

Prevalence of Hypertension in the Urban Population of Catanduva, in the State of São Paulo, Brazil

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Objective - To study the prevalence of systemic hypertension and its control in the population of Catanduva, in the state of São Paulo, Brazil.

Methods - We carried out a randomized cross-sectional population-based study of the urban population of Catanduva with individuals above 18 years of age (688 individuals accounting for 0.9% of the referred population). We interviewed study participants to analyze the major qualitative and quantitative variables that could influence the hypertensive scenario and the risk for systemic hypertension. Blood pressure was measured through the indirect method according to the III Consenso Brasileiro de Hipertensão (III Brazilian Consensus on Hypertension), which established blood pressure levels $\geq 140/90$ mm Hg as hypertensive.

Results - The prevalence of systemic hypertension was higher in individuals with: (1) history of hypertension ($p < 0.0001$); (2) diabetes mellitus ($p = 0.05$); (3) body mass index (B. M. I) ≥ 25 kg/m² ($p < 0.001$); (4) low educational level ($p < 0.0001$); (5) familial income ranging from 1 to 5 minimum wages ($p < 0.05$); (6) unmarried status (divorced/separated and widow(er)s) ($p < 0.0001$). Of the interviewed individuals, 27.6% ($p = 0.05$) had blood pressure levels under control.

Conclusion - Our study showed that the prevalence of systemic hypertension was 31.5%, and that 27.6% of the individuals interviewed had blood pressure levels under control at the time of the interview.

Key words- hypertension, antihypertensive treatment, epidemiological study of hypertension

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(English version by Stela Maris C. e Gandour)

Several studies on prevalence of systemic hypertension exist in the international medical literature¹⁻⁷. In Brazil, these values have ranged from 16.1% to 35.1%⁸⁻¹⁶, depending on the ethnic and social groups studied and on the parameters proposed as the defined limits of hypertension.

In Brazil, some studies assess the association between systemic hypertension and demographic characteristics, such as age bracket, ethnic group, socioeconomic level, smoking, alcohol consumption, salt ingestion, stress, diabetes, and obesity⁸⁻¹⁶. However, little attention has focused on the control of antihypertensive treatment, which accounts for therapeutical failure in more than 60% of the cases^{13,17-19}.

In the Northwestern region of the state of São Paulo there are municipalities with a high socioeconomic level, such as Catanduva, and their economy are based on the citric and sugar cane agroindustry and also on the tertiary sector industry. Therefore, some of these municipalities have a quality of life similar to that observed in developed countries. Our study aims to assess the prevalence of systemic hypertension associated with some of the above-cited factors in Catanduva. The total population estimated for the city in 1998 was 103,889 inhabitants, 77,598 of whom were above 18 years of age. The prevalence of the male sex was observed until the age of 50 years, according to the IBGE (Brazilian Institute of Geography and Statistics).

Methods

An analytical cross-sectional population-based study with randomized sampling²⁰ was carried out. The population analyzed comprised 688 essentially urban individuals (0.9% of the entire population) with ages above 18 years (74.7% of the entire population), who lived in the municipality of Catanduva, and whose origin was not important, according to data of the 1996 census and the IBGE's forecast for 1998. Of the 688 individuals interviewed, 286 were males and 402

were females. The relative disproportion between males and females was mainly due to the fact that more men than women are in the workforce and therefore men were not readily available to interview. To minimize this effect, the interviews were performed early in the morning to include men before they had to go to work.

To avoid sampling errors, the city was divided into 40 sectors, in which the number of dwellings and the social groups contained did not matter. These sectors were selected, and the study began with the first selected sector, and so on. In each sector, 3 dwellings per block were randomly chosen. No dwelling was excluded, not even those without sewage or electricity. If the inhabitants of the selected dwelling could not participate or if the dwelling was empty, the nearest dwelling was then chosen to meet the criterion established.

The research team comprised 2 teachers (cardiologists), 6 medical students (interviewers), and 1 software specialist. The medical students were properly trained and oriented to administer the questionnaires and to measure the anthropometric parameters. The interviewers wore badges of the Faculdade de Medicina de Catanduva to facilitate contact with the population and data collection¹⁷.

