Adherence to anti-hypertensive treatment within a chronic disease management program: A longitudinal, retrospective study*

ORIGINAL ARTICLE

ADESÃO AO TRATAMENTO DE HIPERTENSOS EM UM PROGRAMA DE GESTÃO DE DOENÇAS CRÔNICAS: ESTUDO LONGITUDINAL RETROSPECTIVO

ADHESIÓN AL TRATAMIENTO DE HIPERTENSOS EN UN PROGRAMA DE GESTIÓN DE ENFERMEDADES CRÓNICAS: ESTUDIO LONGITUDINAL RETROSPECTIVO

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ABSTRACT
Objective: This study assessed pharmacological treatment adherence using the Morisky-Green Test and identified related variables. **Method**: A longitudinal and retrospective study examined 283 patients with hypertension (62.5% women, 73.4 [10.9] years old) who were being monitored by a chronic disease management program for 17 months between 2011 and 2012. Nurses performed all the actions of the program, which consisted of advice via telephone and periodic home visits based on the risk stratification of the patients. **Results**: A significant increase in treatment adherence (25.1% vs. 85.5%) and a decrease in blood pressure were observed ($p < 0.05$). Patients with hypertension and chronic renal failure as well as those treated using angiotensin-converting enzyme inhibitors were the most adherent ($p < 0.05$). Patients with hypertension who received angiotensin receptor blockers were less adherent ($p < 0.05$). **Conclusions**: Strategies such as nurse-performed chronic disease management can increase adherence to anti-hypertensive treatment and therefore contribute to the control of blood pressure, minimizing the morbidity profiles of patients with hypertension.

RESUMO
Objetivo: Avaliar a adesão ao tratamento medicamentoso por meio do Teste de Morisky-Green e identificar as variáveis relacionadas. **Método**: Estudo longitudinal e retrospectivo. Foram estudados 283 hipertensos (62,5% mulheres, 73,4 (10,9) anos), os quais foram seguidos por um programa de gestão de doenças crônicas durante 17 meses, nos anos 2011 e 2012. Todas as ações do programa foram realizadas por enfermeiras e consistiram em orientações por contatos telefônicos e visitas domiciliares, com periocidade de acordo com a estratificação de risco dos clientes. **Resultados**: Verificou-se aumento significativo ($p < 0,05$) na adesão ao tratamento (25,1% vs 85,5%) e diminuição na pressão arterial. Foram mais aderentes ao tratamento ($p < 0,05$) os hipertensos com insuficiência renal crônica e aqueles sob o tratamento com Inibidores da Enzima Conversora de Angiotensina. Os hipertensos que usavam Bloqueadores dos Receptores de Angiotensina foram menos aderentes ($p < 0,05$). **Conclusão**: Considera-se que estratégias como o gerenciamento de doenças crônicas, realizado por enfermeiros, possam aumentar a adesão de hipertensos ao tratamento e dessa forma contribuir para o controle dos níveis tensionais, minimizando o perfil de morbimortalidade dessas pessoas.

RESUMEN
Objetivo: Evaluar la adhesión al tratamiento medicamentoso por medio de la Prueba de Morisky-Green e identificar las variables relacionadas. **Método**: Estudio longitudinal y retrospectivo. Fueron estudiados a 283 hipertensos (62,5% mujeres, 73,4 (10,9) años), quienes fueron seguidos por un programa de gestión de enfermedades crónicas durante 17 meses, los años 2011 y 2012. Todas las acciones del programa las llevaron a cabo enfermeras y consistieron en orientaciones por contactos telefónicos y visitas domiciliarias, con periodicidad según la estratificación de riesgo de los clientes. **Resultados**: Se verificó un incremento significativo ($p < 0,05$) en la adhesión al tratamiento (25,1% vs 85,5%) y disminución en la presión arterial. Fueron más adherentes al tratamiento ($p < 0,05$) los hipertensos con insuficiencia renal crónica y aquellos bajo el tratamiento con Inhibidores de la Enzima Convertidora de Angiotensina. Los hipertensos que usaban Bloqueadores de los Receptores de Angiotensina fueron menos adherentes ($p < 0,05$). **Conclusión**: Se considera que estrategias como la gestión de enfermedades crónicas, realizada por enfermeros, puedan aumentar la adhesión de hipertensos al tratamiento y, de esa manera, contribuir para el control de los niveles tensionales, minimizando el perfil de morbimortalidad de dichas personas.

