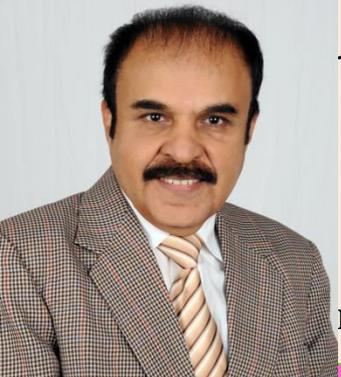




Prof. B C Bansal and Mrs. Uma Bansal

Oration

- President – Association of Physicians of India 1997-98
- Chairman – Indian College of Physicians 1997-98
- President – Geriatric Society of India 1998-99
- President – Indian Association of Clinical Medicine 1999-2000
- President – Indian Epilepsy Society 2001-02
- President – Indian Epilepsy Association – 18th International Epilepsy Congress
Trust 2013 onwards
- Patron – Geriatric Society of India and Association of Physicians of India, Noida
Chapter



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General Medicine, Tirupur (Tamilnadu)

Academic:

- President – Hypertension Society of India (2015-2016)
- Dean Elect – Indian College of Physicians (2015-2016)
- Past President – Association of Physicians of India (2013-2014)

Awards:

- Received BC Roy Award from President of India 2005
- Received Best Performing Doctor Award from Tamilnadu Government on Doctors Day 2014.
- Received Lifetime achievement Award by TN DR. M.G.R. Medical University & Saveetha Medical University, K.G. Foundation and Dr. Mohan's Diabetes Foundation
- Organising Chaiman – AIAARO 2015

HOME BLOOD PRESSURE MONITORING – THE NEED OF THE HOUR

**DR. B A. MURUGANATHAN., MD,
FRCP (GLASG), FRCP (LONDON), FACP (USA),
FPCP (Philippines), FICP**

President – Hypertension Society of India: (HSI)

Dean Elect – Indian College of Physicians: (2015-2016)

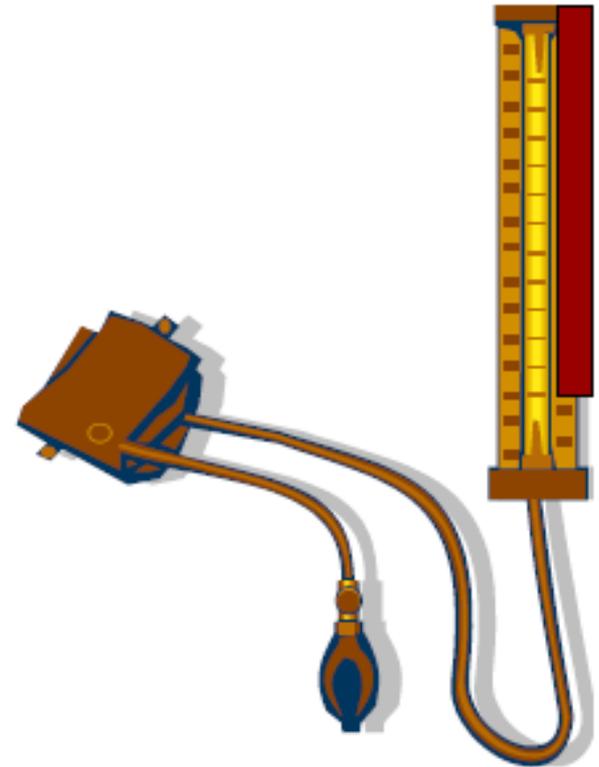
Past President – Association of Physicians of India: (2013 – 2014)

Objective

1. Background
2. What is Home Blood Pressure Monitoring
3. Why HBPM – Advantages
4. How to measure (HBPM)
5. Reading and Interpretation
6. Evidence
7. Comparison with ABPM
8. Future
9. Take Home Messages
10. Appeal

Background

- BP is an accurate predictor of cardiovascular morbidity and mortality
- Accurate and reproducible measurement is an important clinical skill
- Diagnosis and future management plans based ultimately on readings obtained
- Inaccurate readings lead to:
 - Incorrect diagnosis
 - Inappropriate treatment and follow up



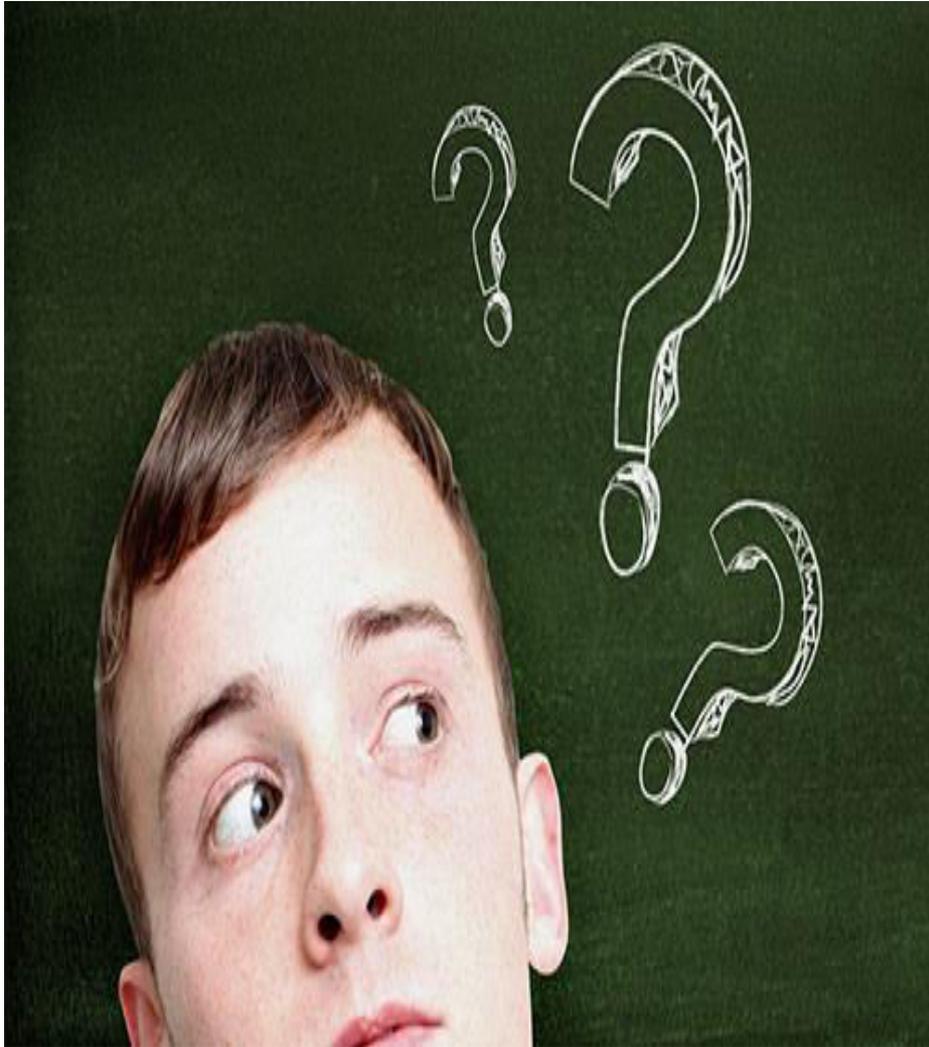
- Following the pioneering work by George Pickering and Maurice Sokolow in the 1960s,
- several techniques developed
- in order to overcome the limitations of the OBP.
- Two of them have become widely used in clinical practice:
- 24-h ambulatory BP monitoring and HBPM

