Prevalence and factors associated with the cooperation of arterial hypertension patients

Prevalência e fatores associados a cooperação do paciente portador de hipertensão arterial

Marília Gabrielle Santos Nunes[1]
Amanda Rosineide da Silva [1]
Amanda de Oliveira Bernardino[1]
Bruno de Luna Oliveira[1]
Augusto César Barreto Neto[1]

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Public health nursing; Hypertension; Education, nursing; Patient compliance; Patient acceptance of health care

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Abstract

Objective: To analyze the prevalence and factors associated with the cooperation of arterial hypertension patients in primary health care.

Methods: Cross-sectional study that included 458 hypertensive patients, randomly selected among primary care users. The study variables were socioeconomic, demographic and clinical and the research instruments used were validated. The logistic regression model was used for multivariate statistical analysis.

Results: The prevalence rates found for patient cooperation corresponded to 26.6%, 16.6% and 85.6% on the Morisky-Green, Batalla and Haynes-Sackett tests, respectively. The adjusted logistic regression analysis showed economic class and smoking as the independent predictors of hypertensive patients' cooperation.

Conclusion: The prevalence of treatment adherence varied according to the assessment instrument used. The factors associated with treatment adherence were: high socioeconomic class, living with a partner and being eutrophic.

Resumo

Objetivo: Analisar a prevalência e os fatores associados a cooperação do paciente portador de hipertensão arterial na atenção primária.

Métodos: Estudo transversal que incluiu com 458 hipertensos selecionados aleatoriamente entre os usuários na assistência primária. As variáveis de estudo foram socioeconômicas, demográficas e clínicas e os instrumentos de pesquisa utilizados eram validados. Foi utilizado o modelo de regressão logística para análise estatística multivariada.

Resultados: As prevalências encontradas para cooperação do paciente foram 26,6%, 16,6% e 85,6% para os testes de *Morisky-Green*, *Batalla* e *Haynes-Sackett*, respectivamente. Análise de regressão logística ajustada mostrou classe econômica e fumo como os preditores independentes para a cooperação do paciente portador de hipertensão arterial.

Conclusão: A prevalência de adesão ao tratamento variou de acordo com o instrumento de avaliação utilizado. Os fatores associados à adesão ao tratamento foram: classe socioeconômica elevada, morar com companheiro e ser eutrófico.

Corresponding author
Marília Gabrielle Santos Nunes
Alto do Reservatório street, unnumbered, Vitória de Santo Antão, PE, Brazil. Zip Code: 55608-680
marilia_gabrielle170@hotmail.com

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[1]Universidade Federal de Pernambuco, Vitória de Santo Antão, PE, Brazil.

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Introduction

Systemic arterial hypertension is a chronic multifactorial phenomenon characterized by the presence of high tension levels, associated with metabolic and hormonal alterations and trophic phenomena, which consist in cardiac and vascular hypertrophy. Mortality due to cardiovascular disease increases progressively with the rise in blood pressure levels as from 115/75mmHg, in a linear, continuous and independent manner.[1]

Understanding the burden of hypertension as a preventable disease and the associated risk factors through the active search of the population is the first step to plan all effective prevention programs. The hypertension programs intend to reduce the prevalence of the hypertensive disease; increase the population's knowledge level about the importance of blood pressure control; guarantee the access to primary health care services and medication for hypertensive patients; and encourage community-based programs.[2] A study undertaken in China proved that the prevalence of hypertension also increases when the age advances. The prevalence in Chinese patients aged 60 years or older corresponds to 59.4%, while the prevalence of Chinese hypertensive people aged 75 years equals 72.8%. This means a growing social and economic burden in that country.[3]

Given the high prevalence and high complication rates, various factors have shown to be associated with the disease control, such as lack of knowledge and awareness on different aspects of hypertension, undiagnosed hypertension and inappropriate or insufficient medication. In addition, most hypertensive patients believe that this disease is not severe, and that the medication should only be taken when the hypertensive symptoms appear.[4]

Although most diagnoses of systemic arterial hypertension are only reached in patients of advanced age, different studies indicate that the disease starts in childhood or adolescence. High blood pressure in childhood commonly leads to hypertension in adult life, consequently representing the main cause of premature death around the world.[5]

