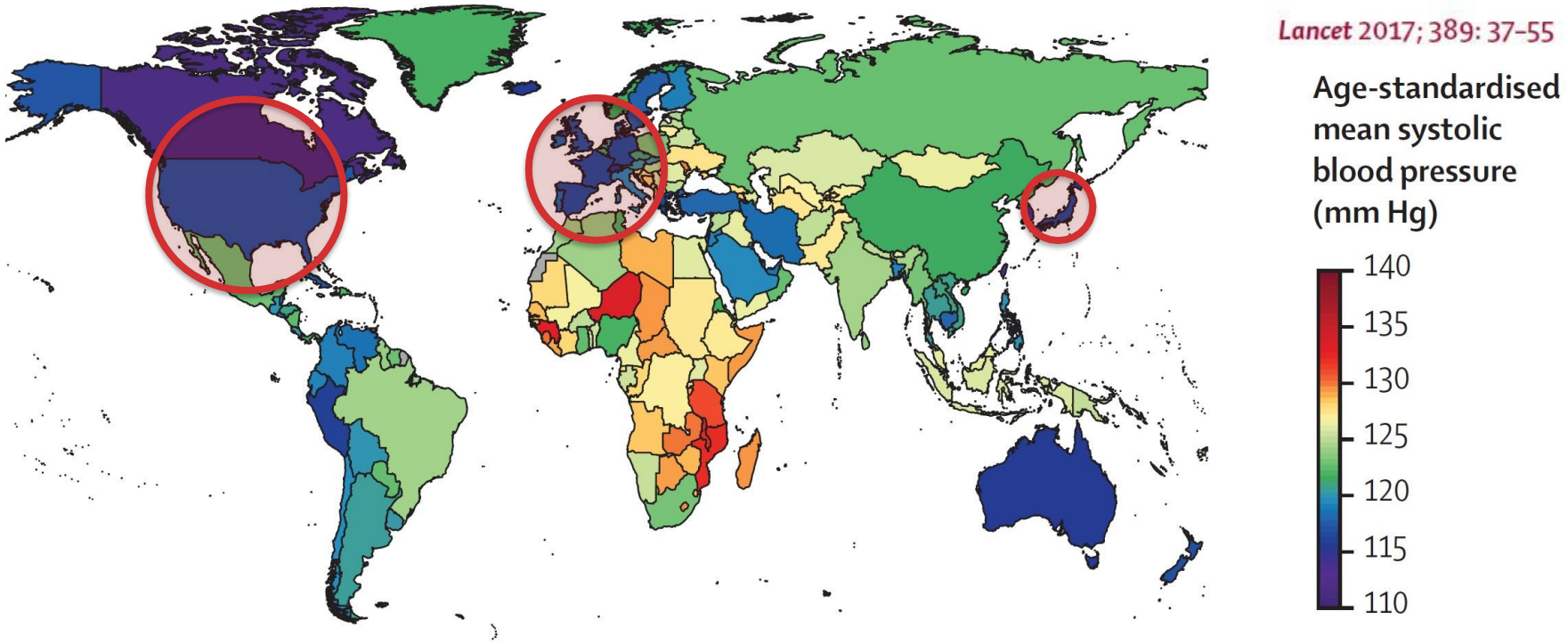
Challenges and strategies for hypertension management

Islam Abusido, MD, FACC

Nov. 18th , 2022

Introduction



- 1.39 billion estimated with hypertension in 2010
- **349** million from HIC
- **1.04 billion** from LMIC

Circulation. 2016;134:441–450

Hypertension: Unbelievably common!

- **Hypertension affects ≥ 1.1 billion / 7.4 billion people worldwide .**
- **Hypertension is number one reason listed for office visits , 42 million office visits are as the primary diagnosis of HTN.**
- **Hypertension causes/contributes to more than 500,000 admissions per year.**
- **Hypertension is the leading cause/contributor to CV death.**

(MI, stroke, vascular disease)

9.6 million deaths per year may be attributable to hypertension.

WHO, July 2016

Hypertension: Unbelievably Common!

Prevalence:

33% of adult Americans, 86 million have hypertension (BP >140/90) .

45% of adult black Americans (highest in world).

