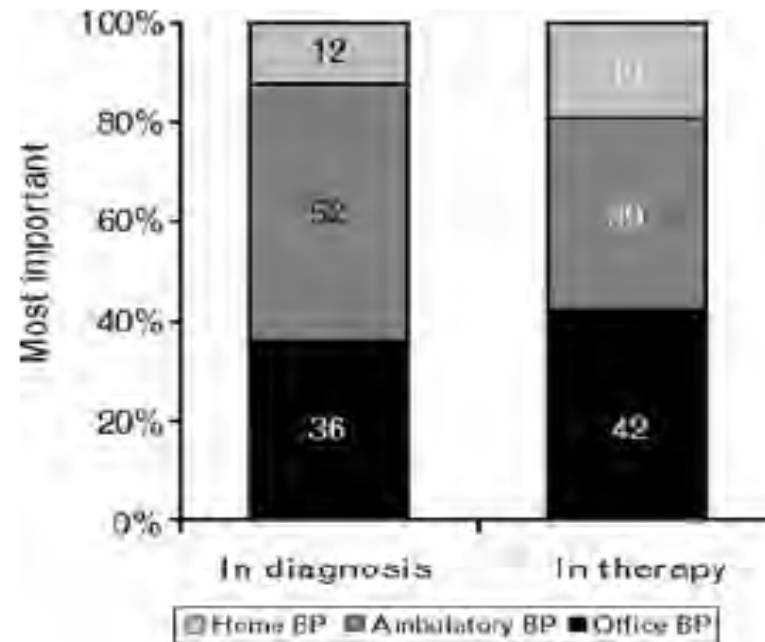


Hipertansiyon Tedavisinde  
Kan Basıncı Ölçümü: Evde mi?  
Ofiste mi? Ambulatuvar mı?

Dr. Hasan Micozkadıođlu  
Bařkent Üniversitesi Tıp Fakóltesi  
Nefroloji Bilim Dalı

**Fig. 2**



Physicians' opinions about the most important blood pressure assessment method in making diagnostic and therapeutic decisions. BP, blood pressure.

# Sunum Akışı

- Tarihçe
- Cihazlar
- Yöntemler
- Tanı
- Hasta Uyumu
- Prognoz
- Maliyet
- Sonuç

# Tarihçe



Rev. Stephen Hales  
(1677-1761)

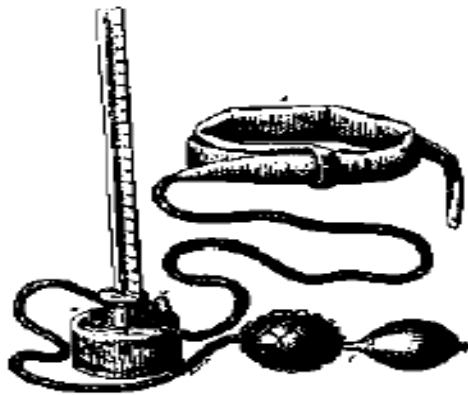
BP= 8 feet 3 inches of water

# Tarihçe

- Carl Ludwig 1847 yılında Kymograph'la (wave writer) insanda ilk kan basıncı ölçümü
- Karl Vierordt 1855 yılında cuff kullanımı
- Von Basch 1881 yılında su ile manometre

# Tarihçe

## Scipione Riva-Rocci and his Sphygmomanometer



NUM. 50

10 DICEMBRE 1896

ANNO XLVII

### Gazzetta Medica di Torino

#### SOMMARIO

**Comunicazioni originali:** Scipione Riva-Rocci. Un nuovo sfigmomanometro.  
**Comunicazione di Scipione Riva-Rocci:** Nota Accademia di medicina di Torino (Seduta 15 e 27 novembre 1896).  
**Nota clinica e terapeutica:** Un caso di tic facciale su ecologia. — L'entropia delle vie respiratorie. — Un caso di secesso fetore quanto collettività. — Il latte al cristallo e al carbonato di calcio.  
**Redazione della Gazzetta di Torino:** 24 decembre del mese di novembre.

# Tarihçe

- Nikolai Korotkoff 1905 yılında oskültasyonu ekliyor
- 1940'lar EKBM cihazları
- 1960'lar AKBM cihazları

## Utility and feasibility of a new programmable home blood pressure monitoring device for the assessment of nighttime blood pressure

Hisako Ushio · Tomoaki Ishigami · Naomi Araki · Shintaro Minegishi · Koichi Tamura · Yasuko Okano · Kazuaki Uchino · Osamu Tochikubo · Satoshi Umemura

Received: 16 February 2009 / Accepted: 13 April 2009 / Published online: 19 May 2009  
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### Abstract

**Background** Recent evidence indicates that both ambulatory blood pressure monitoring (ABPM) and home blood pressure monitoring (HBPM) are more useful than the measurement of office blood pressure for evaluating cardiovascular risks in subjects with hypertension. The major advantage of ABPM over HBPM is the ability to measure nighttime blood pressure and ambulatory blood pressure during the day. A newly developed, programmable HBPM device (HEM-5041, OMRON, Kyoto, Japan) can record blood pressure up to 350 times and measure nighttime blood pressure automatically.

**Methods** To validate the utility, feasibility, and safety of this device, we measured blood pressure by HBPM using HEM-5041 and by ABPM and compared the values in healthy volunteers.

**Results** As compared with ABPM, daytime blood pressures, coefficients of variation for systolic blood pressure, diastolic blood pressure, and pulse rate, and the percentage nighttime fall in these variables were significantly lower with HBPM. However, nighttime blood pressures did not significantly differ between HBPM and ABPM. The results of a questionnaire survey indicated that the subjects were more comfortable when blood pressure was measured by HBPM than by ABPM, whereas the quality of sleep was similar.

**Conclusions** Our results suggest that HEM-5041 is useful for evaluating nighttime blood pressures as well as nighttime blood pressure falls, without causing clinically significant discomfort.