DESCRIPTORS
Hypertension
Medication adherence
Nursing care
Chronic disease
Treatment outcome

DESCRITORES
Hipertensão
Adesão à medicação
Cuidados de enfermagem
Doença crônica
Resultado do tratamento

DESCRIPTORES
Hipertensión
Cumplimiento de la medicación
Atención de enfermería
Enfermedad crónica
Resultado del tratamiento

INTRODUCTION

Over the last decade, cardiovascular diseases, especially ischemic heart disease (myocardial infarction), stroke, hypertension, and congestive heart failure have become the major causes of mortality worldwide, accounting for approximately 30% of all deaths and comprising up to 50% of the mortality cases classified as chronic non-communicable diseases. These diseases cause 17 million deaths worldwide each year[1].

Hypertension is recognized as a major current public health problem[2]. A quantitative systematic review composed of 44 studies across 35 countries published between 2003 and 2008 revealed overall hypertension rates of 37.8% and 32.1% in men and women, respectively[3]. No study has characterized the prevalence of this disease in Brazil. Population-based studies conducted over the last decade in various Brazilian cities have indicated differences in the prevalence of hypertension such as in Luzerna (Santa Catarina)[4] with 14.7%; Sinop (Mato Grosso)[5] with 23.2%; Salvador (Bahia)[6] with 29.9%; São Paulo (São Paulo)[7] with 32%; Goiânia (Goiás)[8] with 36.4%; and Campo Grande (Mato Grosso do Sul)[9] with 41.4%. A meta-analysis and systematic literature review estimated a 68% prevalence of hypertension among the elderly in Brazil[10].

In addition to the high prevalence of hypertension, the unsatisfactory control of hypertension is an issue that is directly related (in most cases) to treatment adherence. Treatment adherence can be considered *the degree of compliance with the therapeutic measures indicated, whether medicinal or not, with the aim of keeping blood pressure at normal levels*[11].

The levels of adherence to the treatment of hypertension oscillate at approximately 30%[12]. The major factors that likely affect patient adherence to treatment are related to 1) patient characteristics such as age, gender, marital status, religion, lifestyle, cultural aspects, and health beliefs; 2) disease characteristics such as chronicity and deleterious long-term effects; 3) pharmacological treatment aspects such as the undesirable effects of medications and complex dosages; 4) institutional aspects; and 5) the relationship between the patient and the healthcare team members. With regard to the latter, the inclusion of healthcare team members such as the nurse tends to favor treatment adherence[13]. Importantly, telephone contact also positively affects chronic disease treatment adherence[14].

To be able to achieve and maintain controlled blood pressure levels, patients with hypertension often require constant encouragement with regard to lifestyle changes and treatment adjustments. Therefore, it is important to direct programs and health policies to treat hypertension.

Chronic disease management models are one of the proposed solutions to increase treatment adherence. This new model of care began in American hospitals in the 1980s, when Medicare (i.e., American public health insurance) provided strong incentives to hospitals to shorten the length of hospital stay[15]. In clinical practice, chronic disease management is defined as an organized, proactive, and patient-centered approach involving groups of people with a specific disease (or subpopulations with specific risk factors). Care is focused and integrated on the whole person, considering the spectrum of the disease and its complications, and aimed at preventing comorbidities. Essential components include identifying the population as well as implementing clinical practice guidelines and other tools for decision making[16].

Thus, the current study assessed adherence to pharmacological therapy and identified related variables among a group of patients with hypertension enrolled in a chronic disease management program.

METHOD

This longitudinal and retrospective study used a quantitative approach to investigate patients with hypertension who participated in a chronic disease management program for 17 months between 2011 and 2012. The study was conducted at the Department of Chronic Disease Management of a private institution in São Paulo, Brazil, that was contracted by health insurance companies. Nurses performed the program by systematically guiding patients with hypertension using telephone contact and home visits.

After admission to the program, a risk stratification was conducted based on the number of comorbidities, hospitalizations, and the presence of diseases such as cancer, heart failure, urinary incontinence, coronary artery disease, osteoporosis, or kidney failure. The predictive score for hospitalization ranged from 0 to 100, and higher scores denoted greater risk. Thus, Statuses 1 through 5 corresponded to ≥40%, ≥30%, ≥20%, ≥10%, and <10% possibilities of hospitalization, respectively. After patient classification, the following approach timeline was established: Status 1 - extreme risk, telephone contact at least every 10 days with quarterly home visits; Status 2 - high-risk, telephone contact between 10 and 21 days with quarterly home visits; Status 3 - moderate risk, telephone contact between 15 and 30 days with quarterly home visits; Status 4 - low-risk, telephone contact between 30 and 60 days without pre-scheduled home visits; and Status 5 - self-care, telephone contact at least every 90 days without home visits.

