

Control of blood pressure in a population of patients with hypertension and in a subgroup with hypertension and diabetes: Relationship with characteristics of the health care center and the community

M. Benítez, N. Codina, A. Dalfó, M.A. Vila, J.M. Escribà, E. Senar, M. Miracle y F.J. Tovillas

Aims. To evaluate how well blood pressure (BP) is controlled in the population of persons with hypertension alone and with diabetes, and to evaluate the influence of characteristics of the health care center on the degree of control of BP.

Design. Descriptive, cross-sectional, multicenter, retrospective study.

Setting. 31 health centers in Catalonia (Northeastern Spain).

Participants. Random sample of 2240 clinical records of patients with hypertension who were seen at 31 different primary care centers in Catalonia between January and December 1996.

Main outcome measures. Audit of clinical records. We recorded the two most recent BP measurements, and annotations regarding screening for and diagnosis of other cardiovascular risk factors. We also recorded health center and physician characteristics.

Results. 495 patients (22.1%) had diabetes in addition to hypertension. 61.2% were women. Mean age was 64.9 years (95% CI, 64.4-65.4 years).

In 25.7% of the patients, BP was below 140/90 mmHg (95% CI, 23.9-27.5%), but among patients with diabetes only 6.7% had BP below 130/85 mmHg (95% CI, 4.5-8.9%).

Mean systolic and diastolic BP at the end of the study period were higher at teaching centers. Diastolic BP was significantly higher at urban centers and in patients younger than 65 years. Diastolic BP was also higher in patients with at least one associated cardiovascular risk factor, and at centers less than 6 years old, although these differences were not statistically significant. We found no differences according to physician characteristics.

Conclusions. Blood pressure was adequately controlled in few patients with hypertension and diabetes in Catalonia. Associated cardiovascular risk factors, age less than 65 years, and being a patient at a teaching center or an urban center, were associated with a worse degree of BP control.

Key words: Hypertension. Diabetes mellitus. Cardiovascular risk factors.

CONTROL DE LA PRESIÓN ARTERIAL EN LA POBLACIÓN HIPERTENSA Y EN EL SUBGRUPO DE HIPERTENSOS Y DIABÉTICOS: RELACIÓN CON LAS CARACTERÍSTICAS DEL CENTRO Y DE LA COMUNIDAD

Objetivo. Valorar el grado de control de la presión arterial (PA) en la población hipertensa e hipertenso y diabética, así como la influencia de las características del centro en este control.

Diseño. Estudio descriptivo, transversal, multicéntrico, retrospectivo.

Emplazamiento. Un total de 31 centros de salud de Cataluña.

Participantes. Muestra aleatoria de 2.240 historias clínicas de pacientes hipertensos de 31 centros de atención primaria de Cataluña, atendidos entre enero y diciembre de 1996.

Mediciones principales. Auditoría de historias clínicas. Se recogieron los dos últimos valores de PA y el registro de cribado y diagnóstico de otros factores de riesgo cardiovascular. También se recogieron las características del centro de salud y del médico.

Resultados. Cuatrocientos noventa y cinco pacientes (22,1%) eran además diabéticos. Un 61,2% era de sexo femenino. La media de edad es de 64,9 años (IC del 95%, 64,4-65,4). El 25,7% de los pacientes presentaba cifras de PA por debajo de 140/90 mmHg (IC del 95%, 23,9-27,5%), pero solamente en un 6,7% de diabéticos eran menores de 130/85 mmHg (IC del 95%, 4,5-8,9%).

Las cifras de PA sistólica (PAS) y diastólica (PAD) medias al final del período de estudio fueron mayores en los centros docentes. Se observaron PAD significativamente superiores en los centros urbanos y en los pacientes menores de 65 años. También fueron mayores en aquellos pacientes que tenían algún factor de riesgo cardiovascular asociado y en los centros con menos de 6 años de funcionamiento, aunque las diferencias no fueron estadísticamente significativas. No se observaron diferencias según las características del médico.

Conclusiones. Existe un bajo grado de reducción de las cifras de PA entre la población hipertensa y diabética de Cataluña. Presentar otros factores de riesgo cardiovascular asociados, tener menos de 65 años y ser atendido en un centro docente y urbano se asocian a peor control tensional.