**Keywords** Ambulatory blood pressure monitoring · Home blood pressure monitoring · Hypertension · Nighttime blood pressure

### Introduction

High blood pressure is one of the major causes of morbidity and mortality associated with cardiovascular diseases. Appropriate management of high blood pressure thus has a pivotal role in health and longevity. The Veterans Administration trials in the 1960s [1, 2] and other large clinical trials have shown that blood pressure lowering reduces both mortality and morbidity from cardiovascular causes for the subjects with hypertension. Clinical evidence obtained from these trials has been used to establish several guidelines for the management of blood pressure. So far, blood pressures have been measured by auscultation using devices similar to the “ancestral” device developed by Scipione Riva-Rocci, even in large clinical trials. However, recent evidence indicates that the office

# Cihazlar



# Cihazlar

- Civalı oskültasyon manometreleri
  - Hasta eğitimi
  - Duymada farklılık
  - Ölçümü yuvarlama
  - Çevre kirliliği
- Aneroid manometreler
- Elektronik oskültasyon manometreleri

# Cihazlar

- Osilometrik cihazlar
  - Parmak
    - Periferik vazokonstriksiyon
    - Ateroskleroz
    - Aritmi
  - El bileği
  - Dirsek üstü
    - Obezite, yaşlılık
    - Aritmi

**Box 7. Advantages and disadvantages of automated oscillometric BP devices**

Advantages	Disadvantages
Provide printouts with Systolic and diastolic blood pressure Mean blood pressure Heart rate Time of measurement Date of measurement Eliminate observer error Eliminate observer bias Eliminate terminal digit preference Minimal training Store data for future analysis and comparison Provide trend plots	Poor record for accuracy but improving All use oscillometric measurement – systolic and diastolic blood pressure derived from algorithm known only to manufacturer Oscillometric technique fails in some individuals Oscillometric technique not accurate in arrhythmias More expensive than aneroid or mercury devices BP underestimation in pre-eclampsia.

# OKBM

- 110 yıldır kullanılıyor
- 61 prospektif çalışma 1 milyondan fazla erişkin
- Kan basıncında artış= SVO ve KVO sonucu mortalitede artış
- Kan basıncında azalma= SVO ve KVO sonucu mortalitede azalma

# OKBM

- Ölçen kişilerin değişmesi
- Aynı kişinin her seferinde farklı ölçmesi
- Yetersiz sayıda ölçüm
- Sayıları yuvarlama
- Beyaz Önlük HT belirleyememe
- Maskeli HT belirleyememe

# EKBM

- Beyaz Önlük HT tanısı
- Maskeli HT tanısı
- Ölçen kişiden kaynaklı hatalar yok
- 24 saat takip nispeten iyi
- Hasta uyumunda iyileşme
- Nispeten ucuz
- Tedavinin etkilerini takip
- Kayıt ve bilgi aktarma

# EKBM

- Gece kan basıncı takibi yok
- Anksiyete sebebi
- Kendi kendine tedavi düzenleme
- Hasta eğitimi
- Geçerliliği olmayan cihazlar
- Hasta kayıtları güvenilir değil

# AKBM

- Ölçen kişiden kaynaklı hatalar yok
- Gün içi ve gece boyu kan basıncı takibi
- Beyaz Önlük HT tanısı
- Maskeli HT tanısı
- Tedavinin etkilerini takip
- Kayıt ve bilgi aktarma
- Prognostik değeri daha yüksek

# AKBM

- Eđitilmiş personel
- Yüksek maliyet
- Günlük aktivite ve uykuda rahatsızlık
- Referans normal kan basıncı deđerleri tartışmalı

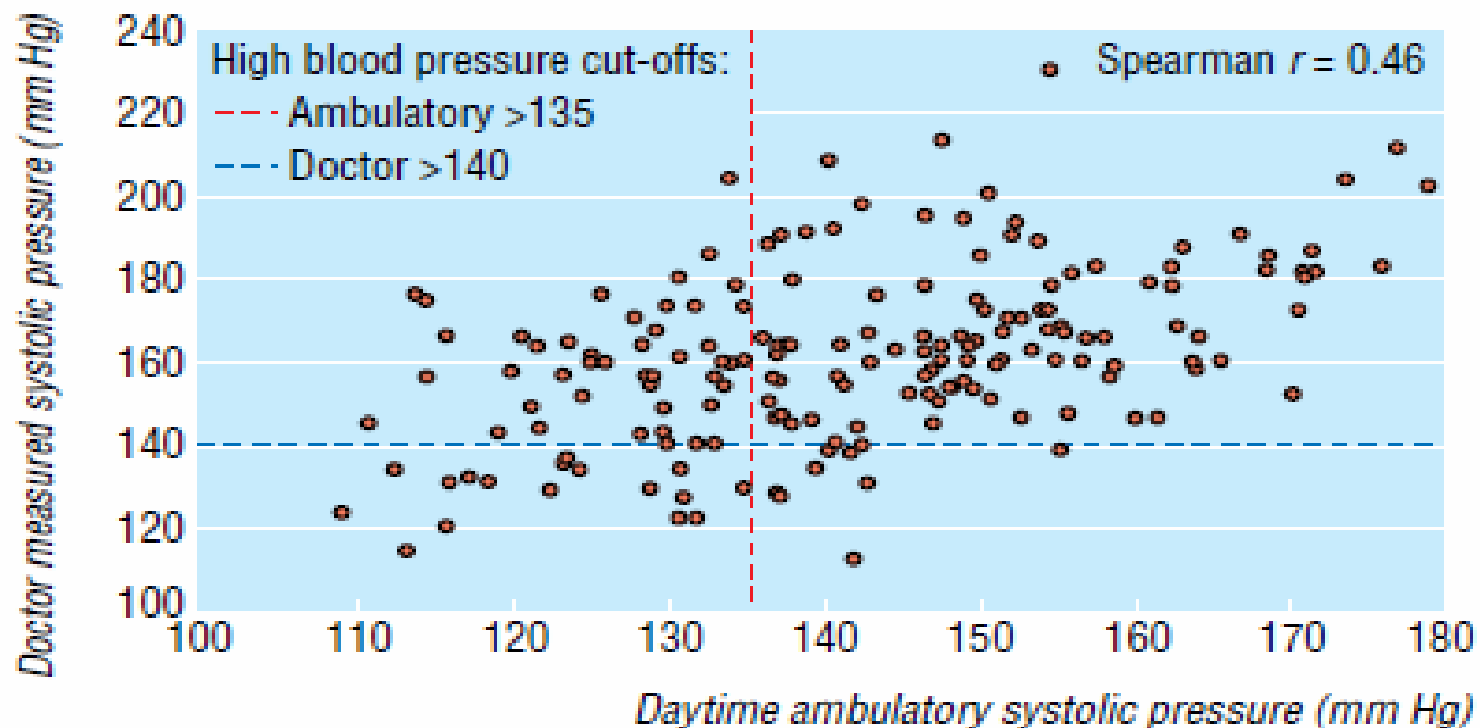
# HT Tanısı

- Beyaz Önlük HT
  - Prevalans %20
  - Çocuklar ve yaşlılarda daha sık
  - Devamlı HT gelişme riski normotensiflere göre yüksek
  - Ateroskleroz ve hedef organ hasarı daha fazla

