

# Hypertension in the City of São Paulo: Self-Reported Prevalence Assessed by Telephone Surveys

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## Abstract

**Background:** Little is known about the prevalence of hypertension in São Paulo, Brazil.

**Objective:** To identify the prevalence of self-reported hypertension in the city of São Paulo.

**Methods:** There were 613 telephone interviews using directories of household landlines. The sample was calculated with an estimated prevalence of hypertension in 20.0%.

**Results:** The prevalence of self-reported hypertension was 23.0% and 9.0% of respondents reported that the value of their last pressure measurement was greater than 140/90 mmHg, but they were unaware that they were hypertensive, with a total prevalence 32.0%. Hypertensive patients reported that: 89.0% were under treatment and 35.2% were controlled; 27.0% miss medical appointments; 16.2% stop taking drugs; 14.8% have a history of stroke; 27.8% had heart disease and 38.7% had hypercholesterolemia; 71.2% received advice to reduce salt, 64.6% to perform physical activity, 60.0% to lose weight loss and 26.2% to control stress; and 78.9% measured pressure regularly. There was a statistically significant relation ( $p < 0.05$ ) for: 1) missing medical appointments with longer treatment and irregular health monitoring; 2) stop taking the drugs with smoking, alcohol and failure to monitor health; 3) carry out treatment for hypertension with dyslipidemia, higher age and longer use of contraceptives for women; and 4) body mass index changed with diabetes, hypercholesterolemia, uncontrolled systolic blood pressure and use of more than one anti-hypertension drug.

**Conclusion:** The prevalence of self-reported hypertension in the city of São Paulo resembles the prevalence found in other studies. (Arq Bras Cardiol. 2010; [online]. ahead print, PP.0-0)

**Key words:** Hypertension/epidemiology; prevalence; São Paulo; Brazil; telephone/utilization.

## Introduction

Cardiovascular diseases are a major cause of morbidity and mortality both in developed countries and in developing countries. In recent decades, many epidemiological studies have confirmed hypertension as a risk factor for this group of diseases<sup>1-4</sup>.

These diseases include the coronary disease, stroke and congestive heart failure. In Brazil, there has been a decrease in mortality from cardiovascular diseases, but they persist as the most frequent cause of mortality<sup>5</sup>.

The prevalence of hypertension varies widely from population to population depending on biological, demographic, social and environmental factors present in each of them. Recent studies in Brazil indicate rates of 23.6%

to 41.4%<sup>6-8</sup>. However, these studies examined the prevalence identified through measurement of blood pressure.

One strategy that can be useful because of its low cost, easy workability and whose data are recognized, would be seeking data through surveys conducted through telephone interviews, in random samples of the population living in households with landlines, which justifies its use in studies and surveillance systems as the one held in São Paulo<sup>9</sup>. This type of model has also been used in other countries very successfully<sup>10,11</sup> and, in our environment, adopted by the Ministry of Health as a form of surveillance of chronic diseases<sup>12</sup>.

Hypertension is a chronic degenerative disease. We must keep hypertensive patients under treatment with blood pressure controlled to avoid cardiovascular, cerebrovascular, renal, and heart complications. At this point, we are faced with the great irony of hypertension, because most patients do not benefit from the treatment due to poor adherence. Several factors that influence adherence, such as personal characteristics, knowledge, values, beliefs, experiences, expectations, social support and financial resources<sup>13,14</sup>.

Faced with the high prevalence of hypertension and its

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status as one of the major risk factors for cardiovascular disease and unsatisfactory levels of control, it is essential to know the prevalence of hypertension and aspects related to treatment and the population of the largest city of Brazil.

## Methods

### Target population

The study was conducted in São Paulo. The target population surveyed included individuals living in the households randomly selected for the study, older than 18, who gave verbal consent for using the information taken in the survey. To calculate the sample, we considered the proportionality of households from the 5 regions of São Paulo (North, South, Central, East and West). We determined the sample for dichotomous variables in cross-sectional studies. For this calculation, we estimated the prevalence of hypertension in the population at 20.0%, based on the average results of population studies performed in Brazil for hypertension. The desired accuracy of the confidence interval was 10.0% (15-25.0%) and confidence interval was 99.0%. Using these parameters, we obtained a sample of 426 households. This figure was rounded-up to 500 and multiplied by two, with an estimated loss of 50%, totaling 1,000 households. In the survey, there were 38.7% of refusals, resulting in a sample of 613 individuals interviewed. The selection of telephone numbers to be contacted was made by lot from a list provided by the company Telefonica, according to the population density in different regions of São Paulo.

