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VALUATION OF THE FREQUENCY OF CARDIOVASCULAR BRAIN EVENTS IN HYPERTENSIVE PATIENTS WITH AND WITHOUT BLOOD PRESSURE CONTROL

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ABSTRACT

Introduction: Introduction: Systemic arterial hypertension (SAH) is the main factor for cardiovascular diseases (CVD). HBP is a clinical condition that involves many factors characterized by elevated and sustained blood pressure (BP) levels.
Objective: to evaluate the frequency of cardiovascular brain events in hypertensive patients who control or not blood pressure.
Methods: a descriptive cross-sectional study was carried out in which the frequency of cardiovascular brain events in hypertensive patients with and without BP control was evaluated. 424 patients diagnosed with SAH according to the criteria adopted by the Brazilian Hypertension Guidelines, that is, systolic pressure equal to or greater than 140 mmHg and diastolic pressure equal to or greater than 90 mmHg participated in this study. The patients were divided into two groups, group one (GI) composed of 135 individuals with blood pressure control and group two (GII), composed of 289 individuals without blood pressure control.
Results: Mean age of study participants was 60.2 ± 12. The age was similar for both groups (p=0.89). The GI indicated a lower percentage in relation to alcoholism and smoking compared to GII. 81 participants who did not control blood pressure responded that their health was worse than the previous year. The risk of events was for GII increased for OR 1.29. It was seen that the prevalence of events was higher in the GII group. Smokers and alcoholics have greater difficulty in controlling blood pressure, as well as those with other associated diseases.
Conclusion: Hypertensive individuals who did not control BP had more cardiovascular brain events. Smokers and alcoholics and other associated diseases have greater difficulty in controlling blood pressure.

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INTRODUCTION

Cardiovascular diseases (CVD) represent an important and growing cause of worldwide morbidity and mortality and are associated with the presence of cardiovascular risk factors (CRF) (BRAZIL, Ministry of Health, 2006). Cardiovascular risks are conditions that predispose a person to an increased risk of developing heart and vessel diseases. There are several risk factors for cardiovascular disease. One of the main factors that imply the emergence of cardiovascular disease is systemic arterial hypertension (SAH) (Moreira *et al.*, 2009). HBP is a clinical condition that involves many factors characterized by elevated and sustained blood pressure (BP) levels. It is often associated with functional and / or structural changes in target organs (kidneys, heart, blood vessels and encephalon) and

metabolic changes, with consequent increase in cardiovascular risk (Picon *et al*., 2012). A systematic review with 22 studies considering BP values greater than 130/90 mmHg, such as SAH, found prevalences between 22.3% and 43.9%, the mean was 32.5%. Considering the population aged between 60 and 69 years, the prevalence was 50%; Among individuals aged over 70 years, the prevalence was 75%. Among genders, the prevalence was 35.8% for men and 30% for women. In another systematic review with 44 studies conducted between 2003 and 2008, from 35 different countries, an overall prevalence of 37.8% in men and 32.1% in women. For the state of São Paulo, the general prevalence is 20% was shown (Picon *et al*., 2012). The prevalence of SAH between developing and developed countries is similar (BRAZIL, Ministry of Health, 2006). In Brazil, CVD represents approximately 30% of all deaths. Of these, about 50% affect adults between the ages of 30 and 69, during productive phase (Vianna and Poz, 1998). In order to better establish life the control of SAH, the Family Health Program (PSF) was implemented in Brazil in 1994. This program provides strategies that allow for the integration and promote the organization of activities in a territory serving the family in an integral and continuous way, developing actions of prevention and health promotion (Trevisol *et al*., 2012). Individuals with chronic conditions such as hypertension are followed up at the Basic Health Units (UBS), where the family health team is located. Through this strategy, seek to provide integral, continuous and quality assistance is developed by a multi professional team (Alba-Leonel *et al*., 2016). Some studies show the reality of the prevalence of hypertension in a given area or region. However, data on the results of direct work with health promotion and treatment of individuals with SAH, especially the occurrence of cardiovascular brain events and hospitalization of patients accompanied by the Family Health Strategy (FHS), are still scarce, especially data from Rural or peripheral regions. Therefore, assessing cardiovascular risk in hypertensive patients treated in the FHT program is a necessity in order to develop better strategies for the effective treatment of patients with cardiovascular risks, such as hypertension. CVDs are titled as the leading cause of death in several countries in the world. Due to their high global mortality rate, CVD has been a major target of many studies. Given the above, it is evident that public health strategies are extremely necessary for the control of CVD for patients with SAH. The theme of this study fits the lifestyle research line. Therefore, the main objective of this study is to evaluate cardiovascular brain events in hypertensive patients who control or not blood pressure, and to analyze the lifestyle and cardiovascular risk of individuals with hypertension.

