

## Low adherence to medication therapy in systemic arterial hypertension: prevalence and associated factors in primary healthcare

### Baixa adesão terapêutica em hipertensão arterial sistêmica: prevalência e fatores associados na atenção básica à saúde

Larissa Tosta<sup>1</sup>, Luciana Ricarte Cavalcante<sup>2</sup>, João Pedro Azevedo Gonzaga Vieira<sup>3</sup>, Yasmin Pitanga Rode<sup>4</sup>, Andréa de Araújo Guimarães<sup>5</sup>, Luciara Leite Brito<sup>6</sup>, Helena Fraga-Maia<sup>7</sup>

<sup>1</sup>Autora para correspondência. Medical Institute of Integrated Management. Carlos Gomes Health Multicenter. Salvador, Bahia, Brazil. ORCID: 0000-0002-4291-9571. larissa\_tosta@hotmail.com

<sup>2</sup>Family Health Residency Program (FESF-SUS/FIOCRUZ). Salvador, Bahia, Brazil. ORCID: 0000-0001-7531-2584. lucianaricarte@gmail.com

<sup>3</sup>State University of Bahia. Salvador, Bahia, Brazil. ORCID: 0000-0003-3854-7522. jpagvieira@gmail.com

<sup>4</sup>State University of Bahia. Salvador, Bahia, Brazil. ORCID: 0000-0001-8396-7046. yasminprode@gmail.com

<sup>5</sup>State University of Bahia. Salvador, Bahia, Brazil. ORCID: 0000-0002-5275-6761. andreia.agfisio@gmail.com

<sup>6</sup>State University of Bahia. Salvador, Bahia, Brazil. ORCID: 0000-0002-9441-0523. luciara@ufba.br

<sup>7</sup>State University of Bahia. Salvador, Bahia, Brazil. ORCID: 0000-0002-2782-4910. helenafragamaia@gmail.com

**RESUMO | INTRODUÇÃO:** O abandono do tratamento pode ocorrer sem que os profissionais da Atenção Básica identifiquem os motivos para tais condutas concorrendo para o agravamento dos casos. **OBJETIVO:** Estimar a associação entre fatores sociodemográficos, culturais e de estilo de vida com a adesão terapêutica de hipertensos. **MÉTODOS:** Realizou-se um estudo transversal com usuários hipertensos que usavam medicação para controle dos níveis pressóricos e buscavam atendimento em unidades de atenção básica em um distrito sanitário da cidade do Salvador, Bahia. Foram incluídos os que tinham idade maior que 18 anos e excluídos os que tinham alteração cognitiva e também mulheres com hipertensão gestacional. A magnitude da associação entre as variáveis estudadas e a adesão terapêutica foi estimada pelo cálculo da razão de chances (Odds Ratio, OR), adotando-se o intervalo de confiança a 95% (IC95%). **RESULTADOS:** A amostra foi composta com 185 hipertensos e a prevalência de não adesão ao tratamento foi de 68,1%. Os fatores associados com a não adesão terapêutica foram situação conjugal solteiro, separado, viúvo (OR= 2,23; IC95% 1,04 – 4,47), não alteração dos hábitos alimentares (OR= 2,51; IC95% 1,12 – 5,59), assim como faltar às consultas (OR=4,20; IC95% 1,16 – 15,18) e entender bem tudo que é dito em uma consulta (OR=0,60; IC95% 0,38 – 0,95). **CONCLUSÕES:** Grande parte dos hipertensos não apresentou adesão terapêutica, e os fatores associados são passíveis de modificação por meio de tecnologias leves e investimentos na qualidade da atenção primária à saúde. Devem ser encorajados novos estudos com desenhos longitudinais que possam identificar as causas da não adesão.

**PALAVRAS-CHAVE:** Adesão ao tratamento medicamentoso. Hipertensão arterial sistêmica. Atenção primária à saúde. Fatores de risco.