Palabras clave: Hipertensión arterial. Diabetes mellitus. Factores de riesgo cardiovascular.

Spanish version available at
www.atencionprimaria.com/42194

A commentary follows this article.
(pág. 379)

Equipo de Atención Primaria
Gòtic. Institut Català de la Salut.
Barcelona.

*Técnico de salud DAP Ciutat
Vella.

Correspondence: Mencia Benítez
Camps
EAP Gòtic. Passatge de la Pau, 1.
08002 Barcelona, Spain.

Manuscript accepted for
publication 13.06.01.

Introduction

Hypertension (HT) is a recognized cardiovascular risk factor (CRF) which absorbs a large part of available primary care resources¹⁻³. For most patients with HT, the aim of efforts to control blood pressure (BP) is to maintain figures below 140/90 mmHg. In patients with HT who also have diabetes, the target figures should be even lower, as recent clinical trials have shown^{4,5}. Accordingly, the figures for these patients have been set at 130/85 mmHg^{6,7}, although some authorities recommend even lower values^{8,9}. The difference is due to the greater cardiovascular risk in patients who also have diabetes. Because many micro- and macroangiopathic complications that occur in patients with diabetes are aggravated by HT, blood pressure in these persons needs to be controlled much more strictly⁴.

It is currently accepted that because of the chronic nature and high prevalence of HT, health care aimed at controlling this disorder should be provided mainly by primary care centers (PCC)^{1,2}. In our setting, however, the situation varies widely: some PCCs are located in rural areas, others are in urban areas; some are teaching centers, others are not. Might these differences lead to variations in the results of continued care for these patients?

The aim of this study was to determine whether BP was adequately controlled in the population with HT alone and with diabetes served by PCCs in Catalonia. We also investigated whether the characteristics of the center influenced the degree of control of HT in these populations.

Material and methods

Design

This descriptive, cross-sectional, multicenter study involved 31 PCC in Catalonia and was done in 1998. The clinical data we studied were from the period from January to December 1996, one year after the publication of practical guidelines for the management of HT in Catalanian PCCs¹⁰.

Study population

The region of Catalonia is divided into four primary care subdivisions administered by the Catalanian Institute of Health. Eighteen percent of the centers are located in the Barcelona Nord-Maresma-Girona subdivision; 32% in Centre-Lleida, 38% in Costa de Ponent-Tarragona-Tortosa, and 12% in Barcelona. Seventy percent of the centers are not involved in teaching activities, and the other 30% are teaching centers. The centers were sampled randomly according to a stratified scheme that reproduced the relative percentages of centers in each subdivision. Centers where implementation of the most recent reforms was pending were excluded from this study. Table 1 summarizes the numbers and distribution of the centers that participated.

In the second stage, clinical records held at the centers were sampled randomly, taking into account the total number of patients with HT seen at each center. The sample size necessary to fulfil

the requirements of a 95% confidence interval and a 3% degree of precision was calculated, and mean expected prevalence of HT in the population served by all centers was estimated at 12%.

Data collection

Six persons were trained in a pilot study to audit the clinical records, which were chosen for study just before the data were recorded. A pilot test with the same procedure as was later used for the centers actually included in the study was done with 50 charts from 10 centers considered representative of the region of Catalonia. Problems identified in the pilot study led to some modifications in the questionnaire to adapt it to the information contained in the chart.

These 6 persons audited the clinical records used in all PCCs. None of the auditors had any personal or professional relationship with any of the participating centers.

The following variables were recorded:

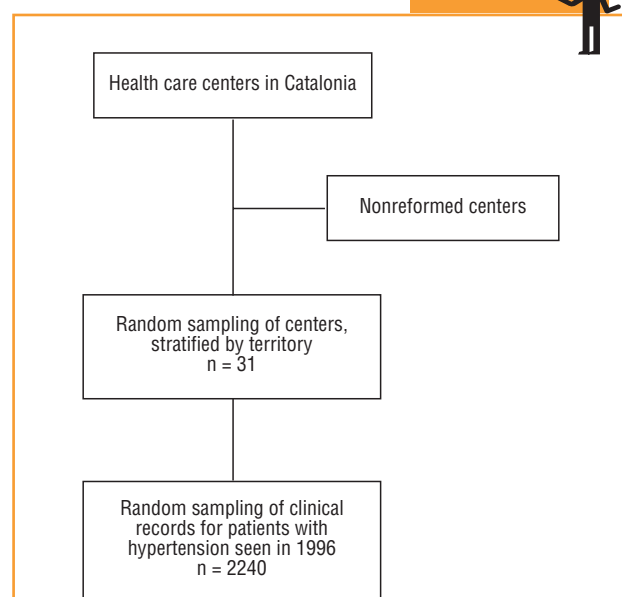
Characteristics of the center.