Treatment adherence is defined as "the extent to which the patient follows the instructions given for the prescribed treatments", and is essential for the success of the treatment. In that sense, adherence to anti-hypertensive treatment is fundamental to control the risk factors and, without these factors, the disease can result in more complex problems. Non-adherence is identified as the main cause of uncontrolled blood pressure, representing a significant risk of cardiovascular events.[6]

The burden of cardiovascular diseases adds up to 17 million deaths per year, that is, almost one third of all deaths. Among these, complications due to hypertension correspond to 9.4 million deaths around the world each year.[7] The prevalence of hypertension is almost the same among men and women. Afro-American women show one of the highest hypertension rates around the world: around 44%. Among hypertensive adults, approximately 80% are aware of their condition, 71% are taking anti-hypertensive medication and only 48% of hypertensive patients have their disease under control.[8] Knowing the detection rate, treatment and control of hypertension is essential to outline promotion and prevention strategies at all levels.[9]

The nurses should incorporate specific competences for delivering health promotion care to arterial hypertension patients. The development and elaboration of strategies aimed at hypertension patients are still scarce. Nurses play a fundamental role in care for these users, as the interventions to promote and control the disease are fundamental for the purpose of treatment, preventing complications and acting to improve the patients' quality of life.[10]

Therefore, the objective in this study was to analyze the prevalence and factors associated with the adherence to arterial hypertension treatment among the users registered in the Hiperdia Program at Primary Health Care Units.

Methods

A cross-sectional study was undertaken between October 2013 and March 2014.

The population eligible for this study consisted of male and female arterial hypertension patients registered in the Primary Care Information System (Arterial Hypertension Control Program), coming from the urban and rural areas of Vitória de Santo Antão, in the state of Pernambuco, in the Northeast of Brazil. Patients with mental illnesses (as reported by families or self-reported), physical conditions (physical impairment that impeded the anthropometric assessment), clinical diseases (systemic lupus erythematosus, diabetes and Aids) and pregnancy (self-reported) were excluded from the sample.

To estimate the sample size, the software SampleXS (Brixton Health, Brixton, UKI2, United Kingdom) was used, which adopts the formula: n = A/(E*E+(A/N)), in which n corresponds to the sample size; A=3.8416PQW, P is the percentage prevalence of the population; Q=(100–P); E is the maximum error of the acceptable sample; w corresponds to the probable design effect; N is the population size. Therefore, the following criteria were adopted: (a) target population of 10,088 hypertensive patients (defined by the city's Secretary of Health)); (b) adherence prevalence corresponding to 51%; (c) 95% confidence interval; (d) 5% sampling error and (e) study design effect equal to 1. The minimum sample size was set at 391 hypertensive patients (adding 10% for possible losses, n=435 users). In this study, 8 users refused to participate in the research and, after the collection, the final sample consisted of 457 analyzed users.

With a view to imprinting the proportionality needed in a stratified sample, the samples were organized by proportional sharing for each Primary Health Care Unit and randomly selected by means of a random drawing table, created in the software Randomizer (Social Psychology Network Association, Middletown, Connecticut, United States). The data were collected by means of a questionnaire applied to the hypertensive patients, mainly based on adherence to the pharmacological and non-pharmacological treatment of arterial hypertension, and focusing on the activities developed in the Hiperdia Program.

The users' adherence was assessed by means of three standardized tests: Batalla, Haynes-Sackett and Morisky-Green.[11-13] The Batalla test consists of three questions and measures the adherence through the users' knowledge about their disease. Differently, the Morisky-Green test consists of four questions and measures adherence through the user's attitudes towards medication use. Both tests consider users as adherent if the correctly answer all questions. In the Haynes-Sackett test, the users self-report their treatment adherence by means of one question, whose affirmative response classifies the individual as non-adherent. As a clinical outcome, the blood pressure was measured, considering anyone with a systolic blood pressure ≥140mmHg and diastolic blood pressure of 90mmHg as non-adherent.