Ugajin T et al. Arch Intern Med 2005;165:1541-1546

Puato M et al. Hypertension 2008;51:1300-1305

Cerasola G et al. J Cardiovasc Risk 1995;2:545-549



**Fig 1** Scatter plot of systolic pressure measured by doctor against daytime ambulatory systolic pressure. On the basis of the cut-off points indicated, doctors' readings have a sensitivity of 91.2%, a specificity of 25.8%, and likelihood ratios of 1.2 for a positive test and 0.33 for a negative test

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# Comparison of agreement between different measures of blood pressure in primary care and daytime ambulatory blood pressure

Paul Little, Jane Barnett, Lucy Barnsley, Jean Marjoram, Alex Fitzgerald-Barron, David Mant

Primary care p 258

Community  
Clinical Sciences  
Division (Primary  
Medical Care  
Group), Faculty of  
Medicine, Health  
and Biological  
Sciences,  
Southampton  
University,  
Aldermoor Health  
Centre,  
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*MRC clinician  
scientist*  
Jane Barnett  
*research nurse*  
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David Mant  
*professor*

Nightingale  
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Alex  
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*general practitioner*

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bmj.com 2002;325:254

## Abstract

**Objective** To assess alternatives to measuring ambulatory pressure, which best predicts response to treatment and adverse outcome.

**Setting** Three general practices in England.

**Design** Validation study.

**Participants** Patients with newly diagnosed high or borderline high blood pressure; patients receiving treatment for hypertension but with poor control.

**Main outcome measures** Overall agreement with ambulatory pressure; prediction of high ambulatory pressure ( $> 135/85$  mm Hg) and treatment thresholds.

**Results** Readings made by doctors were much higher than ambulatory systolic pressure (difference 18.9 mm Hg, 95% confidence interval 16.1 to 21.7), as were recent readings made in the clinic outside research settings (19.9 mm Hg, 17.6 to 22.1). This applied equally to treated patients with poor control (doctor v ambulatory 21.4 mm Hg, 17.3 to 25.4). Doctors' and recent clinic readings ranked systolic pressure poorly compared with ambulatory pressure and other measurements (doctor  $r=0.46$ ; clinic 0.47; repeated readings by nurse 0.60; repeated self measurement 0.73; home readings 0.75) and were not specific at predicting high blood pressure (doctor 26%; recent clinic 15%; nurse 72%; patient in surgery 81%; home 60%), with poor likelihood ratios for a positive test (doctor 1.2; clinic 1.1; nurse 2.1, patient in surgery 4.7; home 2.2). Nor were doctor or recent clinic measures specific in predicting treatment thresholds.

**Conclusion** The "white coat" effect is important in diagnosing and assessing control of hypertension in primary care and is not a research artefact. If ambulatory or home measurements are not available, repeated measurements by the nurse or patient should result in considerably less unnecessary monitoring, initiation, or changing of treatment. It is time to stop using high blood pressure readings documented by general practitioners to make treatment decisions.

## Introduction

Hypertension is perhaps the most common reason for initiation of lifelong drug treatment and ongoing man-

agement by doctors. Six prospective studies have shown that ambulatory blood pressures may be a much better predictor of target organ damage and subsequent adverse events than measurements made in a clinic.<sup>1</sup> As these results were found in research studies and mostly not in typical primary care settings, however, patients may have had a higher "alerting response" than in everyday settings with their family doctor or nurse. It is thus important to clarify whether the white coat effect applies equally outside a research study and in typical family practice settings.

Why is ambulatory monitoring not commonly used to make management decisions? The problem is not just extrapolating results from research or secondary care to routine settings but that clinic derived thresholds have been used in previous research to make treatment decisions. However, several lines of evidence show that patients with daytime ambulatory pressure lower than 135/85 mm Hg have a low risk of subsequent events.<sup>2</sup> An ambulatory pressure of 135/85 mm Hg thus represents good control and approximately corresponds to a clinic pressure of 140/90 mm Hg,<sup>2</sup> a generally accepted marker for control.<sup>3</sup> The threshold for diagnosis in the clinic is usually higher ( $> 160/100$  mm Hg for most patients),<sup>4</sup> so a higher ambulatory threshold of 145/95 mm Hg has been proposed.<sup>5</sup> Recent guidelines recommended ambulatory monitoring for both initial diagnosis and assessing control,<sup>6</sup> although few studies have looked at the assessment role in primary care. One trial in a mixed setting showed that management according to ambulatory pressure resulted in fewer visits, less use of drugs, and similar final blood pressures.<sup>7</sup> Further evidence is needed from typical primary care settings to explore the implications of using ambulatory pressures and other alternatives, both in the initiation of treatment and in monitoring control.

What about other alternatives? Preliminary evidence, mostly from other settings, indicates that measurements by a nurse or technician, repeated measurements, or home measurements may be closer to ambulatory pressure.<sup>7-14</sup> To our knowledge, no study in a typical primary care setting has compared these methods with ambulatory monitoring. Another alternative is self measurement by patients with equipment