**ABSTRACT | INTRODUCTION:** Abandonment of the treatment can occur without the professionals of the Primary Healthcare identifying the reasons for such behavior which can contribute towards the worsening of the condition. **OBJECTIVE:** To estimate the association between sociodemographic, cultural and lifestyle factors with adherence to medication therapy by hypertensive patients. **METHODS:** A cross-sectional study with hypertensive patients using medication for controlling blood pressure levels and being treated at primary healthcare units of a Health District of Salvador, Bahia. The patients included were of ages over 18 years and excluded those with cognitive impairment and also women with gestational hypertension. The dimension of the association between the studied variables and adherence to medication was estimated using the Odds Ratio (OR) adopting the Confidence Interval of 95% (CI95%). **RESULTS:** The sample was composed of 185 hypertensive patients and the prevalence of non-adherence to medication therapy were: marital status single, separated or widow(er) (OR= 2.23; CI95% 1.04 – 4.47), non-alteration to eating habits (OR= 2.51; CI95% 1.12 – 5.59), as well as missing appointments with the doctor (OR=4.20; CI95% 1.16 – 15.18) and clearly understanding what is said during the appointment (OR=0.60; CI95% 0.38 – 0.95). **CONCLUSIONS:** A large part of the hypertensive patients did not present adherence to medication therapy, and the associated factors are changeable through light technologies and investments in the quality of primary healthcare. New studies should be promoted with longitudinal designs to identify the causes for the non-adhesion.

**KEYWORDS:** Adherence to medication therapy. Systemic arterial hypertension. Primary health care. Risk factors.

## Introduction

Cardiovascular diseases (CVD) are responsible for a large number of admissions to hospitals generating, as consequences, severe disorders or even death<sup>1</sup>. Systemic Arterial Hypertension (SAH) affects various target-organs when not controlled, and prevalence in over 30% for the adult population of Brazil<sup>2</sup>. It is one of the main causes of death of individuals by cerebrovascular accidents (CVA) and Coronary Artery Disease (CAD) when associated with Diabetes Mellitus<sup>2,3</sup>. It is known that the most affected individuals are those of low income and schooling, male, single and black<sup>4</sup>.

SAH control depends on various factors, among which medication and non-medication factors<sup>5</sup>. In relation to medication, it has been reported that many users do not make the correct use of such medication<sup>6</sup>. Multidrug use may be a limiting factor for good adherence to medication therapy and, in this manner, the administration of one sole therapeutic dose is advised, as well as the elimination of organization barriers for access to the services and to medication<sup>5-7</sup>. Non-medication treatments depend on changes of lifestyles habits and consequently suffer the influence of aspects inherent to the subject and to the cultural factors of the population. Reduction in drinking and smoking, the practice of physical activities, an adequate diet and stress management are part of the treatment<sup>3,4</sup>.

Low adherence to medication therapy results in a public health issue, whereas the most susceptible are those in economically productive ages. Nevertheless, it should be observed that the transition of the Brazilian age structure, the increase in the age group of the elderly<sup>8</sup> and the concomitance of non-communicable diseases are included among these. Hori et al.<sup>9</sup>, reported that in developed countries, the non-adherence of patients with chronic diseases fluctuated around 50%, and this rate is even higher in countries under development.

Adherence to treatment (AT) is understood as being a degree of coincidence between what was prescribed by the health professional and the correct following of the treatment by users<sup>5</sup>. Researchers estimate that only one-third of the population of hypertensive patients have their blood pressure maintained within

desirable limits, which leads to questioning the users as to the recognition of the seriousness of the disease, acceptance as a chronic disease, adequate use of medication and barriers in relation to socioeconomic factors<sup>5,10</sup>.

The Family Health Units (FHU) and the Primary Healthcare Units (PHU), gateway for users in the National Health System, have the purpose of offering quality services for the diagnosis, conservative treatment and medication to patients with light and moderate hypertension<sup>11</sup>. Furthermore, they are also responsible for the health education and efforts to be performed in terms of promoting adherence to treatment and control of blood pressure levels<sup>11</sup>. Nevertheless, abandonment of the treatment and its interruption may occur without the professional identifying the reasons for such behavior, which can contribute towards the deterioration of the conditions and the need for referral to secondary healthcare<sup>12</sup>.

Accordingly, the knowledge of the local issues associated to low adherence to treatment could contribute both towards the reduction in morbidity and mortality, as well as to maintain the users within primary healthcare. Despite its importance, studies on this matter were not identified for the population under issue. Thus, the objective of this study was to evaluate the association between sociodemographic, cultural and lifestyle factors with adherence to medication therapy for hypertensive patients treated at healthcare units of a Health District.