MATERIALS AND METHODS

This study was approved by the Research Ethics Committee of the Municipal Health Department of the State of São Paulo - SMS / SP (Opinion no. 857,538). This is a descriptive cross-sectional study in which the frequency of cardiovascular brain events was evaluated in hypertensive patients with and without BP control. The data collection site was held in the neighborhood of Capão Redondo, in the Technical Health Supervision of Campo Limpo. The region studied is composed of 268,729 residents, according to data from the City of São Paulo City Hall. To perform the data collection, the patients participating in the research were questioned in a combined schedule with those responsible for the family health teams. The questionnaires were applied and the data were collected by the authors of the research. Participants in this study were patients diagnosed with SAH according to the criteria adopted by the IV Brazilian Guidelines for Hypertension, that is, systolic pressure equal to or greater than 140 mmHg and diastolic pressure equal to or greater than 90 mmHg, older than 30 years with diagnosis of SAH and patients who agreed to participate signing the free and informed consent form. Patients unable to respond adequately to the questionnaires due to psychic issues were automatically excluded from the survey. The research participants came from twelve Basic Health Units (BHU) located throughout the district of Capão Redondo, where they were accompanied by the Family health strategy program of that region. The total number of interviewees was 424, and they were divided into two groups. Group one consisted of 135 patients, who had BP control. Group 2 consisted of 289 patients, who did not control BP (SBP ≥140 and DBP ≥90 mmHg). In order to obtain better data regarding the diagnosis of hypertension, a questionnaire was applied that includes some extremely relevant questions for our research, such as: Are there cases of hypertension in the family? Were you hospitalized? If yes, in what year? Questions regarding perceptions about the state of your health and lifestyle issues such as smoking, alcoholism, and physical activity. The Framingham Score for cardiovascular risk was applied were asked. The Framingham Score, according to Lotufo (2008) is an instrument used to calculate the risk of cardiovascular event. He used the following parameters: systolic blood pressure, total cholesterol, LDL-cholesterol, HDL-cholesterol, age, smoking, and the presence of diabetes mellitus (DM). The Framingham Score score ranged from zero to 25 points, and the higher the score obtained, the greater the cardiovascular risk. To evaluate the level of blood cholesterol was considered the last lipidogram presented by the participant.

Another questionnaire that has been applied is the NAHAS Individual Style Profile. This aims to evaluate by means of a scale the representation of the evaluated one. It is an instrument based on the following variables: "Nutrition", "Physical Activity", "Preventive Behavior", "Social Relationship" and "Stress Control". It is a scale composed of 15 questions divided into the five aspects mentioned above. Each question has a likert scale of response ranging from "0" to "3". The values "0" and "1" are linked to the negative lifestyle profile, which correspond respectively to: "absolutely not part of your lifestyle" and "sometimes corresponds to your behavior." The answers associated with the positive profile are the values "2" and "3", which describe, respectively, that: "almost always true in their behavior" and "always true in their daily lives; It's part of your lifestyle. "All the questionnaires applied were checked by the authors of the research and, in the presence of some unanswered question, they contacted the interviewee to obtain the answer.

Statistical analysis

Data presented as mean and standard deviation. The symmetry of the data analyzed by means of the Kolmogorov-Smirnov test. The comparison between the groups with and without controlled hypertension performed by unpaired t test or analysis of variance respecting the number of variables to be analyzed. Multivariate regression. Correlations made using the matrix correlation was accomplished. P = 0.05 was considered statistically significant.