### Data collection

Data were collected by telephone interviews, using a form designed to meet the survey objectives. The interviews were conducted by undergraduate students of nursing and medicine, trained by the survey coordinators.

Within each household, the selection of respondents was based on a randomization table that correlated the last digit of the telephone number of the household with the person being interviewed in order to avoid selection bias, either by gender, age or hypertension. To carry out the randomization, we considered the number of people older than 18 who have lived for at least 6 months in that household. If the person drawn was not present at the time of call, we asked for the best time and the best day to find such individual. Only one person was randomly selected to answer the questionnaire, so that for each household selected, only one resident was interviewed. If the chosen line corresponded to more than one family living in the household, we selected the family of the person who answered the call.

For the interviews, we made three attempts to find someone in the household. If it was not possible to contact the person selected at random, this person was not replaced. If the person selected could not be interviewed at the time of contact, we scheduled date and time of better convenience for the interview. If the number drawn was a commercial line, it was discarded and the following number in the directory would be chosen. The phone calls took place every day of the week and at different times of the day.

Initially, the data collection instrument used for the interview had the following questions: 1) Do you have or have you had high blood pressure problems? 2) Has any health care professional ever told you that you have high blood pressure problems? 3) Do you take any drugs to treat high blood pressure? 4) Do you often use health facilities to treat high blood pressure? In the case of a positive response to any of these questions, the person was considered as having hypertension.

The data collection instrument was divided into two parts. In the first, directed both to hypertensive and non hypertensive individuals, the questions were about personal identification data (gender, age, weight, height and skin color), socioeconomic conditions (occupation, educational level, family income, housing); habits life (smoking, alcohol consumption, physical activity), personal and family history for hypertension, diabetes, heart problems, high cholesterol and stroke; habit of measuring blood pressure and value of the last measurement; and knowledge and beliefs about hypertension and treatment. The second part of the instrument, addressed only to hypertensive individuals, we evaluated the performance and types of antihypertensive drug therapies and nondrug therapies; attendance to medical appointments; and difficulties in performing the treatment.

### Ethical aspects

Since it was an interview by telephone, informed consent has been replaced by verbal consent obtained by telephone contact with the respondents. Respondents were told that the data obtained would be used exclusively for research purposes. Respondents were also informed of the possibility of leaving the study at any time of the interview and on ensuring the confidentiality of information obtained. The research project was approved by the Ethics Committee of the *Hospital das Clínicas da Universidade de São Paulo*.

### Data analysis

Data were stored in a database and analyzed statistically by SAS and presented in the form of tables and figures, through absolute rates and percentages. We evaluated the prevalence of hypertension in this sample. The characteristics of participants were assessed according to the presence or not of self-reported hypertension. Categorical variables were analyzed by nonparametric tests and continuous variables by analysis of variance (ANOVA). P values < 0.05 were considered significant.

## Results

The prevalence of self-reported hypertension found in this study was 23.0%. According to the data shown in Table 1, significant differences ( $p < 0.05$ ) were found between self-reported hypertensive and normotensive individuals, with hypertensive patients including a larger number of retirees, lower education, higher frequency of smokers and former smokers, less use of birth control pills, higher average age, higher average body mass index and longer duration of smoking, alcohol consumption and oral contraceptive use. Although most of individuals studied are male, which