According to the III Brazilian Consensus on Hypertension of 1998¹⁸, systemic hypertension is defined as systolic pressure ≥ 140 mmHg and diastolic pressure ≥ 90 mmHg (for individuals older than 18 years)¹⁹. These criteria were adopted by the interviewers.

The interview had a mean duration of 30 minutes, being performed from 6 to 10 a.m.¹⁹⁻²³ daily from February 2 to April 4, 1998. The team was distributed in 3 pairs of interviewers, each pair comprising individuals of both sexes. The pairs of interviewers were changed and the criteria of the interview were reassessed weekly.

After explaining to the interviewee the objectives and procedures of the study, 1 of the interviewers collected the personal data and, then, the other interviewer measured the anthropometric data and the blood pressure level. The interview comprised assessment of qualitative and quantitative variables, such as age, sex, race, profession, daily work load, marital status, educational level, familial income, use of medication that could positively influence hypertension (tricyclic antidepressants, monoamine oxidase inhibitors, oral contraceptives), as well as antihypertensive drugs and their use, regular or not. The following parameters were also assessed: dietary habits (amount of meat, number of eggs, number of milk liters ingested per day or weekly), salt ingestion (quantification was based on the presence of the salt container on the table, as no salt quantification in grams was performed because of the difficulty that this would imply), smoking (number of cigarettes smoked daily), ethanol ingestion (if higher than 30 mL per day), number of annual medical visits for blood pressure assessment, weekly programmed physical activity, antecedents of hypertension on first-degree relatives, previous knowledge of hypertension, dwelling conditions, and satisfaction at home and at work²¹⁻²⁶. The criterion for considering a physical activity was the

practice of physical exercises 3 or more times a week for a minimum period of 45 minutes each time^{18,21,22}. All interviewees were asked about the above-cited items, in the that sequence. They received no questionnaire to fill out.

After one medical student administered the questionnaire, the other medical student measured the blood pressure level through the indirect method using an aneroid sphygmomanometer, which is less accurate than the mercury one, but more appropriate for field research because it is easier to handle and is less often rejected by the interviewees^{21,23}. Before blood pressure measurement, the interviewee rested for 5 minutes in a calm environment with a pleasant temperature, remaining seated on a chair with 1 of the arms resting on a table, at heart level. The brachial artery of the right arm was located by palpation. The cuff was firmly placed 2 to 3 cm above the cubital fossa over the brachial artery, centralizing the rubber bag above it. Korotkoff phases determined systolic and diastolic pressures as follows: phase I determined systolic pressure, and phase V determined diastolic pressure. After 3 minutes, a new measurement of blood pressure was performed. The mean of both measurements was obtained¹⁸. At the end, height was measured with a tape measure, and the interviewee was weighed for calculating the body mass index.

For measuring blood pressure, the interviewee should not have performed the following activities in the 30 minutes prior to the interview: practiced physical exercises, drunk alcoholic beverages or coffee, ingested food, and smoked¹⁷⁻²¹. If the interviewer noticed any emotional change in the interviewee, the examination was postponed. After the assessment, the medical student provided a brochure with information on systemic hypertension prevention and its predisposing factors to the interviewee. In addition, every hypertensive interviewee received recommendations for more effective compliance with the antihypertensive treatment²⁷⁻³⁰. The individual who ignored his hypertensive condition was informed of his condition and advised to get a more comprehensive assessment at the medical service of the medical school of Catanduva¹⁷. The address of the hypertensive individual was recorded for future reassessments.

Aneroid sphygmomanometers of a single brand were used, and they were properly calibrated every 15 days. Stethoscopes, scales, and measuring tapes were also of a single brand to avoid technical deviations in values because of the material used²⁵.

Software in the Delphi language for Windows was developed for analyzing, formulating, and computing the results.

Fisher exact test was used for comparing the proportion of noncontinuous variables between 2 groups. The significance level adopted was lower than or equal to 0.05.