An action plan established by the nurse who made first contact with the patient directed the telephone guidance. The actions were established in accordance with the priorities identified for each patient and recorded on an electronic medical record worksheet. Actions were scored with stars from one to five; more stars denoted higher priorities for the action to be im-

plemented. In addition to this visual method, the nurse was also able to assign a specific date for the action to be executed. At the end of each telephone call, the next call would be scheduled. In addition, approximately 100 brochures that described the program's course-work were created. Depending on what was worked on with the patient, at least one brochure would be sent to consolidate the information provided by the nurse after each call. The major subjects covered in the brochure centered on the issue of hypertension as a chronic disease; drug and non-drug treatments; risk factors including obesity, the excessive intake of salt and fats, smoking, physical inactivity, alcohol consumption, and stress; and the importance of regular blood pressure measurements and receiving regular physical examinations. After the home visits, the nurses updated the patient data in the electronic medical records. During the home visits, assessments of blood pressure, blood glucose, weight, height, and waist circumference were performed; in addition, annotations regarding the results from the laboratory tests performed on patients were made. The guidelines listed in the action plan were also reinforced on these occasions.

The inclusion criteria for this study were a diagnosis of hypertension and classified as Status 2 or 3. The exclusion criteria were the presence of a neurological disease or a dependency on others that hindered direct communication. An a priori sample size calculation was not conducted because all patients who followed the criteria participated in the study (see Figure 1). All participants were monitored from January 2011 (the inclusion date in the program) to the early second half of 2012.
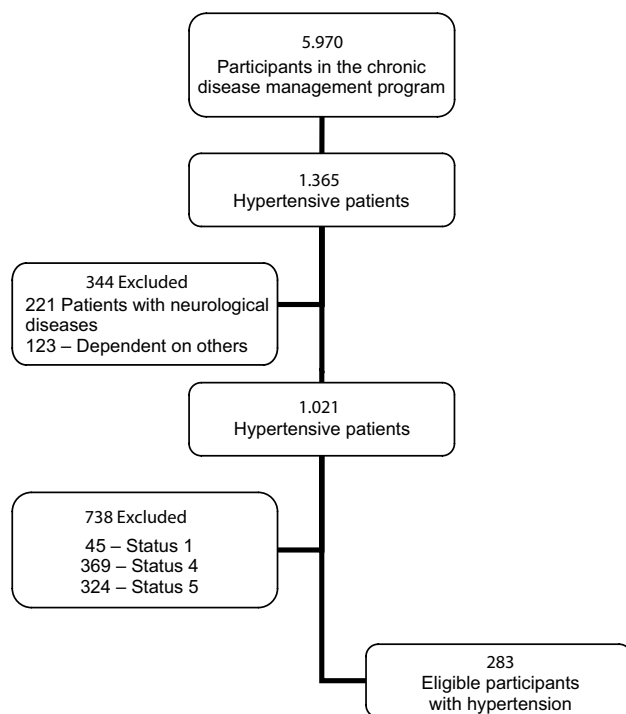

Figure 1 – Flowchart of the inclusion of patients with hypertension

The data for this study were collected from the notes made on the patients' electronic medical records. Thus, patients reported data concerning blood pressure, weight, and height via telephone. Data concerning habits and lifestyles such as smoking, alcohol consumption, and physical activity were assessed using dichotomous responses (yes and no) to the following questions: *Do you currently smoke?*; *Do you drink alcoholic beverages?*; and *Do you perform regular physical activity?* Body mass index (BMI; weight [kg]/height2 [m]) was classified using the World Health Organization (WHO) categories[17] as normal (18.5-24.9), overweight (25-29.9), or obese (≥30). Systolic blood pressures less than 140 mmHg and diastolic blood pressures less than 90 mmHg were considered controlled [2].

To assess pharmacological treatment adherence, the Morisky-Green test, which is widely used and validated in our setting, was used[18]. This instrument consists of four dichotomous (yes/no) questions. Treatment adherence was met when all of the responses to the following questions were negative: *Do you ever forget to take your medicine?; Are you careless at times about taking your medicine? When you feel better do you sometimes stop take the medicine, do you taking it? Sometimes if you feel worse when you take the medicine, do you stop taking it?*

The results of this study were divided into five periods that represent the data analyzed over the corresponding five quarters when patients with hypertension were monitored. These data are related to the information obtained from the telephone interviews. The data analysis did not distinguish between patients with hypertension classified as Status 2 or 3. Statistical analyses were performed at a significance level of $p < 0.05$. The relationship between variables was assessed using the chi-square test and Fisher's exact test, and means were compared with Student's t-test. The Research Ethics Committee approved this study under no. 07792512.3.0000.5392; the Research Ethics Committee of the medical institution where the data were collected performed approved this study under no. 01/2013.