# Recent Advances in Automated Blood Pressure Measurement

*Martin G. Myers, MD, FRCPC*

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Current Medicine Group LLC ISSN 1522-6417  
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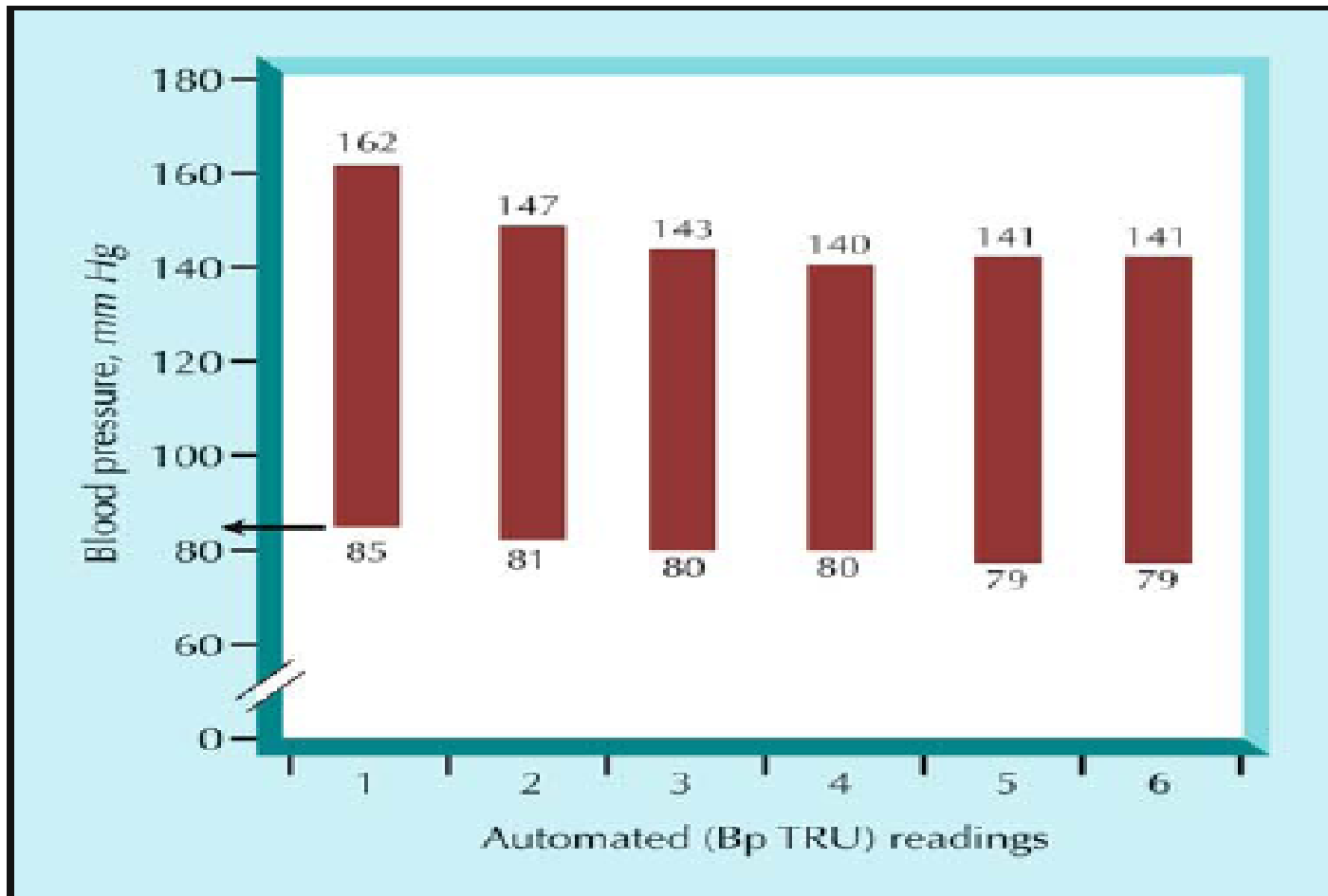
During the past 15 years, clinical outcome studies have consistently reported that home and 24-hour ambulatory blood pressure recordings provide a significantly better measure of cardiovascular risk than do manual blood pressure readings taken in the office or clinic. The advent of automated sphygmomanometers that record blood pressure with the patient alone in the examining room will be the next major change in our approach to recording blood pressure. These automated devices virtually eliminate the white coat response and their readings correlate significantly better with the ambulatory blood pressure compared with manual office blood pressure readings. The principal finding from recent research into automated blood pressure measurement is that the presence of an observer during the actual reading in itself provokes the white coat response.

patient interaction, especially if conversation takes place during the actual BP measurement. Recent research has documented the importance of eliminating the observer from the BP measurement process. These findings have important implications for the diagnosis and management of hypertension because it may now be possible to obtain an accurate assessment of an individual's status not only with home or 24-hour ambulatory BP recording devices but also in the office setting.

## **BP Recorded Outside the Office**

The white coat response to having BP measured in the doctor's office was first reported almost 70 years ago [1]. Ayman and Goldshine [1] observed that BP recorded in the home was lower than readings obtained in the doctors' offices. The next milestone was the development of a rudimentary ambulatory BP device, the Remler semi-automated portable BP recorder [2]. For the first time, this device permitted BP to be measured "during normal daily activities."

In their initial 1966 paper, Sokolow et al. [3] demonstrated a BP reduction in 124 hypertensive patients, from a mean of 169/104 mm Hg in the office to 156/95 mm Hg during the day. In a move that showed incredible



**Figure 1.** Mean blood pressure values are shown for 50 patients with the initial reading (1) taken by the physician using the automated (BpTRU) recorder and the next five readings taken with the patient alone in the examining room. (*Adapted from Myers [13•].*)