WHAT IS HOME BLOOD PRESSURE MONITORING



- SMBP is defined as the regular measurement of blood pressure by the patient outside the clinical setting, either at home or elsewhere.
- It is sometimes known as “home blood pressure monitoring”

WHY SHOULD WE DO



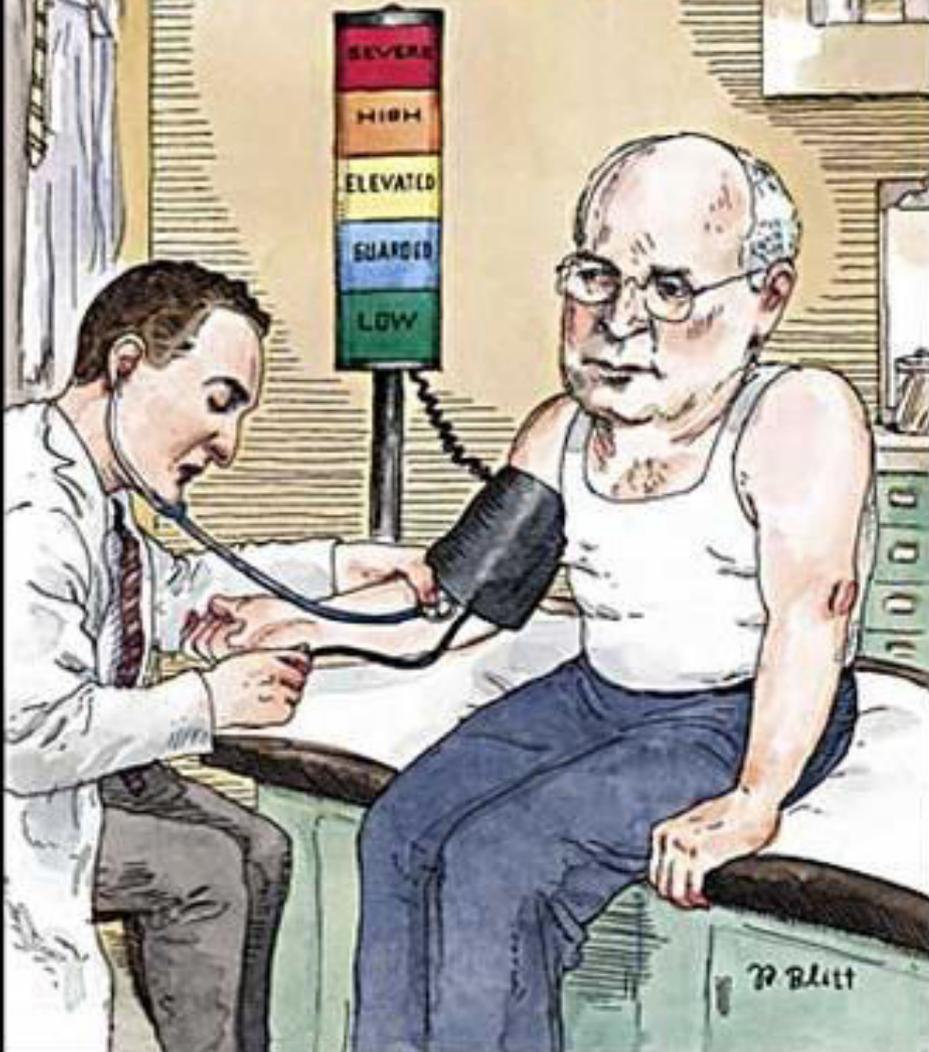
Limitations

- Clinic BP has several important limitations, -- just a snapshot of an individual's blood pressure
- Inadequate or misleading estimates of a patient's true BP status
- Not a representative estimate of an individual's usual BP outside the medical setting.
- Suboptimal prediction of cardiovascular risk.
 - Inherent variability coupled with small number of BP readings
 - Poor technique due to common errors (eg, cuff over clothing, incorrect cuff size, device not calibrated)
 - Patterns of BP such as white coat hypertension, masked hypertension, nocturnal non-dipping can not be diagnosed.

PRICE \$3.95

AUG. 30, 2004

THE NEW YORKER



A Diagnosis of Hypertension

based exclusively on Physician readings is no longer acceptable

- Measurement error
- Small number of readings
- Effects of recent activities
- Expense & Inconvenience
- White coat effect

Can we do better?

- Clinic – based definition of hypertension correctly identifies 55 million people who are truly hypertensive, but incorrectly identifies or fails to identify another 40 million, either because of false positives (10 million white coat hypertensives) or false negatives (30 million masked hypertensives).
- Thus for every two people that are classified properly, there is another one person who is misclassified – not a very good record for a diagnostic test. Home blood pressure monitoring can solve this problem to certain extent.



(Hypertens Res 2007; 30: 479–488)

HBPM



- Self recorded BP monitoring - the most accurate, inexpensive, and available way to diagnose and manage hypertension.
- Both office readings and automatic, ambulatory monitoring (ABPM) will continue to have taken their place
- But home readings have taken their place at the top of the hierarchy of BP measurement (Norman M. Kaplan)
- Zanchetti (2011) has noted, home readings may be the most practical way to assess BP variability.

The Advantage of Home Blood Pressure Monitoring

- It provides multiple measurements of BP in different days, weeks or months.
- Good Prognostic value
- Improve **adherence** to antihypertensive therapy (Bosworth et al., 2011)
- Home BP is more closely related to hypertension-induced target organ damage and predicts the risk of cardiovascular events better than office BP. (Niiranen et al., 2013)
- HBPM can detect the white-coat and masked hypertension
- Translation of home readings either by memory in the device or by **telemonitoring**) Omboni et al., 2013)

Use of HBPM as an Intervention for Improving Medication Adherence and BP Control

- HBPM – a useful **adherence enhancing strategy**, especially when used in combination with other approaches such as patient counseling, patient reminders, and use of nurse case managers.
- Success with **behavioral** or lifestyle interventions in patients with chronic conditions improved by encouraging the patient to become actively involved in his or her care,
- In the case of obesity, 75% of people who are successful with long-term weight loss report **weighing themselves regularly**.

Home blood pressure monitoring and telemedicine

- data -- transfer to a remote computer through telephone (stationary or mobile) or Internet connection ---
- reports of these data aid the physician in making therapeutic decisions, communicated to the patient without the need for additional clinic visits.
- Through **titration of antihypertensive drugs**, -- more meaningful change in BP.

Special populations who may benefit from Home Blood Pressure Monitoring

- **Elderly:** BP variability tends to be high, and white coat hypertension is common.(Cushman et al., 2012)
- **Diabetics:** Tight BP control is important and home monitoring may help achieve this. (Eguchi et al., 2012),
- **Pregnancy:** The early detection of pre-eclampsia might be facilitated by HBPM.
- **Chronic Kidney Disease:** BP may fluctuate a lot and home monitors help with management.
- **Children:**

Usefulness of HBPM in clinical trials

Advantages:

1. Availability of multiple BP readings, affording a better reproducibility
2. Reduction of the sample size of patients to be included
3. Guidance of treatment (initiation and titration)
4. Identification of patients with WCH or masked hypertension
5. Minimization of placebo effect
6. Assessment of the duration of action of antihypertensive drugs (M/E ratio)
7. Possibility to measure BP during prolonged periods
8. Improvement of compliance
9. Management of unexplained vertigo or fatigue (SBP <100 mmHg)
10. Time until antihypertensive drugs have maximum effect (in days or weeks) can be analysed

White-coat (or isolated office) hypertension and masked (or isolated ambulatory) hypertension

- ‘white-coat-’ hypertension’ refers to the condition in which BP is elevated in the office at repeated visits and normal out of the office, either on ABPM or HBPM.
- Conversely, BP may be normal in the office and abnormally high out of the medical environment, which is termed ‘masked-’ or ‘isolated ambulatory hypertension’.