**Table 1 - Biosocial characteristics and lifestyle of respondents related to self-reported hypertension**

Variables	Self-reported hypertension			
	Yes		No	
	N	%	N	%
<b>Sex</b>				
Male	105	74	313	64
Female	37	26	158	36
<b>Color</b>				
White	85	60	314	67
Black	31	22	79	17
Eastern origin	4	3	14	3
Brown	22	15	64	13
<b>Works*</b>				
Yes	50	35	259	55
No	37	26	112	24
Retired	35	25	29	6
Unemployed	2	1	18	4
Homemaker	18	13	52	11
<b>Education level*</b>				
Primary education	66	46	143	30
High school	45	32	179	38
Higher education	20	14	140	30
Reads and writes	3	2	3	0,6
Does not know	6	4	6	1,4
<b>Income</b>				
Up to R\$ 1,000	45	32	122	26
From 1,000 to 5,000	33	23	127	27
> 5.000	8	6	31	7
Does not know/did not answer.	56	39	191	40
<b>Smoking*</b>				
Yes	39	30	93	20
No	72	51	296	63
Quit	30	21	80	17
<b>Alcohol consumption</b>				
Yes	31	22	129	28
No	108	78	338	72
<b>Use contraceptive drugs*</b>				
Yes	7	7	77	25
No	64	60	140	46
Quit	35	33	90	29
<b>Physical exercising</b>				
Yes	40	28	173	37
No	82	58	226	48
Quit	20	14	71	15
<b>Age (years)*</b>	55.0 + 15.1		39 + 14.5	
<b>BMI (kg/m<sup>2</sup>)*</b>	26.7 + 5.1		24.0 + 3.8	
<b>Smoking time (months)*</b>	281.1 + 195.2		177.3 + 142.9	
<b>Alcohol consumption time (months)*</b>	361.0 + 163.0		12.9 + 10.8	
<b>G/day of ethanol</b>	12.9 + 10.8		10.2 + 13.9	
<b>Time using contraceptive drugs (months)*</b>	142.4 + 108.8		92.1 + 83.9	

\*p < 0.05.

is a random fact, this variable did not correlate with reports of hypertension.

Among the diseases reported by all respondents, the most cited one was hypercholesterolemia (15.0%). Figure 1 shows that hypertensive individuals presented significantly higher rates ( $p < 0.05$ ), history of hypercholesterolemia, cardiovascular diseases and stroke.

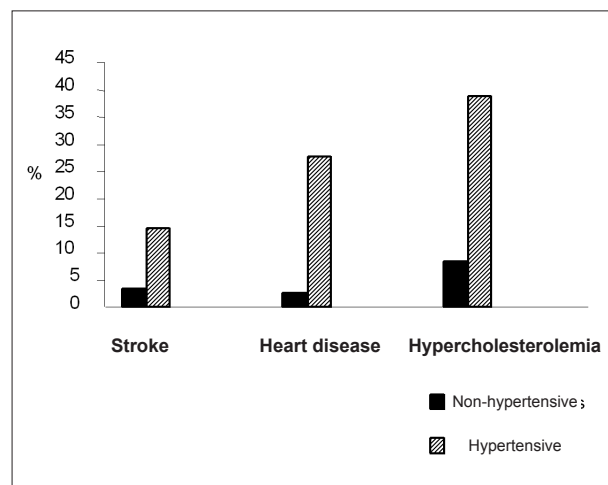
According to the data shown in Table 2, we observed that self-reported hypertensive individuals were used to measuring blood pressure more often at home and at health care centers than non-hypertensive individuals. They also recalled more easily the last time they measured blood pressure and the value of the last measure than non-hypertensive individuals ( $p < 0.05$ ).

As to their familiarization with the disease, as compared to a common cold, hypertensive individuals considered hypertension a less severe disease. In contrast, non-hypertensive individuals considered hypertension a more severe disease ( $p < 0.05$ ). On the other hand, hypertensive individuals had more information about stroke being one of the complications of hypertension and that hypertension treatment is lifelong. Although most hypertensive individuals are supposedly aware of the value at which pressure is considered high, a little less than one quarter (23.7%) reported the correct value (Table 2).

With regard to antihypertensive treatment, little more than half of hypertensive individuals received orientation from health services on nondrug therapies, and about half also reported to adopt them. Figure 2 shows that the most cited measures were control of salt in the diet, exercising and body weight control.

Out of hypertensive respondents, 16.8% reported that in the last two weeks they had stopped taking the drugs a few times and 30.6% reported having had difficulties in carrying out drug treatment. Figure 3 shows the reasons that most led hypertensive individuals stop taking drugs: oblivion, cost, side effects, and those who only take the drug when feeling ill.