## Materials and methods

A cross-sectional study performed with patients regularly assigned in FHU and PHU linked to the Cabula-Beiru Health District (CBHD), in the municipality of Salvador, Bahia, diagnosed with Systemic Arterial Hypertension. Patients over the age of eighteen in the mentioned units at the time of the research were included. Women with gestational hypertension and patients with cognitive impairment were excluded.

The size of the sample was calculated using the Open-Epi version 2 program (<http://www.openepi.com>).

The parameters used were: size of the population at the CBHD of 359,071, prevalence of the outcome of 24%, confidence limit of 5%, and design effect of 1, totaling 158 interviewees. The sample process adopted was consecutive and for convenience. It should be observed that the Cabula-Beiru Health District is an area with an expressive population with restricted opportunities of education, productive inclusion and social advancement. There is a large portion of the population without any kind of paid employment. Issues with urban violence and poor health are also commonly observed.

Primary data was collected by the researchers by means of the application of specific instruments and scales to evaluate non-adhesion to medication therapy. The period of data collection occurred from September 2015 to November 2016. Rooms were made available at all of the three units, objective of the research, for applying the data collection instruments and clinical information of the patients.

Among the clinical data, two measures of arterial blood pressure were performed by the same researcher, both on the left arm, respecting 5 minute interval between these, with a SOLIDOR® adult aneroid sphygmomanometer. For measuring weight, the individual should be wearing light clothes and barefoot, using WISO® Ultraslim W801 digital scales with 100 grams precision, adopting the measure in kilograms. Waist and hip circumference was measured using a SECA® anthropometric tape, in meters. Finally, to measure the height of the users a MD® compact stadiometer was used, of milimetric precision and in meters. With the purpose of minimizing measurement bias, training workshops were performed for data collection on blood pressure, as well as for anthropometric data with all of the researchers. To evaluate the degree of agreement among the researchers the Kappa Index was used and the value obtained at the end of the training was of 0.79, indicating substantial agreement.

The investigation form was prepared by the authors of the study, containing structured questions. In relation to sociodemographic variables, age in full years and gender were asked. Skin color was defined by the interviewer and classified in accordance with the IBGE, but for the purpose of

analysis the information was collapsed into white and black/brown. Marital status was assessed considering the existence or absence of a partner. Schooling was defined in accordance with years of study, and categorized as less than eight years and greater or equal to eight years. Family income was categorized in less than two and equal or greater than two minimum wages, which at the time of data collection was equal to R\$ 880.00. With reference to occupational activity, it was verified at the time of the data collection whether the user informed having or not a paid employment. Religion investigated in accordance on how faith was professed by the user and categorized as catholic, evangelical/protestant, spiritualist, candomblé/umbanda, no religion and others. For the purpose of analysis, these were collapsed into catholic and other religions.

In relation to clinical data, the time of treatment for SAH in years was registered. The existence of the diagnosis for concomitant Diabetes Mellitus (DM) was questioned. And, with reference to the treatment and self-care and how much medication for blood pressure control, which were categorized as equal to 3 and greater than 3. Regarding the use of the healthcare services it was registered whether the user turned up or not to the scheduled appointments. And, upon investigation of the communication processes and the perception of the guidance for self-care, the clear understanding of the information received was considered as dichotomous variables.

AT was investigated through the application of the Morisky-Green Test with four items (MGT), these being: 1) Do you sometimes have problems remembering to take your medication?; 2) Do you sometimes neglect to take your medication?; 3) Do you stop taking the medication when you feel better?, and finally, 4) Sometimes, if you feel worse when you take the medication, do you stop taking it? The individuals were then classified as adherent, moderately adherent and non-adherent, whereby the latter two were collapsed for the purpose of analysis as non-adherent.

The data bank was prepared using the Excel for Windows® (V. 7.0) program and analyzed using the statistical analysis program Stata® (V.10.0), where corrections were made to data input with the objective of eliminating possible errors or inconsistencies.

