

## ORIGINAL ARTICLE

## Matricial Support and Arterial Hypertension Control

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### Abstract

**Background:** A continuing education program for health professionals improves their performance and increases hypertension control rates.

**Objective:** To estimate the prevalence of hypertension control and therapeutic inertia among adults treated at Primary Health Care Units after a continuing education program focused on cardiology for health professionals.

**Methods:** A cross-sectional study was carried out, which included cluster sampling and analysis of medical records. We evaluated 463 patients with high blood pressure and analyzed the blood pressure, medications, and therapeutic increments in 2013, which were compared to the data obtained in 2007.

**Results:** There was prevalence of female patients and appointments at the Family Health Care Units. The age ranged between 24 and 92 years (mean of 61.7 years). There was a reduction in the mean blood pressure (148.62/91.60 ± 23.52/14.51 mmHg to 137.60/84.03 ± 21.84/12.72) between the first and last records, and BP control in 58% of the sample, that is, higher than the 36.6% found in 2007. In the analyzed period, there was a therapeutic increment of 39% in appointments, which benefited 52% patients with high blood pressure, higher than the 12% and 29.5%, respectively, found in 2007. The mean number of drugs per patient increased from 1.85 to 2.05, with a predominance of diuretics and angiotensin-converting-enzyme inhibitors.

**Conclusion:** There was a reduction in the clinical inertia and increased control of arterial hypertension was observed, compared with the findings of the previous study. The result suggests that the matricial support program for health professionals and other measures to improve disease control in the Primary Health Care Units were effective. (Int J Cardiovasc Sci. 2017;30(3):199-206)

**Keywords:** Hypertension / prevention & control; Hypertension / epidemiology; Prevalence; Inertia; Health Centers; Primary Health Care; Health Education.

### Introduction

There are many factors involved in the adequate control of arterial hypertension (AH). Regarding patient behavior shortly after disease diagnosis, greater appreciation of medical care and medication use was observed.<sup>1,2</sup> One inquires, therefore, whether health professionals are prepared to meet the requests of the population.

The importance of health professionals' qualification and training is indisputable to achieve a higher quality of services.<sup>3-7</sup> AH guidelines can contribute to it;<sup>8-10</sup>

however, their knowledge does not represent a guarantee of their appropriate use. Cabana et al.<sup>11</sup> reviewed publications searching for the different barriers that prevent adherence to the guidelines and Milchak et al.,<sup>12</sup> when evaluating the literature on physicians' adherence to the guidelines, reported substantial gaps between the development, dissemination, and their routine use. Lemos et al.<sup>13</sup> and Spranger et al.<sup>14</sup> showed that the guidelines' recommendations are not followed by primary care physicians and that their adherence is overestimated by professionals. La Sierra et al.,<sup>15</sup> in a

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study with general practitioners, verified there was no consensus on the fact that adherence to the guidelines led to better disease control and prevention of complications. Mion Junior et al.<sup>16</sup> also identified gaps regarding the following of Brazilian guidelines by specialists and general practitioners. Permanent medical education strategies were reviewed and classified according to their degree of efficacy by Davis et al.<sup>3</sup> in a meta-analysis that included 99 studies. The most effective methods were systematic interventions based on daily practice.

In 2010, as a consequence of research on clinical inertia and hypertension control,<sup>17</sup> the Matricial Support (MS) Program in cardiology was started by the Municipal Health Secretariat, aiming at continuing education for primary health care professionals and the training of teams to solve problems that require less technological density. To evaluate the possible contribution of MS to AH control, we repeated the study<sup>17</sup> after 4 years.

The objective of this study was to estimate the prevalence of AH control and therapeutic inertia in adults treated at the Basic Health Units (BHUs) after the implementation of an MS program in cardiology.

## Methods

This was a cross-sectional study, with a retrospective analysis of medical files of patients with AH, enrolled at the Municipal Health Secretariat. Patients were randomly selected by conglomerates in two stages, in which each BHU constituted a conglomerate. In the first stage, 14 BHUs (25%) of a total of 56, were chosen by drawing lots, including four conventional care units and ten Family Health Strategy (FHS) units, which included seven municipal health regions.

In the second stage, the patients from each BHU were selected by systematic random sampling, with probability proportional to the number of users linked to the unit. The last digit of the file was selected by drawing lots, from zero to nine, including all with the same last digit, following enrollment at the unit. When the patient did not meet the inclusion criteria, he or she was replaced by the subsequent one, and so on, until the number determined for that BHU was attained.

