Nursing actions increases the control of hypertensive patients and reduces white-coat effect*

ATUAÇÃO DA ENFERMEIRA ELEVA O CONTROLE DE HIPERTENSOS E DIMINUI O EFEITO DO AVENTAL BRANCO

LA PRÁCTICA DE LA ENFERMERA AUMENTA EL CONTROL DE LOS PACIENTES HIPERTENSOS Y REDUCE EL EFECTO DE BATA BLANCA

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ABSTRACT

A randomized comparative study was performed to evaluate the control of hypertension with use of home blood pressure measurement (HBPM) and casual blood pressure measurement, and analyze the white coat effect. Hypertensive patients in primary health care units were randomly divided into two groups: group I, participating of the educational activities and group II that followed the routine treatment. The hypertensive patients from group I realized HBPM at the beginning and the end of the study. White-coat effect was evaluated by the difference between the casual blood pressure measurement and HBPM. The study included 290 hypertensive patients, but realized HBPM 82 hypertensive patients. There was increase in blood pressure control from the beginning to end of study in hypertensive patients from group I ($p < 0.05$) measured by HBP (60% to 68.3%) and casual measurement (62% to 71%) and in group II, HMBP hypertension control was higher than the casual blood pressure measurement (63% vs 50%). The white coat effect was greater in hipertensive patients from group II.

DESCRIPTORS

Hypertension
Blood pressure determination
Nursing care

RESUMO

Realizou-se estudo comparativo randomizado para avaliar o controle de hipertensos, com uso da medida residencial da pressão arterial (MRPA) e medida casual, bem como para analisar o efeito do avental branco. Hipertensos atendidos em unidades básicas de saúde foram divididos aleatoriamente em: grupo I, participante das atividades educativas, e grupo II, que seguiu a rotina de atendimento. Os hipertensos do grupo I realizaram MRPA no início e final do estudo. Efeito do avental branco foi avaliado pela diferença entre a medida casual e MRPA. Foram incluídos 290 hipertensos, porém realizaram MRPA 82 hipertensos. Houve aumento no controle da pressão do início ao final do estudo nos hipertensos do grupo I ($p < 0,05$) avaliado pela MRPA (60% para 68,3%) e pela medida casual (62% para 71%); no grupo II o controle foi maior na MRPA do que na medida casual (63% vs 50%). O efeito do avental branco foi maior no grupo II.

DESCRITORES

Hipertensão
Determinação da pressão arterial
Cuidados de enfermagem

RESUMEN

Un estudio comparativo aleatorizado se realizó para evaluar el control de la hipertensión con el uso de la medición de la presión arterial en el hogar y la medición ocasional de la presión arterial, y analizar el efecto de bata blanca. Los pacientes hipertensos en las unidades de atención primaria de salud fueron divididos aleatoriamente en dos grupos: grupo I, participando de las actividades educativas y el grupo II que siguieron el tratamiento de rutina. Los pacientes hipertensos del grupo I se dio cuenta de medición de la presión arterial en el hogar en el comienzo y el final del estudio. Blanco-capa efecto fue evaluado por la diferencia entre la medición de la presión arterial casual y medición de la presión arterial en el hogar. El estudio incluyó a 290 pacientes hipertensos, pero se dio cuenta de la medición de la presión arterial en el hogar 82 pacientes hipertensos. Hubo un aumento en el control de la presión arterial desde el principio hasta el final del estudio en los pacientes hipertensos del grupo I ($p <0,05$) medida por la medición de la presión arterial en el hogar (60% a 68,3%) y la medición ocasional (62% a 71%) y en el grupo II, el control de la hipertensión con el uso de la medición de la presión arterial en el hogar fue superior a la medición de la presión arterial ocasional (63% vs 50%). El efecto de bata blanca fue mayor en los pacientes hipertensos del grupo II.

DESCRIPTORES

Hipertensión
Determinación de la presión sanguínea
Atención de enfermería

*Taken from the thesis "Uso da monitorização residencial da pressão arterial (MRPA) na avaliação do controle de hipertensos, após implementação de programa educativo, em unidades básicas de saúde", Adult Health Nursing Program, University of São Paulo School of Nursing, 2010.