Number of years in operation, teaching or non-teaching, rural or urban. A rural center was defined as a local center separate from the PCC, required to serve a widely dispersed population. A teaching center was defined as one where resident physicians worked in addition to permanent staff.

Physician characteristics.

Age, sex, specialty, type of contract, number of patients, and hours spent per day seeing patients.

Material and methods



Scheme of the study design

Descriptive, cross-sectional study. Audit of random sample of clinical records of patients with hypertension seen in a sample of Primary care centers in Catalonia.

TABLA 1 Distribution of the sample of clinical records (HCCR) from different health centers

Centre	N	% HCCR
<i>Barcelonès Nord-Maresme-Girona</i>		
Besalú	76	3.4
Girona-4	93	4.2
Masnou	76	3.4
Ronda Cerdanya	56	2.5
Sarrià de Ter	83	3.7
<i>Costa de Ponent-Tarragona-Tortosa</i>		
Camps Blancs	107	4.8
Constantí	53	2.4
Cornellà-La Gavarra	90	4
Can Serra	72	3.2
Castelldefels	33	1.5
Torreforta-La Granja	39	1.7
La Sènia	39	1.7
Molí Nou	76	3.9
Mora	75	3.3
Sant Just Desvern	86	3.8
Santa Coloma de Queralt	68	3
Ulldecona	37	1.7
Valls	97	4.3
<i>Centre-Lleida</i>		
Ponts	102	4.6
Can Deu	59	2.6
Cervera	72	3.2
La Llagosta	64	2.9
Súria	96	4.3
Manresa 2	65	2.9
Montornés-Montmeló	75	3.3
Santa Eugènia de Berga	93	4.2
Torre Romeu	109	4.9
<i>Barcelona</i>		
La Mina	66	2.9
Raval Sud	72	3.2
Via Barcino	43	1.9
Rec Comtal	68	3

Patient characteristics.

Age, sex, known duration of HT, last two BP values, screening for and diagnosis of any of the following CRF: smoking (recorded in the medical record as smoker vs. nonsmoker), diabetes (two glucose values > 140 mg/dL), obesity (body mass index ≥ 30) and hypercholesterolemia (two cholesterol values > 200 mg/dL). Screening was recorded when the record noted any screening procedure for CRF via interview, laboratory analysis or electrocardiogram. The degree of staff compliance in recording the indicators proposed by the Working Group on Hypertension of the Catalan Society for Family and Community Medicine (evaluation of the

TABLA 2 Characteristics of participating health centers (n = 31)

	N	%
Type		
Rural	10	32.3
Urban	21	67.7
Age of center		
≤ 5 years	4	12.9
6-10 years	24	77.4
≥ 10 years	3	9.7
Teaching center		
Yes	11	35.5
No	20	64.5
Mean visitors/day (SD)	30.07 (SD, 6.65)	

SD: Standard deviation.

diagnosis, follow-up, check-ups, multifactorial approach and structure was also evaluated¹⁰. The data from this part of the audit will be analyzed in a separate study.

Statistical analysis

The statistical analysis was done with the SPSS statistical package for Windows; 95% confidence intervals were used. The possible relationships between variables were analyzed with the chi-square test for qualitative variables, and with Student's t test for quantitative variables. Differences were considered significant at p values ≤ 0.05 .

Results

Description of the sample

From all patients served by the 31 centers included in the study, we selected 2240 with hypertension, of whom 495 (22.1%) also had diabetes. Teaching centers were responsible for 34.6% of all patients with HT sampled for this study, and 42.1% were seen at rural centers. The center and patient characteristics are summarized in Tables 2 and 3. Mean age of the physicians was 39.9 years, and 56.7% were men. Slightly more than three quarters (78.4%) were members of the permanent staff, and 43.7% were family physicians. Mean age of the patients was 64.9 years (95% CI 64.4-65.4 years), and 61.2% were women. In the subgroup with both HT and diabetes, mean age was 67.7 years (95% CI 66.6-68.7 years), and 65% were women.