The data were processed in the software Excel and analyzed with the help of the software Statistical Package for the Social Sciences, version 17.0. (SPSS Inc., Chicago, Illinois, United States).

In the description of the proportions, the binomial distribution approached the normal distribution with a 95% confidence interval. When comparing the proportions, the Mantel-Haenszel test and Pearson's chi-square or linear trend test were used.

The multivariate analysis was used to estimate the independent contribution of each variable to the chance of adhering to the hypertension treatment. To construct the model, the bivariate analysis variables were tested with 20% probabilities. Therefore, binary logistic regression was employed using the backward method. For the sake of interpretation, the type I error limit was up to 5% ($p \leq 0.05$).

The study developed complied with the Brazilian and international standards for ethics in research involving human beings.

Results

All users answered the three research instruments. The prevalence rates found for adherence to the antihypertensive treatment were 26.6%, 16.6% and 85.6% for the Morisky-Green, Batalla and Haynes-Sackett tests, respectively.

In table 1, it was verified that most of the users who adhered to the treatment had concluded their primary education, showing significance with p=0.03. When asked about whether they added salt to their food, most of the interviewees who adhered to the treatment answered that they did not use to add additional salt to the dish (p=0.010). As regards physical exercise, most of the interviewees who adhered to the treatment answered that they were active (p≤0.001).

Table 2 shows an association between the interviewees in economic class E and treatment adherence (p<0.001). In addition, a statistically significant association was observed between the hypertensive patients who adhered and who lived with partners and between the hypertensive patients who adhered and who lived with relatives (p=0.020), and also among the hypertensive patients who had taken Primary Education (p=0.010). Most interviewees manifested obesity when assessed through the body mass index and waist circumference, showing an association with adherence to anti-hypertensive treatment (p<0.050)

In the multivariate analysis of the logistic regression in combination with the Morisky-Green test (Table 3), economic class (odds ratio 3.574; 95% confidence interval between 1.012-12.624) and smoking (odds ratio 0.427; 95% confidence interval between 0.161-1.134) were maintained as independent risk factors for adherence to arterial hypertension treatment. The independent risk factors for adherence to arterial hypertension treatment were economic class (odds ratio 0.055; 95% confidence interval between 0.013-0.230), marital situation (odds ratio 2.454; 95% confidence interval between 1.184-5.088) and body mass index (odds ratio 4.118; 95% confidence interval 2.088-8.120).

Table 1. Socioeconomic and behavioral variables and anthropometric parameters according to the Morisky-Green test (MGT)

Variables	MGT		PR (95%CI)	p-value*
	With adherence 122 n(%)	Without adherence 335 n(%)		
Sex			1.29(0.91-1.82)	0.157
Male	29(32.6)	60(67.42)		
Female	93(25.2)	276(74.8)		
Race			1.25(0.91-1.72)	0.164
White	40(31.2)	88(68.8)		
Non White	82(24.8)	248(75.2)		
Residence			1.09(0.74-1.62)	0.641
Urban	99(27.1)	266(72.9)		
Rural	23(24.7)	70(75.3)		
Social classes**				
B/C	40(26.3)	112(73.7)	1	-
D	77(26.2)	217(73.8)	1.00(0.72-1.39)	0.977
E	4(36.4)	7(63.6)	0.72(0.31-1.65)	0.469
Marital status				
Alone	12(21.8)	43(78.2)	1	-
With partner	19(20.7)	73(79.3)	1.05(0.55-2.0)	0.867
With relatives	91(29.3)	220(70.7)	0.74(0.43-1.26)	0.258
Education				
Illiterate	68(31.1)	151(68.9)	1	-
Primary Education	44(22.1)	155(77.9)	1.40 (1.01-1.94)	0.039
Secondary and Higher Education	10(25)	30(75.0)	1.24 (0.70-2.20)	0.443
Alcohol consumption			1.02 (0.61-1.70)	0.920
Yes	12(27.3)	32(72.7)		
No	110(26.6)	304(73.4)		
Use of cigarettes			1.44(0.90-2.28)	0.143
Yes	13(37.1)	22(62.9)		
No	109(25.8)	314(74.2)		
Use of salt				
Normal	36(25.7)	104(74.3)	1	-
Little	85(27.7)	222(72.3)	0.92(0.66-1.29)	0.663
Salted	1(9.1)	10(90.9)	2.82(0.42-18.72)	0.218
Salt shaker on the table			1.37(0.93-2.03)	0.123
Yes	20(35.1)	37(65.0)		
No	102(25.4)	299(74.6)		
Addition of salt to food			0.66 (0.47-0.93)	0.014
Yes	36(20.3)	141(79.7)		
No	86(30.7)	194(69.3)		
BMI			1.19(0.87-1.63)	0.265
Obesity	73(28.5)	183(71.5)		
No obesity	48(23.9)	153(76.1)		
CC***			1.18(0.86-1.63)	0.295
Eutrophic	40(30.1)	93 (69.9)		
Abdominal obesity abdominal	82(25.3)	242 (74.7)		
CP****			1.00(0.61-1.64)	0.992
Eutrophic	13(26.5)	36(73.5)		
Overweight	108(26.5)	300(73.5)		
Blood pressure			1.02(0.75-1.40)	0.865
Normal	49(27.1)	132(72.9)		
Hypertensive	73(26.4)	204(73.6)		
Physical exercise			0.55 (0.40-0.75)	<0.001
Active	84(23.0)	282(77.0)		
Insufficiently active	38(41.3)	54(58.7)		

