

# Difficulties in Achieving Arterial Hypertension Control

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*Conflict of interest: We undersign, certificate that we do not have any financial or personal relationships that might bias the content of this work.*

## ABSTRACT

**Objective:** Our study aims to examine the effectiveness of arterial hypertension treatment on arterial pressure values in a group of people, by gender and age.

**Material and methods:** We performed an analytical prospective study, from 2007 to 2009, that included 2266 people; 674 subjects (397 women and 277 men) were diagnosed with essential systemic arterial hypertension, according to ESH (European Society of Hypertension) criteria. Medium age was 49 years. Therapy applied to all diagnosed patients consisted in: general measures (lifestyle modifications) and pharmacological treatment. Medication regimens implied: one agent (single drug therapy: inhibitors of angiotensin converting enzyme or angiotensin receptors blockers), two, three or more combined drugs (we used a combination of inhibitors of angiotensin converting enzyme or angiotensin receptors blockers and diuretics, beta-blockers, calcium channel blockers). Patients were followed up at 1 month, 3 and 6 month from the beginning of the study. Statistics used was EpiInfo6.

**Results:** Hypertension control was obtained for 33.38% of all patients; a better control was noticed for feminine gender (35.52%) over masculine gender (30.33%); distribution on age group showed the best control of the disease for the group aged 41 to 60 years old (19.92%) over those aged under 40 years (1.93%) and over 60 years (12.17%).

**Conclusions:** Patient's poor compliance to treatment generates a suboptimal hypertension control, emphasizing that efforts for achieving goal blood pressure should continue.

**Keywords:** arterial hypertension, therapy, control

## INTRODUCTION

**A**rterial hypertension (AHT) represents a health problem worldwide, being the most common entity treated by a physician (1-3). In our country there is an increased number of hy-

pertensive people and a high incidence of death caused by this disease and its complications (4). As a consequence, hypertension control and treatment stand as a real challenge (5,6). Best control of hypertension is obtained in USA (27.4%) and France (27%), while, in Romania control is rated around 7%, a situation

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that have not changed during last years, despite all efforts made for an adequate therapy (7). Difficulties in achieving hypertension control derive mostly from a lack of patient's cooperation.

**Objective:** the study aims to analyze effectiveness of hypertension treatment in a population from Cluj county (both urban and areas around), supervised by a family physician, generally and by gender and age. □

## MATERIAL AND METHODS

A study that included 2266 people was carried on during 2007-2009. Subjects enrolled in our study were patients registered to the same family physician. 674 people were diagnosed with arterial hypertension according to ESH criteria that imply: three different appointments with the physician (in order to exclude "white coat fear"), arterial pressure values of at least 140/90 mmHg or a patient already undergoing an antihypertensive therapy (8,9). Each selected individual was submitted to an interview based on a questionnaire. Anthropometric measures and laboratory tests were performed. Laboratory studies included: routine laboratory tests: cell blood count, serum electrolytes, serum creatinine, uric acid, glycemia, urinalysis; lipid profile: total cholesterol, low density lipoprotein and high density lipoprotein, triglycerides.

Study inclusion criteria were: age between 14 and 90 years old, diagnosis of arterial hypertension (patients diagnosed with secondary arterial hypertension, or a pathology that may lead in its course to hypertension were excluded), and patients agreement to participate to the study. Medium age was 49 years. We evaluated treatment and control of hypertension generally in the group of study and by gender and age. Assessment was performed at 1 month, 3 and 6 months from the beginning of treatment (we proceeded to a close follow up of patients in order to be able to respond to all their requests and to help them understand the importance of treatment and to avoid that healthcare professional's attitude would influence the results).

Characteristics of subjects submitted to the study: a slightly predominance of feminine gender (there were 397 women and 277 men included in the study), 179 patients had a family history of cardiovascular events, 157 hyper-

tensive people associated diabetes mellitus, 318 had obesity, 345 had dyslipidemia.