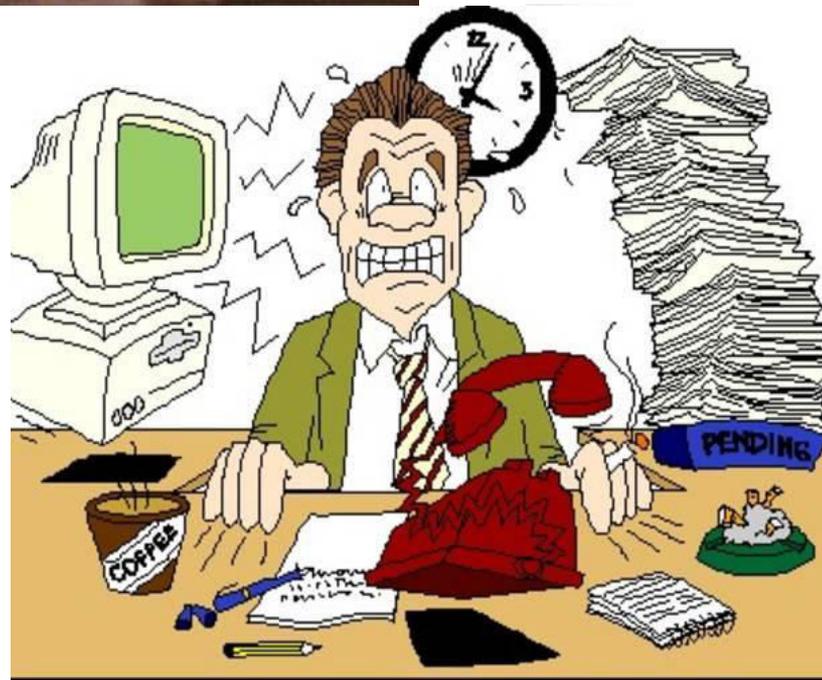


“Reversed” White Coat Hypertension





Masked Hypertension

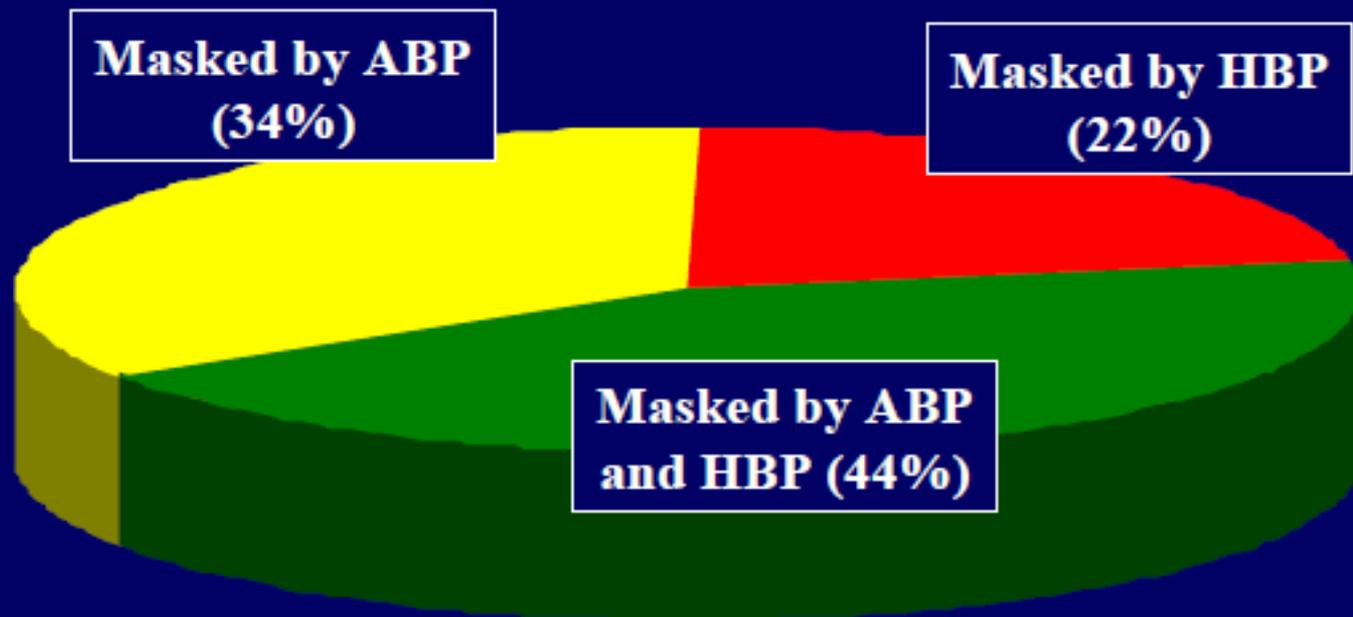


“Lathi Charge”

Etiology of masked hypertension



Masked Hypertension Detected By ABP, HBP Or Both



WHEN TO SUSPECT?

TYPE OF BP	BP AT CLINIC	TARGET ORGAN DISEASE
NORMOTENSIVE	NORMAL	NIL
WHITE COAT	HIGH	NIL
MASKED	NORMAL	PRESENT
TRUE HBP	HIGH	PRESENT

MASKED HYPERTENSION HAS THE WORST PROGNOSIS

HOW TO MEASURE HBPM

Measuring your
blood pressure at home



- A recent Gallup poll of hypertensive patients found the following:
- The number of patients monitoring their BP at home being 38% in 2000 and 55% in 2005, an increase of 17%.
- Fewer than half of the hypertensives in the U.S have a home device (Ostchega et al., 2013)
- Patients should be advised to purchase oscillometric monitors that measure BP on the upper arm with an appropriate cuff size
- Accurate according to the standard international protocols.
- They should be shown how to use them by their health care providers.

Blood Pressure Measurement

“The measurement of blood pressure is the clinical procedure of greatest importance that is performed in the sloppiest manner.”

Kaplan N. M. Amer J Hypertension 1998: 11: 134-6

- Types of SMBP monitoring devices include:
 - “Manual” devices — sphygmomanometers that require manual inflation and auscultation
 - “Semi automated” devices — manually inflated sphygmomanometers with automated display
 - “Automated” devices — inflation of sphygmomanometers and BP measurement are both automated
- Many devices are commercially available and have been validated by leading organizations.
- Patients may require some instruction on device use.

Home BP Monitoring





Equipment

- Documentation can be improved if patients use monitors capable of printing and storing readings.
- Oscillometric devices may not work well with patients who have atrial fibrillation or other arrhythmias.
- Patients monitor should be checked against mercury sphygmomanometer.



Blood Pressure Measurement

How can anything so simple
be so complex?

Spend some time ---- educate the patients

© Continuing Medical Implementation *bridging the care gap*

Advice for home blood pressure monitoring

- DO** take all clothing off upper arm and put cuff on.
- DO** sit on a chair, back supported, arm on a table at heart level, feet flat on the floor.
- DO** wait for 5 minutes before taking the first measurement.
- DO** wait for one minute before taking the second measurement.
- DO** record date and time of both measurements on BP log.
- DO** measure twice a day, morning and evening, on same arm, same time for 7 days before visit to your health care provider.