65% of Americans age 60y

90% of Americans age 85y

Projected prevalence in 2030: 41% of adults

Circulation 2015; 131:e86 *Am J Kid Dis 2010; 55:441*

Prevalence of Hypertension in Jordan

- **Jaddou et al in 1995 reported the prevalence of hypertension in Jordan to be 29.4% and the awareness rate is 38.8%, and in another publication in 2011 hypertension prevalence rate was 32.3% and awareness rate was 56.1%.**

- **Prevalence rate was significantly higher among males, older age groups, least educated, obese, and diabetics than their counterparts**

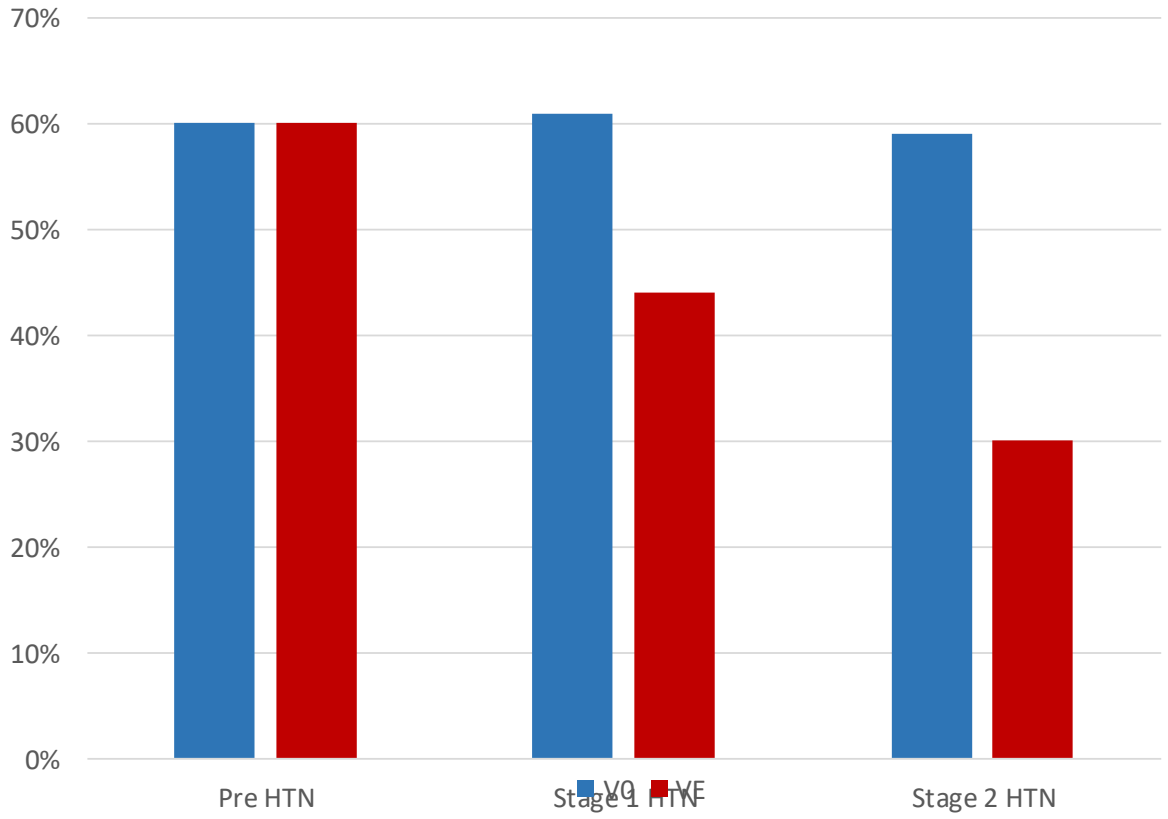
- **Jaddou et al :Hypertension Prevalence Awareness, Treatment and Control. Results from National Survey, Jordan, International Journal of Hypertension 2011**

The Challenges!!!!

- **Awareness: ~ 60% of hypertensive individuals are aware of being diseased**
- **Treatment: ~ 50% of hypertensive patients who know they are diseased are treated.**
- **Control: ~ 40% of the treated patients are controlled**
- **Of all hypertensive patients: Only 12% are controlled**
- **(aware 60%)*(Treated 50%)*(controlled 40%)**