Therapy applied included: general measures, with lifestyle modifications and pharmacological treatment. Drug regimens consisted in: single drug, 2, 3 or more medicines. Lifestyle modifications were indicated to all patients and it implied: weight loss for those with obesity, a reduction of saturated fats and cholesterol, a balanced diet, a limited intake of salt and alcohol, an adequate intake of potassium, calcium and magnesium, exercise, smoking cessation (10-13). As single drug therapy we preferred angiotensin converting enzyme inhibitors (enalapril, ramipril, quinapril, perindopril) - for their effect of decreasing the risk for coronary disease or angiotensin II receptors blockers (sartans); in cases of 2, 3 or more drugs we chose a combination between angiotensin converting enzyme inhibitors or angiotensin II receptors inhibitors and diuretics/beta blockers/calcium channel blockers (14-20). Our choice for treatment was based on: arterial pressure values, age, patients history, comorbidities (obesity, dyslipidemia, diabetes mellitus), lifestyle (smoking, high intake of alcohol and salt, sedentary), patients risk profile, effect on cardiovascular risk factors, adverse reaction tolerance; when choosing a pharmacologic agent we always considered treatments cost. Therapy was established according to cardiovascular risk level (21-23).

To avoid participants withdrawal from the study due to disagreeable side effects of a medicine (for example: cough caused by angiotensin converting enzyme inhibitors), we replaced the incriminated pharmacological agent with a better tolerated one (24-27).

We must underline that we followed compelling rules when applying therapy: highest doses tolerated were achieved, drug association were carefully chosen (based on data from literature). Medical staff involved in the study was available for assistance when requested, so that medical attitude could not be questioned upon the results obtained.

The study is an analytical prospective one. Statistics used was EpiInfo6. A value of p under 0.05 was considered statistic significant.

Ethical principles for Medical Research Involving Human Subjects elaborated by the declaration of Helsinki were respected. □

**RESULTS**

About a third of all patients underwent monotherapy and the rest of them received combined treatment (2, 3 or more pharmacological agents). Most of the subjects (almost half of them) needed a combination of 2 agents (Figure 1).

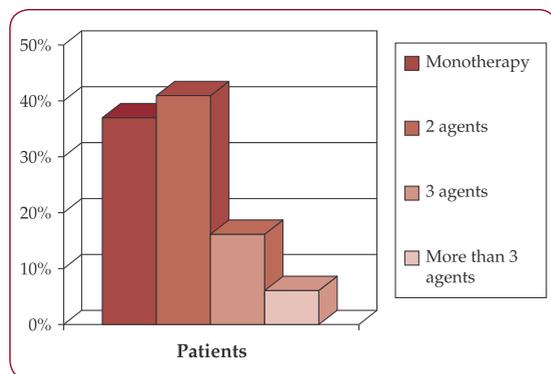
We noticed persistent cough as a redundant side effect in a number of 13 hypertensive subjects (5.2%).

Generally, we obtained arterial hypertension control only for about a third of all individuals treated (Figure 2).

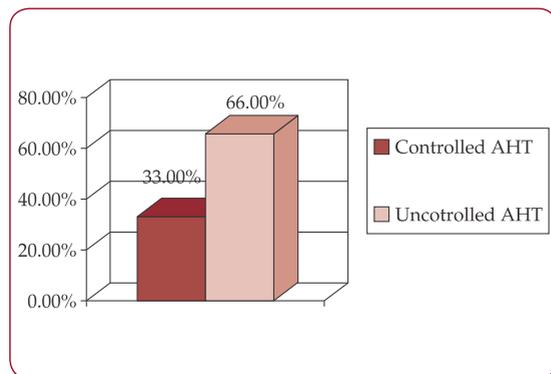
We found out a better control of hypertension for feminine gender (Figure 3).

Distribution on age groups showed the best control for patients aged 41 to 60 years (Figure 4).

We observed that over half of the hypertensive people associated mixt dyslipidemia, almost half associated obesity and a quarter were also diagnosed with diabetes mellitus (Tabel 1).