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INTRODUCTION

Arterial hypertension is basically defined by the rise in blood pressure levels, making blood pressure measurement an essential resource to distinguish between normal and hypertension. The observer, i.e. the person performing the blood pressure measurement, plays a fundamental role due to his/her direct influence on the accuracy of the obtained measures. Health team members, responsible for practicing the blood pressure measurement procedure, should be able to remove any possibility of error that can compromise not only the arterial hypertension diagnosis, but also the conduction of antihypertensive treatment. Among other error sources, observer-patient interaction stands out, which can lead to falsely high blood pressure levels as a result of the white-coat phenomenon. Home blood pressure measurement (HBPM) can be one alternative to assess and even avoid this condition. Research[1-3] has shown that, when blood pressure is measured outside the consultation room and without the observer's presence, whether through HBPM or Ambulatory Blood Pressure Measurement (ABPM), levels are lower than during casual measures in the consultation room.

In the Brazilian context, cardiovascular illnesses have been the main cause of death. They remain responsible for a large number of hospitalizations, entailing high healthcare and socioeconomic costs[4]. To illustrate the range of the problem, between January and April 2010, 110,712 hospitalizations due to diseases of the circulatory apparatus were registered in the Unified Health System and arterial hypertension was responsible for 28,216 of these hospitalizations[5]. Hence, arterial hypertension treatment and control are fundamental. Despite these data, low arterial hypertension control rates are frequent. In the United States, the control rate is 34%[6]; the most positive data come from Canada, where 66% of hypertension cases are under control. A study developed at Primary Health Care Units in the West of São Paulo City showed that 45% of hypertension patients were under control[7].

This panorama makes health professionals and researchers use resources that can improve these control levels. In that context, home blood pressure measurement (HBPM) has been acknowledged not only as an instrument to assess pressure levels, but also as a tool to enhance hypertensive patients' treatment adherence, as it permits greater involvement and responsibility for the disease[8-9]. HBPM not only represents an increasingly present technology, due to the use of automatic and semi-automatic devices, but is also easy to handle, which makes it into a reliable method for pressure level evaluation.

Health team members, responsible for practicing the blood pressure measurement procedure, should be able to remove any possibility of error that can compromise not only the arterial hypertension diagnosis, but also the conduction of antihypertensive treatment.

It is also highlighted that anti-hypertensive treatment can respond well to healthy practices and lifestyles, and health education constitutes an important strategy to conquer that goal. This study aimed to join two adherence and control maximization strategies: an educative program about hypertension and HBPM use. Thus, the study objectives were: to assess hypertension control, using HBPM and casusal measures, and analyze the white-coat effect.

METHOD

An experimental and randomized quantitative field study was developed, involving 290 randomly selected hypertensive patients aged 18 years or older, who had been monitored for more than six months at two primary health care units located in Western São Paulo City. Participants were 82 hypertensive patients who agree to perform HBPM (60.0 ± 10.8 years; 56.1% women; 63.0% white; 70.7% finished primary education; and 56.1% gaining a family income of up to three minimum wages). Approval for the study was obtained from the Ethics Committee and all participants signed the informed consent term. This research was part of a Public Health Policy project and received funding from the São Paulo Research Foundation (Process No. 03/06454-1).

The hypertensive patients were randomly divided in two groups. Group I (study) participated in educative activities and Group II (control) followed the care routine at the units. Nurses developed the educative program for the hypertensive patients at the units during six months, with two-weekly meetings. The addressed themes were related to the disease and anti-hypertensive treatment, involving medication or not.

Blood pressure levels in Group I were measured in two phases: before and after the development of the educative program, at the primary health care unit and at home by the patients themselves (HBPM). Pressure levels among hypertensive patients in Group II were measured at the health unit and through HBPM, in a single phase. A nurse measured pressure levels at the unit, using a validated device[10] (OMROM- HEM-705 CP), in the upper left limb, with the patient sitting down and the arm rested at the height of the heart, after 5-10 minutes of rest, for three consecutive times. For HBPM, after proper training, the patient used the same device and conditions described above, on four consecutive days, in the morning (between 7a.m. and 10a.m.) and afternoon (between 5p.m. and 8p.m.), with three consecutive measures in each period, in compliance with the recommendations in the II Guideline for HBPM use[11].