The data for CRF showed that 40.5% of the patients had at least one other risk factor in addition to HT; this was the largest of the subgroups of patients with one or more CRF. The most common CRF was hypercholesterolemia (54.5%), followed by obesity (47.6%).

Control of blood pressure

Mean systolic (SBP) and diastolic blood pressure (DBP) was 145.6 mmHg (95% CI 145-146 mmHg) and 84.8 mmHg (95% CI 84.4-85.2 mmHg) respectively. In the

TABLA 3
Characteristics of the patients (n = 2240)

	N	%
Sex		
Men	869	38.8
Women	1371	61.2
Other cardiovascular risk factors		
Diabetes	495	22.1
Smoking	314	14
Obesity	1066	47.6
Hypercholesterolemia	1221	54.5
N.º of CRF		
Only HT	400	17.87
HT and 1 CRF	906	40.45
HT and 2 CRF	697	31.11
HT and 3 CRF	237	10.58
According to type of center		
Rural	943	42.1
Urban	1297	57.9
Teaching	773	34.5
Non-teaching	1467	65.4

HT: Hypertension; CRF: Cardiovascular risk factors (Diabetes, smoking, obesity, hypercholesterolemia).

subgroup of patients with HT and diabetes, these figures were 147.9 mmHg (95% CI 147-149 mmHg) and 83.2 mmHg (95% CI 82.4-84.0 mmHg) respectively.

Optimum control of HT (BP < 140/90 mmHg) was attained in 25.7% of all cases (95% CI 23.9-27.5%). In the subgroup with HT and diabetes, BP was < 140/90 mmHg in 24.7% of the patients (95% CI 21.0-28.4%). The difference between patients with HT only and those with HT and diabetes was not significant. In the latter subgroup, the proportion of patients whose BP was < 130/85 mmHg decreased to 6.7% (95% CI 4.5-8.9%).

Variables associated with control of BP

Systolic BP was higher in patients older than 65 years and in patients followed at urban and teaching centers, although the difference was significant only for teaching centers ($p = 0.0001$) and patients older than 65 years ($p = 0.0001$). Diastolic BP was significantly higher in patients followed at urban centers ($p = 0.0001$) and teaching centers ($p = 0.001$). In contrast with systolic BP, which was higher in patients older than 65 years, diastolic BP was higher in patients younger than 65 years ($p = 0.0001$).

The relationships between BP values and different factors analyzed in this study are summarized in Table 4.

Blood pressure was higher in patients with more than one

TABLA 4
Mean SBP and DBP according to different risk factors in the population of persons with hypertension seen in health care centers in Catalonia

	SPB			DPB		
	Mean (mmHg)	Difference	95% CI	Mean (mmHg)	Difference	95% C
Type of center						
Rural	145HT + 3 CRF1	-0.8	(-2.31; 0.76)	83.4	-2	(-2.94; -1.13)*
Urban	145.9			85.4		
Teach	147.6	3	(1.52; 4.55)**	85.8	1.6	(0.68; 2.47)*
Non-teach	144.6			84.2		
N.º assoc. CRF						
Only HT	144.7			84.1		
HT + 1 CRF	145.2	-0.5**	(-2.60; 1.52)	84.7	-0.6b	(-1.75; 0.65)
HT + 2 CRF	146.2	-1.5**	(-3.70; 0.56)	85.1	-1 ^b	(-2.26; 0.26)
HT + 3 CRF	146.9	-2.2**	(-5.07; 0.55)	84.9	-0.8 ^b	(-2.43; 0.81)
Sex						
Men	144.4	-1.9	(-3.37; 0.39)	84.7	-0.1	(-0.91; 0.85)
Women	146.3			84.8		
Age						
≤ 65 years	143	-4.7	(-6.09; 3.23)	87.7	5.2	(4.38; 6.02)*
> 65 years	147.7			82.5		

SBP: Systolic blood pressure; DBP: Diastolic blood pressure; CRF: cardiovascular risk factors (diabetes, smoking, hypercholesterolemia and obesity); HT: Hypertension.

