

## Prevalence and Sociodemographic Factors in a Hypertensive Population in São José do Rio Preto, São Paulo, Brazil

*Claudia B. Cesarino, José Paulo Cipullo, José Fernando Vilela Martin, Luiz Alberto Ciorlia, Maria Regina P. de Godoy, José Antonio Cordeiro, Isabela C. Rodrigues*

*Faculdade de Medicina de São José do Rio Preto (FAMERP), São José do Rio Preto, SP - Brazil*

### Summary

**Background:** Systemic arterial hypertension (SAH) is one of the greatest problems of public health in Brazil. Its detection and early treatment should be a priority to reduce the morbimortality of the cardiovascular diseases.

**Objective:** This study aimed at assessing the prevalence of SAH and the sociodemographic factors in a population of hypertensive individuals from São José do Rio Preto, São Paulo, Brazil.

**Methods:** A cross-sectional study was carried out in a stratified sample of 1,717 people, representative of the urban adult population from the city of São José do Rio Preto, between 2004 and 2005.

**Results:** The sample consisted of 1,717 people, with 762 of them (25.2%) being characterized as hypertensive. The following results were observed: 54.6% were women; 78.4% were caucasian; 66.1% were illiterate or had not finished Elementary School; 63.9% were married, 40.9% belonged to social classes D and E; 37.9% were self-employed or wage earners.

**Conclusion:** The results of study on SAH in the city of São José do Rio Preto shows the need for early-onset continuous educational interventions. (*Arq Bras Cardiol* 2008;91(1):29-33)

**Key words:** Hipertension, ethnology, prevention & control, prevalence.

### Introduction

The data from the Ministry of Health in Brazil show that cardiovascular diseases are the main cause of mortality in the country, representing 30.8% of the deaths, with systemic arterial hypertension (SAH) being one of the main risk factors. In Brazil, the disease affects around 17 million individuals, with one million only in the state of São Paulo<sup>1</sup>.

SAH is a clinical condition, characterized by elevated and sustained blood pressure (BP) levels. The chosen threshold, clinically established to define SAH in individuals older than 18 years, is when blood pressure levels are  $\geq 140$  mmHg x 90 mmHg. When assessing the disease, the presence of risk factors, comorbidities and target-organ lesions must also be considered in addition to blood pressure levels<sup>2</sup>. SAH is usually asymptomatic, determined by several associated genetic (age, ethnicity, sex, family history) and risk factors (smoking, obesity, alcohol consumption, sedentarism, stress and excess salt consumption)<sup>2</sup>.

The adherence of an individual with SAH to treatment is

a challenge to the public health, as its control requires the patient's cooperation; a means to obtain this adherence is to facilitate the access to information about arterial hypertension and detect hypertensive individuals, in order to increase the number of subjects with blood pressure control and healthy lifestyle, thus improving the prevention of cardiovascular diseases<sup>3</sup>.

Therefore, the aim of the present study was to estimate the prevalence of SAH in the population and the sociodemographic factors of the hypertensive individuals in the city of São José do Rio Preto, state of São Paulo, Brazil.

### Methods

A transversal study was carried out in 2004/2005 with a sample of 1,717 individuals stratified by age range, representative of the urban adult population ( $\geq 18$  years) of the city of São José do Rio Preto, state of São Paulo, Brazil, which has a population of 370,000 inhabitants<sup>4</sup>.

When calculating the sample size, the number of inhabitants, expected prevalence of SAH at each range, maximum allowed error and 95% confidence interval were considered. The age ranges assessed were the following: 18 to 39 years; 40 to 49; 50 to 59; 60 to 69 and > 70 years.

The city was divided in five regions, according to the proportionality of the population. A district, street, household

**Mailing address:** Claudia Bernardi Cesarino •

Rua Jamil Barbar Cury, 511, Tarraf II, 15.092-530, São José do Rio Preto, SP - Brazil

E-mail: claudiacesarino@famerp.br

Manuscript received October 05, 2007; revised manuscript received November 13, 2007; accepted January 15, 2008.

and one adult individual living there for more than 6 months were selected by drawing lots for each region. In case of refusal to participate, one individual from the nearest neighbor household was selected and after the first visit, the side of the street was alternated, skipping two households. The exclusion criteria were: pregnancy, consumptive diseases and severe psychiatric diseases, mental deficit or retardation and bedridden patients.

The interviewers were adequately trained and supervised by a field coordinator. The participants answered a standardized and codified questionnaire, which included personal data, socioeconomic status, level of schooling, lifestyle, personal and family medical history, whether the individual knew he or she had SAH and medications used.