Blood pressure control was assessed according to the value of the last measure. We found a high rate of failure to control

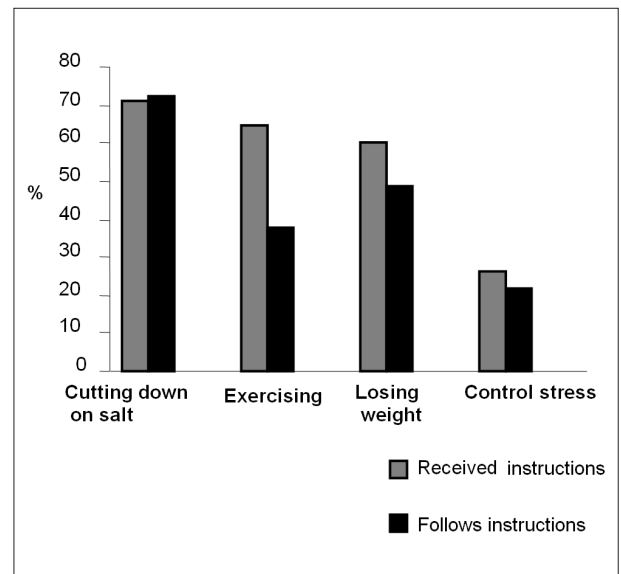


**Figure 1 - Diseases reported by hypertensive and non-hypertensive individuals.**

**Table 2 - Habits related to the disease and beliefs of respondents in relation to self-reported hypertension**

Variables	Self-reported hypertension			
	Yes		No	
	N	%	N	%
<b>Habit of measuring blood pressure *</b>				
Yes	112	78.9	224	47.7
<b>Interval*</b>				
Up to one month	86	76.4	97	43.3
Up to 6 months	23	21.8	91	40.6
Annual	2	1.8	30	13.4
Other	0	0.0	6	2.7
<b>Place of measurement*</b>				
Health care center	43	38.4	51	23.0
Home	29	25.9	25	11.2
<b>Knows the last time blood pressure was measured*</b>				
Yes	130	91.5	344	73.2
<b>Knows the value of the last blood pressure measurement*</b>				
Yes	115	81.0	254	54.7
<b>Thinks that high blood pressure compared to a cold is*</b>				
More severe	124	87.9	438	93.2
Equal	1	0.7	9	1.9
Less severe	6	4.3	11	2.3
Does not know	10	7.1	12	2.6
<b>Stroke is a complication of hypertension*</b>				
Yes	88	65.2	249	55.1
<b>Value from which pressure is considered high*</b>				
Yes	97	68.8	226	48.2
<b>Time of hypertension therapy*</b>				
Time limited	6	4.3	40	8.5
Entire life	101	73.2	275	58.7
Does not know	31	22.5	154	32.8

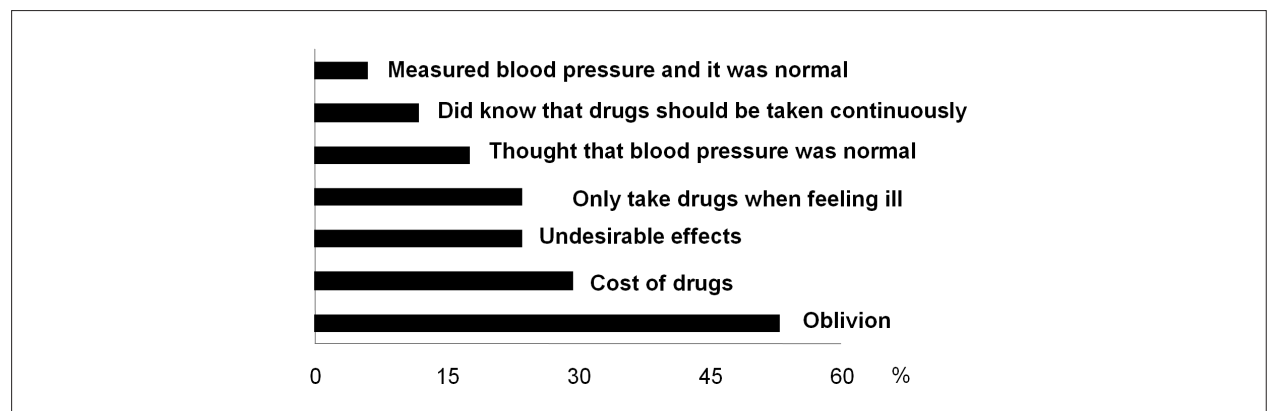
\*p < 0.05.