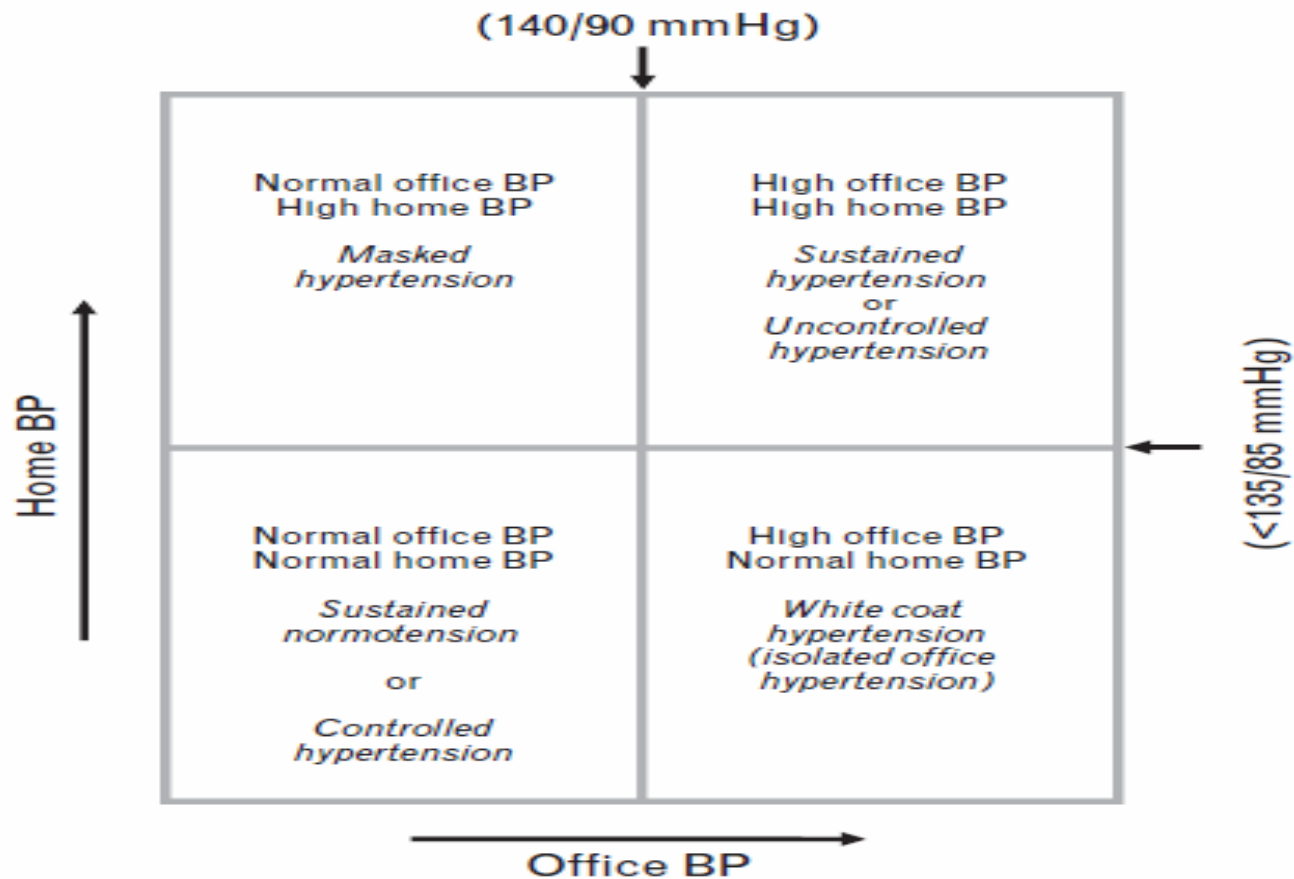
# HT Tanısı

- Maskeli HT
  - Prevalans %14-%30
  - Tanısında AKBM ve EKBM benzer prevalans veriyor
  - Hipertansiflerle benzer oranda end-organ hasarı görülüyor

Liu J et al. Ann Intern Med 1999;131:564-572

Stergiou GS et al. Am J Hypertens 2005;18:772-778

**Fig. 1**



Schematic relationship between office and home blood pressure. True hypertensive patients are at greatest risk of cardiovascular events and true normotensive individuals at lowest risk. White coat and masked hypertensive patients lie in between, with white-coat hypertensive patients having a risk close to that of true normotensive individuals and masked hypertensive patients closer to true hypertensive patients.

# Hasta Uyumu

- OKBM hastaları ile EKBM hastaları düzenli ilaç kullanımı yönünden değerlendiriliyor
- EKBM hastaları %92 uyumlu
- OKBM hastaları %74 uyumlu

# Hasta Uyumu

- OlmeTel çalışmasında hasta uyumu ve kan basıncı regülasyonu EKBM ile daha iyi
- Kontrolsüz HT bulunan hastalarda EKBM ile daha iyi kan basıncı kontrolü

Ewald S et al. Clin drug Investig 2006;26:439-446  
McManus et al. BMJ 2005;331:493

# Hasta Uyumu

- Treatment of Hypertension According Home or Office Blood Pressure Study (THOP) çalışmasında EKBM kan basıncı regülasyonu açısından AKBM ve OKBM'den daha kötü

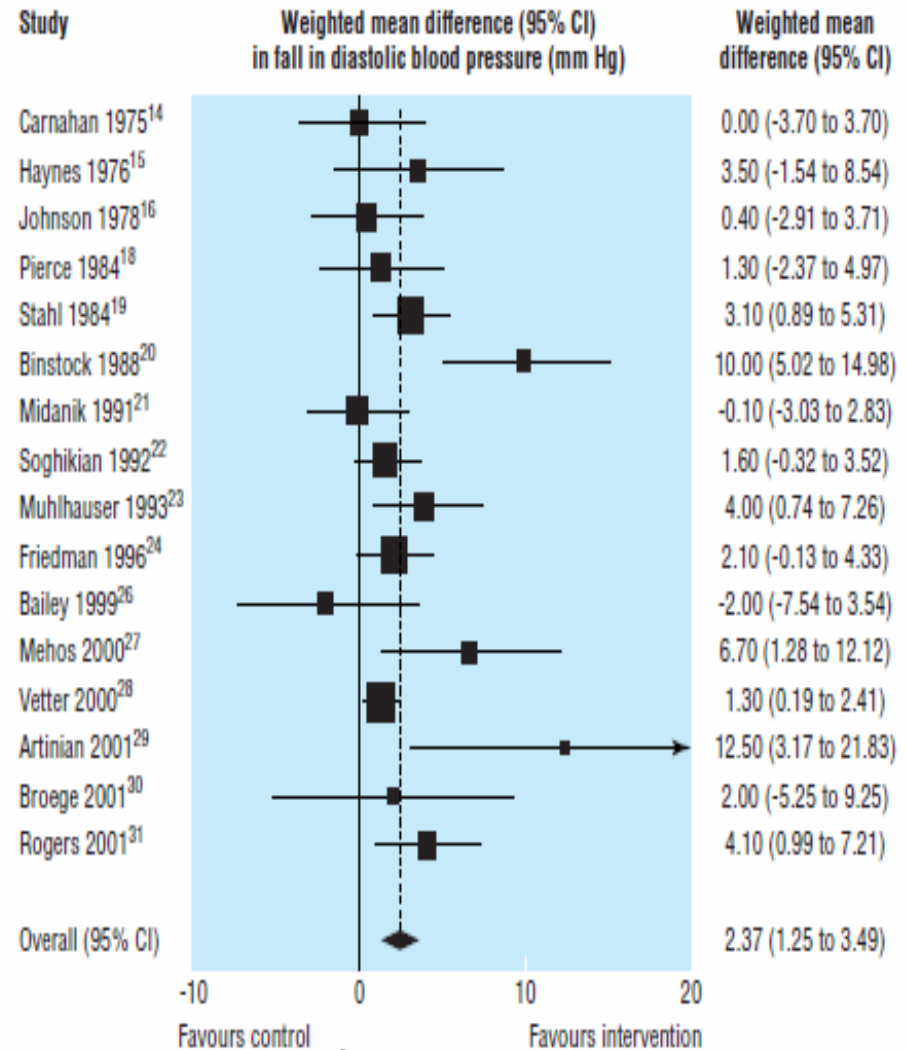
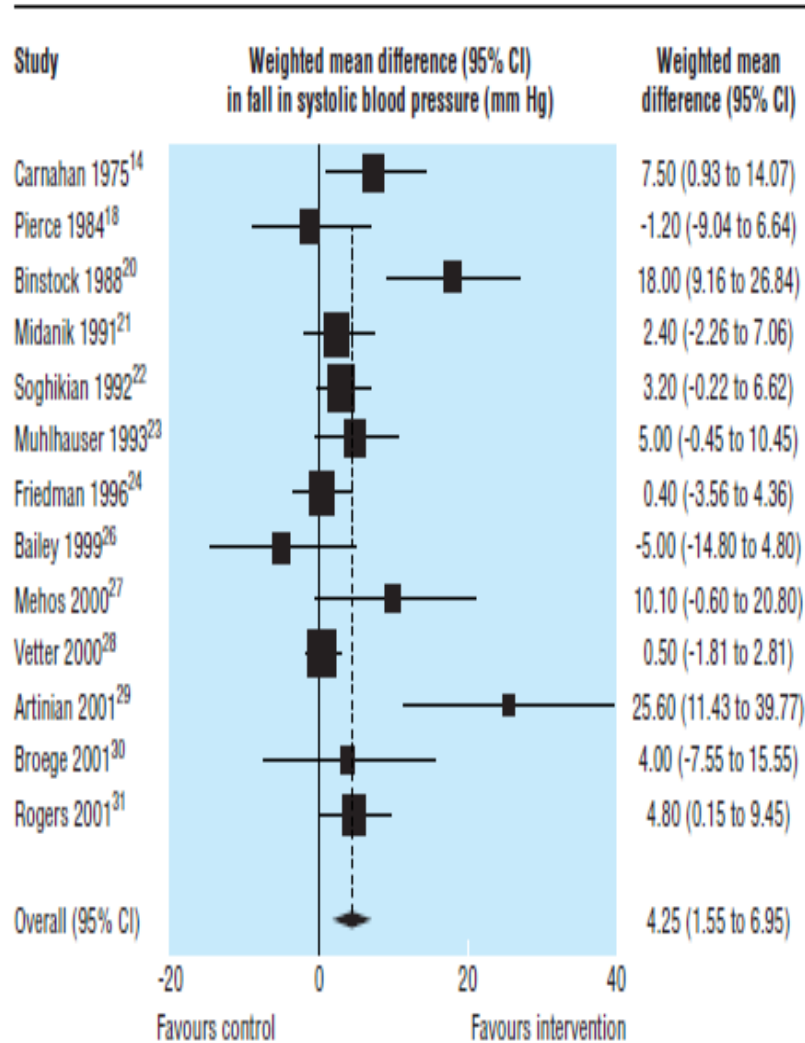
# Hasta Uyumu