*Statistically significant difference.

**Difference in comparison to the category "Only HT."

TABLA 5**Mean SBP and DBP according to factors studied in the subgroup of patients with hypertension and diabetes, seen at health care centers in Catalonia**

	SBP			DBP		
	Mean (mmHg)	Difference	95% CI	Mean (mmHg)	Difference	95% CI
Type of center						
Rural	147	-1.3	(-4.58; 1.82)	82.4	-1.2	(-3.09; 0.66)
Urban	148.3			83.6		
Teaching	150.8	4.3	(1.21; 7.39)*	84.5	1.9	(0.13; 3.77)*
Non-teaching	146.5			82.6		
N.º assoc. CRF						
HT and DM	145.3			80.5		
HT. DM and 1 CRF	148.3	-3**	(-7.17; 1.17)	83.3	-2.8 ^b	(-5.19; -0.33)*
HT. DM and 2 CRF	148.7	-3.4**	(-7.82; 1.08)	84.4	-3.9 ^b	(-6.43; -1.39)*
Sex						
Men	146.3	(-2.5)	(-5.56; 0.71)	83	-0.3	(-2.17; 1.53)
Women	148.8			83.3		
Age						
≤ 65 years	147	(-1.5)	(-4.50; 1.61)	86.5	5	(3.34; 6.81)*
> 65 years	148.5			81.5		

CRF: Cardiovascular risk factors (diabetes, smoking, hypercholesterolemia and obesity); SBP: Systolic blood pressure;

DBP: Diastolic blood pressure.

* Statistically significant difference.

**Difference in comparison to the category "HT and DM."

CRF in addition to diabetes, and in patients who were followed at centers that had been open for less than 6 years, although these differences were not statistically significant. We found no relation between physician's age and degree of control of HT.

The relationships between BP values and different factors we studied in the population of patients with HT and diabetes are summarized in Table 5. In this population, systolic BP was higher at teaching centers and at urban centers, in patients older than 65 years, and when one other CRF was present in addition to HT and diabetes. However, the difference was significant only for teaching centers ($p = 0.005$). Diastolic BP was higher in urban centers (statistically nonsignificant), in patients younger than 65 years ($p = 0.001$), and in patients followed at teaching centers ($p = 0.036$).

Discussion

Hypertension is a CRF whose control and follow-up are mainly the responsibility of the primary care physician¹⁻³. Studies have shown that above the cut-off values used to diagnose HT and evaluate the effectiveness of control measures, the risk of a cardiovascular event is increased. These cut-off values are currently 140/90 mmHg in patients without diabetes, and 130/85 mmHg in patients with diabetes^{6,7}.

Many studies¹¹⁻¹⁴ have looked at the prevalence and degree of control of HT in Spain, although few of them have taken into account the influence of characteristics of the center responsible for the patient. The Controlpres-95 study¹¹, which involved a total of 7032 patients with HT, investigated the degree of control of HT in Spain with a questionnaire that was used in primary care settings and outpatient cardiology clinics. In this study, the optimum control value (BP < 140/90 mmHg) was found in no more than 13% of all patients treated. When suboptimal control figures were considered (BP < 160/90 mmHg), this figure increased to 18%.

In the Controlpres-98 study¹², which involved only primary care centers and recruited 6900 patients with HT, the proportion of patients with an optimum degree of control was somewhat higher: 16.3%. When BP values ≤ 140/90 mmHg were used, the percentage increased to 30.1%. In another study Banegas et al¹³ found that the percentage of treated patients in whom control of BP was considered adequate (< 140/90 mmHg) was only 15.5%. Plans et al¹⁴, in a study that was limited to patients with HT in Catalonia, found that BP was lower than 160/95 mmHg in 21% of the patients. This proportion is lower than that in the present study, especially in view of the higher cut-off value used by Plans et al. to consider BP control adequate. In the 7 years that separate these two studies, primary health care services have been reformed in Catalonia, team care has been fomented, and programs for



the diagnosis and follow-up of HT have been established. These factors have undoubtedly helped to improve these percentages.