**Figure 2 - Instructions and follow-up of nondrug therapy.**

blood pressure (45.8%). Approximately 9.0% of individuals reporting normotensive conditions reported blood pressure values compatible with hypertension, and a large portion of this group did not know the value of the last blood pressure measurement (Table 3).

Most respondents who reported hypertension said they were under therapy. Performance of therapy was related to ( $p < 0.05$ ) older age, longer duration of contraceptive use, taking drugs for hypertension and increased cholesterol. From those who reported to perform treatment for hypertension, 88.1% reported to have been under drug therapy, and only 5.5% were also under nondrug therapy. Failure to take drugs in the last two weeks was related ( $p < 0.05$ ) with a largest number of cigarettes smoked per day, consumption of ethanol and failure to attend health services regularly. Among the hypertensive individuals, 18.0% failed to attend medical appointments in the past year. Failure to attend medical appointments, as pointed out by 27.0%, was related ( $p < 0.05$ ) to longer treatment and failure to seek medical monitoring regularly (Table 4).



**Figure 3 - Self-reported reasons for stopping taking anti-hypertensive drugs.**

**Table 3 - Control of blood pressure of self-reported normotensive individuals and hypertensive individuals**

	Pressure < 140/90 mmHg		Pressure ≥ 140/90 mmHg		Does not know	
	N	%	N	%	N	%
<b>Self-reported hypertension</b>						
Yes	50	35.2	65	45.8	27	19.0
No	213	45.2	41	8.7	217	46.1

**Table 4 - Characteristics of self-reported hypertensive individuals associated to therapy and failure to attend medical appointments**

Variables	Under hypertension therapy			
	Yes		No	
	N	%	N	%
Taking drugs*	104	95.41	5	4.59
Hypercholesterolemia *	45	93.75	3	6.25
Age* (years, average ± standard deviation)	58.4 ± 13.9		48.1 ± 13.7	
Time using contraceptive drugs (years, average ± standard deviation)*	13.2 ± 8.6		2.0 ± 2.1	
	Stopped taking drugs			
	Yes		No	
	N	%	N	%
Number of cigarettes per day* (packet)				
- Less than 1	1	8.3	11	91.7
- One	4	28.6	10	71.4
- Two	3	75.0	1	25.0
Health care service monitoring*	13	13.5	83	86.5
G/day of ethanol* (average ± standard deviation)	28.4 ± 12.6		7.5 ± 4.5	
	Missed medical appointments			
	Yes		No	
	N	%	N	%
Health care service monitoring*	15	15.3	83	84.7
Time of therapy (months, average ± standard deviation)*	50.9 ± 65.9		11.7 ± 118.0	

\*p < 0.05.

The body mass index in the ranges of overweight and obesity was associated with a higher prevalence of cardiovascular risk factors such as diabetes, hypercholesterolemia, uncontrolled systolic blood pressure, and use of more than one antihypertensive drug (Figure 4).

## Discussion

The main finding of this study was that the self-reported prevalence of 23.0%, obtained by phone interview, presented an intermediate value between the prevalence rates identified in other studies. Even though there is a difference between the two forms of identification of the disease, such method may be useful for ease of implementation and low cost, besides allowing planning and targeting health interventions. Moreover, 9.0% reported that the value of their last blood pressure was above 140/90 mmHg, but were unaware that they were hypertensive. This amount, added to the self-reported prevalence of 23.0%, according to the inclusion criteria for this study, increases the prevalence to 32.0%.