*Pearson's Chi-square test; ** classification criterion of Brazilian Association for Population Studies; ***I ≥ P85 for overweight; II ≥ P_{90} for obesity; III ≥ 0.5 for obesity; ****CP>35.5cm for male; CP>32cm for female. PR - Prevalence Ratio; 95%CI - 95% confidence interval; BMI - body mass index; CC - arm circumference; CP - neck circumference

Table 2. Socioeconomic, behavioral variables and anthropometric parameters according to Haynes-Sackett test

Variables	Haynes-Sackett test		PR(95%CI)	p-value*
	Adherence 392	No adherence 66		
	n(%)	n(%)		
Sex			0.93(0.83-1.03)	0.160
Male	72(80.9)	17(19.1)		
Female	320(86.7)	49(13.3)		
Race			1.01(0.93-1.10)	0.668
White	111(86.7)	17(11.3)		
Non White	281(85.2)	49(14.8)		
Residence			0.97(0.89-1.06)	0.643
Urban	311(85.2)	54(14.8)		
Rural	81(87.1)	12(12.9)		
Social classes**				
B/C	138(90.8)	14(9.2)	1	-
D	249(84.7)	45(15.3)	1.07(0.99-1.14)	0.072
E	4(36.4)	7(63.6)	2.49(1.14-5.46)	0.000
Marital status				
Alone	41(74.5)	14(25.5)	1	-
With partner	82(89.1)	10(10.9)	0.83(0.70-0.99)	0.021
With relatives	269(86.5)	42(13.5)	0.86(0.73-1.01)	0.023
Education				
Illiterate	178(81.3)	41(18.7)	1	-
Primary Education	178(89.4)	21(10.6)	0.90(0.83-0.98)	0.019
Secondary and Higher Education	36(90.0)	4(10.0)	0.90(0.79-1.01)	0.181
Alcohol consumption			1.03(0.92-1.16)	0.545
Yes	39(88.6)	5(11.4)		
No	353(85.3)	61(14.7)		
Use of cigarettes			1.07(0.96-1.19)	0.306
Yes	32(91.4)	3(8.6)		
No	360(85.1)	63(14.9)		
Use of salt				
Normal	121(86.4)	19(13.6)	1	-
Little	262(85.3)	45(14.7)	1.01(0.93-1.09)	0.761
Salted	9(81.8)	2(18.2)	1.05(0.79-1.40)	0.671
Salt shaker on the table			0.86(0.77-0.96)	0.385
Yes	45(86.5)	7(13.5)		
No	5(100)	0(0)		
Addition of salt to food			0.98(0.91-1.06)	0.694
Yes	150(84.7)	27(15.3)		
No	241(86.1)	39(13.9)		
BMI			0.84(0.78-0.91)	0.000
Obesity	203(79.3)	53(20.7)		
No obesity	188(93.5)	13(6.5)	0.87(0.78-0.96)	0.001
CC***				
Eutrophic	103(77.4)	30(22.6)		
Abdominal obesity abdominal	288(88.9)	36(11.1)		
CP****			0.79(0.65-0.95)	0.000
Eutrophic	34(69.4)	15(30.6)		
Overweight	357(87.5)	51(12.5)		
Blood pressure			1.02(0.94-1.10)	0.571
Normal	157(86.7)	24(13.3)		
Hypertensive	235(84.8)	42(15.2)		
Physical exercise			1.06(0.95-1.18)	0.214
Active	317(86.6)	49(13.4)		
Insufficiently active	75(81.5)	17(18.5)		