Subsequently, the physicians assessed the interviews and measured BP, heart rate and anthropometric data, and the participants were advised to fast and have a 12-hour urine collection for the biochemical analyses.

The BP measurement technique was the one standardized by the VII Joint National Committee<sup>5</sup>. The mean of three BP measurements taken in the sitting position after 5 to 10 minutes of rest was calculated. The criterion adopted for SAH diagnosis was systolic BP  $\geq$  140mmHg and/or diastolic BP  $\geq$  90mmHg or the use of anti-hypertensive medication. The individuals were classified as normotensive or hypertensive.

The classification of the socioeconomic levels adopted the criterion of social classes A-B-C-D-E based on family income and material assets; level of schooling was based on the number of years of school attendance and the sample was divided in three groups:  $S_1$  from 0 to 8 years,  $S_2$  from 9 to 11 years and  $S_3$  more than 11 years of schooling or full College/University education<sup>6</sup>.

Regarding the ethnicity, it was chosen to classify the individuals as caucasian or non-caucasian (Black, Mulatto, Asian or Brazilian Native), even though we were aware of possible failures, as it depends on the observer's criterion.

This study was approved by the Ethical Committee in Research of the School of Medicine of São José do Rio Preto and the participants were informed about the results and received information.

The statistical analysis was carried out by the Minitab software version 12.22, Maple 9.03, R 2.4.1. The estimate of percentages (with 95% confidence intervals) in the adult hypertensive population were calculated based on the frequencies at each age range and the means and standard deviations were calculated by the bootstrap method with an adjustment, considering the size of the strata in the population. The adjustment was based on the fact that the probability of an event in the population is decomposed in the summation, in relation to the age strata, of the probability of the event in the stratum multiplied by the fraction of the stratum in the population; the fractions of the strata were obtained from the IBGE (Brazilian Institute of Geography and Statistics) reports regarding the time of data collection. The level of significance was set at  $p=0.05$  and the multiple paired comparisons were carried out with Bonferroni's correction for the level of significance, i.e., the differences between pairs of variable

categories with their K were considered significant if the  $p$ -value  $< 0.05/K^{7-9}$ .

## Results

Of the 1,717 individuals that comprised the sample, 762 were characterized as hypertensive, which was the aim of this study that estimates a total of 25.2% (95% CI: 22.7% to 27.7%) of hypertensive individuals in the city of São José do Rio Preto. The hypertensive individuals were characterized at the time as: 54.6% of women (95%CI: 49.2% to 60.0%), aged 18 to 93 years, with a mean age of 53.8 years (SD=4.3 yrs) and 78.4% of caucasian individuals (95%CI: 73.2% to 83.5%). Level of schooling was estimated as: 66.1% (95%CI: 60.7% to 71.5%) with 0 to 8 years of schooling; 63.9% (95%CI: 58.5% to 69.3%) were married, and the predominant social classes were C (40.5% (95%CI: 35.1% to 45.9%)) and D-E (40.9% (95%CI: 35.5% to 46.3%)). Regarding the occupation with associated categories, 37.9% (95%CI: 32.5% to 42.2%) were active in the labor market, as self-employed individuals or wage-earners (Table 1).

## Discussion

The population is aging and an increasing number of individuals are reaching their eight decade of life<sup>10</sup>. It is known that blood pressure increases with age, reaching more than 60% at the age range of 65 years, which can be explained by the characteristic age-related alterations that make the individual more prone to the development of SAH, the most prevalent chronic disease identified in epidemiological studies<sup>11-16</sup>. However, in the present study carried out in São José do Rio Preto, the mean age was 53.8 years and it is likely that SAH is a severe public health problem in the studied population, affecting people who are economically active, presaging an epidemiological worsening and cardiovascular consequences.

Currently, the estimated world mean SAH prevalence is 26.4%, with a broad range of variation according to the population studied, being 21.0% in the USA and Canada, 33.5 to 39.7% in European countries, 15 to 21.7% in African and Asian countries and around 40% in Latin American countries<sup>17-19</sup>. The prevalence of SAH in Brazilian studies varies from 24.8 to 44.4%<sup>20-22</sup>, due to the different classification criteria and age limits used in the studies. The estimated prevalence of SAH in the studied population was 25.2%, which corroborates the aforementioned studies.

World rates indicate that the difference in the prevalence of SAH between the genders is small, probably due to a higher prevalence among younger men and elderly women<sup>23</sup>. In Brazil, women are more aware of their hypertensive condition than the men<sup>12-14</sup>, which corroborates the study that states that women recognize their health problems more often than men and seek healthcare services more frequently than men, as well<sup>24</sup>.