Considering the indirect way of assessing the prevalence of self-reported hypertension, the data shown are very close to those obtained by VIGITEL<sup>12</sup> (Monitoring of Chronic Diseases by Telephone Interviews), in 2006, in a survey conducted in all the capitals of the 26 Brazilian states and in the Federal District. The frequency of adults who reported physician-diagnosed hypertension varied between 13.8% in Palmas and 26.9% in Rio de Janeiro.

The Ministry of Health, through the VIGITEL, aims to monitor the frequency and distribution of risk and protective factors for noncommunicable chronic diseases through telephone interviews conducted in random samples of adults living in households served by landlines in each city. Through health surveillance, it is possible to monitor and analyze the profile of diseases and its determinants and constraints, as well as detect changes in trends in time, geographical area and population groups, also contributing to the planning of healthcare interventions.

The evaluation of hypertensive respondents showed a predominance of less-favored social conditions, exemplified by low education and unemployment. As these elements pose challenged to diagnosis and anti-hypertensive therapy, these variables may influence not only the prevalence of hypertension, but also the control of the disease.

In hypertensive individuals, we still find a significant rate of improper lifestyles such as smoking and high body mass index. As for alcoholism, although the daily amount of ethanol taken is within a median range of tolerance for hypertensive individuals, we found that they have had this habit for much longer than non-hypertensive individuals, which may be related to older age. It is known that, along with obesity and salt intake, alcohol consumption is a risk factor for hypertension.

Studies have shown the importance of social and economic characteristics and living habits in the context of hypertension. Research<sup>13</sup> conducted in Porto Alegre showed that abandoning the therapy was associated with low education, smoking and shorter duration of disease. Other two studies showed that the prevalence of hypertension was inversely related to education level<sup>14,15</sup>.

The survey VIGITEL<sup>12</sup> revealed that reports of hypertension diagnosis increased with age and was highest for individuals with up to 8 years of schooling. Smoking is a chemical dependence that exposes individuals to a number of toxic