Inclusion criteria were men and women, older than 18 years, with AH and a minimum follow-up of 12 months, completed by January 1, 2013, with at least two consultations with a physician or nurse in 2013, which included blood pressure measurements.

The sample was calculated based on the 34,116 users enrolled in the Pharmaceutical Assistance Service of the Municipal Health Secretariat and the expected prevalence of AH control in 36% of them, according to the findings of 2007, with a desired accuracy of 0.05 and confidence level of 95%, obtaining a minimum of 354 users. The analysis of the medical record included demographic characteristics of the patients, such as gender, age, and BHU where the patient was originally enrolled. Arterial hypertension follow-up was calculated in months, from the first consultation due to AH at the BHU until January 2013. The systolic (SBP) and diastolic (DBP) blood pressure values were evaluated at the beginning of the treatment at the BHU and two measurements from 2013 (initial and final values in the year). For the purpose of this study, values lower than 140 mmHg for SBP and lower than 90 mmHg for DBP were considered normal at the last consultation. For the calculation of clinical inertia, all blood pressure measurements and drug change records carried out in 2013 were used.

For the year 2013, the number of nursing and medical consultations, blood pressure measurements and changes in therapy (dose or association) were evaluated. The drugs used in the treatment, identified as diuretics, beta-blockers (BBs), calcium channel blockers (CCBs), angiotensin-converting enzyme inhibitors (ACEIs) and others, as well as the number of daily doses, were quantified.

## Statistical Analysis

Values were expressed as  $n \pm$  Standard Deviation (SD). The comparisons between the groups were made using Student's *t*-test for continuous independent variables, and the chi-square test, for nominal variables. A significance level of 5% (Confidence Interval of 95% - 95% CI) was used for the studied prevalence.

The research project submitted to Plataforma Brasil was approved by the Research Ethics Committee of Universidade Regional de Joinville (UNIVILLE) and authorized by the BHU Management of the Municipal Health Secretariat.

## Results

A total of 463 records of hypertensive patients from 14 BHUs were analyzed. Users of FHS units predominated (70%), as well as women (60.7%). The age ranged from 24 to 92 years, with a mean of 61.7 years ( $\pm$  11.41).

The mean number of medical consultations was 2.99 ( $\pm$  2.2) and nursing appointments were 1.55 ( $\pm$  2.6) per patient in 2013. Disease follow-up ranged from 14 to 420 months, with a mean of 95 months ( $\pm$  54.84). The number of BP measurements ranged from 1 to 24, with a total of 1,640 and a mean of 3.5 ( $\pm$  3.34); the abnormalities ranged from zero to 18, with a total of 616 and a mean of 1.3 ( $\pm$  1.76), and the therapeutic increment varied from zero to 3, with a mean of 0.52 ( $\pm$  0.74).

Treatment resulted in significant reductions in SBP and DBP (Table 1), both at the first and last measurements of the year. At the last measurement, blood pressure was normal in 58% of the patients, respectively 62% ( $\pm$  48) of the women and 53% ( $\pm$  50) of the men, with no significant difference in mean blood pressure levels ( $p = 0.062$ ). No significant differences were observed between conventional BHUs and FHS units regarding the distribution of patients with normalized final BP - respectively 57% and 60%. In the FHS units, 64/120 males and 122/204 females had compensated AH ( $p = 0.154$ ), whereas 32/64 males and 51/77 females ( $p = 0.58$ ) had compensated AH in conventional BHUs.

In the initial and final pharmacological treatment in 2013, greater use of diuretics (68.6% and 72.0%) and ACE inhibitors (53.6% and 54%) was observed, followed by BBs (28.7% and 38.2%), ARBs (14.4% and 24.4%), and CCBs (9.7% and 14.5%). The variation was significant between the number of drugs used at the beginning and the end of 2013 ( $1.78 \pm 0.76$  and  $2.0 \pm 0.8$ , 0.261, with  $p = 0.000$ ). No comparisons were made between monotherapy and combination therapy.

Table 2 compares the results of the 2007 and 2013 surveys, demonstrating the increase in the AH control and the reduction in therapeutic inertia.