**FIGURE 1.** Hypertension therapy-type of medication



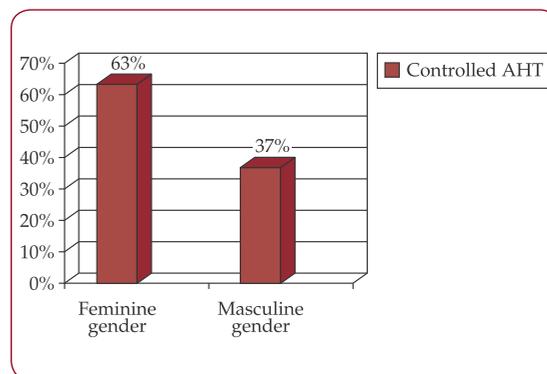
**FIGURE 2.** Hypertension control generally in the studied population

**DISCUSSIONS**

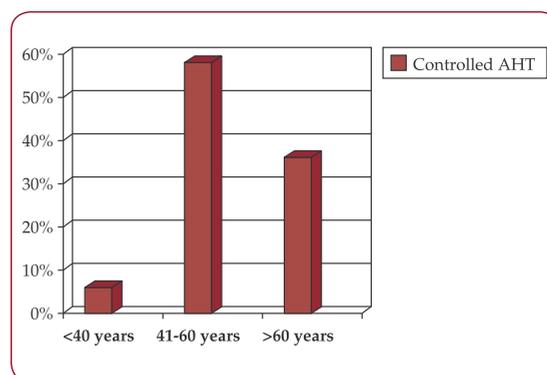
The goal of hypertension treatment is to reduce the risk of cardiovascular disease (28).

The objectives are: to make patients aware of the disease and motivate them, to explain all the benefits that derive from following the treatment accurately (decrease the risk of stroke and cardiovascular disease), to reduce blood pressure as close to normal values as possible (decrease the risk of complications), to slow down the progression of the disease, to improve health status and life quality, to modify lifestyle, to prolong life, to reduce associated morbidities (29-31).

National health surveys in different countries indicated a poor control of hypertension (32). Our study showed a control rate comparable to data from USA and Great Britain, and superior to other European countries and not



**FIGURE 3.** Hypertension control by gender



**FIGURE 4.** Hypertension control by age

Associated morbidities	Number of patients
Diabetes mellitus	157 (23.29%)
Obesity	318 (47.18%)
(Mixt) Dyslipidemia	370 (54.89%)

**TABLE 1.** Associated morbidities of arterial hypertension in the group of study

concordant to SEPHAR study that pointed out a control of hypertension in Romania of only 7%. Other studies conducted in Romania, such as CARDIO-ZONE also indicated a poor control of hypertension in our country (33). Our results may be explained by: a decreased number of patients, particularities concerning medical education and geographic area of participants, availability and involvement of healthcare professionals from the medical unit where the survey was conducted.

Most of the patients involved in our study received a combination of 2 drugs. A third of all patients were administered monotherapy. Only a small percentage underwent treatment that implied more than 3 drugs.

The results we obtained were, anyway, unsatisfying. The lack of an adequate control of hypertension is determined mainly by a reduced compliance of patients to treatment. This attitude is generated by the fact that people are not aware of how important therapy is and how serious the consequences of hypertension may be. In our study the suboptimal control of hypertension was generated by a reduced attendance to treatment and by not following the therapy properly-ignorance of general measures (lifestyle modification: balanced diet, physical activity, weight loss, limitation of alcohol intake and adjustment of dietary sodium, smoking cessation), inadequate drug doses or discontinued medication, or even giving up the treatment; last two situations were encountered especially after blood pressure values were reduced. Another reason for noncompliance (mentioned by some patients) was therapy costs-despite the fact that correlation between therapeutic agent (treatment costs) and financial status of the hypertensive people were considered from the beginning (34-40).