To assess blood pressure control, the reference levels for HBPM were below 135 mmHg for systolic pressure and below 85 mmHg for diastolic pressure[11]. For measures at the PHCU, the adopted levels were below 140 mmHg for systolic pressure and below 90 mmHg for diastolic pressure. Data were organized in a computer database and, for statistical analysis, Statistical Package for Social Sciences (SPSS) software, version 7.5 was used. The categorical variables are displayed in tables with absolute (n) and relative (%) frequencies. The relation between these variables and blood pressure was assessed with the help of the Chi-square test or likelihood ratio test. Quantitative variables are presented as means and standard deviations. The mean scores for both groups were compared using parametric tests (Student's t-test). Significance was set as $p < 0.05$.

RESULTS

The results evidenced that the two hypertensive groups under analysis were similar when considering most sociodemographic characteristics. Statistically significant differences ($p < 0.05$) were found only for gender and occupation, with a predominance of housewives in Group I and self-employed men in Group II (Table 1).

Table 1 – Comparison between sociodemographic characteristics of hypertensive patients who participated in the educative process (group I) and who did not participate in the educative process (group II) - São Paulo. 2008

Characteristics	Hypertensive Patients						p-value
	Group I		Group II		Total		
	N	%	N	%	N	%	
Gender							
Male	10	23.8	26	65.0	36	43.9	0.000
Female	32	76.2	14	35.0	46	56.1	
Ethnic origin							
White	28	67.0	24	60.0	52	63.0	0.580
Not White	14	33.0	16	40.0	30	37.0	
Marital status							
With partner	26	62.0	30	75.0	56	68.0	0.156
No partner	16	38.0	10	25.0	26	32.0	
Education							
Illiterate	06	14.3	05	12.5	11	13.4	0.307
Primary Education	31	73.8	27	67.5	58	70.7	
Secondary Education or higher	05	11.9	08	20.0	13	15.9	
Family income (minimum wages)							
1 to 3	24	57.1	22	55.0	46	56.1	0.564
More than 3	18	42.9	18	45.0	36	43.9	
Occupation							
Housewife	23	54.8	10	25.0	33	40.2	0.009
Retired	06	14.2	02	5.0	08	9.8	
Self-employed	11	26.2	18	45.0	29	35.4	
Employed	02	4.8	10	25.0	12	14.6	
Age (mean ± sd. years)	58.4 ± 10.1		61.6 ± 11.4		60.0 ± 10.8		0.178
BMI (mean ± sd. kg/m2)	29.5 ± 6.0		29.4 ± 4.8		29.4 ± 5.4		0.882
Waist circumference (mean ± sd. cm)	99.7 ± 15.8		100.1 ± 11.9		99.9 ± 13.9		0.899

Patients who participated in the educative interventions (group I) showed a statistically significant decline ($p < 0.05$) in systolic and diastolic pressure levels at the end of the educative interventions when assessed through HBPM. When considering the pressure levels measured at the primary health care units, however, no statistically significant drop in pressure levels was found after the educative interventions. Also, systolic and diastolic pressure levels before the educative interventions were similar when measured at the health units and at home. After the educative interventions, systolic pressure levels were similar when measured at the health units and at home; diastolic pressure levels measured through HBPM were significantly lower though ($p < 0.05$) (Table 2). Systolic and diastolic pressure levels of patients in group II, measured through HBPM, were significantly lower ($p < 0.05$) than measures at the PHCU (Table 3).

Table 2 – Blood pressure measurement of group I hypertensive patients at primary health care units (PHCU) and at home (HBPM) before and after educative interventions - São Paulo, 2010

Place of blood pressure measurement	Systolic (mean ± sd)		p-value	Diastolic (mean ± sd)		p-value
	Pre- intervention	Post- intervention		Pre-intervention	Post- intervention	
PHCU	135.0 ± 23.8	131.7 ± 16.9	0.195	78.7 ± 12.4	78.7 ± 9.4	0.995
HBPM	131.4 ± 15.6	127.3 ± 17.4	**0.04**	79.2 ± 12.2	74.7 ± 9.7	**0.002**
p-value	0.190	0.117		0.732	**0.022**	

Table 3 – Blood pressure measurement of group I hypertensive patients at primary health care units (PHCU) and at home (HBPM) - São Paulo, 2010

Place	Blood pressure	
	Systolic (mean ± sd)	Diastolic (mean ± sd)
PHCU	140.0 ± 20.7*	83.7 ± 11.7*
HBPM	130.4 ± 17.7	78.8 ± 10.1
p-value	**0.001**	**0.002**

*p < 0.05 Blood pressure measured at the health unit vs. blood pressure measured at home

Blood pressure control rates of hypertensive patients in Group I increased after the educative process when assessed through HBPM (60% vs. 68.3%) and at the PHCU (62% vs. 71%). Among Group II patients, who followed routine care at the PHCU, the percentage of controlled patients was higher when analyzed through HBPM (63% vs. 50%) (Figure 1).