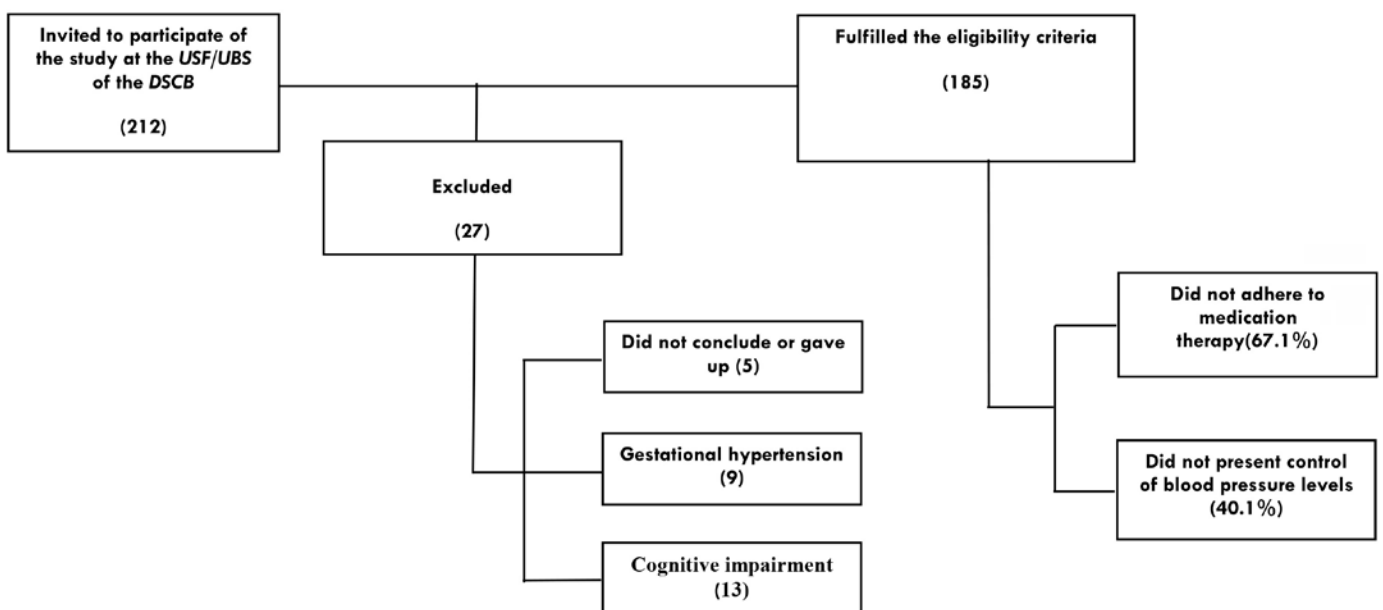
Bivariate analyses were performed with the purpose of identifying the range and variables that were mostly associated to low adherence to therapy. The magnitude of the association between the studied variables and adherence to medication therapy was estimated through the calculation of the odds ratio (OR), adopting the confidence interval of 95% (CI95%) as a measure of precision. Subsequently, multivariate analyses were carried out using logistic regression, from a theoretical model defined a priori, detailing the risk factors in hierarchical blocks.

The strategy used for entering each block of variables was the backward type (retrograde process), having incorporated all the variables and subsequently, in phases, eliminated those with lesser partial statistic value. The variables demonstrating levels of statistical significance remained in the model, according to  $p < 0.10$ .

The research Project was approved by Plataforma Brasil/ CAAE nr 09656012.0.0000.0057. All those invited to take part in the study signed the Written Informed Consent Form.

Out of the 212 individuals present at the healthcare units of the Cabula-Beiru Health District, 185 met the eligibility criteria and were invited to take part in the study. Predominance was observed of the female gender (82.7%), age group below 60 years (53.5%) and skin color black/brown (94.0%). Schooling level was referred by the majority as being below 8 years (63.8%), and the most frequent marital status of the population was of single or without partner (55.1%). In relation to employment there was a higher frequency of inactive people (73.5%). For family income the predominance was for up to one minimum wage (63.2%). A higher prevalence of non-adherence to the treatment for SAH was verified in individuals of the female gender (62.5%) when compared to the male gender (37.5%), single, separate or widow(er)s in relation to married (73.5%), individuals of skin color white (61.5%) in relation to black/brown, individuals who were employed (77.5%) in relation to those without employment (64.7%). It should be observed that there was no association of statistical significance between non-adherence to medication therapy and sociodemographic variables (Table 1). The non-control of blood pressure observed in the population was of 34.0% and the frequency of non-adherence to medication therapy was of 68.1% (data not tabulated).