On what hypertension control by gender is concerned, better results were found out for feminine gender. This can be explained by a higher compliance of women to treatment and more easily proceeded lifestyle modifications (in a previous study we ascertained less inaccurate habits for women in comparison to men: alcohol intake, smoking, additional dietary sodium intake), as well as higher mobilization for physical activity, weight loss (esthetic reasons may have been involved) (41).

We ascertained that age group 41 to 60 years old were the best controlled. A higher adherence to therapy determined by a better understanding on hypertension meaning and on

its consequences, a maturity of medical education, a stable financial status may have led to these results. Worst results were obtained for patients under 40 years old-not necessarily due to a lack of understanding the purpose of the therapy, but mostly, due to a tendency of minimizing the chances for disease consequences (coronary disease, stroke) and distrust that hypertension may occur at this age. The majority of our participants under 40 years old motivated their attitude by the absence of annoying symptoms, correlation of the disease with older people (generally over 50 years old), absence of a family record of hypertension, lack of confidence that applying general measures may lead to targeted values of blood pressure. We must also mention that due to decreased number of patients aged less than 40 years, the results may not be significant. For patients over 60 years of age we ascertained an inadequate treatment invoked by associated comorbidities, with the necessity of an increased number of drugs to be administered and, therefore a higher cost of treatment and by a lack of understanding the importance of an accurate therapy and of the consequences that may derive from not following the treatment. In a previous study we ascertained that patients aged over 60 years presented associated comorbidities in a larger number of cases (diabetes mellitus, obesity and dyslipidemia). Data are not concordant to those existing in specialty literature as, usually the group of hypertensive people aged over 60 years are more difficult to be treated in order to achieve goal blood pressure and we obtained a better control of hypertension for this group of age than other studies did (42,43).

Surprisingly, we found out that the "halves rules" described by Wilber and Barrow even since 1972, meaning that half of the hypertensive people are diagnosed, from these only half are treated, and out of them only half are controlled, also apply to our study (44).

Efforts to make people aware of what hypertension really means and what consequences may have if not treated should be made continuously. Patients need to be motivated to stay on their therapy plan even if that requires a more aggressive attitude of healthcare professionals. ■

## CONCLUSIONS

1. Arterial hypertension control is not optimum, due a lack of compliance of patients to treatment.

2. Efforts to apply measures that increase patients' involvement and compliance to therapy by understanding the disease and its serious consequences should be made continuously.
3. Healthcare professionals should apply a more aggressive therapeutic attitude for hypertensive people and they should encourage patients to take an active role in their own treatment.