In the assessment of the white-coat effect, the analysis of blood pressure differences between HBPM and PHCU showed more hypertensive patients in Group II with positive differences when compared with patients in Group I (Figure 2). At the PHCU, 61.9% of Group I patients showed higher (systolic and diastolic) pressure levels than in HBPM. In Group II, 67.5% of patients showed higher systolic and 75.0% higher diastolic pressure levels at the PHCU than in HBPM.

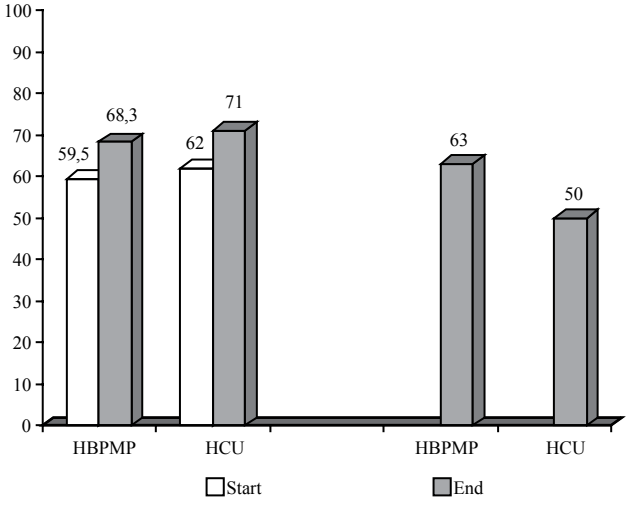

Figure 1 – Hypertension control percentage in groups I and II at the start and end of the educative process according to home blood pressure monitoring (HBPM) and measurement at primary health care units (PHCU) - São Paulo, 2010

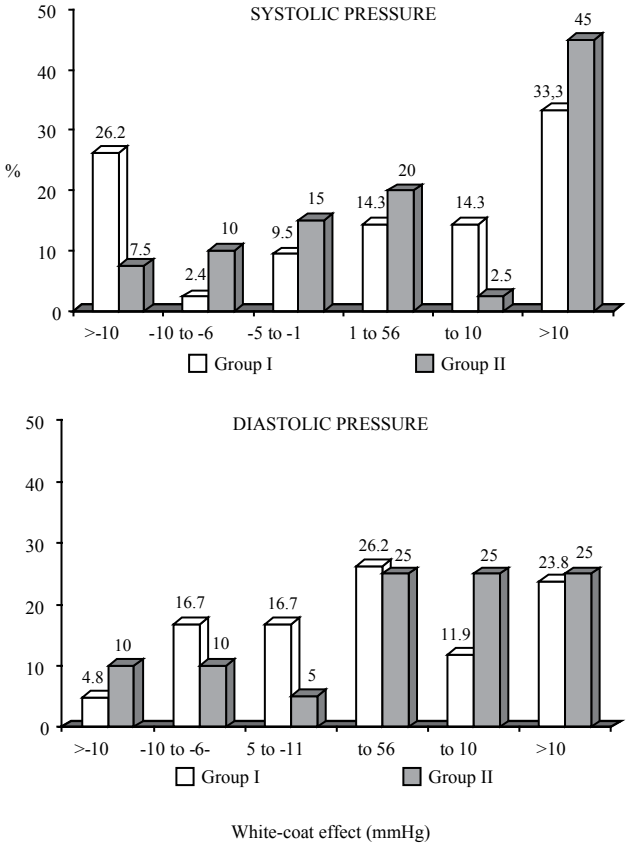

Figure 2 – White-coat effect among hypertensive patients in Groups I and II - São Paulo, 2010

DISCUSSION

One of the main results of this study underlines the importance of an educative program to increase hypertension control rates. The significant drop ($p < 0.05$) in the mean blood pressure levels of patients who participated in the educative program came with an 8.8% rise in pressure level control rates when using HBPM and 9% when measured at the primary health care units. The lack of gender homogeneity in Groups I and II is highlighted as a study limitation, with more women in group I. Hypertension control is a target all health professionals working with these clients need to achieve. Thus, the aim is to maintain pressure levels below 140/90 mmHg in stage 1 and 2 patients, with low and medium cardiovascular risk, and below 130/80 mmHg in patients at high or very high risk, diabetes mellitus, metabolic syndrome, target organ

damage and renal failure[4]. Among different proposed strategies, educative activities with group meetings and individual orientations are important actions to enhance lifestyle control and changes, and studies have shown the effectiveness of these measures[12-17].