DO NOT cross your feet.

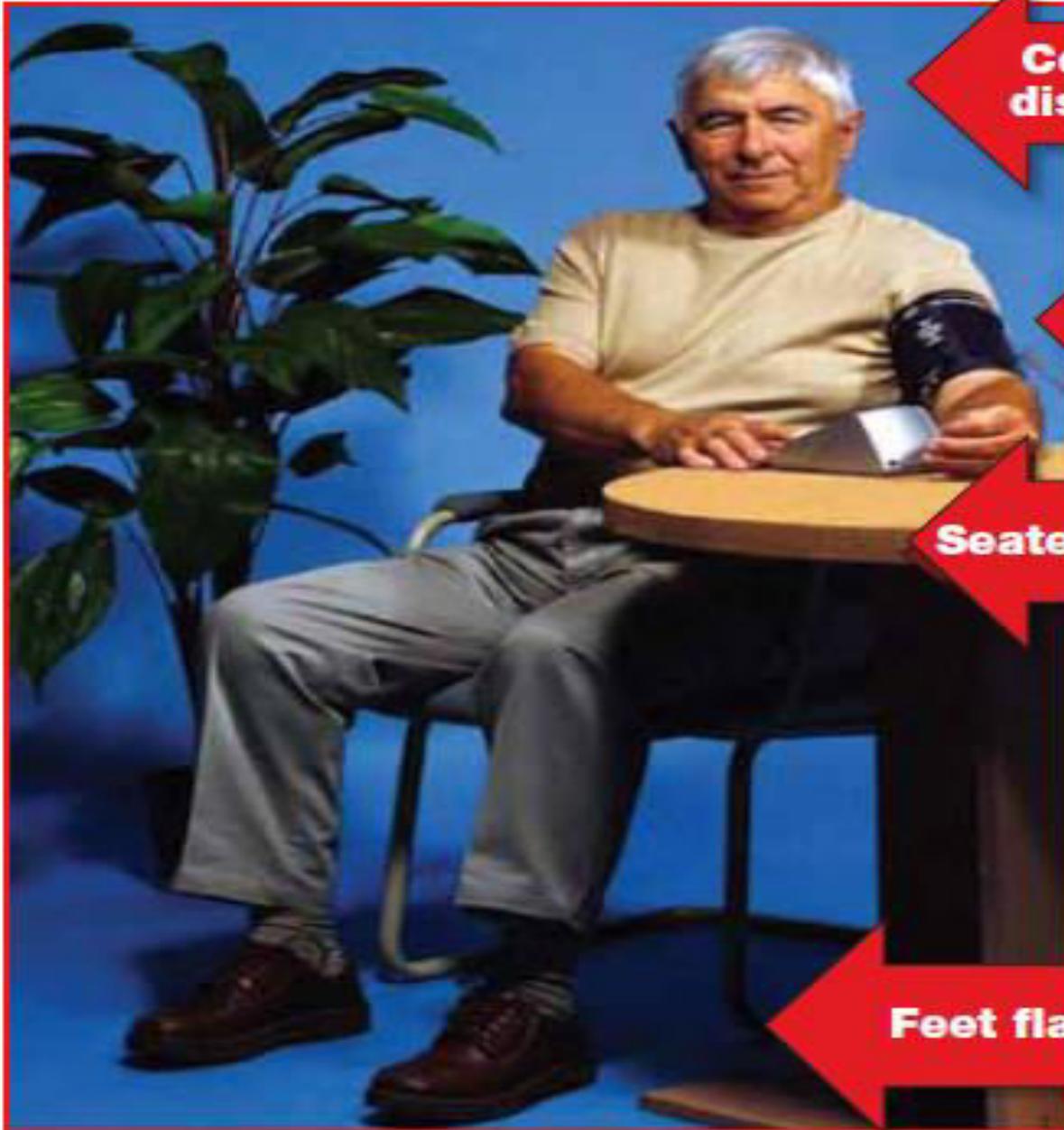
DO NOT take your BP if you are in a hurry.

DO NOT smoke or drink caffeine 30 minutes before measuring BP.

DO NOT eat a big meal for 2 hours before measuring your BP.

DO NOT talk or watch TV during a measurement.

DO NOT measure your pressure if you are uncomfortable, anxious, stressed or in pain.



Comfortable with no distractions or talking

Arm supported at heart level

Seated with back support

Feet flat on the floor

Factors in BP Measurement Variability

Related to	Factor	Systolic BP	Diastolic BP
Environment	Cold vs comfortable room	↑15 mm	↑10 mm
Patient factors	Full bladder	↑10-50	↑10-40
	Heavy exercise	↓18-20	↓7-9
	Heavy meal	↓10-12	↓20
	Smoking	↑10	↑8
Procedure	No rest vs 5 min rest	↑10-20	↑14
	Supine vs sitting	↑3-10	↑1-5
	Back unsupported	↑5-15	↑6
	Arm unsupported	↑1-7	↑5-11
	Legs crossed	↑5-8	↑3-5
Device	Cuff large	↓10-30	↓10-30
	Cuff small	↑3-12 obese; ↑30	↑2-8 obese; ↑30
	Diaphragm vs bell	↓0-2	↓0-2
	Calibration	0-5	0-5

Factors affect the BP measurement result

Aspect	Different approaches affecting the BP assessment
Setting	Office, work, ambulatory, home
Time	Daytime, nighttime, nocturnal dip, morning, evening, morning surge, postprandial
Observer	Doctor, nurse, technician, relative, self-measurement, automated
Device	Mercury, aneroid, hybrid, oscillometric
Posture	Basal, lying, seated, standing, exercise
Reading	First reading, first day, first visit, several measurements
Calculation	Average, variability, reactivity, maximum

Average Changes in BP Associated with Commonly Occurring Activities, Relative to BP while Relaxing

Activity	Systolic BP (mm Hg)	Diastolic BP (mm Hg)
Meetings	+20.2	+15.0
Work	+16.0	+13.0
Transportation	+14.0	+9.2
Walking	+12.0	+5.5
Dressing	+11.5	+9.5
Chores	+10.7	+6.7
Telephone	+9.5	+7.2
Eating	+8.8	+9.6

Average Changes in BP Associated with Commonly Occurring Activities, Relative to BP while Relaxing

Activity	Systolic BP (mm Hg)	Diastolic BP (mm Hg)
Talking	+6.7	+6.7
Desk Work	+5.9	+5.3
Reading	+1.9	+2.2
Business (at home)	+1.6	+3.2
Television	+0.3	+1.1
Relaxing	0.0	0.0
Sleeping	-10.0	-7.6