RESULTS

The data from this study indicate that most of the patients with hypertension who participated in a chronic disease management program were females (62.5%) in their 70s (mean=73.4 [10.9 years]); 89% were older than 60 years. Regarding habits and lifestyles, only 3.5% reported smoking and 10.2% reported consuming alcohol at enrollment; however, the presence of inactivity was significant (96.8%). With regard to the biometric parameters, BMI was within the normal range in approximately one third (30.8%) of the patients; the others were overweight or obese, and the mean weight was in the overweight range (i.e., 27.7 [4.9] kg/m2). Slightly over 10% of the patients had grade

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II (7.1%) or morbid (2.1%) obesity. Although mean blood pressure was within the normal range (128.8 (11.4)/78.9 (7.8) mmHg), 37.6% of the patients with hypertension had blood pressure levels above the recommended limits (≥140/90 mmHg); of these, approximately half had isolated systolic hypertension (Table 1).

Table 1 - The biometric parameters and lifestyles of hypertensive patients at admission to the chronic disease management program, São Paulo, SP, 2013.

Variables	Hypertensive patients	
	N	%
Gender		
Female	177	62.5
Male	106	37.5
Smoke		
Yes	10	3.5
Alcohol consumption		
Yes	29	10.2
Sedentary		
Yes	274	96.8
BMI (kg/m²)		
<18.5	3	1.1
18,5 – 24.9	82	30.8
25 – 29.9	97	36.5
30 – 34.9	59	22.2
35 – 39.9	19	7.1
>40	6	2.3
Mean BMI (sd) in kg/m²	27.7 (4.9)	
Age group in years		
≤ 40	2	0.7
41 - 50	8	2.8
51 - 60	21	7.4
61 - 70	73	25.8
71 - 80	100	35.3
> 80	79	27.9
Mean age (sd) in years	73.4 (10.9)	
Blood pressure systolic/diastolic, mmHg		
Optimal (<120/80)	34	13
Normal (<130/85)	104	39.8
Borderline (130-139/85-89)	25	9.6
Stage 1 (140-159/90-99)	24	9.2
Stage 2 (160-179/100-109)	13	5
Stage 3 (> 180/110)	11	4.2
Isolated Systolic >140/<90	50	19.2
Mean blood pressure (sd), systolic/ diastolic, mmHg	128.8 (11.4)/78.9 (7.8)	

The clinical characterization of patients with hypertension revealed that type 2 diabetes was the most prevalent comorbidity (77%). Approximately 56.5% of patients had at least one type of heart disease; dyslipidemia (27.9%) and renal failure (18.7%) were less commonly observed. With regard to the pharmacological classes of anti-hypertensive medications, 55.1% of patients reported using angiotensin receptor blockers, and 52.7% reported using diuretics. The use of beta-blockers (38.2%), calcium

channel blockers (27.6%), and angiotensin-converting enzyme inhibitors (17.0%) was also recorded. The use of hypolipemic agents was also significant, including statins (53.4%). The evaluation of drug treatment adherence using the Morisky-Green test at admission revealed that only 25.1% of patients with hypertension adhered to the anti-hypertensive treatment, and 37.6% did not control their blood pressure (Table 2). With regard to the number of anti-hypertensive drugs used, 27.9% reported using only one medication, whereas 43.1% used two or three medications. Surprisingly, 6% of patients with hypertension reported not using any anti-hypertensives.

Table 2 - Comorbidities, drug treatment, blood pressure control, and treatment adherence among hypertensive patients at admission to a chronic disease management program, São Paulo, SP, 2013.

Variables	Hypertensive patients	
	N	%
Comorbidades		
Type 2 diabetes	218	77.0
Heart failure	105	37.1
Dyslipidemia	79	27.9
Chronic renal failure	53	18.7
Coronary artery disease	38	13.4
Stroke	30	10.6
Myocardial infarction	17	6.0
Type 1 diabetes	10	3.5
Medications		
Angiotensin receptor blockers	156	55.1
Statins	151	53.4
Diuretics	149	52.7
Beta-blockers	108	38.2
Hypoglycemic agents	105	37.1
Calcium channel blockers	78	27.6
Angiotensin-converting enzyme inhibitors	48	17.0
Insulins	29	10.3
Antiarrhythmics	22	7.8
Central adrenergic agonists	4	1.4
Adherence to medication (Morisky-Green test)		
Yes	71	25.1
No	212	74.9
Controlled blood pressure		
Yes	163	62.4
No	98	37.6

The drug treatment adherence of hypertensive patients (as assessed by the Morisky-Green test) showed a significant change across the follow-up periods ($p<0.05$). An increase was observed beginning at period 2 that persisted across periods 3, 4, and 5. The initial treatment adherence index was 25.1%, and it increased to 85.5% at the end of the assessment. A significant decrease in blood pressure ($p<0.05$), both systolic and diastolic, was observed between period 1 and periods 4 and 5 (Table 3).

