	1.4 - 3.4

* N = 1,003. N – number of individual; CI – confidence interval.

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Table 2 - **Classification of blood pressure in the sample classified by gender and using or not anti-hypertensive drugs, according to the V Brazilian Guidelines for Arterial Hypertension, Nobres, MT, 2006.**

| Classification | % | With medication | | | | Without medication | | | |
| | | Male | | Female | | Male | | Female | |
		n	%	N	%	N	%	n	%
Optimal	54.9	3	4.5	15	13.5	166	37.0	241	63.9
Normal	27.4	10	15.2	24	21.6	118	26.3	60	15.9
Borderline	17.7	7	10.6	14	12.6	81	18.0	35	9.3
Normal (n=774)		20	30.3	53	47.7	365	81.3	336	89.1
Hypertension Estágio I	28.0	12	18.2	14	12.6	21	4.7	17	4.5
Hypertension Estágio II	17.0	7	10.6	8	7.2	13	2.9	11	2.9
Hypertension Estágio III	12.2	7	10.6	12	10.9	9	2.0	-	-
Hipertension Systolic Isolated	42.8	20	30.3	24	21.6	41	9.1	13	3.5
Hipertension (n=229)	-	46	69.7	58	52.3	84	18.7	41	10.9
TOTAL (n=1,003)	-	66	100.0	111	100.0	449	100.0	377	100.0

n - number of individuals.

Tabela 3 - **Classification of blood pressure in the sample, according to the V Brazilian Guidelines for Arterial Hypertension, in use or not of anti-hypertensive drugs, according to gender, Nobres, MT, 2006.**

| Classification | Sex | | | | | | p |
| | Male | | Female | | TOTAL | | |
	N	%	N	%	N	%	
Hipertensive	150	29.1	152	31.1	302	30.1	0.48
Normal	365	70.9	336	68.9	701	69.9	
TOTAL	515	100.0	488	100.0	1003	100.0	-

N – number of individuals.

that their BP was under control. Among the individuals who were not using anti-hypertensive drugs (N = 701), 81.3% of men (N = 365) and 89.1% of women had normal BP. Most of the individuals under treatment and with uncontrolled BP were men (69.7%; N = 46), with a smaller frequency of women (52.3%; N = 58). Hypertensive individuals who were not under treatment were also mostly men (18.7%; N = 84), with less women (10.9%; N = 41). These results are presented in Table 2.

The results showed that 7.3% (N = 73) of hypertensive individuals under treatment had controlled BP (BP < 140/90 mmHg), and that 22.8% (N = 229) of hypertensives without medication had high blood pressure. Considering hypertensive individuals with (7.3%) or without (22.8%) medication, the prevalence of arterial hypertension in the urban region of Nobres is determined as 30.1%, (n = 302; 95%IC - 27.3 - 33.1). Arterial hypertension was more frequent among women

- 31.1% *vs.* 29.1%, but the difference was not statistically significant (Table 3).

The analysis of demographic and life-habit characteristics of the hypertensive population showed significant associations between arterial hypertension and age over 60 years, illiteracy, education level lower than eight years, sedentariness and alcoholism. The comparison between individuals with normal BP and hypertensives showed significant differences for mean age in years (37.1 ± 14.0 *vs.* 54.2 ± 15; p < 0.001), BMI and waist circumference. Family income lower than two minimum wages and smoking were not associated to arterial hypertension (Table 4).

Among hypertensive individuals (N = 302), 73.5% (N = 222) knew about their condition. Among them, 11.6% (N = 35) were not under treatment, and 61.9% (N = 187) were using anti-hypertensive drugs. Among these, controlled BP was observed in 73 persons, or 24.2% of the 302 hypertensive individuals in the sample (Figure 1).

Discussion

The present study is part of a collaborative project conducted by the Federal Universities of Mato Grosso (UFMT – Instituto de Saúde Coletiva and Faculdade de Ciências Médicas) and of Goiás (UFG – Faculdade de Medicina and Liga de Hipertensão Arterial), aiming to estimate the prevalence and to identify epidemiologic characteristics of arterial hypertension in the Central-Western region. The cities of Goiânia[19] and Firminópolis (Goiás), and of Cuiabá[20] (Mato Grosso) had been previously studied. In the present work, only the population of the city of Nobres - MT was investigated. A low frequency of residences (0.5%) was observed, which could be explained by the existence of a Family Health Program covering 100% of the urban region.

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One of the limitations of the type of design used in this study is that it does not allow the definition of causal associations between hypertension and the epidemiologic characteristics analyzed, since cross-sectional studies present possible causes and outcomes in the same moment and time cannot be used as a causal variable. This design, however, provided information and evaluation of variables of interest which included demographic, social and anthropometric factors related to the development of arterial hypertension.

The use of a pre-organized list of residences and inhabitants, and of census sectors provided by IBGE, shortened the long and expensive period of visiting census sectors to enroll residences and identify individuals living in the area, which usually makes population-based studies more difficult to conduct.

A high prevalence of arterial hypertension was observed (30.1%), with no differences related to gender, according to hypertension criteria of ≥ 140/90 mmHg, or to the use of anti-hypertensive drugs[8]. Similar prevalences were observed in other population-based studies, performed in urban zones with the same cutoff point: Rio Grande do Sul, RS – 29.9%[21] and 31.6%[22]; Catanduva, SP – 31.5%[23]; Aracajú, SE – 31.8%[24]; Campos, RJ – 32.0%[25]; Salvador, BA - 29.9%[26]; and Formiga, MG - 32.7%[27]. The investigators involved in the present study have observed higher prevalence of arterial hypertension in Goiânia, GO (36.4%)[19] and in Cuiabá, MT (33.4%)[20].