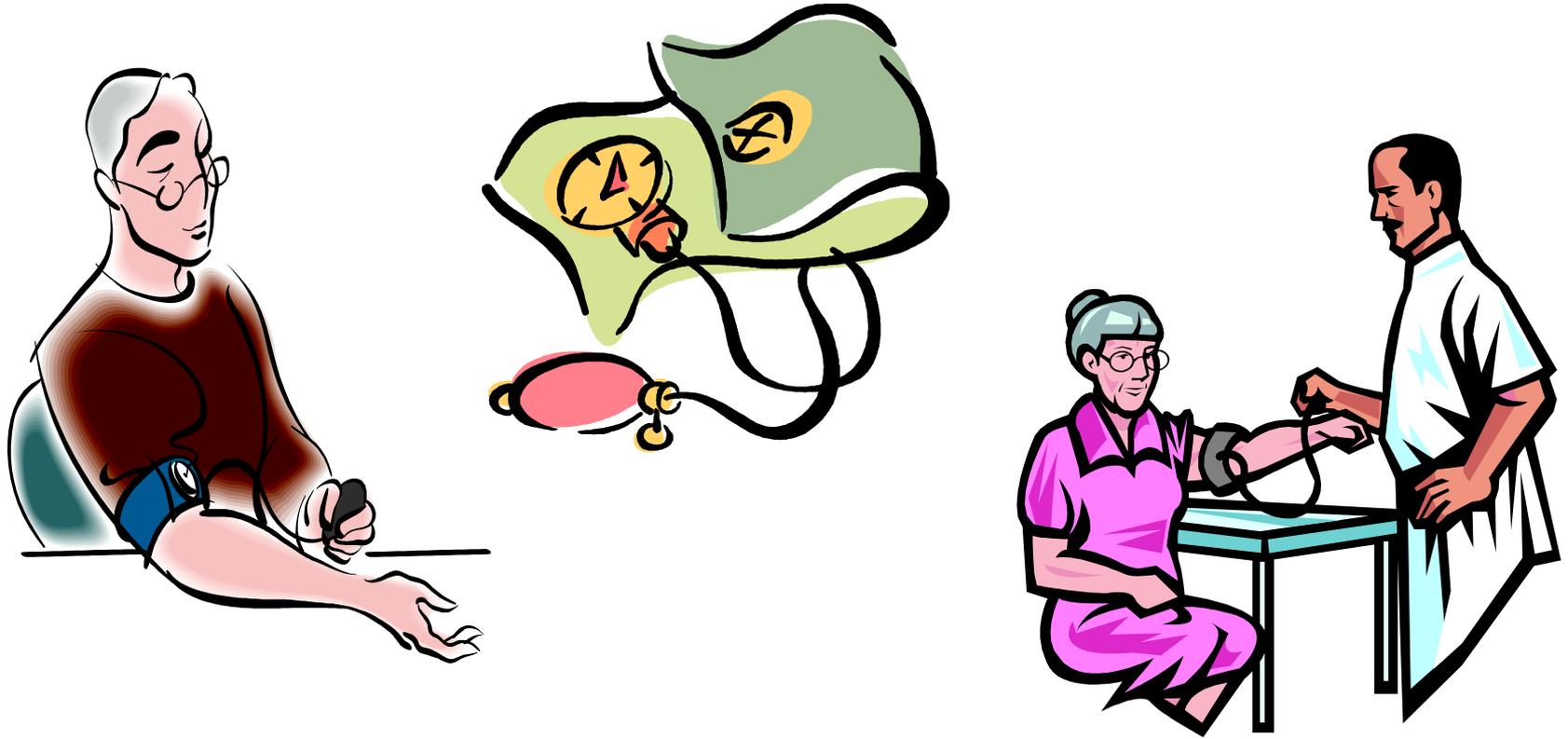
Reading and Interpretation



NICE CG127: Hypertension Diagnosis

- NICE recommend that if the clinic BP $\geq 140/90$ mmHg, 24hour ambulatory BP monitoring should be offered to confirm the diagnosis of hypertension.
 - Home BP measurement may be used to confirm diagnosis if ambulatory BP monitoring is unsuitable:
 - Record BP twice daily in the morning and evening for ≥ 4 days (ideally 7 days) discard first day's measurements)
 - If there is evidence of target organ damage, investigate causes

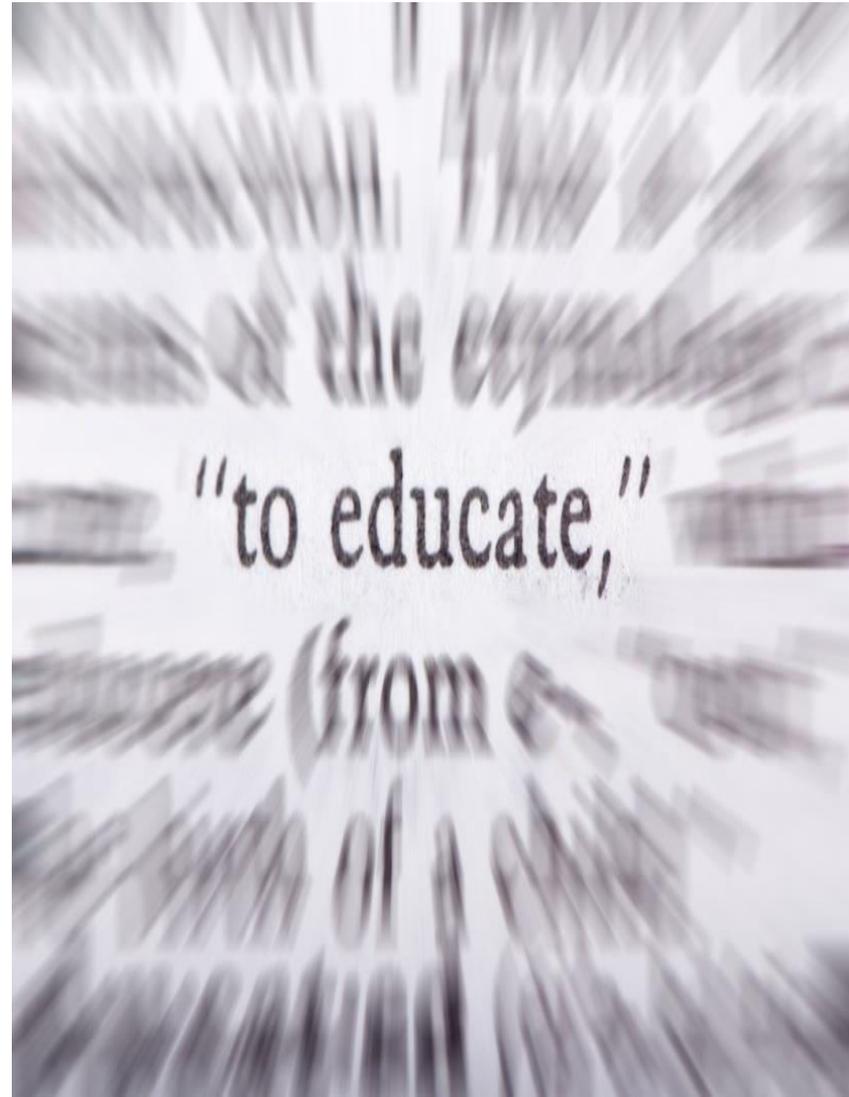
- Three measurements in morning & three in evening are required over period of two days to accurately diagnose masked hypertension.



The upper limit of normal for home pressure is **135/85 mm Hg**. This corresponds to an office blood pressure of **140/90 mmHg**

Teach back

- Have patients bring in monitor, observe if readings are done correctly
- Confirm monitor is accurate
- Reinforce education regarding timing of readings, risk factor management, accurate recording of blood pressure



COMPARISON BETWEEN HBPM and ABPM



- Only 2 studies have compared the prognostic value of ABPM with that of HBPM within the same population, the Pressioni Arteriose Monitorate E Loro Associazioni (PAMELA) Study and the Ohasama Study.
- They found that 24-hour, daytime, and nighttime ambulatory BPs and home BP were closely associated with the risk of silent cerebrovascular lesions and carotid atherosclerosis, whereas clinic BP was not.