## REFERENCES

1. **Kearney PM** – Whelton M, Reynolds K, et al. Worldwide prevalence of hypertension: a systematic review. *J Hypertens* 2004; 22:11-19.
2. **Mancia G, Facchetti R, Bombelli M, et al.** – Long-term risk of mortality associated with selective and combined elevation in office, home, and ambulatory blood pressure. *Hypertension* 2006; 47:846-53.
3. **Kearney PM, Whelton M, Reynolds K, et al.** – Global burden of hypertension: analysis of worldwide data. *Lancet* 2005; 365:217-23.
4. **Dorobantu M, Badila E, Darabont R, et al.** – Prevalenta, tratamentul si controlul hipertensiunii arteriale in Romania–date din studiul SEPCHAR (Studiul de Prevalenta a Hipertensiunii Arteriale si Evaluare a Riscului Cardiovascular in Romania). *Medicina Interna* 2006; 4:9-18.
5. **Chobanian AV** – The Hypertension Paradox-More Uncontrolled Disease despite Improved Therapy. *N Eng J Med* 2009; 361:878-87.
6. **Hebert PR, Moser M, Mayer J, et al.** – Recent evidence on drug therapy of mild to moderate hypertension and decreased risk of coronary heart disease. *Arch Intern Med* 1993; 153:578-81.
7. **Wolf-Maier K, Cooper RS, Kramer H, et al.** – Hypertension Treatment and Control in Five European Countries, Canada, and the United States. *Hypertension* 2004; 43:10-17.
8. 2003 European Society of Hypertension-European Society of Cardiology guidelines for the management of arterial hypertension. *J Hypertension* 2003; 21:1011-53.
9. 2007 Guidelines for the Management of Arterial Hypertension: The Task Force for the Management of Arterial Hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC). *Eur Heart J* 2007; 0:ehm236v1-75.
10. **Chobanian AV, Bakris GL, Black HR, et al.** – Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Hypertension* 2003; 42:1206-52.
11. **Blumenthal JA, Babyak MA, Hinderliter A, et al.** – Effects of the DASH diet alone and in combination with exercise and weight loss on blood pressure and cardiovascular biomarkers in men and women with high blood pressure: the ENCORE study. *Arch Intern Med* 2010; 170:126-35.
12. **Narkiewicz K** – Diagnosis and management of hypertension in obesity. *Obes Rev* 2006; 7:155-62.
13. **Svetkey LP, Moore TJ, Simons-Morton DG, et al.** – Angiotensinogen genotype and blood pressure response in the Dietary Approaches to Stop Hypertension (DASH) study. *J Hypertens* 2001; 19:1949-56.
14. **Kaplan NM, Gifford RW Jr.** – Choice of initial therapy for hypertension. *JAMA* 1996; 275:1577-80.
15. **Williams GH** – Converting-enzyme inhibitors in the treatment of hypertension. *N Eng J Med* 319:1517-25.
16. **Hansson L, Hedner T, Lund-Johansen P et al.** – Randomised trial of effects of calcium antagonists compared with diuretics and beta-blockers on cardiovascular morbidity and mortality in hypertension: the Nordic Diltiazem (NORDIL) study. *Lancet* 2000; 356:359-65.
17. **Cummings DM, Amadio P Jr, Nelson L, et al.** – The role of calcium channel blockers in the treatment of essential hypertension. *Arch Intern Med* 1991; 151:250-9.
18. **Sica DA, Gehr TWB, Frishman WH** – The renin-angiotensin axis: angiotensin-converting enzyme inhibitors and angio-tensin-receptor blockers. In: Frishman W, Sonnenblick S, Sica DA, eds. *Cardiovascular Pharmacotherapeutics*, 2<sup>nd</sup> ed, New York: McGraw-Hill; 2003;131-156.
19. **Lee DS, Vasan RS** – Goals and guidelines for treating hypertension in a patient with heart failure. *Curr Treat Options Cardiovasc Med* 2006; 8:334-344.
20. **Sica DA** – Dosage considerations with perindopril for hypertension. *Am J Cardiol* 2001;88:131-181.
21. **Borghesi C** – Interactions between hypercholesterolemia and hypertension: implications for therapy. *Curr Opin Nephrol Hypertens* 2002; 11:489-496.
22. **Selby JV, Peng T, Karter AJ, et al.** – High rates of co-occurrence of hypertension, elevated low-density lipoprotein cholesterol, and diabetes mellitus in a large managed care population. *Am J Manag Care* 2004; 10:163-170.
23. **Wong ND, Pio JR, Franklin SS, et al.** – Preventing coronary events by optimal control of blood pressure and lipids in patients with the metabolic syndrome. *Am J Cardiol* 2003; 91:1421-1426.
24. **Messerli F, et al.** – Angiotensin receptor blockers: baseline therapy in hypertension? *Eur Heart J* 2009; 30:2427-30.
25. **Luque CA, Vazquez Ortiz M** – Treatment of ACE inhibitor induced cough. *Pharmacotherapy* 1999; 19:804-810.
26. Agency for Healthcare Research and Quality. Comparative Effectiveness of Angiotensin-Converting Enzyme Inhibitors (ACEIs) and Angiotensin II Receptor Antagonists (ARBs) for Treating Essential Hypertension. AHRQ: Agency for Healthcare Research and Quality. Available at <http://effectivehealthcare.ahrq.gov/healthInfo.cfm?infotype=rr&ProcessID=12%20&DocID=48>. Accessed March, 2011.
27. **Kostis JB, Packer M, Black HR, et al.** – Omapatrilat and enalapril in patients with hypertension: the Omapatrilat Cardiovascular Treatment vs. Enalapril (OCTAVE) trial. *Am J Hypertens* 2004; 17:103-111.
28. **Johnson ML, Pietz K, Battleman DS, et al.** – Prevalence of Comorbid Hypertension and Dyslipidemia and Associated Cardiovascular Disease. *Am J Manag Care* 2004; 10:926-932.
29. Weber MA. Hypertension treatment and implications of recent cardiovascular outcome trials. *J Hypertens Suppl* 2006; 24:S37-44.
30. **Sur G, Duncea C** – Hipertensiunea arteriala la copil si adult, Cluj-Napoca: Editura Casa Cartii de Stiinta, 2002.
31. **Lip GYH, Fekmeden DC, Li-Saw-Hee, et al.** – Hypertensive heart disease. *Eur Heart J* 2000; 21:1653-1665.
32. **Khan NA, McAlister FA, Lewanczuk RZ, et al.** – The 2005 Canadian