Table 3 - Drug treatment adherence and blood pressure values among hypertensive patients across the five evaluation periods at a chronic disease management program, São Paulo, SP, 2013.

Variables	Evaluation periods									
	1		2		3		4		5	
	N	%	N	%	N	%	N	%	N	%
Drug treatment adherence										
Yes	71	25.1	150	53	184	65	209	73.9	242	85.5
No	212	74.9	133	47	99	35	74	26.1	41	14.5
p-valvue*			0.00		0.00		0.00		0.00	
Mean blood pressure (sd) mmHg										
Systolic	128.8 (11.4)		128.2 (11.9)		127.8 (11.90)		126.1 (10.9)		125.1 (11.6)	
p-value			0.61		0.23		0.02		0	
Diastolic	78.9 (7.8)		79.7 (9.4)		78.5 (7.3)		77.3 (7.0)		77.2 (8.0)	
p-value §			0.11		0.95		0.03		0.05	

* p-value at period 1 vs. periods 2, 3, 4 and 5 § p-value at period 1 vs. periods 4 and 5
Note: Data analyzed using the chi-square test

The drug treatment adherence of hypertensive patients (as assessed by the Morisky-Green test) showed a significant change across the follow-up periods ($p<0.05$). An increase was observed beginning at period 2 that persisted across periods 3, 4, and 5. The initial treatment adherence index was 25.1%, and it increased to 85.5% at the end of the assessment. A significant decrease in blood pressure ($p<0.05$), both systolic and diastolic, was observed between period 1 and periods 4 and 5 (Table 3).

A significant association was observed between drug treatment adherence at period 5 and the use of angiotensin-converting enzyme inhibitors; specifically, patients with hypertension who used this medication were adherent ($p<0.05$, 18.6% vs. 3.3%). In contrast, those treated with angiotensin receptor blockers tended not to adhere to treatment ($p<0.05$, 53.0% vs. 73.3%). No associations were observed between the other anti-hypertensive medications and treatment adherence. In addition, patients with hypertension and chronic renal failure were more adherent than those who did not have this comorbidity ($p<0.05$, 20.6% vs. 3.3%). Other comorbidities were not associated with treatment adherence (Table 4).

Table 4 - Drug treatment adherence relative to the comorbidities of and the anti-hypertensives used by hypertensive patients enrolled in a chronic disease management program, São Paulo, SP, 2013.

Variables s	Drug treatment adherence						p-valvue
	Yes		No		Total		
	N	%	N	%	N	%	
Anti-hypertensives Drug							
Angiotensin receptor blockers							
Yes	134	53.0	22	73.3	156	55.1	0.03
No	119	47.0	8	26.7	127	44.9	
Diuretics							
Yes	133	52.6	16	53.3	149	52.7	0.23
No		47.4	14	46.7	134	47.3	
Beta-blockers							
Yes	96	37.9	12	40.0	108	38.2	0.83
No	157	62.1	18	60.0	175	61.8	
Channel calcium blockers							
Yes	70	27.7	8	26.7	78	27.6	0.91
No	183	72.3	22	73.3	205	72.4	
Angiotensin-converting enzyme inhibitors							
Yes	47	18.6	1	3.3	48	17	0.03
No	206	81.4	29	96.7	235	83	
Comorbidades							
Type 2 diabetes							
Yes	193	76.3	25	83.3	218	77	0.38
No	60	23.7	5	16.7	65	23	
Heart disease							
Yes	116	45.8	14	46.7	130	45.9	0.54
No	137	54.2	16	53.3	153	54.1	

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Variables s	Drug treatment adherence						p-valvue
	Yes		No		Total		
	N	%	N	%	N	%	
Chronic renal failure							
Yes	52	20.6	1	3.3	53	18.7	0.02
No	201	79.4	29	96.7	230	81.3	
Stroke							
Yes	25	9.9	5	16.7	30	10.6	0.34
No	228	90.1	25	83.3	253	89.4	
Dyslipidemia							
Yes	69	27.3	10	33.3	79	27.9	0.48
No	184	72.7	20	66.7	204	72.1	

Note: Data analyzed using Fisher's exact test

DISCUSSION

The major finding of this study is the marked increase ($p < 0.05$) in drug treatment adherence, as assessed by the Morisky-Green test, throughout the evaluation period among patients with hypertension in a chronic disease management program. The Morisky-Green test is designed to identify and evaluate the problems and barriers to appropriate adherence. This test can be used initially as a diagnostic tool to assess adherence behaviors and the level of compliance with drug treatment. An important feature of the Morisky-Green test is its ability to identify problems associated with attitudes and behaviors as well as the consequent use of appropriate measures to address them. The adherence rate in the current study increased approximately 60% (i.e., from 25.1% at admission to 85.5% during the last evaluation period). This observation was positively reflected in the blood pressure measurements, which showed evident decreases.