Figure 1. Flowchart of the selection and composition of the population of the study with hypertensive patients treated at primary healthcare units of the Cabula-Beiru Health District, Salvador, Bahia, 2016. (n=185)



**Table 1.** Prevalence of non-adherence to medication therapy in accordance with the social characteristics of hypertensive patients treated at primary healthcare units of the Cabula-Beiru Health District, Salvador, Bahia, 2016

Variables	n=185	%	Prevalence of non-adherence to medication therapy(%)	p* value
<b>Gender</b>				
Male	32	17.3	37.5	0.454
Female	153	82.7	62.5	
<b>Age (years)</b>				
24 – 60	99	53.5	69.7	0.619
> 60	86	46.5	66.3	
<b>Marital status</b>				
Married or common-law marriage	83	44.9	61.5	0.079
Single, separated, widow(er)	102	55.1	73.5	
<b>Skin color</b>				
White	11	6.0	81.8	0.314
Black/brown	174	94.0	67.4	
<b>Schooling (in years)</b>				
> 8	67	36.2	73.1	0.269
0 – 8	118	63.8	65.3	
<b>Income</b>				
≥ 2 – 3	68	36.8	69.1	0.822
< 2	117	63.2	67.5	
<b>Employed</b>				
No	136	73.5	64.7	0.098
Yes	49	26.5	77.5	
<b>Religion</b>				
Catholic	103	55.7	65.1	0.317
Protestant / other	82	44.3	71.9	

Table 2 includes data on the prevalence of non-adherence to therapy in accordance with the lifestyle and clinical characteristics and those relative to the assistance to hypertensive patients. The hypertensive patients were, largely, non-smokers (94.0%), and did not have the habit of consuming alcoholic beverages, (78.9%). Regarding the presence at scheduled medical appointments 78.9% of the users mentioned having been to appointments during a period of less than six months, and 87.0% declared not to have missed any appointments. With reference to comorbidities, it was observed that 27.6% presented concomitant Diabetes Mellitus. In relation to the availability of medication at the healthcare units, 54.6% of the users mentioned not being able to obtain all the medications for the treatment. With reference to the communication processes, understanding clearly what is said during the appointments was referred by 69.7% of the patients. A significantly higher

prevalence was identified for non-adherence to the treatment of SAH for individuals using more than three medications (100.0%) when compared to those using three or less medications (64.5%). Despite not having identified statistically significant association of the other variables of lifestyle, clinics and of assistance with the prevalence of non-adhesion to the treatment of SAH, greater differences were verified in the prevalence among smokers (81.8%) and non-smokers (67.2%), patients that mentioned having the habit of missing medical appointments (83.3%) in relation to those not having the habit of missing the appointments (65.8%), the patient understanding everything that is said during the appointment (72.1%). In relation to the variable of change in the consumption of fruit, greens and cereals, the prevalence of non-adherence to medication therapy was of 73.3% and this variable was demonstrated to be associated in a statistically significant manner (p=0.012) to non-adherence to medication therapy.

**Table 2.** Prevalence of non-adherence to medication therapy in accordance with the lifestyle and clinical

Variables	n=185	%	Prevalence of non-adherence to medication therapy(%)	p* value
<b>Smokers</b>				
No	174	94.0	67.2	
Yes	11	6.0	81.8	0.314
<b>Regular use of alcoholic beverages</b>				
No	146	78.9	67.8	
Yes	39	21.1	69.2	0.866
<b>Addition of salt to prepared food</b>				
No	113	61.1	65.5	
Yes	72	38.9	72.2	0.338
<b>Last medical appointment to care for SAH (months)</b>				
≤ 6 months	146	78.9	69.2	
> 6 months	39	21.1	64.1	0.546
<b>Do you often miss your appointments</b>				
No	161	87.0	65.8	
Yes	24	13.0	83.3	0.086
<b>Concomitant Diabetes Mellitus</b>				
No	134	72.4	70.9	
Yes	51	27.6	60.1	0.187
<b>Quantity of medication in use</b>				
≤ 3	166	89.7	64.5	
> 3	19	10.3	100.0	<b>0.002</b>
<b>Are you able to get all your medications (UBS/USF)</b>				
Yes	84	45.4	64.3	
No	101	54.6	71.3	0.309
<b>Do you clearly understand what is said during your appointments with the doctor</b>				
Yes	129	69.7	72.1	
No	56	30.3	58.9	0.78