- HOMERUS(Home vs Office Measurement Reduction Unnecessary Treatment)
- Hedef organ hasarı riskinde azalma her iki grupta benzer
- Hedef kan basıncına ulaşma her iki grupta benzer
- EKBM grubunda kan basıncı OKBM grubundan daha yüksek

# Hasta Uyumu

- Metaanaliz, Kontrollü randomize 18 çalışma: EKBM grubunda hedef kan basıncına ulaşma standard takip grubuna göre daha iyi

# Hasta Uyumu



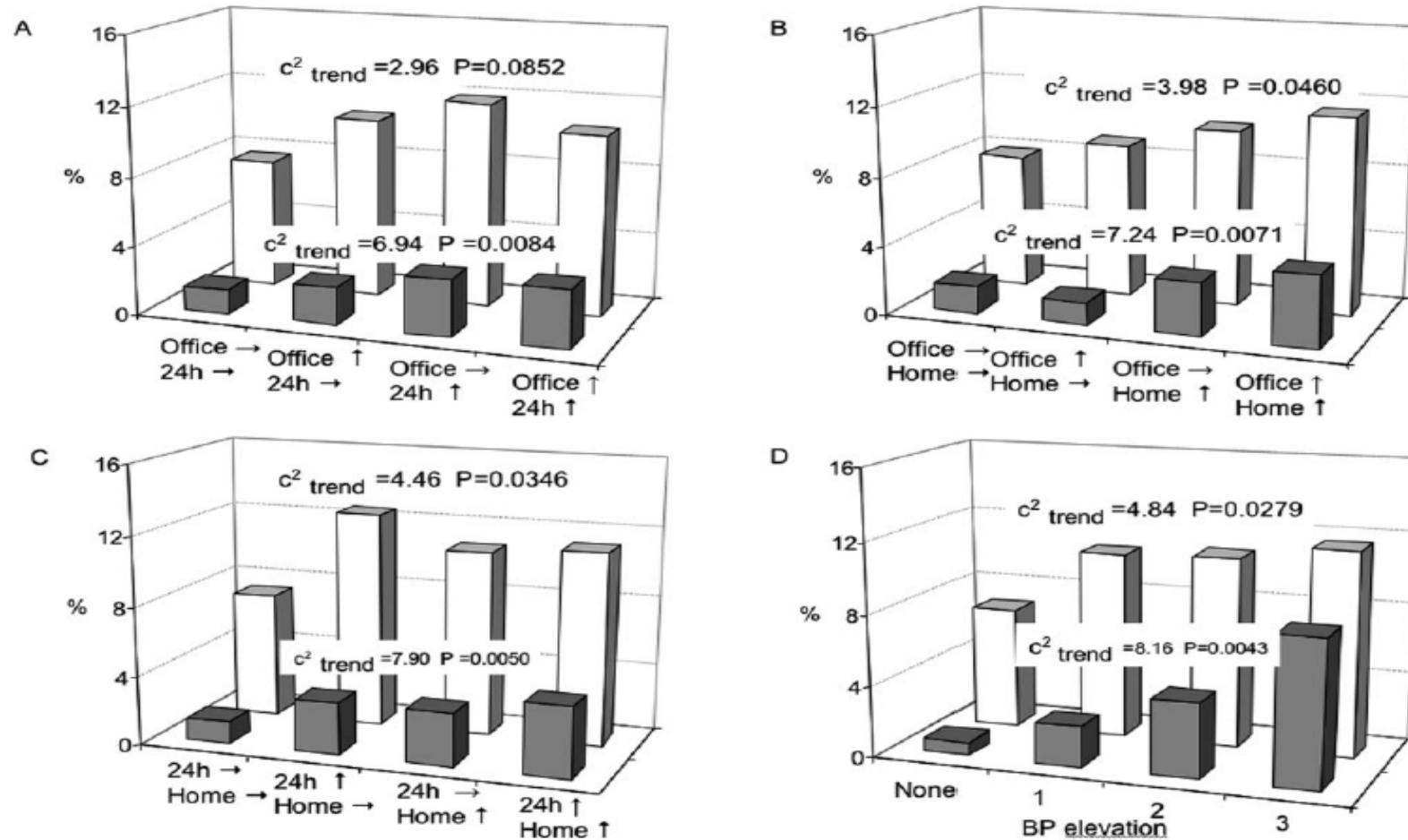
# Prognoz

## Long-Term Risk of Mortality Associated With Selective and Combined Elevation in Office, Home, and Ambulatory Blood Pressure