The proportion of patients with HT who were followed at PCCs in Catalonia and in whom BP could be considered optimally controlled ($< 140/90$ mmHg) was 25.7%, a figure somewhat higher than in earlier studies. In a study of a population in Hospitalet¹⁵, HT was considered well controlled in 36.4% of the patients. Although this figure is much higher than that in the present study, it should be noted that the BP value taken to indicate a good degree of control in the Hospitalet study was 160/90 mmHg.

We believe that our findings for the control of HT are better than those of other studies, as we investigated only health centers operating under the new system, where HT is managed according to a standardized protocol^{10,16}. In the subgroup of patients with HT and diabetes, a population that received particular attention in this study, 24.7% of the patients had BP $< 140/90$ mmHg. As noted above, this cut-off does not reflect an adequate degree of control in this subgroup^{4,5}, as current recommendation for these patients is to maintain BP below 130/85 mmHg. Only 6.7% percent of the patients with HT and diabetes in the present study met this stricter criterion, a proportion below the 10% recently reported by Hanninen et al¹⁷. However, these authors used a cut-off of 140/90 mmHg.

A further aim of our study was to compare the degree of control of BP between urban and rural centers, and between teaching and non-teaching centers. In teaching centers 10.8% of the patients were considered to have well controlled BP, whereas in non-teaching centers this proportion—24.9%—was significantly higher.

A search of the Medline database for items published between 1960 and 2000 failed to identify any studies that examined the influence of characteristics of the center where the patients were followed. None of the articles published during this period compared the influence of teaching vs. non-teaching centers on the degree of control of HT. Although studies have been published that investigated control of HT in rural populations¹⁸, none have compared rural vs. urban centers. In addition, we could not find any multicenter studies in Spain that mentioned the percentage of patients with HT and diabetes whose BP met currently recommended criteria. Surprisingly, at teaching centers, where activities are more often performed according to standard protocols to fulfil training requirements for residents, and where the degree of control of HT might be assumed to be higher, we found that the degree of control attained was worse than in non-teaching centers, both for all patients with HT and for the subgroup with HT and diabetes. In fact, the use of protocols to control cardiovascular risk is not accompanied by improved control of CRF¹⁹, as a study in the Basque Country showed. Although the number of patients recorded as having CRF increases, control is not necessarily im-

What is known about the subject

- The degree of control of hypertension in Spain is poor.
- In patients with hypertension and diabetes, blood pressure figures should be more strictly controlled.
- Hypertension should be followed mainly at primary care centers; however, the influence of characteristics of each center on the effectiveness of control is unknown.

What this study contributes

- The degree of control of hypertension is low (below 140/90 mmHg in 25.7% of the patients).
- Control is even worse in patients with diabetes (below 130/85 mmHg in 6.7% of the patients).
- The percentage of patients whose hypertension is well controlled is lower in teaching health centers and in urban centers.

proved²⁰. For similar reasons HT might be expected to be better controlled at urban centers because of the greater availability of resources; however, our findings show the opposite. We believe these differences may be caused by confounding factors which were not determined in the present study, such as differences in life style, eating habits or even the patient's degree of trust in his or her physician, and having higher BP at the time of diagnosis. Further studies will be needed to determine the causes of these differences.

The CRF most often associated with HT were obesity and hypercholesterolemia, a finding consistent with the results of the Controlpres-95¹¹ and Controlpres-98 studies¹². The percentage of patients with HT who smoked was only 12.4%, a figure similar to that found in these two earlier studies. In summary, we conclude that BP was decreased in a small proportion of patients with HT who were followed at PCC in Catalonia. The percentage was even smaller for patients with HT who also had diabetes (6.7%), a population in which HT should be controlled more effectively.