A study carried out with employees from a University hospital verified a higher prevalence of SAH in individuals of the male sex, with 10 years of schooling and older than 50 years<sup>6</sup>; however, this study with hypertensive adult individuals

**Table 1 - Sociodemographic factors of the hypertensive individuals from São José do Rio Preto, SP - 2005: percentage (estimate, 95% confidence interval and p-value)**

Variables	Percentage	95%CI
<b>Sex</b>		
		<b>p-value=0.098</b>
Female	54.6	49.2 to 60.0
Male	45.4	40.0 to 50.8
<b>Ethnicity</b>		
		<b>p-value &lt;0.001</b>
Caucasian	78.4	73.2 to 83.5
Non-Caucasian	21.6	16.5 to 26.8
<b>Schooling (S)</b>		
		<b>(1)</b>
S1 - from 0 to 8 years	66.1	60.7 to 71.5
S2 - from 8 to 11 years	12.7	8.0 to 17.4
S3 - more than 11 years	21.2	16.6 to 25.7
<b>Civil Status</b>		
		<b>(2)</b>
Married	63.9	58.5 to 69.3
Separated, divorced or widowed	26.3	21.6 to 31.1
Single	9.8	5.7 to 13.9
<b>Social Class</b>		
		<b>(3)</b>
AB	18.6	15.0 to 22.2
C	40.5	35.1 to 45.9
DE	40.9	35.5 to 46.3
<b>Profession</b>		
		<b>p-values ≥ 0.032(4)</b>
Active	37.9	32.5 to 42.2
Non-Active	34.8	30.9 to 39.3
Homemaker	27.3	22.1 to 32.4

Based on Bonferroni's threshold: (1) More hypertensive individuals with 0 to 8 years of schooling ( $p$ -values<0.001); no evidence of difference between the percentages of hypertensive individuals with 8 to 11 and more than 11 years of schooling and/or full College/University education ( $p$ -value=0.028). (2) More hypertensive individuals are married than divorced or single ( $p$ -value<0.001). (3) More hypertensive individuals belong to social classes C and DE than to AB ( $p$ -values<0.001); no evidence of difference between the percentages of hypertensive individuals from classes C and DE ( $p$ -value=0.93). (4) It cannot be affirmed that there is a difference between the percentages of professions ( $p$ -values<0.032).

from São José do Rio Preto in 2004/2005 did not demonstrate any difference between men and women ( $p$ -value = 0.098). It is known that, in Brazil, more women than men refer a previous medical diagnosis of SAH<sup>12-14</sup>.

The prevalence of SAH for the non-caucasian ethnicity is described in the literature as being almost two-fold higher than for the caucasians, with a genetic hypothesis being responsible for this fact<sup>25,26</sup>. According to a data analysis carried out by IBGE, the population of São José do Rio Preto in 2000 consisted of 358,593 inhabitants and 82% of this population was caucasian<sup>27</sup>. A study carried out in 2000 at the Emergency Department of Hospital de Base in the city of São José do Rio Preto, found 83.5% of emergencies and 86.6% of hypertensive emergencies in caucasian patients, showing that most of the individuals with hypertension were caucasian, as observed in the present study<sup>28</sup>. Differently from the present

study, the results demonstrated at the Hospital Universitário Oswaldo Cruz in the city of Recife, state of Pernambuco, at the Cardiology Emergency Unit, where patients with hypertensive crises and symptoms associated with elevated BP were treated from May 2001 to October 2002, showed that 75% of the patients treated during this period were classified as non-caucasians<sup>29</sup>.

Few studies have correlated the prevalence of SAH with the civil status<sup>22,30</sup>. In our sample, a higher prevalence of married hypertensive individuals (63.9%) was observed, which is in agreement with a study that assessed the quality of life of hypertensive individuals from a support group, where 54% of the individuals were married or lived with a partner<sup>25</sup>. It is possible that the lower prevalence of SAH among the single (9.8%) is due to the predominance of young individuals in the studied population and, among the married ones, the degree of family responsibilities could represent a risk factor for SAH.

The socioeconomic differences have an important role in health conditions due to several factors, such as access to the healthcare system, level of information, problem comprehension and treatment adherence<sup>31</sup>. In several studies the assessment of the socioeconomic level is based on the type of occupation and level of schooling, with higher rates of CVD being observed in the lower socioeconomic levels<sup>30</sup>. No significant difference regarding the prevalence of SAH was observed among the social classes, in spite of a higher prevalence among classes C and D-E.