Giuseppe Mancia, Rita Facchetti, Michele Bombelli, Guido Grassi, Roberto Sega

*Abstract*—In the Pressioni Arteriose Monitorate e Loro Associazioni (PAMELA) study, office, home, and ambulatory blood pressure (BP) values were measured contemporaneously between 1990 and 1993 in a large population sample (n=2051). Cardiovascular (CV) and non-CV death certificates were collected over the next 148 months, which allowed us to assess the prognostic value of selective and combined elevation in these 3 BPs over a long follow-up. There were 69 CV and 233 all-cause deaths. Compared with subjects with normal office and 24-hour BP, the hazard ratio for CV death showed a progressive increase in those with a selective office BP elevation (white-coat hypertension), a selective 24-hour BP elevation (masked hypertension), and elevation in both office and 24-hour BP. This was the case also when the above conditions were identified by office versus home BP values. Selective elevation in home versus ambulatory BP or vice versa also carried an increased risk. There was indeed a progressive increase in both CV and all-cause mortality risk from subjects in whom office, home, and ambulatory BP were all normal to those in whom 1, 2, or all 3 BPs were elevated, regardless of which BP was considered. The trends remained significant after adjustment for age and gender, as well as, in most instances, after further adjustment for other cardiovascular risk factors. Thus, white-coat hypertension and masked hypertension, both when identified by office and ambulatory or by office and home BPs, are not prognostically innocent. Indeed, each BP elevation (office, home, or ambulatory) carries an increase in risk mortality that adds to that of the other BP elevations. (*Hypertension*. 2006; 47:846-853.)

# Prognoz



**Figure 1.** Percentage incidence of CV (■) and all-cause death (□) over an average follow-up of 148 months in subjects with various combinations of normality or elevation in office, home, and 24-hour BP. Data are adjusted for age and gender. Numbers refer to  $\chi^2$  trends and related P values.

# Prognoz

## Telemedicine Home Blood Pressure Measurements and Progression of Albuminuria in Elderly People With Diabetes

Walter Palmas, Thomas G. Pickering, Jeanne Teresi, Joseph E. Schwartz, Lesley Field,  
Ruth S. Weinstock, Steven Shea

*Abstract*—We assessed whether home blood pressure monitoring improved the prediction of progression of albuminuria when added to office measurements and compared it with ambulatory blood pressure monitoring in a multiethnic cohort of older people (n=392) with diabetes mellitus, without macroalbuminuria, participating in the telemedicine arm of the Informatics for Diabetes Education and Telemedicine Study. Albuminuria was assessed by measuring the spot urine albumin:creatinine ratio at baseline and annually for 3 years. The ambulatory sleep:wake systolic blood pressure ratio was categorized as dipping (ratio:  $\leq 0.9$ ), nondipping (ratio:  $>0.9$  to  $1.0$ ), and nocturnal rise (ratio:  $>1.0$ ). In a repeated-measures mixed linear model, after adjustment that included office pulse pressure, home pulse pressure was independently associated with a higher follow-up albumin:creatinine ratio ( $P=0.001$ ). That association persisted ( $P=0.01$ ) after adjusting for 24-hour pulse pressure and nocturnal rise, which were also independent predictors ( $P=0.02$  and  $P=0.03$ , respectively). Cox proportional hazards models examined the progression of albuminuria (n=74) as defined by cutoff values used by clinicians. After the adjustment for office pulse pressure, the hazards ratio (95% CI) per 10-mm Hg increment of home pulse pressure was 1.34 (range: 1.1 to 1.7;  $P=0.01$ ). Home pulse pressure was not an independent predictor in the model including ambulatory monitoring data; a nocturnal rise was the only independent predictor ( $P=0.035$ ). Cox models built separately for home pulse pressure and ambulatory monitoring exhibited similar calibration and discrimination. In conclusion, nocturnal blood pressure elevation was the strongest predictor of worsening albuminuria. Home blood pressure measurements added to office measurements and may constitute an adequate substitute for ambulatory monitoring. (*Hypertension*. 2008;51:1282-1288.)

# Prognoz

- EKBM, OKBM'na göre hipertansif end-organ hasarıyla daha güçlü korelasyon gösteriyor.
- Son çalışmalarda AKBM'na göre de daha iyi korelasyon tespit edilmiş.

Niiranen TJ et al. J Hum Hypertens 2007;21:788-794

Stergiou GS et al. Am J Hypertens 2007;20:616-621

# Prognoz

- Kardiyovasküler olay ve mortalite belirleyicisi olarak EKBM, OKBM'na göre daha anlamlı bulunmuş

Fagard RH et al. J Hum Hypertens 2005;19:801-807

Ohkubo T et al. J Hypertens 1999;16:971-975

Sega R et al. Circulation 2005;111:1777-1783

# Prognoz

Table 1. Prospective Studies Relating Home BP and Office BP to Cardiovascular Events and Mortality

Study	Population Studied	No. of Subjects	Home BP Schedule			Outcome	
			Days	AM	PM		
Ohasama <sup>81</sup>	Population	1789	28	1	0	28	Strokes and mortality predicted better by HBPM
SHEAF <sup>99</sup>	Treated hypertensive patients	4939	4	3	3	24	CV morbidity and mortality predicted better by HBPM
PAMELA <sup>82</sup>	Population	2051	1	1	1	2	CV and total mortality predicted better by HBPM
Belgian <sup>100</sup>	Referred	391	1	3	0	3	Combined CV events predicted better by HBPM
Didima <sup>98</sup>	Population	662	3	2	2	12	CV events predicted by both HBPM and office BP

CV indicates cardiovascular.

# Prognoz

- Kardiyovasküler mortalite yönünden EKBM'nun, OKBM'na üstünlüğü yok

Stergiou GS et al. J Hypertens 2007;25:1590-1596

# Maliyet

- EKBM'nun HT ve ilişkili komplikasyonlara bağlı sağlık harcamalarını azalttığı gösterilmiştir
- Ohasama çalışması: %12 tasarruf  
OKBM 77 milyar dolar/yıl  
EKBM 68 milyar dolar/yıl

# Maliyet

- Treatment of Hypertension According Home or Office Blood Pressure Study (THOP):
- İlaç harcaması:
  - EKBM 1688 Euro/100 hasta/ay
  - OKBM 2120 Euro/100 hasta/ay
- Doktor harcaması:
  - EKBM 1510 Euro/100 hasta/ay
  - OKBM 1759 Euro/100 hasta/ay