Results

The prevalence of hypertension in the municipality of Catanduva was 31.5% (n=217), corresponding to 0.9% of

the sample of 77,598 inhabitants. The prevalence of isolated diastolic hypertension was 14.8% (n=102), the prevalence of isolated systolic hypertension was 6.5% (n=45), and that of systolic/diastolic hypertension was 10.2% (n=70).

The prevalence of systemic hypertension was 33.9% for the male sex (n=286) and 29.9% for the female sex (n=402), in population above 18 years of age in the municipality (77,598). Figure 1 shows the systolic and diastolic blood pressure levels in the respective age brackets for both sexes. In regard to the hypertensive population, 44.7% (n=97) were of the male sex and 55.3% (n=120) of the female sex.

The prevalence of systemic hypertension for individuals working up to 6 hours per day was 20.7% and for those working 8, 10, and 12 hours it was, respectively, 21%, 29.3%, and 28.3%. The workload was systematically observed, and in regard to those women who answered they were housewives and did not have a helper, they were placed in the 12h group.

In regard to the interviewees (n=688), 577 (84.1%) were white, 107 (15.5%) were black (individuals resulting from miscegenation were considered as black people), and 4 were individuals of Far Eastern heritage, 3 of whom were hypertensive. These latter values were not included in the percentages because they constituted a very small group. The population of the municipality of Catanduva has a predominance of white individuals as compared with most Brazilian cities, because of the high concentration of Italian immigrants and their descendants there. This fact resulted in an unexpected percentage of 31.8% of white hypertensive individuals and 29% of black hypertensive individuals,

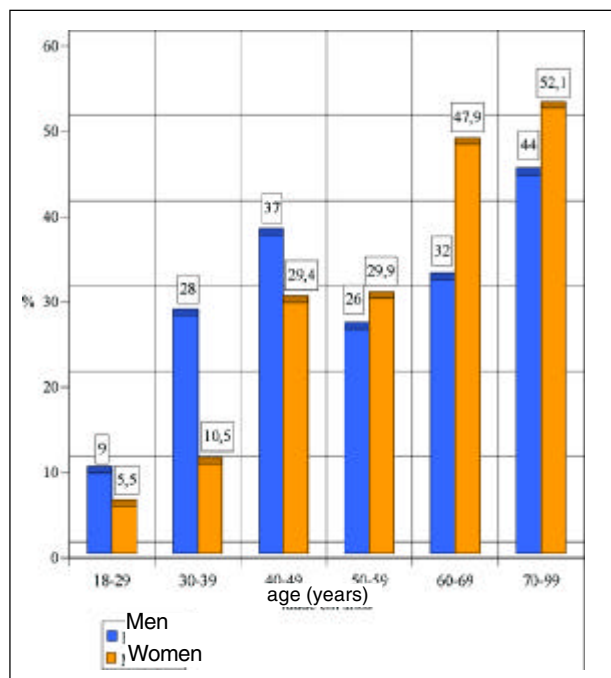


Fig. 1 – Prevalence of systemic hypertension in the female and male sex in different age brackets.

considering that 577 of the interviewees were white and 107 were black, a fact already reported in a previous study¹⁰.

In regard to the educational level, which is a variable rarely studied in the medical literature, we observed that 49.5% of the illiterate individuals (n=107) had systemic hypertension and only 12.7% (n=71) of the individuals who had completed the university educational level had hypertension (p<0.0001). Figure 2 shows the percentage relation between educational level and systemic hypertension.

Another result of our study, which had not been reported in the literature, was the higher prevalence of systemic hypertension in the unmarried group (divorced/separated and widow(er)s) as compared with that of the married group (p<0.0001), which deserves a further assessment (Table I and fig. 3). The bachelors were not included in the unmarried group because of their predominantly low age bracket.

The criterion for analyzing the control of the treatment followed the algorithm in chart I. The medication being used was analyzed in detail, and an inquiry about changes in lifestyle was performed. If the interviewee did not have a strict change in lifestyle, he was excluded from this group. In regard to the elderly, an exception was considered for those who were not in condition to exercise due to any type of physical incapacity. However, even if not participating in physical exercise, if the individual met the remaining criteria for changes in lifestyle, he would be included in the group. The results of this cross-sectional analysis are shown in chart I.