- The ambulatory BP values -- a significant predictor of silent cerebrovascular lesions,
- In contrast, home BP was more closely associated with the risk of carotid atherosclerosis than any of the ambulatory BPs.
- These results led the authors to conclude that the clinical significance of ABPM and HBPM for predicting target organ damage may differ for different target organs.

ESC 2013

Definitions of hypertension by office and out-of-office blood pressure levels

Category	Systolic BP (mmHg)		Diastolic BP (mmHg)
Office BP	≥140	and/or	≥90
Ambulatory BP			
Daytime (or awake)	≥135	and/or	≥85
Nighttime (or asleep)	≥120	and/or	≥70
24-h	≥130	and/or	≥80
Home BP	≥135	and/or	≥85

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

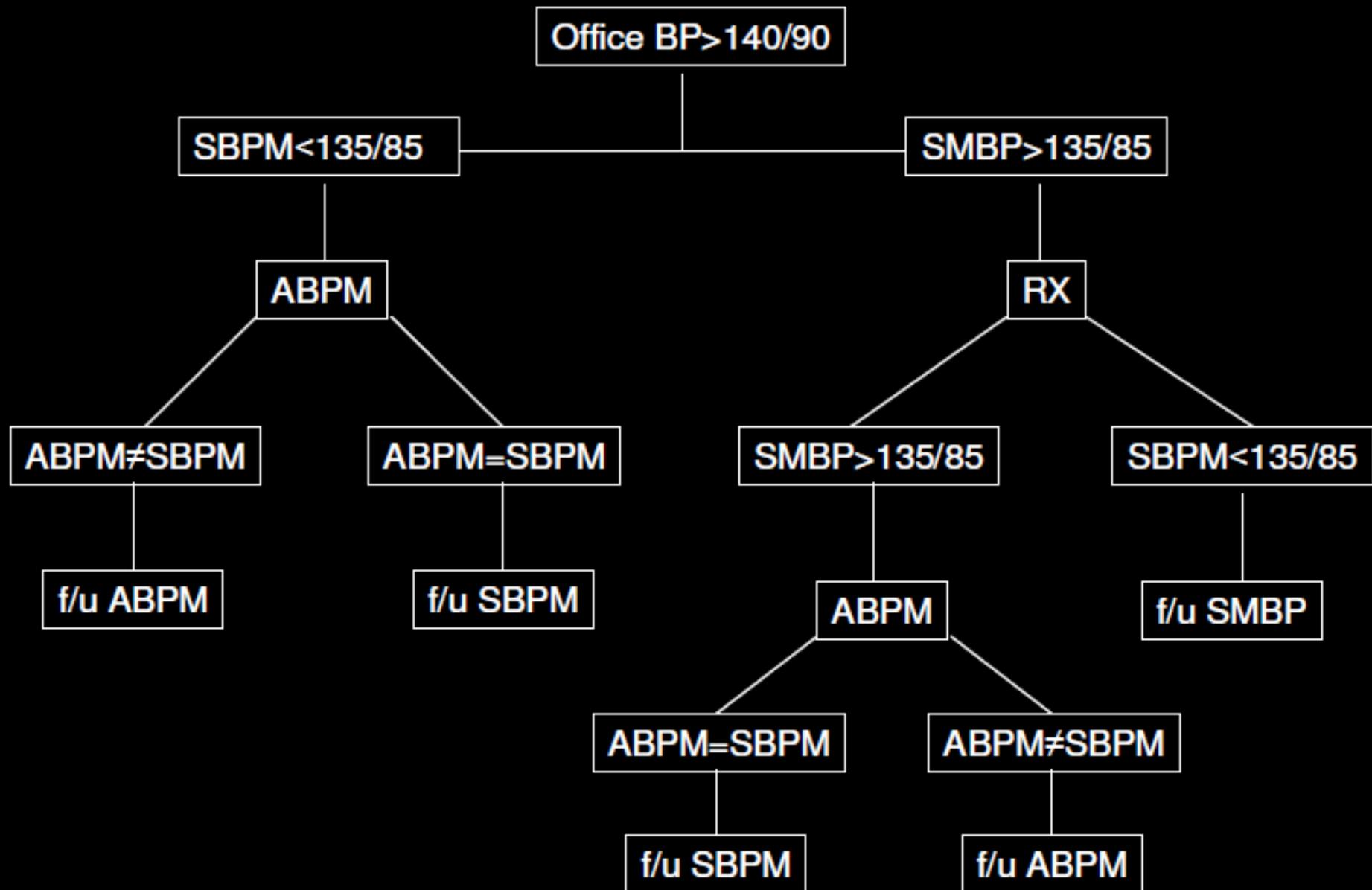
Data are from Reference,⁶ modified WCH indicates white coat hypertension; MH, masked hypertension.

**Ambulatory and Home Blood Pressure
Measurement **Complementary** Rather Than
Competitive Methods**

Paolo Palatini

- A study of Hara et al --
- Large number of BP readings used to calculate home BP, -- comparable to that collected during the 24-hour recordings.
- **Supplementary**, rather than a competitive, role in the assessment

Algorithm for the Use of Ambulatory Blood-Pressure Monitoring



EVIDENCE



© 2004 CCSSO--SCASS Health Education Assessment Project



Evidence: Showing What You Learned

Value of Home Blood Pressure Monitoring

- Five prospective studies have compared home and office BP for predicting cardiovascular outcomes.
- All 5 found that home BP is a significant predictor, and 4/5 that it is stronger than office BP.
- Other studies have shown that home BP predicts target organ damage better than office BP.

Prospective Studies Relating Home BP and Office BP to Cardiovascular Events and Mortality

Study	No. of Subjects	Home BP Schedule				Outcome
		Days	AM	PM	Total	
Ohasama	1789	28	1	0	28	Strokes and mortality predicted better by HBPM
SHEAF	4939	4	3	3	24	CV morbidity and mortality predicted better by HBPM
PAMELA	2051	1	1	1	2	CV and total mortality predicted better by HBPM
Belgian	391	1	3	0	3	Combined CV events predicted better by HBPM
Didima	662	3	2	2	12	CV events predicted by both HBPM and office BP

Prospective Studies Showing that Home BP Predicts CV Morbidity Better than Clinic BP

Author	Year	Population	N	Comments
Imai	1996	Population	1789	ABP & HBP predict, not CBP
Bobrie	2004	Treated	4939	HBP predicts, not CBP
Sega	2005	Population	2051	HBP predicts better than CBP

For persons >60 years of age, HBPM is as good or better than ABPM when predicting mortality in older patients (Fagard RH, et al. J Hum Hypertens. 2005)

- Agency for Healthcare Research and Quality (AHRQ)
AHRQ Systematic review
- This review identified 48 comparative studies that examined the impact of HMBP with or without additional support in the management of hypertension
- On a population level, home BP is lower than clinic BP

Current Usage of HBPM

- Several national and international guidelines do recommend the use of HBPM for hypertension management (Gianfranco Paratia, et al. Journal of Hypertension 2008, 26:1505–1530)

6. O'Brien E, et al.. J Hypertens 2003; 21:821–848.

99. Williams B, et al.2004-BHS IV. J Hum Hypertens 2004; 18:139–185.

100. World Health Organization International Society of Hypertension Writing Group J Hypertens 2003; 21:1983–1992.

101. Imai Y, et al.. Hypertens Res 2003; 26:771–782.

102. Pickering Tget al. Circulation 2005;111:697–716.

Editorial Commentary

Home Blood Pressure as a Cardiovascular Outcome Predictor

It's Time to Take This Method Seriously

George S. Stergiou, Konstantinos C.M. Siontis, John P.A. Ioannidis

(*Hypertension*. 2010;55:1301-1303.) © 2010 American Heart Association, Inc.