In Table 3 the association between non-adhesion to medication therapy and social, lifestyle and clinical characteristics as well as those related to the assistance to hypertensive patients is described, in order to classify these as risk or protection factors. Among the patients assessed, being single, separated or widow(er) (OR=2.23; CI95%: 1.04 – 4.47), not having changes in eating habits for fruit, greens and cereals (OR= 2.51; CI95%: 1.12 – 5.59) and the habit of missing appointments (OR= 4.20; CI95%: 1.16 – 15.18) were associated positively in a significant manner to non-adhesion to medication therapy. On the other hand, understanding clearly all that is said during the appointments (OR= 0.60; CI95%: 0.38 – 0.95) and having concomitant Diabetes Mellitus (OR=0.41; CI95%: 0.17 – 1.01) were protection factors associated significantly to non-adhesion to medication therapy.

**Table 3.** Association between non-adhesion to medication therapy and social, lifestyle and clinical characteristics and those related to the assistance to hypertensive patients treated at the primary healthcare units of the Cabula-Beiru Health District, Salvador, Bahia, 2016. (n=185)

Variables	Gross OR (CI95%)	Adjusted OR (CI95%)	p value
<b>Gender</b> (Female)	0.73 (0.33 – 1.63)	0.61 (0.22 – 1.67)	0.340
<b>Age (years)</b> (24 – 60)	1.17 (0.62 – 2.17)	1.12 (0.49 – 2.58)	0.776
<b>Marital status</b> (Single, separated, widow)	1.74 (0.93 – 3.25)	2.23 (1.04 – 4.47)	<b>0.038</b>
<b>Skin color</b> (Black/brown)	0.45 (0.95 – 2.18)	0.32 (0.55 – 1.88)	0.194
<b>Schooling (in years)</b> (> 8)	0.68 (0.35 – 1.33)	0.67 (0.29 -1.55)	0.358
<b>Family income (minimum wage)</b> (≥ 2 – 3)	0.92 (0.48 – 1.76)	0.60 (0.26 – 1.37)	0.230
<b>Employed</b> (Yes)	1.88 (0.88 – 4.01)	1.90 (0.75 – 4.81)	0.172
<b>Religion</b> (Protestant/other)	1.37 (0.73 – 2.58)	1.51 (0.72 – 3.17)	0.272
<b>Smoker</b> (Yes)	2.19 (0.45 – 10.48)	2.88 (0.48 - 17.99)	0.247
<b>Adequate consumption of fruit, greens and vegetables</b> (No)	2.34 (1.19- 4.59)	2.51 (1.12 – 5.59)	<b>0.024</b>
<b>Regular use of alcoholic beverages</b> (Yes)	1.06 (0.49 – 2.29)	0.60 (0.21 – 1.65)	0.324
<b>Addition of salt to prepared food</b> (Yes)	1.37 (0.71 – 2.61)	1.28 (0.61 – 2.71)	0.508
<b>Last medical appointment to care for SAH (months)</b> (>6)	1.37 (0.74 – 2.56)	0.69 (0.28 – 1.67)	0.414
<b>Do you often miss medical appointments</b> (Yes)	2.59 (0.84 – 7.96)	4.20 (1.16 – 15.18)	<b>0.028</b>
<b>Concomitant Diabetes Mellitus</b> (Yes)	0.63 (0.32 – 1.24)	0.41 (0.17 – 1.01)	0.053
<b>Quantity of medication in use</b> (> 3)	1.09 (0.58 – 2.04)	1.13 (0.49 – 2.63)	0.763
<b>Are you able to get all your medications (UBS/USF)</b> (No)	1.37 (0.74 – 2.56)	1.54 (0.74 – 3.21)	0.244
<b>Do you clearly understand what is said during your appointments with the doctor</b> (Yes)	0.55 (0.28 – 1.07)	0.60 (0.38 – 0.95)	<b>0.033</b>

Table 4 presents the final model in the multivariate logistic regression. Non-adhesion to medication therapy was demonstrated to be associated to the factors of not altering eating habits related to the adequate consumption of fruit, greens and cereals (OR=2.50; CI95%: 1.21 – 5.19); presenting concomitant Diabetes Mellitus (OR=0.46; CI 95%: 0.22 – 0.98), and clearly understanding all that is said during the medical appointments (OR=0.65; CI95%: 0.43 – 0.99). Gender and age remained in the model for adjustment.