In regard to familial income, our results seemed to be related to the educational level; this correlation, however, was not exactly contiguous (fig. 4).

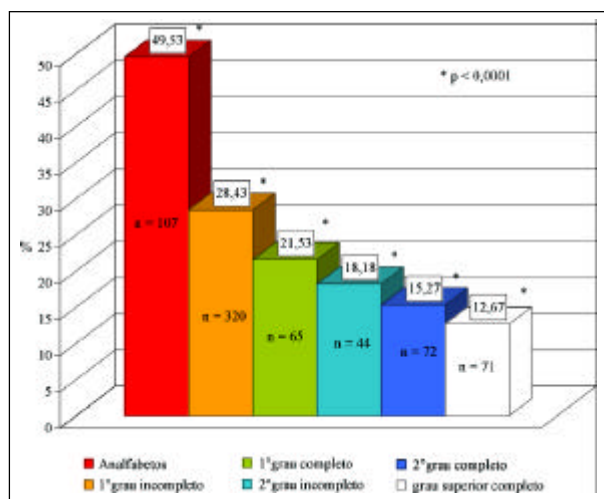


Fig. 2 – Comparison of blood pressure levels of hypertensive individuals with their respective educational levels in the municipality of Catanduva (p<0.0001).

Table I - Prevalence of systemic hypertension in the married and unmarried groups in the municipality of Catanduva

Married	25.77%	N=454	P<0.0001
Divorced/separated	29.82%	N=57	P<0.0001
Widow(er)s	45.34%	N=86	P<0.0001
Bachelors	15.29%	N=85	P<0.0001

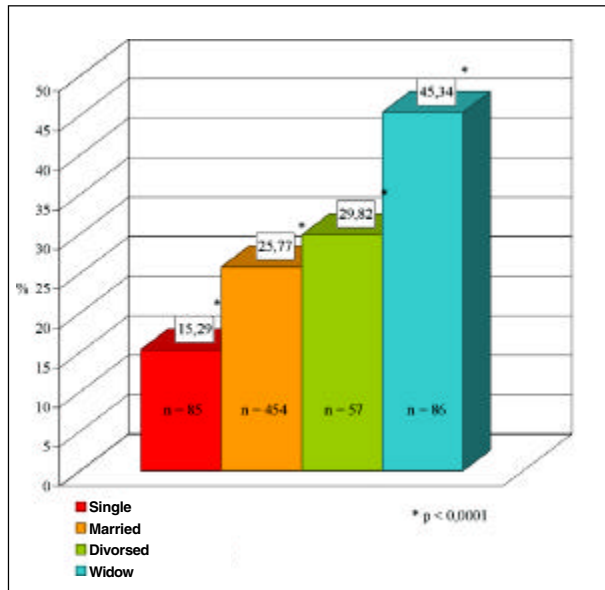


Fig. 3 – Prevalence of systemic hypertension in the groups of different marital statuses in the municipality of Catanduva (p<0.0001).

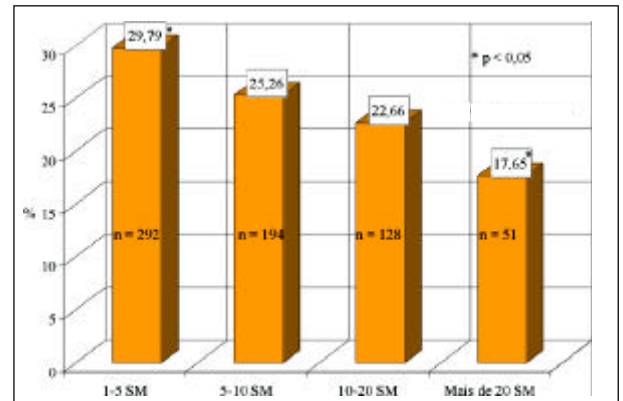


Fig. 4 – Prevalence of systemic hypertension in the groups of different familial incomes in the municipality of Catanduva (p<0.05), SM: Minimum wage.