## Discussion

Despite evidence supporting the impact of AH treatment on morbidity and mortality reduction, disease control is still far from adequate levels in most settings.<sup>18-21</sup> Better control levels have been reported in Canada, Cuba, and drug trials, which show that it is possible to achieve normal BP levels in a large number of participants.<sup>4,5,22</sup> In the ALLHAT (The Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial) study,<sup>23</sup> after 4 years of follow-up, BP was controlled in 72% of white Latino and 69% of black Latino individuals. In the CONVINCe study,<sup>24</sup> control was maintained during the 2 years of the study in 69% of the participants. Insufficient control has numerous causes, including lack of knowledge of the disease by a significant number of patients, lack of adherence to treatment and inadequate treatment management by health professionals.<sup>1,2,6,7,25-28</sup>

Tamblyn et al., in a Canadian study developed between 1993 and 2007, with 13,205 patients and 645 physicians, demonstrated greater adherence to treatment in patients treated by physicians who performed more reevaluations, better drug management that included faster therapeutic changes, and who better communicated with patients.<sup>6</sup> Professional competence is rewarded by better disease control and by a society with fewer cardiovascular and other complications, in addition to a reduction in costs for the healthcare system.

The interesting French study DUO-HTA, through an investigation with general practitioners, cardiologists and hypertensive patients, divided the physicians into five groups according to greater or lesser motivation to exercise their work. There was an association between

**Table 1 – Temporal evolution of blood pressure in patients with arterial hypertension**

Blood Pressure	N	Minimum	Maximum	Mean	Standard deviation
Initial systolic blood pressure	463	90.00	240.00	148.6263	23.52664
Initial systolic blood pressure 2013	463	90.00	280.00	135.9093	23.33421
Final systolic blood pressure 2013	463	90.00	230.00	137.6048	21.84215
Initial diastolic blood pressure	463	60.00	140.00	91.6026	14.48756
Initial diastolic blood pressure 2013	463	10.00	180.00	83.2393	14.51320
Final Diastolic Blood Pressure 2013	463	40.00	140.00	84.0346	12.71954

**Table 2 – Demographic and follow-up characteristics of patients with arterial hypertension in 2007 (415) and in 2013 (463)**

Variables	2007		2013	
	Mean	Standard Deviation	Mean	Standard Deviation
Age, years	61.5	± 11.6	61.7	± 11.41
Treatment, months	75.4	± 49.3	95	± 54.8
Medical consultations	2.6	± 1.9	3.0	± 2.2
Nursing consultations	3.6	± 2.8	1.5	± 2.6
Blood pressure measurements	5.0	± 3.4	3.5	± 3.3
Elevated blood pressure	3.1	± 2.9	1.3	± 1.7
Alteration in treatment	0.37	± 0.9	0.52	± 0.7
Initial drug therapy	1.7	± 0.8	1.78	± 0.76
Final drug therapy	1.8	± 0.8	2.0	± 0.8
Initial systolic blood pressure of the treatment	155.8	± 20.8	148.6	± 23.5
Initial systolic blood pressure, year	139.5	± 20.8	135.9	± 23.3
Final systolic blood pressure, year	140.3	± 22	137.6	± 21.8
Initial diastolic blood pressure of the treatment	95.7	± 10.6	91.6	± 14.5
Initial diastolic blood pressure, year	85.5	± 13.3	83.2	± 14.5
Final diastolic blood pressure, year	84.1	± 12.4	84.0	± 12.7
Compensated arterial hypertension, %	36.6		58	

better disease control and highly motivated professionals. These physicians showed greater empathy with patients, better physician-patient relationship, and more optimism and competence in treating the disease.<sup>29</sup>

Phillips et al.<sup>25</sup> pointed out that the biomedical model, focused on symptom relief, is as one of the causes of hypertension management failure. "Clinical inertia", that is, the failure by healthcare professionals to initiate or intensify therapy when indicated, would be the major problem. The overestimation of the provided care, the use of "weak" reasons to avoid treatment intensification and gaps in education, training and organizational practice aimed at achieving therapeutic goals would be responsible for this inertia. Daugherty et al.,<sup>26</sup> in a study carried out in patients with refractory hypertension treated in Primary Health Care, comparing treatment adherence and therapeutic inertia, found that the latter was more important regarding the insufficient control of AH. Heisler et al.,<sup>27</sup> in a study that included 38,327 patients, found therapeutic intensification in only 30% of the opportunities. It was also verified that health professionals

did not evaluate the presence of low adherence, and so the therapeutic intensification produced polypharmacy, even lower adherence levels and higher costs for the system.