* Pearson's chi-square test; ** classification criterion of Brazilian Association for Population Studies; *** I ≥ P_{85} for overweight; II ≥ P_{90} for obesity; III ≥0.5 for obesity; **** CP>35.5cm for male; CP>32cm for female. PR - Prevalence Ratio; 95%CI - 95% confidence interval; BMI - body mass index; CC - arm circumference; CP - neck circumference

Table 3. Independent predictors for the cooperation of arterial hypertension patients through the Morisky-Green and Haynes-Sackett tests, according to the multivariate analysis of the logistic regression

Risk factors	Final model		
	Adjusted OD*	95%CI	p-value**
Morisky-Green			
Economic class ABEP			<0.05
B/C	1	Ref	
D	1.807	[1.121-2.912]	
E	3.574	[1.012-12.624]	
Smoking			0.088
Yes	1		
No	0.427	[0.161-1.134]	
Haynes-Sackett			
Economic class ABEP			
B/C	1		
D	0.726	[0.376-1.402]	0.340
E	0.055	[0.013-0.230]	<0.001
Marital situation			0.016
Alone	1		
With partner/relatives	2.454	[1.184-5.008]	
BMI			<0.001
Obese	1		
Normal	4.118	[2.088-8.120]	

*Model adjusted for the variables: salt us, adding salt to dish, marital situation, level of physical exercise, race, waist circumference measure, body mass index and sex; ** likelihood ratio for heterogeneous proportions. OD - odds ratio; 95%CI: 95% confidence interval; ABEP - Brazilian Association of Population Studies; Ref: reference category; BMI - Body Mass Index

Discussion

The study presented limitations that should be taken into account when interpreting the results. That is so because this is a cross-sectional study, in which cause and effect relations cannot be determined; the population was highly homogeneous from the ethnical viewpoint, although the sample was carefully selected to exclude the confounding factors in the analysis; the fact that the interviews were held at the homes demanded more time to collect them, causing operational difficulties to obtain the sample. Another limitation was the fact that the Batalla test in the multivariate logistic regression analysis model came out inconclusive, probably due to some inconsistency in the data.

The applicability of these study results related to the planning for the creation of new public policies linked to the Hiperdia program and aimed at attending to the conditions for adherence to arterial hypertension treatment in Primary Care.

Among the positive points in this study, the collection of anthropometric and blood pressure measures through direct instead of self-referred measuring can be highlighted, as well as the geographical range of this study, which was undertaken at all health services distant from the metropolitan region. Another point that should be considered is the sample size, which was sufficient to guarantee prevalence estimates and able to identify factors associated with treatment adherence, including the use of the odds ratio, which was made possible through the multivariate logistic regression analysis. The fact that three instruments were used to measure the adherence permitted assessing different aspects of the adherence.