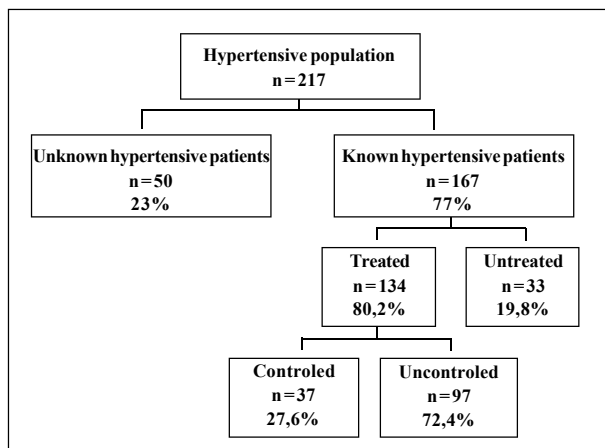


Chart I – Profile of the antihypertensive treatment in the municipality of Catanduva.

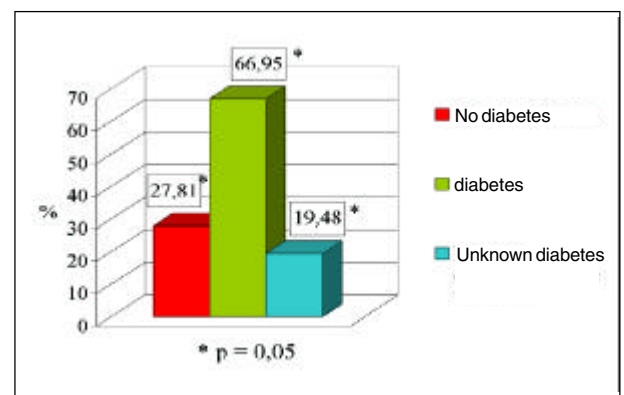


Fig. 5 – Prevalence of systemic hypertension in diabetic and nondiabetic individuals in the municipality of Catanduva (p<0.05).

The results of the study confirmed the strong correlation between diabetes mellitus and the prevalence of systemic hypertension (p=0.05). We investigated the 2 forms of diabetes (I and II), whether the interviewees knew in advance they had diabetes, and whether they were treating their disease. Among those reporting not having diabetes, the prevalence of systemic hypertension was 27.8% (n=399). Among those with type I or II diabetes, the prevalence was 66.9% (n=46) (p=0.05). Among those who did not know they had the disease and were hypertensive, the prevalence was 19.5% (n=231). Twelve interviewees did not answer this question (fig. 5).

A result of little significance was that 26.1% of those individuals not visiting the doctor regularly were hypertensive, and 28.6% of those visiting the doctor regularly had the disease.

The interviewees ingesting more than 30 mL of ethanol per day had a prevalence of systemic hypertension of 34.8%, and those who did not drink or who drank less than

30 mL of ethanol per day had a prevalence of systemic hypertension of 25.8% (p=0.05) (fig. 6).

In regard to programmed physical activity (3 times a week, for at least 45 minutes), 23.2% of the individuals with this practice were hypertensive (n=99). Among those who did not have a programmed physical activity practice, 26.9% (n=491) had systemic hypertension. The investigation regarding the history of hypertension among first-degree relatives confirmed previously reported data⁸⁻¹⁵. Prevalence of systemic hypertension in these individuals was 37.8% (n=367), and among those who had no hypertensive first-degree relatives it was 12.7% (n=307) (p<0.0001). Fourteen interviewees did not answer this question (fig. 7).

Considering the interviewees, 167 (77%) knew about their previous hypertensive condition. The remaining 23% (n=50) had hypertension but did not know about it.

The analysis of body mass index of the population of the municipality of Catanduva showed a strong correlation between obesity and systemic hypertension (p<0.001) (fig. 8).