Does home blood pressure monitoring improve patient outcomes? A systematic review comparing home and ambulatory blood pressure monitoring on blood pressure control and patient outcomes

[Tonya L Breaux-Shropshire](#),^{1,2} [Eric Judd](#),¹ [Lee A Vucovich](#),³ [Toneyell S Shropshire](#),⁴ and [Sonal Singh](#)⁵

- HBPM encourages patient – centered care and improves BP control and patient outcomes.

Home Versus Ambulatory And Office Blood Pressure In Predicting Target Organ Damage In Hypertension

Home versus ambulatory and office blood pressure in predicting target organ damage in hypertension: a systematic review and meta-analysis – Review published: 2012. Bibliographic details: Bliziotis IA, Destounis A, Stergiou GS. Journal of Hypertension 2012; 30(7): 1289-1299.

Data suggest that home BP is as good as ambulatory monitoring and superior to office measurements in regard to their association with preclinical organ damage assessed by echocardiographic left ventricular mass index.

[J Hypertens.](#) 2008 Oct;26(10):1919-27. doi: 10.1097/HJH.0b013e32830c4368.

Ambulatory blood pressure monitoring versus self-measurement of blood pressure at home: correlation with target organ damage ([Gaborieau V¹](#), [Delarche N](#), [Gosse P](#))

Home blood pressure was at least as well correlated with target organ damage, as was the ambulatory blood pressure.

The USPSTF recommends obtaining measurements outside of the clinical setting for diagnostic confirmation before starting treatment.

Annals of Internal Medicine CLINICAL GUIDELINE

Screening for High Blood Pressure in Adults: U.S. Preventive Services Task Force Recommendation Statement (Albert L. Siu, MD, MSPH, on behalf of the U.S. Preventive Services Task Force*)

The USPSTF recommends obtaining measurements outside of the clinical setting for diagnostic confirmation before starting treatment.

- Only the CHEP and NICE guidelines currently recommend that a diagnosis can be made based on both ABPM and HBPM
- French and Taiwan guidelines recommend the use of self-monitoring to confirm office BP measurements before diagnosis is made for all other guidelines office BP is still regarded as the gold standard for diagnosis

Limitations for HBPM

- Continues 24-hours monitoring not possible
- **Cannot diagnose nocturnal hypertension:**
cannot be monitored during sleep, and is not useful to determine whether the patient is a dipper or non-dipper.
- Not useful in sleep apnoea
- Arrhythmia

FUTURE



- The availability of HBPM devices with arrhythmia – detection algorithms,
- Development and production of an ‘adjustable cuff’, which may be applicable to all adult arms, in order to avoid the inaccuracy induced by miscuffing.

HBPM

- Sleep HBP in addition to morning HBP
- Automatic HBPM device with data memory and three automatic measurements of BP during the sleep period.
- nocturnal dipping may be recognised by home monitoring devices that are more accessible and less expensive than 24-hour ABPM devices.
- Two devices have been used to obtain three measurements of sleep-time BP: the Omron HEM-5001 (Ishikawa et al., 2012) and the Microlife Watch BNP (Stergiou et al., 2012c).

Recommendations to improve the utility of HBPM in India

1. Every physician should explain to his patients about the value of HBPM and advise them to buy a BP apparatus
2. Every healthcare professional should instruct the patient to do home blood pressure monitoring and bring the record when they come for consultation and impress them that would help them to determine whether lifestyle or medication changes are needed.
3. Various Medical associations like HSI, API, IMA, should promote HBPM
4. Every medical college hospital should run a hypertension clinic once a week and focus on to improve the control of BP and the health care team should advice about HBPM

Recommendations to improve the utility of HBPM in India

5. The government should promote standard validated (make in India) BP apparatus at affordable cost and help them for periodical BP apparatus validation
6. NGOs and health workers should provide proper education about HBPM to the patients
7. Proper hand bills, brochures in regional languages should be made freely available at all clinics both private and government
8. Industries and pharma companies also must participate in the HBPM awareness campaign and help conducting free education camps at mall, railway stations and other public places.

Prognostic Significance Home Blood Pressure Monitoring

DRIVE HOME MESSAGES

- Home BP is at least as **well correlated with organ damage** as is the ambulatory BP and that the prognostic significance of home BP is similar to that of ambulatory BP after adjustment for age and gender.
- Recent guidelines have strongly endorsed the application of HBPM and recommended this method as **a routine component of BP measurement** in most patients with known or suspected hypertension.
- Evidence on HBPM :-should no longer be regarded as complementary or a screening test requiring confirmation by ABPM, but as an **alternative to ABPM diagnostic test** to be used for decision making in hypertension management

Indian Scenario

- India – 100 million patients with high BP
- Among the Indian population, only about half (55%) of the hypertensive patients were aware of their disease
- Only a third (36%) of these known hypertensive subjects were under treatment
- Only a quarter (28.2%) of this treatment group patients had their BP under control.
- According to Cure study 15.4% of the total hypertensive group only had blood pressure under control
- treatment and control were more common among men than among women.
- According to WHO 2008 statistics, the prevalence of HTN was 23.1% among Indian men and 22.6% among Indian women.

- HYPERTENSION IS A SILENT KILLER
- WE SHOULD NOT BE SILENT ABOUT HBPM



MY AFFECTIONATE APPEAL



- In every house there is a person who has Hypertension.
- Home Blood Pressure Monitoring helps to improve BP control.
- Home Blood Sugar Monitoring is known but not HBPM.
- **KINDLY PROMOTE, POPULARISE AND FAMILIARISE HOME BLOOD PRESSURE MONITORING**

THE HINDU

[NATIONAL](#) » [TAMIL NADU](#)

TIRUPUR, August 22, 2015

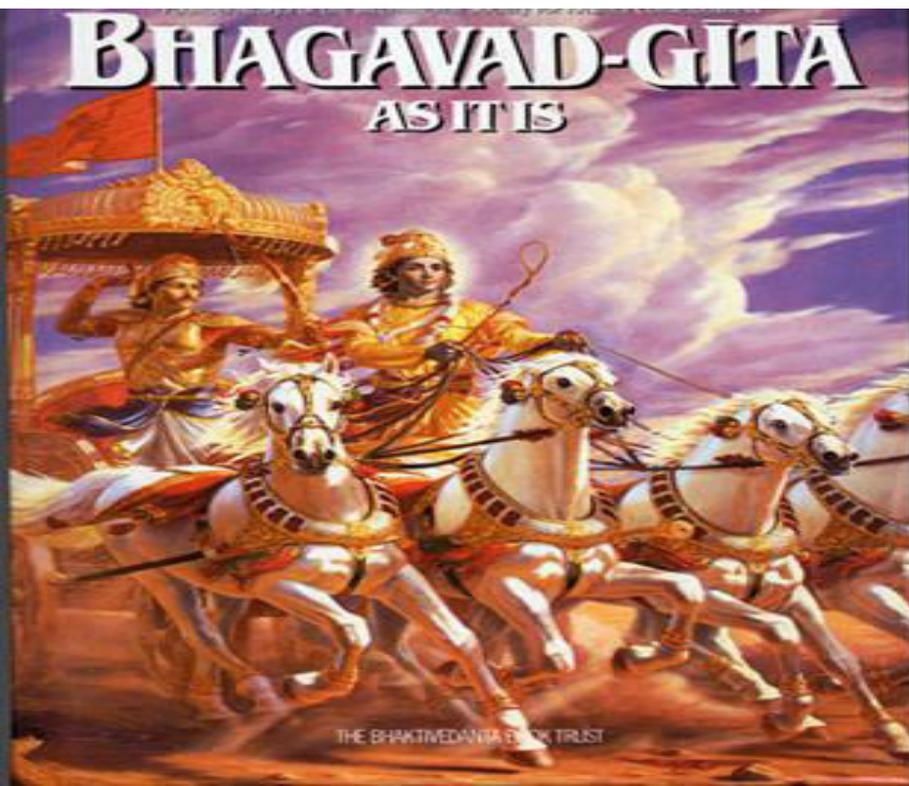
Updated: August 22, 2015 05:42 IST

‘Gift a BP monitoring apparatus’