Evaluating adherence to chronic disease treatments, such as those for hypertension, is not an easy or simple task. Several factors affect the adherence process such as gender; age; socioeconomic status; the disease itself, including its chronicity, the absence of specific symptoms, and the presence of late complications; aspects of the treatment such as undesirable medication side effects and complex regimens; and institutional aspects such as access to health services and the relationship between the patient with hypertension and the healthcare team[12]. Although no significant associations were observed between adherence and either gender or treatment, the fact that most of the participants were female septuagenarians might have increased their adherence levels to the drug treatment. Studies have revealed that adherence levels tend to be greater after 60 years of age[19,20]. Aging and the greater involvement in healthcare issues of patients with hypertension might lead to greater treatment adherence and improve disease control. Women seem to have more accurate perceptions of their health conditions and develop deeper relationships with healthcare services as a result of their attributes and reproductive functions.

Anti-hypertensive drug characteristics such as undesirable side effects, life-long treatments, and regimens involving various medications might also affect the adherence process. The current study revealed a positive association between medication adherence and the use of angiotensin-converting enzyme inhibitors; however, the opposite pattern was observed with regard to the use of angiotensin receptor blockers. Angiotensin II (AT1) receptor blockers (ARB II) antagonize the action of AT1 by specifically blocking its receptors. These medications are indicated to treat hypertension, especially among populations at high cardiovascular risk or with comorbidities and promote the reduction of cardiovascular morbidity and mortality[21,22]. A meta-analysis found that patients with hypertension who use angiotensin-converting enzyme inhibitors were 30% less likely to adhere than those who use angiotensin receptor blockers[23]. A likely explanation for this finding is the extensive use of angiotensin receptor blockers among the patients with hypertension studied (55.1%); in fact, it was the most frequently used medication. Another explanation is the number of medications used by the patients: 66% reported using more than two anti-hypertensive drugs, and the number of prescribed medications is the most important factor that hinders treatment adherence in a complex treatment regimen. In addition, the significant presence of comorbidities that require treatments with specific medications is noteworthy.

Another finding that deserves attention is that patients with hypertension and chronic renal failure were clearly more adherent to the drug treatment. This finding might be explained by the greater severity of their conditions, which resulted in more intensive healthcare. Hypertension can be controlled with drug and non-drug treatments. However, deleterious effects (e.g., the deterioration of renal function) can occur with injury to target organs when the disease is not properly treated and

blood pressure is not decreased to desirable levels[24]. A more aggressive blood pressure reduction is indicated for patients with hypertension and impaired renal function; the treatment of hypertension should aim for a blood pressure of 130/80 mmHg[2]. A 15-year follow-up cohort study of patients with hypertension showed a decreased risk of renal failure with a reduction in systolic blood pressure after establishing an anti-hypertensive treatment[25]. Thus, the relationship between higher treatment adherence among patients with chronic renal failure can be explained by their need to maintain optimal blood pressure levels to slow the degeneration produced by this pathology.

Strikingly, despite the increased treatment adherence observed during the follow-up assessment of patients with hypertension, blood pressure measurement remained controlled in approximately 60% of patients. However, this value can be considered reasonable compared with the findings in the literature. In a recent systematic review of population-based studies conducted in Brazil, the highest blood pressure control index (57.6%) was obtained in a multicenter study of 100 Brazilian municipalities, where the lowest percentage (approximately 10%) was observed[26]. The VI Brazilian Guidelines on Hypertension indicate that the average control of hypertension in this country is only 19.2%. In general, however, these levels oscillate at approximately 30%[2].