RESULTS

Of the individuals interviewed, the GI was composed of 135 participants, with the female sex being 74.8% and the male sex being 25.1% of the total sample. The GII was composed of 289 participants, with the female sex corresponding to 66% and the male sex to 33.9% of the total sample. It was seen that the mean systolic BP of the GI was 112.9 ± 48.1 and that of the GII was 144.7 ± 17.8. The mean GI diastolic BP was 74.7 ± 28.6 and the GII was 85.2 ± 13.8. The mean age of the study population was 60.2 years. GI indicated a lower percentage in relation to alcoholism and smoking compared to GII. It was found that health status "much worse" than in the previous year was more prevalent in GII (Table 1). When participants were asked about their health status in relation to individuals their own age, it was seen that 81 of them responded that their health was much worse than the previous year. Of these, 32 had some event, showing a prevalence of 39.5% (95% CI: 1.09-6.3), p=0.03 (Table 2). Among the patients studied in GI, 18 had one or more acute myocardial infarction (AMI), 10 had 1 stroke and 31 were hospitalized more than 1 time in the study period. In GII, 41 had 1 or more AMI, 33 had stroke and 86 were hospitalized. The prevalence of events was higher in GII, the group that did not control BP (Table 3). The lifestyle assessed using the NAHAS questionnaire was not a discriminant risk factor for cardiovascular events, when considered those with a better life style, scoring 8 and 9 in the domains, no increased risk was found for those who had low scores. (Table 4). No significantly increased risk for AMI was found based on demographics and health-related behaviors (Table 5). No significant risk for stroke was found based on demographics and health-related behaviors (Table 6). Among the patients studied in the GI, none had AMI, 7.4 had a stroke and 22.9 were hospitalized for more than 1 time in the study period. In GII, 14.1 had one or more AMI, 11.4 had stroke and 29.7 were hospitalized. The prevalence of events was higher in GII, the group that did not control BP (Figure 1). The Framingham Score it was more than in GII than GI (p=0,0021)

DISCUSSION

The objective of this study was to evaluate cardiovascular brain events in hypertensive patients with and without BP control. In the majority of the evaluated, it was observed that there are the occurrence of cardiovascular brain events, being them, AMI and stroke. First, the vast majority of patients are not fully PA controlled. Second, the prevalence of cardiovascular brain events was higher in the group of individuals who did not control BP, as well as higher hospitalization rates. Third, age, smoking, alcohol consumption and body mass index (BMI) did not influence the prevalence of events. It was seen that the frequency of

Table 1. Demographic characteristics. Clinics and perception of the health status of the sample

Variables	GI (n=135)	GII (N=289)	All (n=424)
Age (years)	58.2±12.3	61.1±11.7	60.2±12
Gender			
Female (%)	74.8	66	68.3
Male (%)	25.1	33.9	31.6
BMI	28.8±5.43	29.1±5.70	28.89±5.63
Systolic BP	112.9±48.1	144.7±17.8	-
Diastolic BP	74.7±28.6	85.2±13.8	-
Smokers (%)	16.2	16.6	16.5
Ethylene (%)	10.3	17.6	15.3
Physically active (%)	65.9	71.2	69.3
Diabetic (%)	50.3	49.8	49.7
State of health in relation to last year			
Much better (%)	15.5	20.7	19.1
Better (%)	20	18.3	18.8
equal (%)	27.4	31.8	30.4
Worse (%)	44.4	43.5	43.8
Much worse (%)	8.1	5.1	5.8

Table 2. Prevalence ratios for all events (AMI, stroke, hypertensive crisis, hospitalization, angina, DM decompensation)

Variables	Nº	Events	Prevalence (%)	OR	CI 95%	p
Groups						
GI	135	31	23.0	1		
GII	289	86	29.7	1.29	0.9 a 1.8	0.15
Age group (years)						
< 40	24	5	20.8	1		
> 40 < 60	172	50	29.1	1.4	0.61 a 3.01	0.4
> 60 < 70	111	34	30.6	1.4	0.64 a 3.3	0.45
> 70	90	21	23.3	1.12	0.47 a 2.6	0.79
Non-smokers	356	98	27.5	1		
Smokers	70	21	30.0	1.09	0.7 a 1.6	0.8
Non-alcoholic	361	99	27.4	1		
Ethylene	65	20	30.8	1.12	0.75 a 1.6	0.58
Physically active	294	84	28.6	1		
Sedentary	132	35	26.5	0.92	0.66 a 1.3	0.43
Non-diabetic	213	60	28.2	1		
Diabetic	211	59	28.0	0.99	0.73 a 1.3	0.96
State of health in relation to last year						
Much better (%)	25	4	16.0	1		
Better (%)	186	55	29.6	1.8	0.73 a 4.6	0.1
equal (%)	129	38	29.5	1.84	0.72 a 4.7	0.16
Worse (%)	80	20	25.0	1.56	0.58 a 4.1	0.3
Much worse (%)	81	32	39.5	2.46	1.09 a 6.3	0.03*

Table 3. Prevalence ratio for AMI, Stroke and hospitalization for the group of patients who control and not BP