References

1. Abellán J, Leal M, García-Galbis JA. Papel de la atención primaria en el control de la presión arterial. *Hipertensión* 1999; 16: 147-154.
2. De la Figuera M, Dalfó A. Hipertensión arterial. En: Martín Zurro A, Cano Pérez JF, editores. *Atención primaria*

3. Dalfó A, Botey A, Buil P, Esteban J, Gual J, Revert L. Estudio del seguimiento y control del paciente hipertenso en la asistencia primaria y hospitalaria. *Aten Primaria* 1987; 4: 233-239.
4. UKPDS Group. High blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes (UKPDS 38). *BMJ* 1998; 317: 713-719.
5. Hansson L, Zanchetti A, Carruthers SG, Dahlof B, Elmfeldt D, Julius S et al. Effects of intensive blood-pressure lowering and low-dose aspirin in patients with hypertension: principal results of the Hypertension Optimal treatment (HOT) randomised trial. HOT Study Group. *Lancet* 1998; 351: 1755-1762.
6. The Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High blood pressure. *Arch Inter Med* 1997; 157: 2413-2446.
7. 1999 World Health Organization. International Society of Hypertension. Guidelines for the management of hypertension. Guidelines Subcommittee. *Journal Hypertens* 1999; 17: 151-183.
8. Ramsay LE, Williams B, Johnston GD, MacGregor GA, Poston L, Potter JF et al. Guidelines for management of hypertension: report of the third working party of the British Hypertension Society. *J Hum Hypertens* 1999; 13: 569-592.
9. Feldman RD, Campbell N, Larochelle P, Bolli P, Burgess ED, Carruthers G et al. 1999 Canadian recommendations for the management of hypertension. *CMAJ* 1999; 161 (Supl 12): 1-22.
10. Grupo de Trabajo en Hipertensión Arterial. Hipertensión arterial para la atención primaria. Sociedad Catalana de Medicina Familiar y Comunitaria. Barcelona: EDIDE, 1995.
11. Coca A. Control de la hipertensión arterial en España. Resultados del estudio Controlpres-95. *Hipertensión* 1995; 12: 182-188.
12. Coca A. Evolución del control de la hipertensión arterial en España. Resultados del estudio Controlpres-98. *Hipertensión* 1998; 15: 298-307.
13. Banegas JR, Rodríguez-Artalejo F, Graciani A, Villar F, Guallar P, De la Cruz JL. Epidemiología de la hipertensión arterial en España. Prevalencia, conocimiento y control. *Hipertensión* 1999; 16: 315-321.
14. Plans P, Pardell F, Salleras L. Epidemiología de la hipertensión arterial en la población adulta de Cataluña. *Med Clin (Barc)* 1992; 98: 369-372.
15. Armario P, Hernández del Rey R, Gasulla JM, Alonso A, Tresserras R, Pardell H. Prevalencia de hipertensión arterial en l'Hospital de Llobregat. Evolución de la tasa de control entre 1981 y 1987. *Med Clin (Bar)* 1990; 94: 570-575.
16. Guia pràctica. Hipertensió arterial per a l'atenció primària. Societat Catalana de Medicina familiar i Comunitària. Barcelona: EDIDE, 1999.
17. Hanninen JA, Takal JK, Keinanen-Kiukaanniemi. Blood pressure control in subjects with type 2 diabetes. *J Hum Hypertens* 2000; 14: 111-115.
18. Fornells JM, Balaguer I. Control de la hipertensión en el medio rural: 18 meses de seguimiento. *Med Clin (Barc)* 1987; 89: 450-455.
19. Casi A, Aizpurúa F, Ibáñez F, Múgica J, Torradella S. Efectividad de los protocolos sobre riesgo cardiovascular en el País Vasco. *Aten Primaria* 2000; 26: 287-292.
20. Dalfó A, Sisó A, Vila MA, Núñez S, Botinas M, Gibert E. Rela-

COMMENTARY

"Control of blood pressure in a population of patients with hypertension and in a subgroup with hypertension and diabetes

A. Maiques Galán

Primary Care Center. Manises. Valencia.

The control of hypertension is one of the measures used most widely to evaluate the effectiveness of interventions aimed at this risk factor. In studies published in Spain, adequate control of blood pressure, with values below 140/90 mmHg, has been achieved in a low percentage of cases, e.g., 16.3% in a study based on a population of patients diagnosed as having hypertension and treated with drugs¹, and 15.5% in a study of a population of patients aged 35-65 years².

The repercussions of these elevated blood pressure values on health in the population is beyond question; however, it is also true that the consequences of poor control of hypertension vary enormously depending on the patient's cardiovascular risk. Treatment with antihypertensive drugs provides the greatest absolute benefits in patients with the

Control of hypertension. Characteristics

Hypertension is inadequately controlled in primary care centers.