The education for individuals with chronic diseases such as hypertension is intended to influence their behaviors to change their lifestyles and adhere to treatment. The educational objectives are helping them to understand, acknowledge, and accept the disease; knowing and recognizing risk behaviors; informing them about treatment decisions and diagnoses; negotiating and complying with treatment proposals; and facing problems with treatment maintenance. The challenge of hypertensive treatment adherence requires the involvement and participation of the patient and the healthcare team, especially the nurses and their staff. To achieve and maintain controlled blood pressure levels, constant stimuli that might contribute to lifestyle changes and medication adjustments are required. Patients with hypertension should be observed at regular intervals to control and maintain their blood pressure levels over the long term. The primary reason for the inadequate control of hypertension appears to be patients' non-compliance with long-term treatments, both through changes in lifestyle and adhering to medication regimes. Thus, chronic disease management proposals directly affect these factors, and studies have recognized the beneficial effects of these strategies[27,28]. The ease of access to the target population via telephone is also important given the mobile phone system and technological advances in the field. A clinical trial conducted in Brazil compared two groups of patients with hypertension and showed that those who received telephone calls had lower treatment dropout rates (p<0.05)[14].

Currently, therapeutic, pharmacological, and non-pharmacological measures exist to effectively treat hypertension. However, unsatisfactory disease control rates are associated with these measures, leading hypertensive patients to have problems arising from complications. This lack of control is directly related to the lack of treatment adherence. Adherence, in turn, is composed of a series of factors that are strongly related to the risk factors for hypertension itself. In the individual risk stratification of patients with hypertension, the search for variables beyond those specified in consensus statements and guidelines are an important prerequisite to recognize strategies that facilitate the desired treatment adherence, adequately control the disease, and prevent treatment attrition. Poor treatment adherence is a problem that must be faced by hypertensive individuals, families, communities, institutions, and healthcare teams. Public healthcare policies should be directed at all of these parties; however, special attention should be provided to patients with the uncontrolled hypertension who should be provided with special promotion, prevention, and control strategies to minimize or prevent complications.

Study limitations

The major limitation of the current study is its design: An observational study cannot evaluate the relationship between cause and effect. Although changes occurred in the variables over time, the absence of a control group does not allow these changes to be related to the intervention applied. Another limiting factor was the data collection from electronic medical records. Some data, such as those from laboratory tests, were absent from the records, which hampered the analysis of certain variables. Many records did not contain sufficient information during the analyzed period. However, the lack of data cannot be attributed to the absence of notes from the nurses or to a lack of knowledge regarding the participants' data.

CONCLUSION

The chronic disease management strategy, with the participation of nurses working to guide patients with hypertension via the telephone, might have increased adherence to their medication therapy. The adoption of strategies aimed at changing the morbidity and mortality of diseases such as hypertension should be a goal for all levels of healthcare. The importance of a nurse for patients with hypertension is undeniable, especially with regard to treatment adherence, which often requires major changes in lifestyle that are revealed over the medium or long term. Therefore, maintaining relationships through the chronic disease management programs that remain incipient in Brazil should be encouraged.

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REFERENCES

1. Goulart FAA; Organização Pan-Americana da Saúde; Organização Mundial da Saúde. Doenças crônicas não transmissíveis: estratégias de controle e desafios para os sistemas de saúde. Brasília: Ministério da Saúde; 2011.

2. Sociedade Brasileira de Cardiologia; Sociedade Brasileira de Hipertensão; Sociedade Brasileira de Nefrologia. VI Diretrizes Brasileiras de Hipertensão Arterial. Arq Bras Cardiol. 2010;17(1Supl 1):1-51.

3. Pereira M, Lunet N, Azevedo A, Barros H. Differences in prevalence, awareness, treatment and control of hypertension between developing and developed countries. J Hypertens. 2009;27(5):963-75.

4. Nunes Filho JR, Debastiani D, Nunes AD, Peres KG. Prevalência de fatores de risco cardiovascular em adultos de Luzerna, Santa Catarina, 2006. Arq Bras Cardiol. 2007;89(5):319-24.

5. Martins MSAS, Ferreira MG, Guimarães LV, Vianna LA. Hipertensão arterial e estilo de vida em SINOP, município da Amazônia Legal. Arq Bras Cardiol. 2010;94(5):639-44.

6. Lessa I, Magalhães L, Araújo MJ, Almeida Filho N, Aquino E, Oliveira MM. Hipertensão arterial na população adulta de Salvador (BA) – Brasil. Arq Bras Cardiol. 2006;87(6):747-56.

7. Mion Junior D, Pierin AMG, Bensenor IM, Marin JC, Costa KR, Henrique LF, et al. Hipertensão arterial na cidade de São Paulo: prevalência referida por contato telefônico. Arq Bras Cardiol. 2010;95(1):99-106.

8. Jardim PCBV, Gondim MRP, Monego ET, Moreira HG, Vitorino PV, Souza WK, et al. Hipertensão arterial e alguns fatores de risco em uma capital brasileira. Arq Bras Cardiol. 2007;88(4):452-7.