**Table 4.** Final model of factors associated to the non-adhesion to medication therapy of hypertensive patients treated at primary healthcare units in the Cabula-Beiru health District, Salvador, Bahia, 2016. (n=185)

Variables	Gross OR (CI95%)	Adjusted OR * (CI95%)	p value
<b>Adequate consumption of fruit, greens and vegetables</b>			
Yes	1.00		
No	2.34 (1.19-4.59)	2.50 (1.21 – 5.19)	<b>0.014</b>
<b>Concomitant Diabetes Mellitus</b>			
No	1.00	1.00	
Yes	0.63 (0.32 – 1.24)	0.46 (0.22 – 0.98)	<b>0.045</b>
<b>Do you clearly understand what is said during your appointments with the doctor</b>			
No	1.00	1	
Yes	0.55 (0.28 – 1.07)	0.65 (0.43 – 0.99)	<b>0.047</b>

\* Adjusted by gender and age.

## Discussion

In the present study, non-adhesion to therapy by hypertensive patients treated at units of the CBHD was high. Such findings corroborate those of de Martins et al.<sup>13</sup> that, upon evaluation of the hypertensive patients registered in a FHU of the city of Montes Claros, MG, identified 70.7% of non-adhesion to medication treatment. Similar results were also obtained by Nunes et al.<sup>14</sup> who interviewed 458 individuals in a rural and urban zone of Vitória de Santo Antão, PE. These researchers obtained a frequency of 73.4%. The high prevalence found for non-adhesion to therapy may be justified by the profile of the studied population. It was observed that the interviewed users had multiple risk factors, these being related to the social condition, environmental factors and to the inadequate use of medication therapy which influenced the control of blood pressure levels.

It is estimated that, in general, less than 80% of the population with indication for anti-hypertensive treatment follow the recommendations for the use of the medication as indicated by their doctors<sup>15</sup>. The cooperation of the hypertensive patient in relation to the medication and non-medication therapies may be even further affected by the presence of comorbidities and due to not clearly understanding all that is said during the medical appointments.

Scientific evidences reiterate that the presence of comorbidities enhances AT and determine higher commitment of the patient with the therapeutic regimen<sup>6,16</sup>. These changes in behavior could mean increased frequency to the medical appointments and imply in the clarification as to the risks involved with the association of morbid disorders. In the present study, having concomitant DM was a factor associated to improved adhesion to therapy, corroborating the results of the above mentioned studies. Nevertheless, different results are also observed in literature. Loyola Filho et al.<sup>17</sup>, for example, emphasized that the association of pathologies may require the use of more medication, which could negatively affect adhesion to therapy. Pierin et al.<sup>18</sup>, emphasized that the commitment to the treatment is lower when complex therapeutic regimens are prescribed that can lead to forgetting to administrate the medication and involve socioeconomic factors.

Amongst the communication processes, clearly understanding all that is said during an appointment is related to the practice of the professionals. In the present study, these processes were demonstrated as protection factors for the non-adhesion to therapy and may be influenced by the professional-patient interaction. It is possible to suppose that the interrelations between health professionals and users of the CBHD units were demonstrated to be



satisfactory and it was also possible to verify the formation of bonds among these social actors, which could contribute towards the process of following through the therapeutic regimen. In a similar manner, but inversely, Rêgo et al.<sup>19</sup> and Souza et al.<sup>20</sup>, despite using another method for evaluating therapeutic adherence considered the non-compliance with recommendations as a risk factor. These authors emphasized that in these cases, the necessary recommendations may not have been transmitted in accessible language, or be influenced by the lack of functional literacy on health by part of the patients. Thus, they may not have given due importance to the recommendations received.