As observed, even before the educative activities were put in practice, hypertension control levels in Group I were higher than levels identified in Brazil. Only about 30% of patients keep their blood pressure under control. Among hypertensive patients who did not participate in the educative activities, blood pressure control according to PHCU measures corresponded to 50%. It is believed that the rise in these patients' control rates resulted from better nursing team care delivery and orientations. This fact may be related to the activities involving the nursing team, which received better specific training on hypertensive care, deriving from a comprehensive project developed at these units. This illustrates the effectiveness of the educative measures put in practice for hypertensive clients and the nursing team. A previous study at the same primary health care units showed that hypertension control among the 440 patients assessed corresponded to 45.5%[7].

Another highlight in the present study findings refers to the distinctions in the obtained blood pressure measures. Reports on differences between blood pressure levels measured in the consultation room and at home date back a long time[18] and current results confirm the need to assess blood pressure levels through alternative methods, as the casual measure is subject to the observer and the environment's interference. To illustrate this situation, a study involving 318 hypertensive patients at the outpatient clinic of a teaching hospital demonstrated significant variations in patients' control percentage, depending on the method used or the person performing the measurement. Thus, 26.9% of patients were under control according to HBPM, 15.6% according to ambulatory blood pressure monitoring (ABPM), 15.6% when patients measured their own pressure in the consultation room, 15.4% when the nurse measured the blood pressure and only 9.8% when the physician performed the measurement[19]. In this study, the observer's influence was minimized in the group that continued interacting with the health professionals (Group I), as various meetings happened in this group as part of the educative process.

Based on the presented results, it is underlined that it is important for health professionals to adopt pressure control improvement measures, especially those directly involved in the arterial hypertension problem. Besides its role in maximizing pressure role, HBPM is indicated to identify and monitor hypertension and the white-coat effect[8]. In this study, it was only during the second assessment phase, i.e. after the educative interventions, that Group I patients displayed significantly lower diastolic pressure levels at home than the levels the nurse measured in the outpatient clinic of the PHCU (74.7 ± 9.7 vs. 78.4 ± 9.4 mmHg, $p < 0.05$), with slightly higher HBPM measures than the levels the nurse obtained (79.2 ± 12.2 vs. 78.7 ± 12.4 mmHg) at first. This fact gains important dimensions as the professionals who perform measurement procedures at the two PHCUs are mostly nursing team members. As the present study results showed that the nurse provoked less white-coat effect and that, in the group that received educative interventions, measures obtained at the PHCU and at home did not differ, two important influences on the pressure level can be remover: the environment and the observer. Besides, the fact that the observer/environment more strongly influenced Group II hypertensive patients in comparison with Group 1 proves the importance of professional-patient interaction to mitigate the white-coat effect. The elimination of the observer's action in the blood pressure measurement was also identified in a research in which home visits were made to a group of home care patients. During a special home visit that involved only one physician and one nurse who were members of the patient's treatment team, the pressure levels these professionals measured were similar to the HBPM levels, indicating the absence of the observer's effect in that measure[20].

CONCLUSION

The presented findings once again reinforce the importance of nurses' activities, not only to enhance hypertensive patients' control, but also to mitigate the white-coat effect that results from blood pressure measurement. A significant increase in blood pressure was found in all patients under study. The rise in pressure control rates in Group II can be attributed to health units' greater involvement in hypertensive care through the concomitant training of nursing teams and the adoption of new practices, including the use of automatic devices, posters and educative folders at the waiting rooms and activities intrinsic in the educative program put in practice during the research. What at first may seem to be a study limitation actually reinforces the evidence of nursing team education strategies. In addition, blood pressure control is directly related with the treatment adherence process, in which countless factors are interconnected, turning blood pressure control of hypertensive patients into a challenge to everyone.

Also, the importance of professional-patient interaction is highlighted to mitigate the white-coat effect at primary health care units, leading to more reliable blood pressure levels, with the consequent disclosure of lower pressure levels and, hence, higher hypertension control rates.

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