Regarding the three levels of schooling, it was observed that individuals with lower levels of schooling presented a higher prevalence of SAH in all age ranges in comparison with the intermediate and higher levels; this was corroborated by the NHANES, which has shown a higher prevalence of SAH among individuals with the lower levels of schooling in the last 30 years<sup>31</sup>.

Regarding the years of schooling, there was a predominance of individuals in the S<sub>1</sub> category (0 to 8 years of schooling) when compared to those in the S<sub>2</sub> category (more than 8 to 11 years of schooling); however, no significant difference is observed between the S<sub>2</sub> and S<sub>3</sub> categories (more than 11 years of schooling and/or full College/University education), considering that there is a confidence interval overlapping. A study carried out in the Brazilian capital cities and the Federal District showed that 25.1% to 45.8% of the hypertensive individuals have not completed Elementary School<sup>20</sup>. Among women, this association is even higher, as whereas 32.8% of the women with up to eight years of schooling refer SAH, only 13.6% of the women with 12 years or more of schooling are in the same situation<sup>11,21,22</sup>.

The social class of the studied sample was characterized as being middle to low-class, being compatible with the economic situation of the majority of the Brazilian population. Data from the IBGE show the percentage distribution of the per capita family monthly income in minimum wages of the large regions, Federation Units, and metropolitan regions, demonstrating that 51.3% of the individuals earn less than a minimum wage and 23.2% earn from one to two minimum wages<sup>4,25</sup>.

The prevalence of SAH is also related to the individuals' occupations and the physical characteristics of their work,

such as lack of autonomy, working under strict supervision, repetitive nature of the work, job instability, continuous exposition to noise, vibrations and extreme temperatures, can result in blood pressure elevation<sup>25</sup>. The present study did not demonstrate any evidence of difference between the percentages of occupation categories, which is in disagreement with the current literature.

## Conclusions

The prevalence of SAH in the city of São José do Rio Preto, state of São Paulo, Brazil (25.2%) is in agreement with other Brazilian studies. It was verified that the hypertensive individuals are adults in the economically active age range, caucasians, married, with low level of schooling that belong to the middle-low and low social classes. The prevalence of these sociodemographic factors among the hypertensive individuals can be especially negative for the population of São José do

Rio Preto SP, Brazil which, in addition to hindering treatment, increases the risk of cardiovascular complications.

The data obtained from the present study show the need for higher public investments with the objective of planning public policies aiming at the necessity of early-onset continuous educational interventions.

## Potential Conflict of Interest

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

## Sources of Funding

There were no external funding sources for this study.

## Study Association

This study is not associated with any graduation program.