Groups	Nº	AMI	No IAM	Prevalence (%)	OR	CI 95%	p
Control	135	18	117	13.3	1		
No control	289	41	247	14.2	1.07	0.59 to 1.95	0.8
Groups	N°	stroke	No stroke				
Control	135	10	125	7.4	1		
No control	289	33	256	11.4	1.6	0.76 to 3.37	0.2
GROUPS	Nº	hospitalization	No hospitalization				
Control	135	31	104	23.0	1		
No control	289	86	203	29.8	1.42	0.88 to 2.28	0.14

Table 4. Prevalence ratio for all events (AMI, stroke, hypertensive crisis, hospitalization, angina, DM decompensation) according to lifestyle

Variables	Nº	Events	Prevalence (%)	OR	CI 95%	P
Nutrition						
0to1	5	0	0.0	0.55	0.10 to 3.8	0.29
2 3	31	8	25.8	0.96	0.50 to 1.88	0.46
4 to 5	93	26	28.0	1.07	0.68 to 1.62	0.4
6 to 7	160	46	28.8	1.12	0.74 to 1.57	0.33
8 to 9	136	36	26.5	1		
Physical activity						
0-1	83	24	28.9	0.83	0.54 to 1.43	0.3
2 to 3	147	42	28.6	0.81	0.56 to 1.34	0.26
4 to 5	67	15	22.4	0.63	0.41 to 1.27	0.13
6 to 7	65	17	26.2	0.72	0.46 to 1.36	0.2
8 to 9	64	21	32.8	1		
Preventive						
0-1	4	1	25	0.94	0.17 to 5.2	0.47
2 to 3	18	6	33.3	1.41	0.64 to 2.5	0.25
4 to 5	24	8	33.3	1.41	0.70 to 2.3	0.22
6 to 7	97	29	29.9	1.2	0.79 to 1.64	0.23
8 to 9	283	74	26.1	1		
Social aspect						
0-1	7	1	14.3	0.39	0.07 to 2.98	0.18
2 to 3	23	3	13.0	0.35	0.15 to 1.28	0.04
4 to 5	42	9	21.4	0.64	0.39 to 1.33	0.13
6 to 7	118	36	30.5	0.51	0.42 to 0.85	0.002*
8 to 9	236	70	29.7	1		
Stress management						
0 -1	3	0	0	0.8	0.15 to 4.7	0.42
2 to 3	26	5	19.2	0.57	0.28 to 1.49	0.14
4 to 5	58	15	25.9	0.84	0.53 to 1.44	0.3
6 to 7	165	47	28.5	0.96	0.69 to 1.35	0.43
8 to 9	174	51	29.3	1		

Table 5. Prevalence ratio of AMI for the sample according to demographic data and according to health-related behaviors

Variables	Nº	MI	Prevalence (%)	OR	CI 95%	p
Groups						
GI	135	15	11.1	1		
GII	289	45	15.5	1.3	0.8 to 2.7	0.29
Age group (years)						
< 40	24	2	8.3	1		
> 40 < 60	172	29	16.9	2.2	0.51 to 7.9	0.38
> 60 < 70	111	19	17.1	2.2	0.51 to 8.2	0.36
> 70	90	8	8.9	1	0.24 to 4.7	1
Non-smokers	356	46	12.9	1		
Smokers	70	13	18.6	1.5	0.82 to 2.5	0.25
Non-alcoholic	361	48	13.3	1		
Ethylene	65	11	16.9	1.32	0.69 to 2.3	0.43
Physically active	294	41	13.9	1		
Sedentary	132	18	13.6	0.97	0.53 to 1.7	1
Non-diabetic	213	28	13.1	1		
Diabetic	211	31	14.7	1.13	0.69 to 1.7	0.67
State of health in relation to last year						
Much better (%)	25	3	12.0	1		
Better (%)	186	27	14.5	1.24	0.34 a 4.4	1
equal (%)	129	20	15.5	1.34	0.41 a 4	1
Worse (%)	80	8	10.0	0.81	0.19 a 3.3	0.72
Much worse (%)	81	19	23.5	2.2	0.60 a 8.3	0.26

Table 6. CVA prevalence ratio for the sample according to demographic data and according to health related behaviors