Phillips et al.<sup>25</sup> defined clinical inertia in 2001 and Okonofua et al.,<sup>28</sup> in 2006, introduced the term "therapeutic inertia". The terms are applied to risk factors when the therapeutic goals are clearly defined, and the benefits derived from treatment are well established. It applies when therapy is recognized as effective and there are widely distributed and easily accessed guidelines. The health professional recognizes the problem but fails to act. Okonofua et al.<sup>28</sup> observed 55% of medical consultations with high BP and therapeutic increment in only 13%. The multivariate analysis showed that a therapeutic increase in 30% of the consultations would result in 45% to 66% of control increase in one year.

In 2007, we found evidence of significant clinical inertia. After observing elevated blood pressure levels in their patients, primary care physicians promoted increases in therapy in only 12.0% of the occasions, favoring only 29.5% of hypertensive patients with changes in the number of

drugs or doses. Additionally, many hypertensive patients were no longer included in the study due to inadequate follow-up. In that year, only 36.6% of the treated subjects had normal BP, and the high percentage of comorbidities found suggested late diagnosis and inadequate treatment of AH.<sup>17</sup> These findings stimulated the continuing education initiatives and the planning of a reevaluation.

The literature review<sup>3-7</sup> suggests that continuing education programs that use multiple teaching and training tools, adapted to local conditions, and involving the different health professionals and patients, are likely to succeed. Easy access to specialist doctors, multiprofessional care and administrative interventions also contribute to better disease control. The Canadian Hypertension Education Program, implemented in 1999, contributed to an enormous increase in the diagnosis, treatment, and control of AH.<sup>4,5</sup> AH control increased from 13.2% in 1999 to 64.6% in 2009.<sup>5</sup>

Predicted for some BHUs, the MS program ended up including all of them, at the request of regional coordination and the heads of the units. The Hypertension Guidelines<sup>10</sup> were reviewed with the collaboration of Primary Health Care professionals, seeking greater adherence,<sup>15</sup> and was improved by sports medicine guidelines. A periodic AH refresher course, carried out for decades, has been maintained.

Since many referrals to the specialist were based on electrocardiogram findings, including extrasystoles, divisional blocks, and others, in patients without clinical evidence of cardiopathy, a course on interpretation of reports was provided. The radiology reports suggesting increase in the left ventricle were focused on the MS program, because they generate unnecessary consultations and iatrogenesis.

Proposed by Campos and Domitti<sup>30</sup> and Campos and Cunha,<sup>31</sup> the MS in health aims to ensure specialized help and technical-pedagogical support to the professionals in charge of health care problems. The supporter is a specialist, who can contribute with interventions that increase the resolution capacity of the team primarily responsible for the case. MS seeks to customize reference and counter-reference systems by stimulating and facilitating direct contact between Primary Health Care and the supporting specialist. It provides the shared creation of clinical guidelines, including criteria for triggering support and defines the spectrum of accountability of the referral team members and matricial supporters.

MS and reference team are organizational arrangements and constitute a methodology for health work management, aiming at performing expanded clinical care and dialogic integration between different specialties and professions. This methodology complements reference and counter-reference mechanisms, protocols, and regulatory centers, and may be relevant to rationalize access to and the use of specialized resources.<sup>30,31</sup> It was initially used in mental health services, Primary Care, and the hospital area of the Unified Health System (SUS) of Campinas (SP). Subsequently, some programs of the Ministry of Health, such as HumanizaSUS, Mental Health and Basic Care / Family Health, were also incorporated into this perspective.<sup>31</sup>

Two basic ways to establish contact between Primary Health Care and the supporter were implemented. The first relies on scheduled sporadic and regular meetings, during which the health cases or problems selected by the reference team are discussed, therapeutic projects are elaborated and lines of intervention are established for the several professionals involved. The discussions encourage the dialogue on clinical, collective health and system management issues. In situations that require specific attention from the supporter's knowledge base, specialized interventions or interferences are scheduled, without excluding the Primary Health Care team follow-up. In the second, in emergency situations, the reference professional engages the supporter through electronic or telephone contact.

The weekly meetings, scheduled by the teams, using a semi-annual schedule, takes place in the BHU or in the regional headquarters. Although there are joint consultations, the usual format is the conversation circle. Initially, only doctors and nurses were involved, but nursing technicians and community health agents were soon included, followed by nutritionists, pharmacists, dentists, students, and other professionals.