9. Souza ARA, Costa A, Nakamura D, Mocheti LN, Stevanato Filho PR, Ovando LA. Um estudo sobre hipertensão arterial sistêmica na cidade de Campo Grande, MS. Arq Bras Cardiol. 2007;88(4):441-6.

10. Picon RV, Fuchs FD, Moreira LB, Fuchs SC. Prevalence of hypertension among elderly persons in urban Brazil: a systematic review with meta-analysis. Am J Hypertens. 2013; 26(4):541-8.

11. Car MR, Pierin AMG, Aquino VLA. Estudos sobre a influência do processo educativo no controle da hipertensão arterial. Rev Esc Enferm USP. 1991;25(3):259-69.

12. Barbosa RGB, Lima NKC. Índices de adesão ao tratamento anti-hipertensivo no Brasil e mundo. Rev Bras Hipertens. 2006;13(1):35-8.

13. Pierin AMG. Hipertensão arterial: uma proposta para o cuidar. São Paulo: Manole; 2004.

14. Ortega KC, Gusmão JL, Pierin AM, Nishiura JL, Ignez EC, Segre CA, et al. How to avoid discontinuation of antihypertensive treatment: the experience in São Paulo, Brazil. Clinics (São Paulo). 2010;65(9):857-63.

15. Zitter M. A new paradigm in health care delivery: disease management in disease management: a systems approach to improving patient outcomes. Am Hosp Pub.1997;1:1-25.

16. Norris SL, Glasgow RE, Engelgau MM, O'Connor PJ, McCulloch D, et al. Chronic disease management: a definition and systematic approach to componente interventions. Dis Manag Health Out. 2003;11(8):477-88.

17. World Health Organization. Obesity: preventing and managing the global epidemic. Report of a World Health Organization Consultation. Geneva; 2000.

18. Strelec MAM, Pierin AMG, Mion Junior D. The influence of patient's consciousness regarding high blood pressure and patient's attitude in face of disease controlling medicine intake. Arq Bras Cardiol. 2003;81(4):349-54.

19. Busnello RG, Melchior R, Faccin CS, Vettori D, Petter J, Moreira LB, et al. Characteristics associated with the dropout of hypertensive patients followed up in an outpatient referral clinic. Arq Bras Cardiol. 2001;76(5):352-4.

20. Pierin AMG, Marrone S. Controle da hipertensão arterial e fatores associados na atenção primária em Unidades Básicas de Saúde localizadas na Região Oeste da cidade de São Paulo. Ciênc Saúde Coletiva 2011;16(1):1389-400.

21. Julius S, Kejdelsen SE, Weber M, Brunner HR, Ekman S, Hansson L, et al. Outcomes in hypertensive patients in highcardiovascular risk treated with regimens based on valsartan and amlodipine: the VALUE radomised trial. Lancet. 2004;363(9426):2022-31.

22. Yusuf S, Teo KK, Pogue J, Dyal L, Copland I, Schumacher H, et al.; ONTARGET Investigators. Telmisartan, ramipril, or both in patients at high risk for vascular events. N Engl J Med. 2008;358(15):1547-59.

23. Lemstra M, Blackburn D, Crawley A, Fung R. Proportion and risk indicators of nonadherence to antihypertensive therapy: a meta-analysis. Can J Cardiol. 2012; 28(5):574-80.

24. Haroun MK, Jaar BG, Hoffman SC, Comstock GW, Klag MJ, Coresh J. Risk factors for chronic kidney disease: a prospective study of 23,534 men and women in Washington County, Maryland. J Am Soc Nephrol. 2003;14(11):2934-41.

25. Perry HM, Miller JP, Fornoff JR, Baty JD, Sambhi MP, Rutan G, et al. Early predictors of 15-year end-stage renal disease in hypertensive patients. Hypertension. 1995;25(4):587-94.

816   **Rev Esc Enferm USP**
2014; 48(5):809-17
www.ee.usp.br/reeusp/

26. Pinho NA, Pierin AMG. O controle da hipertensão arterial em publicações brasileiras. Arq Bras Cardiol. 2013;101(3):65-73.

27. Edelman D, McDuffie JR, Oddone E, Gierisch JM, Nagi A, Williams JW. Shared medical appointments for chronic medical conditions: a systematic review [Internet]. Washington: Department of Veterans Affairs (US); 2012 [cited 2014 May 16]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK99785/

28. Housden L, Wong ST, Dawes M. Effectiveness of group medical visits for improving diabetes care: a systematic review and meta-analysis. CMAJ. 2013;185(13):635- 44.

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