Variables	Nº	stroke	Prevalence (%)	OR	CI 95%	p
Groups						
GI	135	14	10.4	1		
GII	289	27	9.3	0.88	0.48 to 1.6	0.72
Age group (years)						
< 40	24	2	8.3	1		
> 40 < 60	172	16	9.3	1.12	0.27 to 4.5	1
> 60 < 70	111	10	9.0	1.08	0.25 to 4.6	1
> 70	90	10	11.1	1.37	0.31 to 5.6	1
Non-smokers	356	35	9.8	1		
Smokers	70	8	11.4	1.18	0.52 to 2.6	0.66
Non-alcoholic	361	36	10.0	1		
Ethylene	65	7	10.8	1.09	0.46 to 2.5	0.82
Physically active	294	30	10.2	1		
Sedentary	132	13	9.8	0.96	0.48 to 1.9	1
Non-diabetic	213	24	11.3	1		
Diabetic	211	19	9.0	0.77	0.41 to 1.4	0.52
State of health in relation to last year						
Much better (%)	25	2	8.0	1		
Better (%)	186	20	10.8	1.38	0.33 to 5.4	1
equal (%)	129	13	10.1	1.28	0.30 to 5.2	1
Worse (%)	80	7	8.8	1.1	0.24 to 4.9	1
Much worse (%)	81	8	9.9	1.2	0.28 to 5.4	1

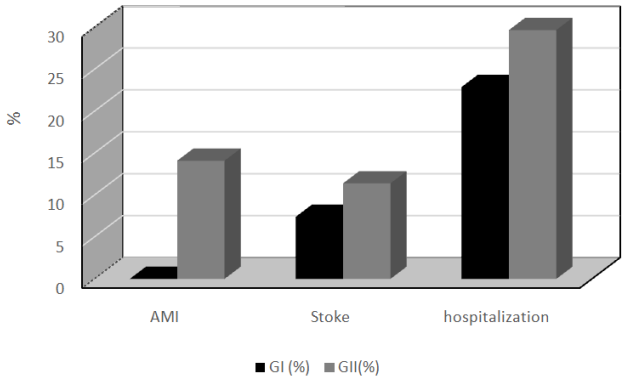

Figure 1. Proportion of events per group

cardiovascular brain events was higher in non-smokers, non-alcoholics, non-diabetics, and physically active individuals. These data are explained by the fact that individuals only acquire a good lifestyle when they have some brain event, such as stroke or AMI. To check the rate of cardiovascular brain events and hospitalization, the patient was asked if he or she had suffered any cardiovascular brain event or if he or she had been hospitalized in the past few years. Because these events are very marked, the veracity of the responses may have been very large, so the methods of this study eliminate the possibility of bias and confounding factors. It was verified that the number of events was higher among the patients who did not control BP. For Gagliardi (2009), the main risk factor for stroke is SAH, which, when properly controlled, significantly reduces incidence rates. About 80% of strokes are related to SAH, which can cause all different types of stroke, such as infarction, hemorrhage, major strokes or lacunar and vascular dementias. The detection and control of BP is a basic and fundamental point of any stroke prevention program and should be major focus (Wolf *et al*., 1991). According to the study by Mazzola (2007) (Lopes Junior *et al*., 2013), hypertensive individuals present up to seven times greater risk of developing stroke than healthy individuals. In a study carried out in Brazil, 27.4% of deaths were due to cardiovascular diseases, and the main cause of death in all regions was stroke associated with SAH (responsible for 40% of deaths) and coronary diseases (responsible for 25% of deaths) (Rodrigues *et al*., 2013). According to the Brazilian Society of Cerebrovascular Diseases, when pressure is high, it damages the blood vessels in the brain blood and can cause a stroke. The association between age, smoking, diabetes, elevated systolic blood pressure, low HDL cholesterol, and electrocardiographic abnormalities with an increased incidence of generic stroke, ischemic attack, has been associated with the association between isolated systolic hypertension and other risk factors with ischemic and hemorrhagic stroke subtypes Transient (TIA), or ischemic stroke. Isolated systolic hypertension, history of diabetes and smoking were the risk factors for lacunar stroke, while carotid murmur was a risk factor for atherosclerotic stroke and embolic age. Both blood pressures may significant risk, but this risk is augmented the greater the difference between systolic and diastolic blood pressures (Davis *et al*., 1998). It was seen that the vast majority of individuals do not maintain full BP control. Some studies have related this lack of control of pressure levels with the lifestyle that the individual has. Smoking cessation is the most significant lifestyle change in the prevention of cardiovascular diseases, such as stroke and AMI and, therefore, smoking cessation should be targeted. Excess consumption of sodium plays an important role in the development of hypertension, and it is important to encourage individuals to reduce their daily salt intake (Rohrbacher *et al*., 2014). The individual who does not perform physical activity has increased BP and consequently increased risk of