Control of hypertension is not better in patients with diabetes or a greater number of risk factors, who would be expected to benefit most from antihypertensive treatment.

Evidence shows that there continues to be a gap between expert recommendations for the control of hypertension and clinical practice.

greatest degrees of cardiovascular risk, who are most likely to benefit more from this intervention and from appropriate control of their hypertension. In view of this situation, the benefits would be different depending on whether the control of hypertension were inadequate only in patients at higher cardiovascular risk or whether patients at low risk were also included.

Patients with diabetes are a group at high cardiovascular risk for whom special care must be taken in controlling blood pressure. The association of hypertension with diabetes leads to a higher degree of risk, which can nonetheless be reverted with antihypertensive treatment, as studies have shown³. In addition, control measures should be stricter in these patients (target values < 130/85 mmHg) than in those without diabetes⁴.

Studies available to date on the control of hypertension do not report the cardiovascular risk or characteristics of the patients in whom the control of hypertension was optimum or deficient. The article published by Benítez et al. in this issue of *Atención Primaria* analyzes a very important group within the population with hypertension: patients who also have diabetes. Their data show that patients with diabetes who were followed at health care centers in the region of Catalonia do not represent a priority group for intervention aimed at controlling hypertension. (Although their study was limited to Catalonia, the same situation probably exists in the rest of Spain.) The authors found that the proportion of patients with diabetes in whom hypertension was well controlled (24.7%) was similar to that in the population without diabetes (25.7%), and that among the former, blood pressure was below the currently recommended criterion (< 130/85 mmHg) in only 6.7%. This finding illustrates, once again, the gap between expert recommendations and clinical practice. Despite the evidence, the criteria for appropriate control of risk factors continue to become stricter and more demanding.

Moreover, as the number of cardiovascular risk factors increases, so does the tendency for blood pressure to rise, in patients with and without diabetes. (The difference between these groups in the increase in blood pressure is statistically significant.) From the findings reported by Benítez et al., it can be concluded that primary care resources

devoted to controlling hypertension are not being directed toward groups of patients who, because of their high cardiovascular risk, are considered top priority—i.e., patients with diabetes or other risk factors. This is suggested by the fact that blood pressure values in the latter were similar to, or even worse than, those in the entire sample of patients. Further in-depth studies are needed to investigate the degree of control of risk factors—specifically hypertension—with particular attention to two groups of patients: those with diabetes and those at high cardiovascular risk, defined as a likelihood of having coronary disease of 20% or higher, as calculated from current risk tables. These patients, together with those who have clinically manifest cardiovascular disease, constitute the priority groups for intervention aimed at preventing cardiovascular disease. One further notable feature of the study by Benítez et al. is that blood pressure was more poorly controlled in teaching centers. This conclusion was also reported in an evaluation of the *Programa de Actividades Preventivas y de Promoción de Salud* (Preventive Activities and Health Promotion Program)⁵. Such results should lead us to reflect carefully in order to determine the causes of these results and analyze the presence of confounding factors that lead to the poor control of hypertension.

References

1. Coca A. Evolución del control de la hipertensión arterial en España. Resultados del Estudio Controlpres 98. *Hipertension* 1998; 15: 298-309.
2. Banegas JR, Rodríguez-Artalejo F, De la Cruz Troca JJ, Guallar-Castillón P, Del Rey Calero J. Blood pressure in Spain: distribution, awareness, control, and benefits of a reduction in average pressure. *Hypertension* 1998; 32: 998-1002.
3. Curb JD, Pressel SL, Cutler JA, Savage P, Applegate WB, Black H. Effect of diuretic-based antihypertensive treatment on cardiovascular disease risk in older diabetic patients with isolated systolic hypertension. *JAMA* 1996; 276: 1886-1892.
4. World Health Organization, International Society of Hypertension. 1999 WHO-ISH Guidelines for the management of hypertension. *J Hypertens* 1999; 17: 151-183.
5. Brotons C, Iglesias M, Martín-Zurro A, Martín-Rabadán M, Gené J. Evaluation of preventive and health promotion activities in 166 primary care practices in Spain. The Coordinating Group For Prevention and Health Promotion in Primary Care in Spain. *Fam Pract* 1996; 13: 144-151.