In Nobres, hypertension had similar prevalence in both sexes, in accordance with the results seen in Cuiabá, MT[28], Cianorte, PR[29] and Caucaia, CE[30]. According to classification criteria for BP from the V Brazilian Guidelines for Arterial Hypertension[8], among normal individuals (N = 774) 54.9% presented optimal BP, 27.4% normal BP and 17.0% had borderline BP. Among hypertensives (N = 229), 28.0% had stage I hypertension, 17.0% stage II, 12.2% stage III hypertension, and 42.8% presented isolated systolic hypertension.

The prevalence of hypertension stage III observed in Nobres, MT (12.2%) was higher than that described for Vitória, ES (5.8%)[31] and Cuiabá, MT (3.8%)[20]. Similarly, for hypertension stage I the prevalence in Nobres (42.8%) was much higher than in Cuiabá, MT (9.8%)[20], and in Catanduva, SP (5.6%)[23].

The analysis of sociodemographic and life-habit variables showed that, in general, means and proportions were higher in hypertensives than in normal individuals, as already described in other studies conducted in Cuiabá[28] and in Goiânia[19].

In relation to knowledge, treatment and control of hypertension, taking into account the prevalence of hypertension in Nobres (30.1%; n = 1,003), the results showed that 73.5% of hypertensives knew about their condition, and 61.9% of them were under drug therapy. Among these individuals, 24.2% had controlled BP when the study was performed.

According to the North-American study *Third National Health and Nutrition Examination Survey*[32], knowledge and treatment of BP have frequencies of 70.0% and 59.0%, respectively, similar to the values found in the present work (73.5% and 61.9%). The North-American study showed a frequency of pressure control of 34.0%, higher than the

Table 4 - Characteristics of the sample classified as normal or hypertensive, Nobres, MT, 2006.

Characteristic	Nor.al	Hipertensa	P
Mean age (years)	37.1±14.0	54.2±15.9	<0.001
Over 60 years old (%)	8.3	40.4	<0.001
Illiterate (%)	6.1	21.9	<0.001
Education < 8 years (%)	56.0	67.6	0.030
Family income ≤ 2 minimum wages (%)	59.9	56.3	0.285
Mean B.I (kg/m²)	24.5±4.4	27.6±4.9	<0.001
Mean WC (cm)	86.3±10.4	95.0±12.1	<0.001
Smoking (%)	24.3	22.2	0.480
Sedentariness (%)	20.7	27.5	0.018
Alcoholism (%)	47.4	31.8	<0.001
Mean blood pressure (mmHg)			
SBP	114.3±13.3	147.4±22.3	<0.001
DBP	70.1±8.7	86.8±13.2	<0.001
TOTAL (n = 1003)	701	302	1003

BMI – body mass index; WC – waist circumference; SBP – systolic blood pressure; DBP – diastolic blood pressure; n – number of individuals.
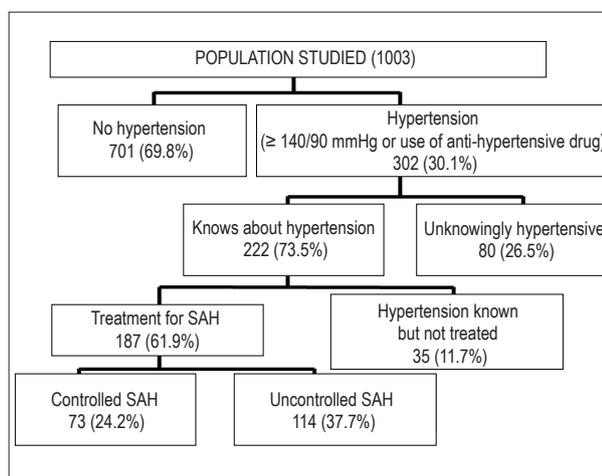

Fig. 1 - Distribution, knowledge, treatment and control of blood pressure in Nobres, MT, 2006.

frequency observed in this study (24.2%). In Portugal, a study considering a population of 5,023 adults showed a prevalence of 42.1% for hypertension, with only 11.2% of pressure control[33].

In Goiânia, the frequency of knowledge, treatment and control of BP were determined as 64.3%, 42.4% and 12.9%, respectively[19]. In Cuiabá, MT[20], these values reached 68.3%, 68.5% and 16.6%, respectively. Comparing different cities in

the Central-Western region, the frequency of control of BP observed in Nobres (24.2%) was higher than that in Cuiabá (16.6%) or in Goiânia (12.9%).

A higher level of knowledge about hypertension was seen in Nobres, as compared to Goiânia, GO[19], Cuiabá, MT[20] and most of the Brazilian states. This fact may be explained by the activity of the Family Health Program, in collaboration with the Local Community Health Agents Program of the Health Secretary in Nobres. In this context, further studies should explore the causes for the lack of success of anti-hypertensive treatment. The following aspects should be considered: lack of adherence to treatment; difficulties in the access to medication and medical services; efficiency of the therapeutic protocols used; behavior of health professionals when treating hypertensive patients; influence of side effects of drugs; and role of social class, education level and cultural aspects on the approach and control of the disease.

Potential Conflict of Interest

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

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Study Association

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