developing cardiovascular brain diseases. Regular exercise can reduce blood pressure levels and increase cardiovascular capacity. Therefore, an aerobic exercise program helps strengthen the heart, lower weight and prevent side effects of chronic diseases, such as dyslipidemia, DM and obesity (Reza and Nogueira, 2008). These studies indicate the success of control of SAH through changes in lifestyle, such as stopping smoking, lowering sodium levels, practicing physical activity such as aerobic exercise and making correct use of the medication.

For Dosse (2009), adherence to the treatment of hypertension is defined when the health council coincides with the behavior of the individual in relation to the recommended lifestyle changes and attending medical appointments. The control of SAH is directly related to the degree of adherence of the individuals to the therapeutic regimen. According to Júnior (2002), the diet rich in sodium and fats, alcoholism, smoking, absence of regular physical exercise and psychoemotional changes are contributing factors for the elevation of Hindering their control. For Gonçalves (2007), overweight increases two to six times the risk of hypertension, while weight loss in normotensive patients reduces BP and the risk of acquiring SAH throughout life.

According to Lima (2015), stressors and psychological factors, such as nervousness and stress, may be one of the causes for individuals to have uncontrolled BP. For Chiara (2015), the knowledge about the disease presented by the individual with SAH has been associated with a better control of BP levels. Similarly, the higher level of knowledge about SAH has been associated with a better adherence to multiprofessional treatment. Therefore, the lack of knowledge about hypertension may be one of the causes of high and uncontrolled BP levels.

According to information from the Surveillance System for Risk Factors and Protection for Chronic Diseases by Telephone Inquiry (Vigitel) for the year 2013, the prevalence of SAH reported in adults in the Brazilian capitals and the Federal District was 24.1%, with higher prevalences at the age group above 65 years and among individuals with lower schooling. Regarding the treatment of hypertension, the estimate is that only 3 million (7%) are being treated, which is very little, and that the percentage of control is between 25 and 30%. It is worth noting, however, that these data certainly reflect a social stratum compatible with better medical care and purchasing power to maintain the regular use of antihypertensive medication (Andrade *et al*., 2015). According to Filho (2015), this fact accounts for 54% of stroke deaths and 47% for ischemic heart disease. This reality demonstrates that effective, safe and goal-focused treatment is essential, leading to an improvement in the prognosis of hypertensive patients by reducing cardiovascular brain events. The problem of adherence to the treatment of hypertension is complex because several factors are involved, such as: patient (gender, age, ethnicity, marital status, education and socioeconomic level); Associated diseases; Beliefs, cultural and life habits (problem, experience with the illness, family context, self-esteem); awareness Treatment (cost, quality of life, undesirable effects); Health policy, waiting for care, access, distance) and relationship with the family health team (involvement and inappropriate relationship). Therefore, adherence to the multidisciplinary treatment of hypertension depends on these factors (Santos *et al*., 2005). The uncontrolled SAH is associated with many complications of high morbidity and mortality, such as stroke and AMI. According to Lessa (2006), the impact of uncontrolled SAH is measured by the costs of complications, considering the prevalence of hypertension, the incidence of acute complications, and hospital admissions of events caused by uncontrolled hypertension. According to the study by Barreto (2014), the non-adherence to the treatment of hypertension, as well as the late diagnosis and the prolonged and asymptomatic course of the disease, is described as one of the main triggers of hypertension, Of individuals with hypertension develop cardiovascular brain events. In view of the above, it is extremely important that professionals should know how individuals belonging to the group of uncontrolled SAH and asymptomatic individuals perceive disease and therapeutics. It is important that professionals know how to create strategies for health promotion and prevention, so that through these strategies, guidance is given to individuals with SAH, asymptomatic patients and those with family history, and as a consequence, to reduce the high level of any SAH.

Conclusion

Considering the results obtained with this research, we conclude that hypertensive individuals who do not controlled BP had more cardiovascular brain events and hospitalizations, compared to hypertensive individuals who have BP control. Individuals who did not control had a much worse health compared to those who had control. Despite this, there was no relationship between lifestyle and episodes of cardiovascular brain events. We suggest similar research for the study of the relationship of lifestyle with the index of cardiovascular brain events in patients without BP control.

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