- Hypertension Education Program recommendations for the management of hypertension: part II -therapy. *Can J Cardiol* 2005; 21:657-72.
33. **Cinteza M, Pana B, Cochino E, et al.** – Prevalence and control of cardiovascular risk factors in Romania cardiovascular zone national study. *Maedica* 2007; 2:277-88.
34. World Health Organization. 1999 World Health Organization-International Society of Hypertension Guidelines for the Management of Hypertension. Guidelines Subcommittee. *J Hypertens* 17:151-83.
35. **Sacks FM, Svetkey LP, Vollmer WM, et al.** – Effects on blood pressure of reduced dietary sodium and the Dietary Approaches to Stop Hypertension (DASH) diet. DASH-Sodium Collaborative Research Group. *N Engl J Med* 2001; 344:3-10.
36. **Calhoun DA, Jones D, Textor S, et al.** – Resistant hypertension: diagnosis, evaluation, and treatment: a scientific statement from the American Heart Association Professional Education Committee of the Council for High Blood Pressure Research. *Circulation* 2008; 117:510-26.
37. **Dickerson JE, Hingorani AD, Ashby MJ, et al.** – Optimisation of antihypertensive treatment by crossover rotation of four major classes. *Lancet* 1999; 353:2008-13.
38. **Andersson OK, Almgren T, Persson B, et al.** – Survival in treated hypertension: follow-up study after two decades. *BMJ* 1999; 319:392-400.
39. **Yusuf S, Sleight P, Pogue J, et al.** – Effects of an angiotensin-converting-enzyme inhibitor, ramipril, on cardiovascular events in high-risk patients. The Heart Outcomes Prevention Evaluation Study Investigators. *N Engl J Med* 2000; 342:145-53.
40. **Gradman AH, Cutler NR, Davis PJ, et al.** – Combined enalapril and felodipine extended release (ER) for systemic hypertension. Enalapril-Felodipine ER Factorial Study Group. *Am J Cardiol* 1997; 79:431-5.
41. **Sur G, Sur M, Kudor-Szabadi L, et al.** – Arterial Hypertension-Prevalence of Risk factors and Morbide Associations that increase Cardiovascular risk. *Maedica* 2010; 5:34-41.
42. **Wolff JL, Starfield B, Anderson G** – Prevalence, expenditures, and complications of multiple chronic conditions in the elderly. *Arch Intern Med* 2002; 162:2269.
43. **Kannel WB** – Cardiovascular disease preventive measures for the older patient: an epidemiologic perspective. *Am J Geriatr Cardiol* 2006; 15:382-8.
44. **Wilber JA, Barrow JG** – Hypertension-a community problem. *Am J Med* 1972; 52:653-663.