Discussion

The study carried out in the municipality of Catanduva, in some ways, reports a reality of Brazilian cities. The 31.5% prevalence of hypertension in a population of

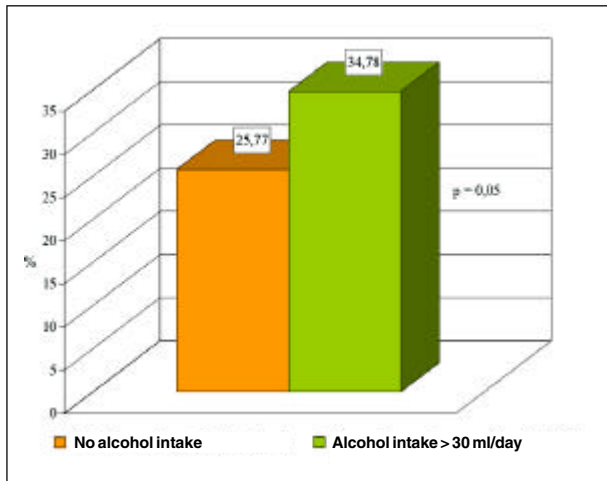


Fig. 6 – Prevalence of systemic hypertension in the interviewees drinking more than 30 mL/day of ethanol in the municipality of Catanduva (p<0.005).

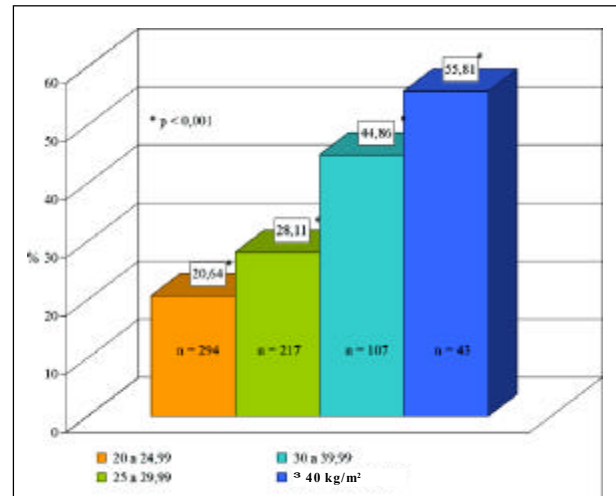


Fig. 8 – Correlation between prevalence of systemic hypertension and body mass index of the interviewees in the municipality of Catanduva (p<0.001).

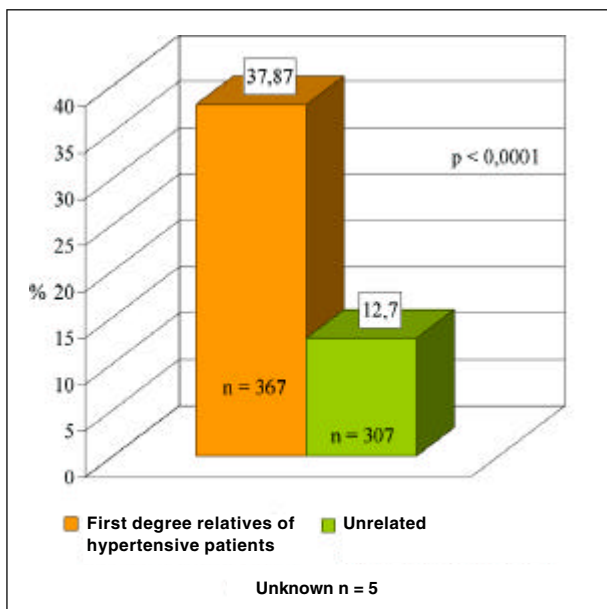


Fig. 7 - Prevalence of systemic hypertension in individuals with familial history of hypertension in the municipality of Catanduva (p<0.0001).

103,889 inhabitants is not startling, because studies carried out in other Brazilian municipalities have shown prevalence rates higher than 30%¹⁰. Even though the criteria used in this latter study were those of the World Health Organization and the criteria adopted in our study were those of the III Brazilian Consensus on Hypertension, both results are considered high for a certain chronic disease.

The inadequate therapeutical control of hypertension deserves special emphasis, because it involves not only the health professional but also primarily the acceptance by the patient of the need to change lifestyles and to adjust the medication for the therapy to become effective^{21,23}.

In our study, with antihypertensive control in 27.6% (chart I) of participants, the change in lifestyle was considered a criterion adequate for treatment that should be prioritized, either associated or not with medicamentous therapy.