R. VIMAL KUMAR

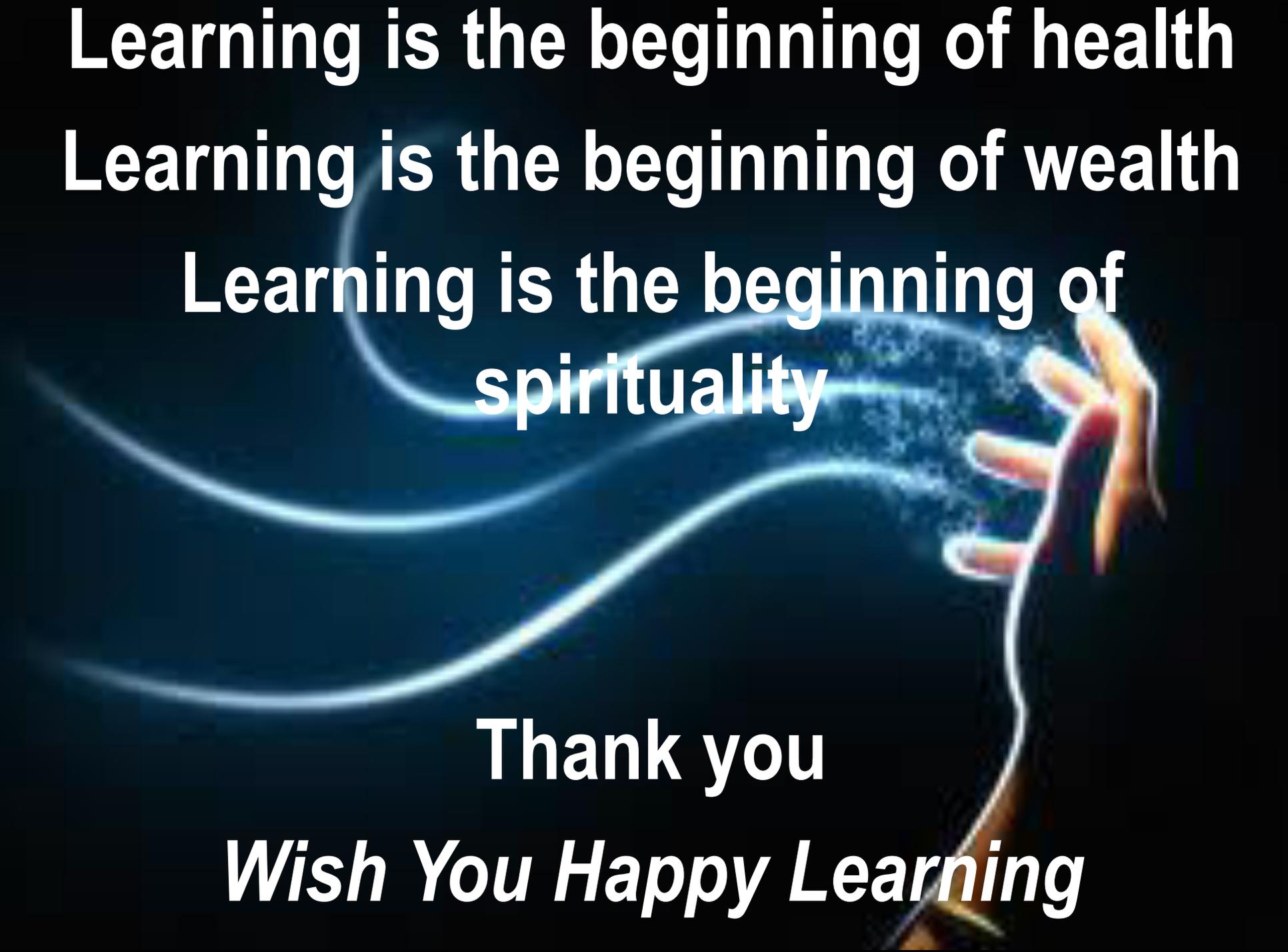
The Hypertension Society of India plans to take its awareness campaign forward by urging people to gift Blood Pressure (BP) monitoring apparatus to friends and family on special occasions. They are doing this with the help of voluntary organisations. According to the Society's newly elected national president, **A. Muruganathan, a Tirupur-based doctor**, the Society want to promote blood pressure monitoring at homes as almost all families have at least one member having high BP. “With hypertension recognised as a major health problem , gifting a BP apparatus is more valuable than giving fancy items.”

Control over his diet,
takes regular exercise, has time to relax,
does the right toil in discharge of his duties,
observes proper hours of sleep and awakening,
and is balanced in his actions and reactions,
emotions and reasons, duties and rewards,



Conquers disease

From the Bhagavad Gita

A hand is shown on the right side of the image, reaching out towards the left. The hand is illuminated with a warm, golden light. In the background, there are several glowing, wavy lines of blue and white light that create a sense of energy and movement. The overall background is dark, making the light elements stand out.

Learning is the beginning of health
Learning is the beginning of wealth
**Learning is the beginning of
spirituality**

Thank you
Wish You Happy Learning

Thank you for



your attention

Conclusions

- **Hypertension is epidemic in India. Greater awareness, screening, treatment adherence and control are needed.**
- **Standardized and correct way of measurement of hypertension is crucial.**
- **Despite all the reasons that home and ambulatory measurements are better than office readings, for now, office sphygmomanometry will continue to be widely used for diagnosing and monitoring hypertension.**
- **Ensure that only clinically validated equipment is used and all sphygmomanometers are regularly checked.**
 - **Mercury devices annually and aneroid devices twice a year.**
- **Ensure each consulting room has both large and regular cuffs as this reduces the likelihood of cuffs being inappropriately used.**
 - **‘Miscuffing’ can introduce large errors in measurement.**

Outcome(s)	Major findings
UACR, LVH by ECG	One year changes in SBP were closer between HBPM and daytime ABPM than clinic measurement. No changes in UACR or LVH by ECG were seen
UACR, LV mass index	<p>SBP measured by ABPM, HBPM, and clinic was associated with natural log-transformed UACR and LVmassindex</p> <p>.Correlation with UACR was strongest for SBP by HBPM</p>

Urine Albumin-to-Creatinine Ratio (UACR), Left ventricular hypertrophy (LVH), electrocardiogram (ECG) & left ventricular mass index

Self Blood Glucose Monitoring

1. Costly every time strip cost
2. Needle pricks
3. Can be done practically (on a single day)
maximum six times – six pricks – six strips
4. HBPM can be done without pain and cost as many times as possible