In the first years, the Primary Health Care professionals brought dozens of cases for discussion, and the patients were allocated into three groups: those intended for priority and short-term care, those waiting for a consultation with the specialist and those to be reassessed by the general practitioner. Among the latter, there are patients with controlled disease and hypertensive patients supposedly refractory to treatment or without complications.

The MS contributed to the reduction in the time waiting for a consultation with a cardiologist and allowed anticipating the treatment of patients with more

complex and/or severe problems. It triggered a process in which the referrals made by the reference teams were qualified, reflecting the professionals' greater aptitude and certainty regarding adequate patient management. Even with an unaffected availability of specialized consultations, the impact on the waiting was very relevant at the end of 2 years, going from 11,180 to 3,739 patients.<sup>32</sup> Most of the remaining patients comprise those on follow-up, and the waiting time for specialized care that lasted more than 12 months became less than 3 months. In cases considered as priority, which include chest pain, coronary disease, heart failure and preoperative assessments, the consultations occur within shorter periods. The participants' satisfaction with the method and results was expressed in testimonials and assessment meetings, and generated MS programs in other specialties.<sup>32</sup>

The MS was extended to the municipal hospital and to the emergency care units to discuss hypertensive pseudo-urgencies and cardiac emergencies. A program was also implemented for dental professionals to discuss the recommendations for the perioperative evaluation guideline of SBC<sup>33</sup> and the AH guideline.<sup>8</sup>

Comparing the studies carried out in 2007<sup>16</sup> and 2013, we observed an increase in the number of medical consultations and antihypertensive drugs per patient, as well as a reduction in therapeutic inertia, changes that must have contributed to the better control of AH in 2013. During the period between the studies, city parks were equipped with gym equipment and the mileage of the cycle lanes increased, initiatives that may have contributed to some treatments. Media campaigns may also have contributed to greater demand for disease treatment and control.

The number of users enrolled in the Pharmacy Service of the Municipal Health Secretariat increased from 27,700 to 34,116, suggesting an increase in diagnosis and treatment. We found high turnover by the medical staff in the conventional units assessed, with only 17% of active general practitioners since 2007, while 69% of the physicians were kept in the FHS units. As the knowledge was continuously disseminated and reached all Primary Health Care professionals, it is possible that the turnover effects were of little significance. SUS also provides the free distribution of antihypertensive drugs, but lack of medication was frequently observed in 2013 due to the inertia of the municipal manager – a variable that may have impaired disease control.

Another study carried out in 2013 found AH control rates similar to ours. The study evaluated the efficacy of providing guidance to hypertensive patients through Community Health Agents. Four FHS units and 432 patients were included in the study. The Community Health Agents received training to measure blood pressure and used an automated device to measure BP at the patients' homes. The initial blood pressure showed a control of 52.3% in the measurements performed in the BHU and 65.5% in the home measurements. At the end of the Community Health Agents' work, at 6 months, BP control in the home measurements was obtained in 70.9% of the patients.<sup>34</sup>

## Conclusion

Matricial support used a variety of pedagogical resources, including case discussions and topics of collective interest, face-to-face and at distance, joint consultations, joint creation of guidelines, distribution of scientific articles, training in blood pressure measurement, teamwork encouragement and others.<sup>3-7</sup> Furthermore, it facilitated access to the specialist and contributed to the qualification and appreciation of Primary Health Care professionals. Although only 4 years have passed and despite the many variables, we believe that the continuing education initiatives for referral professionals, mainly matricial support, contributed to the large percentage of hypertensive patients controlled in 2013.

Two study limitations were considered important, the fact that blood pressure measurements were obtained from the medical records and, since it covered all Basic Health Units, it did not have a control group without matricial support. Therefore, we consider appropriate to perform local reevaluations and the use of matricial support in other services to confirm our findings.

## Author contributions

Conception and design of the research: Hoepfner C. Acquisition of data: Hoepfner C, Longo M, Coiradas AO, Teixeira LMR. Analysis and interpretation of the data: Hoepfner C, Longo M, Coiradas AO, Teixeira LMR. Writing of the manuscript: Hoepfner C, Longo M, Coiradas AO, Teixeira LMR. Critical revision of the manuscript for intellectual content: Hoepfner C, Coiradas AO, Longo M, Teixeira LMR.

### Potential conflicts of interest

The authors declare no relevant conflicts of interest.

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### Academic Affiliation

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