It was possible to observe in the present study that the interviewed parties, in their majority, did not change their diets in the sense of eating adequately fruit, greens and cereals and this factor was associated with the non-adhesion to medication therapy. Similar results were obtained by Szwarcwald et al.<sup>21</sup> in accordance with the National Health Research. These researchers found that, despite the users having received information as to the need for adopting healthy habits, they consumed fruit and vegetables in lower quantities than recommended, expressing a barrier against change in lifestyle. It is perceived that altering eating habits can be influenced by the guidance of health professionals. Giroto et al.<sup>15</sup>, suggested alternative explanations for this phenomenon and among these being that the patients give greater emphasis to the restriction to sodium and fat. For the users of the CBHD, a possible explanation for not consuming adequate amounts of fruit, greens and cereals would be the price of these, often referred by the patients as an important factor, as well as their own cultural traditions.

Low schooling levels also influence, in effect, not only healthcare, but may also affect the answers given in response to questions in queries about health. Barreto et al.<sup>22</sup>, as in this present study, reaffirm this finding and classify illiteracy as a risk factor for non-adhesion to therapy. These researchers mention that individuals with low schooling levels have less conditions of processing the information on the disease. They can present less understanding of existing complications, of the medical prescriptions and, thus, do not carry out preventive measures to

control their health conditions. In a different manner, Silva et al.<sup>23</sup>, found associations between the reduction of blood pressure levels and low schooling and justified such evidence by the possibility of the medical recommendations being accepted better by individuals with a lower degree of information, when compared to those with more instruction. Nevertheless, it is necessary to consider also that the less educated have more difficulty in requesting more clarification when they have doubts about the treatment.

With reference to skin color, it is known that individuals with black skin color are more prone to developing SAH, either due to genetic factors or to environmental factors<sup>3</sup>. In the city of Salvador, Bahia, around 80% of the population is black and evidences point out that this population also has lower schooling levels and lower income. These factors, jointly, affect also the choice of food that could contain a higher content of sodium. Furthermore, black people are also more sensitive to sodium<sup>4</sup> and, therefore, face more difficulties with the evolution of SAH. Usually, they need more medication to control blood pressure levels. However, in this study, statistically significant association between skin color and adhesion to therapy was not found, probably due to the homogeneity of the interviewed population as to this aspect.

The use of the Morisky-Green Test (MGT) of four items was demonstrated as being a commonly used resource, with low cost and easy application, independently of schooling levels<sup>18</sup>. Other advantages that can be pointed out were the partnership established with the Municipal Health Department and the collaboration of the managers of the health units that comprehensively enabled data collection. The realization of the pilot study for the calibration of the instrument and training of the interviewers can also be highlighted as strong points of the study. Among the limitations it is possible to include difficulties for establishing comparisons considering that there are many forms of classifying non-adhesion to therapy. Another limitation is the fact that it was not possible to evaluate the adequacy of the medical prescription for each patient and whether it determines or not the desired pressure control.

## Conclusion

The results evidenced a high prevalence of non-adhesion to medication treatment and that the presence of DM, the low level of understanding as to what is explained during the medical appointments and the permanence of inadequate eating habits were factors associated to non-adherence. Such results reinforce the need for the FHU and PHU professional to foster a bond of the users with the units through health education groups and, in this manner, make the treatment more straightforward for adhesion to therapy. New studies with longitudinal designs that may identify prognostic factors for non-adhesion should be encouraged.

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## Author contributions

Study conception and design: Fraga-Maia H, Tosta LS, Cavalcante LR; Statistical analysis and manuscript writing: FRAGA-MAIA H, TOSTA LS, Cavalcante LR, Brito LL, Vieira JPAG, Rode YP, Guimarães AA. Data collection: Fraga-Maia H, Tosta LS, Cavalcante LR, Vieira JPAG, Rode YP, Guimarães AA; Data analysis and interpretation: Fraga-Maia H, Tosta LS, Cavalcante LR, Brito LL, Vieira JPAG, Rode YP, Guimarães AA; Obtaining financing: Fraga-Maia H; Critical review of the manuscript regarding important intellectual content: Fraga-Maia H, Tosta LS, Cavalcante LR, Brito LL.

## Competing interests

No financial, legal or political competing interests with third parties (government, commercial, private foundation, etc.) were disclosed for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.).

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