# Maliyet

## Self-Measurement of Blood Pressure at Home Reduces the Need for Antihypertensive Drugs A Randomized, Controlled Trial

Willem J. Verberk, Abraham A. Kroon, Jacques W.M. Lenders, Alfons G.H. Kessels,  
Gert A. van Montfrans, Andries J. Smit, Paul-Hugo M. van der Kuy, Patricia J. Nelemans,  
Roger J.M.W. Rennenberg, Diederick E. Grobbee, Frank W. Beltman, Manuela A. Joore,  
Daniëlle E.M. Brunenberg, Carmen Dirksen, Theo Thien, Peter W. de Leeuw;  
for the Home Versus Office Measurement, Reduction of Unnecessary Treatment Study Investigators

**Abstract**—It is still uncertain whether one can safely base treatment decisions on self-measurement of blood pressure. In the present study, we investigated whether antihypertensive treatment based on self-measurement of blood pressure leads to the use of less medication without the loss of blood pressure control. We randomly assigned 430 hypertensive patients to receive treatment either on the basis of self-measured pressures (n=216) or office pressures (OPs; n=214). During 1-year follow-up, blood pressure was measured by office measurement (10 visits), ambulatory monitoring (start and end), and self-measurement (8 times, self-pressure group only). In addition, drug use, associated costs, and degree of target organ damage (echocardiography and microalbuminuria) were assessed. The self-pressure group used less medication than the OP group (1.47 versus 2.48 drug steps;  $P<0.001$ ) with lower costs (\$3222 versus \$4420 per 100 patients per month;  $P<0.001$ ) but without significant differences in systolic and diastolic OP values (1.6/1.0 mm Hg;  $P=0.25/0.20$ ), in changes in left ventricular mass index ( $-6.5$  g/m<sup>2</sup> versus  $-5.6$  g/m<sup>2</sup>;  $P=0.72$ ), or in median urinary microalbumin concentration ( $-1.7$  versus  $-1.5$  mg per 24 hours;  $P=0.87$ ). Nevertheless, 24-hour ambulatory blood pressure values at the end of the trial were higher in the self-pressure than in the OP group: 125.9 versus 123.8 mm Hg ( $P<0.05$ ) for systolic and 77.2 versus 76.1 mm Hg ( $P<0.05$ ) for diastolic blood pressure. These data show that self-measurement leads to less medication use than office blood pressure measurement without leading to significant differences in OP values or target organ damage. Ambulatory values, however, remain slightly elevated for the self-pressure group. (*Hypertension*. 2007;50:1019-1025.)

# Sonuç

*Hypertension* August 2009

**Table 1. Comparison of Main Features of 3 Main Methods of BP Measurement**

Feature	Office BP	ABPM	HBPM
No. of readings	Low	High	Medium
White coat effect	Yes	No	No
Operator dependency	Yes	No	No
Need of device validation (yes if oscillometric device used)	No	Yes	Yes
Daytime BP	+	+ + +	+ +
Nighttime BP and dipping	–	+ + +	–
Morning BP	±	+ +	+
24-h BP variability	–	+ +	±
Long-term BP variability	–	±	+ +
WCH and MH diagnosis	–	+ +	+ +
Placebo effect	+ +	–	–
Reproducibility	Low	High (24-h average values)	High (average of several values)
Prognostic value	+	+ + +	+ +
Patient involvement	–	–	+ +
Need of patient training	–	±	+ +
Physician involvement	+ + +	+ +	+
Patient acceptance	+ +	±	+ +
Monitoring of treatment effects	Limited information	Extensive information on diurnal BP profile, cannot be repeated frequently	Appropriate for long-term monitoring, limited information on BP profile
Hypertension control improvement	+	+ +	+ + +
Cost	Low	High	Low
Availability	High	Low	High

Data are from Reference,<sup>6</sup> modified WCH indicates white coat hypertension; MH, masked hypertension.

# Sonuç

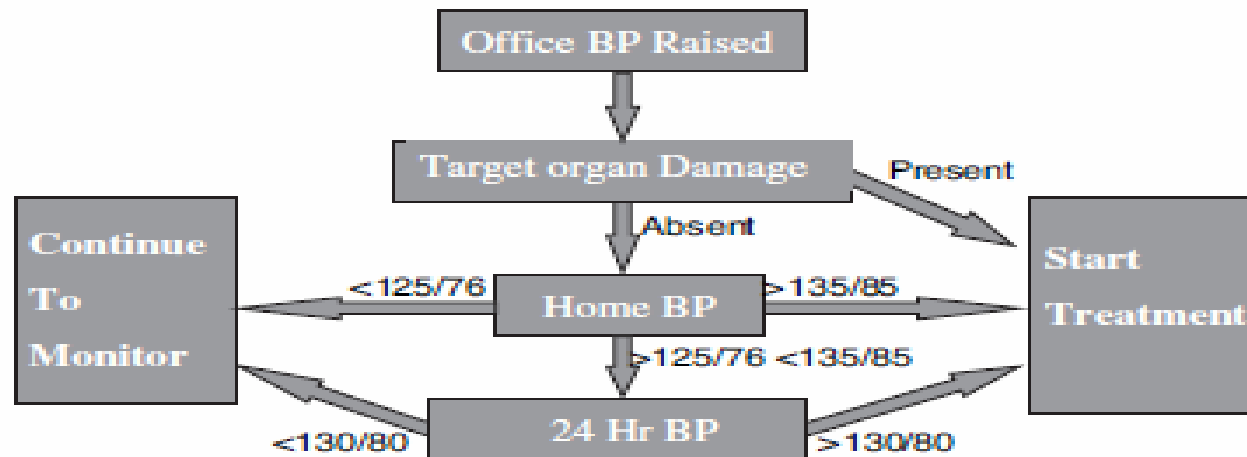
- OKBM'nun güvenilirliđi hastanın otomatik cihazlarla, yalnız olarak, tekrarlanan kan basıncı ölçümleriyle arttırılabilir.
- Ancak günlük aktiviteler esnasında ve gece boyunca kan basıncı takibi ancak EKBM ve AKBM gibi yöntemlerle anlaşılabilir.

# Sonuç

- Bu nedenle ofis dışı kan basıncı ölçüm yöntemleri OKBM'na eklenmelidir.
- OKBM + EKBM, AKBM'nun yerini alabilir.
- AKBM ise seçilmiş hastalarda belirli zamanlarda yapılmalıdır.

# Sonuç

## Schema for Evaluating Need for Treatment



**Figure 2.** Schema for evaluating BP status of hypertensive patients, which can be used in patients in whom the decision to start treatment may be uncertain on the basis of the office BP, which may be just above or below the cutoff point defining adequate control. HBPM may be used to aid the diagnosis if necessary in conjunction with ABPM.