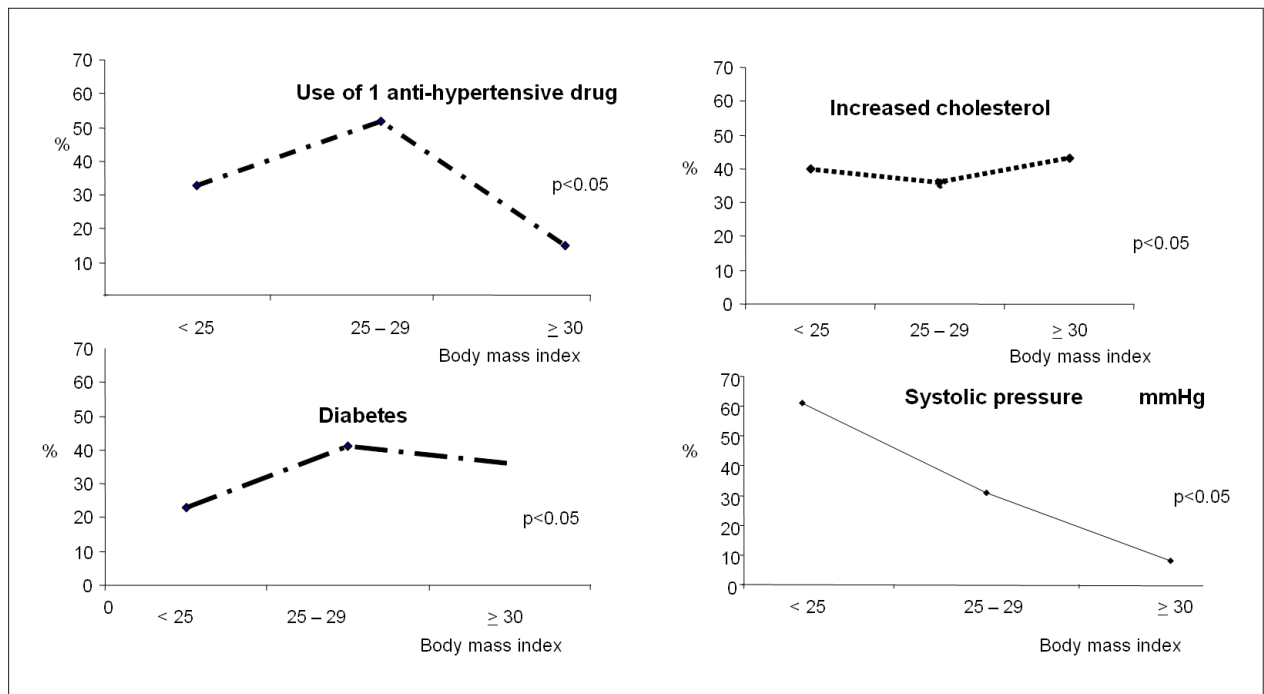


Figure 4 - Variables associated to body mass index (kg/m<sup>2</sup>).

substances, in addition to increasing morbidity and mortality from coronary heart disease, hypertension, stroke, bronchitis and emphysema. Smoking rates identified by VIGITEL, i.e., 16.25%, are well below those found in this study, especially among hypertensive individuals. Regarding alcohol, studies<sup>16-19</sup> indicate varied frequencies of alcohol consumption among specific populations, dependent on cultural and social influence on populations. The household survey indicated by VIGITEL indicated the prevalence of alcohol abuse, which ranged from 22.1% to 12.0%.

The presence of hypertension, diabetes mellitus, obesity and dyslipidemia had a complex relationship, with a common cause that consisted of lifestyle and genetic inheritance. This study also found an association between high body mass index with other cardiovascular risk factors. Studies have revealed the importance of these associations with hypertension and increased cardiovascular risk<sup>20-22</sup>.

Such finding assumes greater importance when one notes that in this study, self-reported hypertensive respondents pointed out, in a significant way, the presence of stroke, heart disease and hypercholesterolemia.

Other variables, such as habit of measuring blood pressure, influenced the condition of self-reported hypertension. However, positive attitudes revealed were not sufficient to ensure an effective control of the disease, considering that just over one third had blood pressure levels checked. Low levels of control cannot be justified by failure to attend medical appointments and irregular use of drug therapy.

Some characteristics of drug therapy can influence adherence, emphasizing the cost, side effects, and complex treatment regimens for life. Also note that negative behaviors,

such as smoking, alcohol consumption and irregular monitoring by health services were significantly related to the fact of stop taking antihypertensive drugs. It was further found that a longer follow-up treatment and less intense monitoring by health services contributed to failure to attend medical appointments. On the other hand, being treated for hypertension was influenced by the presence of comorbidity, such as hypercholesterolemia and advanced age.

Familiarization with the disease and treatment is also a variable to be considered in terms of acceptance to therapy. In general, we observed that hypertensive patients are aware of their health condition, but are not improperly controlled. The discrepancy between having information about the disease and treatment and managing to control blood pressure points out to the essential difference between familiarization and therapy acceptance. While familiarization is rational, therapy acceptance is a complex process, involving concrete emotional factors and barriers involving practicality and logistics support<sup>23-26</sup>.

## Conclusion

The assessment of hypertension reported by means of telephone contacts in the city of São Paulo found a prevalence close to the one found by other studies, and it enables identifying therapy data, particularly relating to hindering aspects, which may contribute to the unsatisfactory control of blood pressure levels. We can also identify the presence of other cardiovascular risk factors, comorbidities, and health behaviors and attitudes.

A potential limitation of this study is that it assesses prevalence only through self-reports, rather than through

blood pressure measurement, as performed in other surveys. However, the data obtained through this type of study may be useful in planning health actions, setting guidelines to prioritize health promotion, prevention and attention to reducing cardiovascular risk factors and subsequent mortality.

Despite the timeliness of this study, surveillance studies may be extremely relevant for allowing the monitoring and analysis of diseases and their determinants and constraints, aiming at implementing health policies in a particular geographic area. Another point to emphasize is the monitoring system performance, evaluated from the significance and reliability of estimates and the cost per interview completed.

Another study, also conducted in São Paulo, showed that the cost per interview was 8 times lower than the cost estimated for similar systems in developed countries and 4-8

times lower than the cost of traditional household surveys conducted in the same city<sup>9</sup>.

### Potential Conflict of Interest

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

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There were no external funding sources for this study.

### Study Association

This study is not associated with any post-graduation program.

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