When using the Morisky-Green test, the prevalence of adherence corresponded to only 26.6% of the users. A study undertaken in Poland in 2013 showed a similar result with an adherence level of 32.4%.[14] In another study of hypertensive users, higher treatment adherence scores were used: approximately 85.7% of the patients indicated they adhered to the treatment.[15] This test is frequently used, but some problems can emerge related to self-information, such as omission, memory lapses and breakdowns in the communication process.[16]

Batalla's test was used as a predictor of treatment adherence due to the strong correlation that exists between adherence and knowledge. In the verification of adherence through Batalla's test, 83.2% of the users were considered as non-adherent to the treatment. An adherence rate of 76.6% was found in a similar study.[17] Based on the assessment using the Haynes-Sackett test, the adherence rate was higher when compared to the Morisky-Green and Batalla tests, in line with earlier findings.[1]

The comparison of the three tests used showed a difference between non-adherence estimated by the Batalla and Morisky-Green tests on the one hand and Haynes-Sackett on the other. That is so because the first two are tests that measure adherence indirectly, through questions related to the users' knowledge or attitude, and the Haynes-Sackett test is a self-report of non-adherence, reducing the number of false cases of non-adherence. The low education level seemed to be related to non-adherence to the treatment,[18] which was not observed in this sample through the Morisky-Green test. The association between education and several other socioeconomic variables can explain this at least partially, which may have influenced this result.

The fact that the users do not add salt to their food is a factor that favors treatment adherence. Results from meta-analyses have demonstrated that reducing sodium has a small but significant effect on the blood pressure,[19] mainly in the elderly and in people with higher blood pressure levels.[20] A moderate reduction of salt in the diet is needed, as well as an increase in foods rich in potassium, not only as a first step in the treatment of hypertensive individuals, but also as a preventive measure to reduce the prevalence of arterial hypertension and its complications in the population.[21] The increase in the education level enhances the adherence to the hypertension treatment when Batalla's instrument is used. The education level has been appointed as the most important socioeconomic factor in the health condition, mainly in cardiovascular health.[22]

When comparing overweight with normal-weight individuals, the risk of developing hypertension increases by 180%. In that sense, the incentive to reduce the weight should be considered a priority, as even small weight losses can result in a significant drop in the blood pressure. In addition, an important relation exists with non-adherence to anti-hypertension treatment in overweight individuals. The prevalence of non-adherence was significantly higher in users with a body mass index and waist circumference that indicate obesity, in line with data from a similar study.[23]

Adherence difficulties and disinterest in the treatment increased when the family was not involved in daily care for the patient and when the relationship among family members was conflicting. When the family serves as a caregiver, however, a satisfactory response is perceived in the disease control, as proven by the Haynes-Sackett analysis in this sample and in earlier studies.[24,25]

In the multivariate analysis using the Morisky-Green test, it was verified that people with a low social class adhere to the treatment more when compared to people from high social classes. This is justified as the

Morisky-Green test can be interpreted as hardly related to the socioeconomic conditions, losing its sensitivity when compared to the Haynes-Sackett test.

Concerning the multivariate analysis using the Haynes-Sackett test, individuals from low social classes show lower levels of adherence to the treatment. In that sense, some studies support a prevalence of non-adherence to the anti-hypertension therapy that is strongly associated with users from lower social classes.[25,26]

As regards the marital status, the fact of living with the partner was identified as a risk factor for treatment adherence, as it was observed that hypertensive people who lived with someone showed a 145% increase in treatment adherence. In addition, in this study, being married or living with relatives was significant for treatment adherence in this study, as evidenced in the literature.[27] The same was also observed in Ethiopia, where married participants were twice as prone to adhere to anti-hypertensive medication than divorced participants.[28]

The association between arterial hypertension and obesity was proven in different studies.[29,30] In this sample, eutrophic people showed a 4.11 times higher probability of adhering to the treatment than obese participants. Obesity reduces the treatment adherence. This requires the adoption of measures offered as strategies that combine adherence, encouragement and orientations about the importance of physical exercise, and weight control, which are essential measure to reduce the pressure levels and, consequently, to promote health and reduce the incidence of cardiovascular events.[24]

Conclusion

The prevalence of treatment adherence varied according to the assessment instrument used. The predictive factors associated with treatment adherence were: high socioeconomic class, living with a partner and being eutrophic.

Collaborations

Bernardino AO and Oliveira BL declare that they contributed to the writing of the article, relevant critical review of the intellectual content and final approval of the version for publication. Nunes MGS; Silva AR; Barreto Neto AC contributed to the conception of the study, analysis, interpretation of the data, writing of the article, relevant critical review of the intellectual content and final approval of the version for publication.

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