## References

1. Ministério da Saúde. Controle da hipertensão arterial: uma proposta de integração ensino-serviço. Brasília: CDCV/Nutes; 1993.
2. Sociedade Brasileira de Cardiologia. V Diretrizes Brasileiras de Hipertensão Arterial. Arq Bras Cardiol. 2007; 89 (3): e24-e79.
3. Jardim PCB. Hipertensão arterial. In: Porto CC. Doenças do coração: prevenção e tratamento. Rio de Janeiro: Guanabara Koogan; 1998. p. 453-6.
4. Instituto Brasileiro de Geografia e Estatística. Cidades – Censo 2000. [texto da internet]. [acesso em 2007 mar 11]. Disponível em: <http://www.ibge.gov.br/cidades>.
5. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, et al. and the National High Blood Pressure Education Program Coordinating Committee. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. Hypertension. 2003; 42: 1206-52.
6. Mattar FN. Análise crítica dos estudos de estratificação sócio-econômica de ABA-Abipeme. Revista de Administração. 1995; 30: 57-74.
7. Minitab Statistical Software, Minitab Inc. [on line]. [accessed 2006 Oct 1]. Available at: <http://www.minitab.com>.
8. R 2.4.1 - A Language and Environment, The R Development Core Team. [on line]. [accessed 2006 Nov 10]. Available at: <http://www.r-project.org>.
9. Bishop YMM, Fienberg SE, Holland PW. Discrete multivariate analysis: theory and practice. Cambridge: The MIT Press, 1975.
10. Organização Mundial da Saúde. Cuidados inovadores para as condições crônicas: componentes estruturais de ação: relatório mundial. Brasília, 2003.
11. Souza ARA, Costa A, Nakamura D, Mocheti LN, Stevenato F<sup>o</sup> PR, Ovando LA. Um estudo sobre hipertensão arterial sistêmica na cidade de Campo Grande MS. Arq Bras Cardiol. 2007; 88 (4): 441-6.
12. Ministério da Saúde. Sistemas de Informação sobre morbidades e mortalidades, 2005. Indicadores e Dados básicos. Datasus. [acesso em 2007 jan 30]. Disponível em: <https://tabnet.datasus.gov.br>.
13. Ministério da Saúde. Secretaria de Atenção à saúde. Sistema de Cadastro e acompanhamento de hipertensos e diabéticos. [acesso em 2007 mar 11]. Disponível em: <https://hiperdia.datasus.gov.br>.
14. Ministério da Saúde. Sistema de monitoramento de fatores de risco e proteção para doenças crônicas não transmissíveis. [acesso em 2007 mar 26]. Disponível em: <http://www.saude.gov.br>.
15. Vasan RS, Larson MG, Leip EP, Kannel WB, Levy D. Assessment of frequency of progression to hypertension in non-hypertension participants in the Framingham Heart Study (BHAS): a cohort study. Lancet. 2001; 358: 1682-6.
16. Nichols WW, O'Rourke MF. McDonalds blood flow in arteries: theoretical, experimental, and clinical principles. 4th ed. London: Auckland: Edward Arnold, 1998.
17. Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. Global burden of hypertension: analysis of worldwide data. Lancet. 2005; 365: 217-23.
18. Joffres MR, Hamet P, MacLean DR, L'italien CJ, Fodor G. Distribution of blood pressure and hypertension in Canada and the United States. Am J Hypertens. 2001; 14: 1099-105.
19. Ordúñez P, Silva LC, Rodriguez MP, Robles S. Prevalence estimates for hypertension in Latin America and Caribbean: are they useful for surveillance? Rev Panam Salud Publica. 2001; 10 (4): 226-31.
20. Lolio CA. Prevalência da hipertensão arterial em Araraquara. Arq Bras Cardiol. 1990; 55: 167-73.
21. Fuchs FD, Moreira LB, Moraes RS, Bredemeier M, Cardozo SC. Prevalência de hipertensão arterial sistêmica e fatores associados na região urbana de Porto Alegre: estudo de base populacional. Arq Bras Cardiol. 1995; 63: 473-9.
22. Freitas OC, Carvalho FR, Neves JM, Veludo PK, Parreira RS, Gonçalves RM, et al. Prevalence of hypertension in the urban population of Catanduva, in the state of São Paulo, Brazil. Arq Bras Cardiol. 2001; 77: 16-21.
23. Hajjar I, Kotchen JM, Kotchen TA. Hypertension: trends in prevalence, incidence, and control. Annu Rev Public Health. 2006; 27: 465-490.
24. Alves M, Godoy SCB. Procura pelo serviço e atenção à saúde do trabalhador e absenteísmo-doença em um hospital universitário. Rev Min Enf. 2001; 15 (1/2): 73-81.
25. Magnabosco P. Qualidade de vida relacionada à saúde do indivíduo com hipertensão arterial integrante de um grupo de convivência [dissertação]. Ribeirão Preto (SP): Escola de Enfermagem de Ribeirão Preto da USP; 2007.
26. Luna RL. Hipertensão arterial. Rio de Janeiro: Medsi, 1989.
27. Instituto Brasileiro de Geografia e Estatística. Censo Demográfico 2000. Banco de Dados Agregados. IBGE Sistema IBGE de Recuperação Automática - SIDRA. [acesso em: 2004 abr 26]. Disponível em: <http://www.sidra.ibge.gov.br>.
28. Martin JFV, Higashiana E, Garcia E, Luizon MR, Cipullo JP. Perfil de crise

## Original Article

- hipertensiva: prevalência e apresentação clínica. *Arq Bras Cardiol.* 2004; 83 (2): 125-30.
29. Lima SG, Nascimento LS, Santos Filho CN, Albuquerque MFP, Victor EG. Hipertensão arterial sistêmica no setor de emergência: o uso de medicamentos sintomáticos como alternativa de tratamento. *Arq Bras Cardiol.* 2005; 85 (2): 115-23.
30. Tobe SW, Kiss A, Szalai JP, Perkins N, Tsigoulis M, Baker B. Impact of job and marital strain on ambulatory blood pressure: results from the double exposure study. *Am J Hypertens.* 2005; 18: 1046-51.
31. Ong KL, Cheung BMY, Man YB, Lau CP, Lam KSL. Prevalence, awareness, treatment, and control of hypertension among United States adults 1999-2004. *Hypertension.* 2007; 49: 69-75.