Control of blood pressure levels, even though not very common, may be obtained only with changes in lifestyle, as we observed in our study. We also observed that despite medicamentous therapy and appropriate changes in lifestyle, some interviewees did not obtain satisfactory blood pressure levels¹⁶ (chart I). This low antihypertensive control was mainly due to the difficulty of the hypertensive individual to adequately make changes in lifestyle with appropriate medicamentous therapy, and also to the lack of appropriate medical orientation for the patient to fit a correct treatment program. This inadequacy was also due to the fact that some groups of hypertensive individuals had economic difficulties in obtaining medication that could effectively control hypertension.

In our study, 55.81% of the individuals with morbid obesity (body mass index ≥ 40 kg/m²) were hypertensive, 44.86% had body mass index between 30 and 39.99kg/m², and only 20.64% of the individuals with body mass index between 20 and 24.99kg/m² had systemic hypertension. Therefore, obesity is certainly one of the major factors accounting for systemic hypertension. Correlating all risk factors for systemic hypertension, we observed that the worst association was obesity and familial history of hypertension, which had a prevalence of 28.2%, as compared with 11.2% of the association with other factors.

In regard to salt ingestion, our study did not find a significant difference between those who admitted taking the salt container to the table during the meals and those who did not, 26.49% and 25.44%, respectively. This may have resulted from the technical incapacity of measuring the daily intake of NaCl, because of the subjective response and idea that each individual had of the amount of salt present in food, and the difficulty in quantifying the amount of salt in the food ingested, resulting in a higher amount of salt consumed.

In our study, the interviewees with an ethanol ingestion higher than 30 mL/day had a prevalence of systemic hypertension similar to that found in the literature.

We observed that hypertension prevailed among those who did not have regular physical activity.

We also observed that the prevalence of systemic hypertension was higher among smokers.

Our study reconfirms that diabetes is one of the major diseases associated with systemic hypertension. The most likely causal link is obesity. Patients with diabetes had a prevalence of systemic hypertension of 66.9% ($p=0.05$), showing that the fact of having type I or II diabetes is closely related to systemic hypertension.

The prevalence of systemic hypertension in males was higher than that in females up to the age of 70 years. This may result from the fact that, in our society, males are less concerned with preventive measures of chronic diseases, such as being physically active, eating healthy food, and not smoking.

A correlation exists between the high workload and the prevalence of systemic hypertension. We could assume that the individual who works more has less or no time for applying measures for changing lifestyles. However, we were not able to obtain a statistical significance between the hours worked (6, 8, 10, and 12 h) and hypertension.

The population of the municipality of Catanduva has a high predominance of white individuals as compared with most Brazilian cities, due to the high concentration of descendants of Italian immigrants. As already reported in previous studies¹¹, the proportion of systemic hypertension in white and black people was not the one expected, which may have resulted from the higher proportion of white residents in the municipality of Catanduva (error β).

The fact that the prevalence of systemic hypertension

is higher in the group with a lower educational level and lower in the group with a higher educational level may result from parallel factors most of the time, because the individual with a lower educational level has a lower knowledge of how to prevent chronic diseases.

A fact that has not yet been reported in the medical literature and that was observed in our study was the higher prevalence of systemic hypertension in unmarried individuals (divorced/separated and widow(er)s) as compared with that of the married ones. This may have a very plausible explanation because these individuals who are considered unmarried are usually older and, therefore, have a higher tendency toward systemic hypertension.

Heredity was an extremely important factor for systemic hypertension. In our study, we found an elevated level of significance for it, which shows the importance of inquiring about the familial history of hypertension, which should be valued by health professionals.

In conclusion, the prevalence of systemic hypertension found in a municipality of the Northwestern region of the state of São Paulo does not essentially differ from that of other areas. The antihypertensive control is, however, low (27.6%). Therefore, we suggest that programs for controlling systemic hypertension should be prioritized and better instruct the population about the reasons that could make compliance with the antihypertensive treatment difficult, jeopardizing the appropriate control of blood pressure and increasing cardiovascular morbidity and mortality.

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