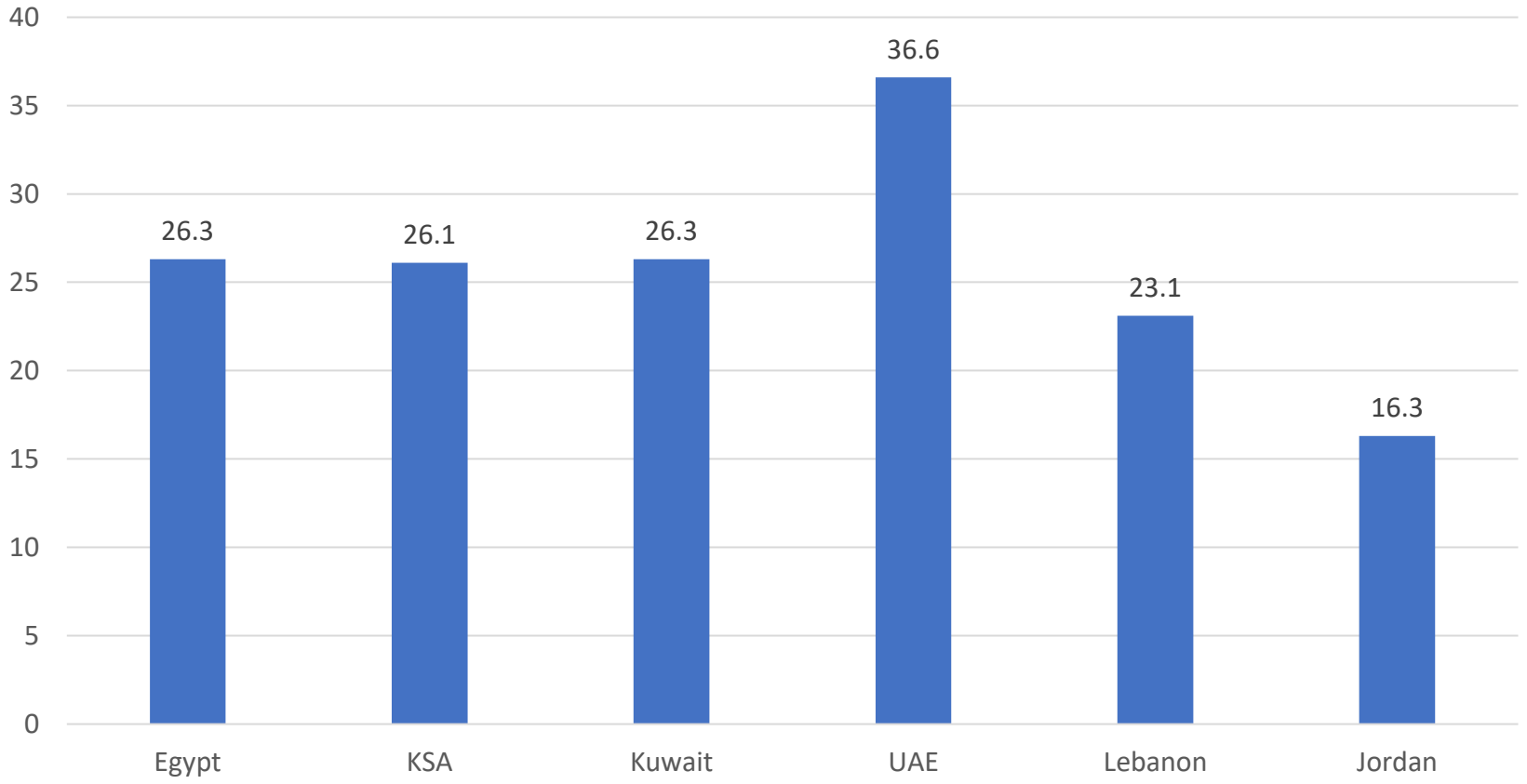
Hajjar I, Kotchen TA. *JAMA*. 2003;290:199–206.
Whelton PK, et al. *Hum Hypertens*. 2004;18:545–51.
Danaei G, et al. *Lancet*. 2011;377:568–77.

Lower adherence with more severe hypertension



Alhaddad IA et al. Vascular Health and Risk Management 2016:12:407-13

Prevalence of Hypertension in countries in Middle East



Saudi Med J. 2007 Jan;28(1):77-84, Saudi J Kidney Dis Transpl 1999;10:376-81,
Journal of Human Hypertension (2005) 19, 861–868. doi:10.1038/sj.jhh.1001909;
Saudi J Kidney Dis Transpl (0) 10: 357-64

Challenges in managing hypertension

- These included patient beliefs and fears regarding medication in general, external barriers such as cost and experience of side effects.

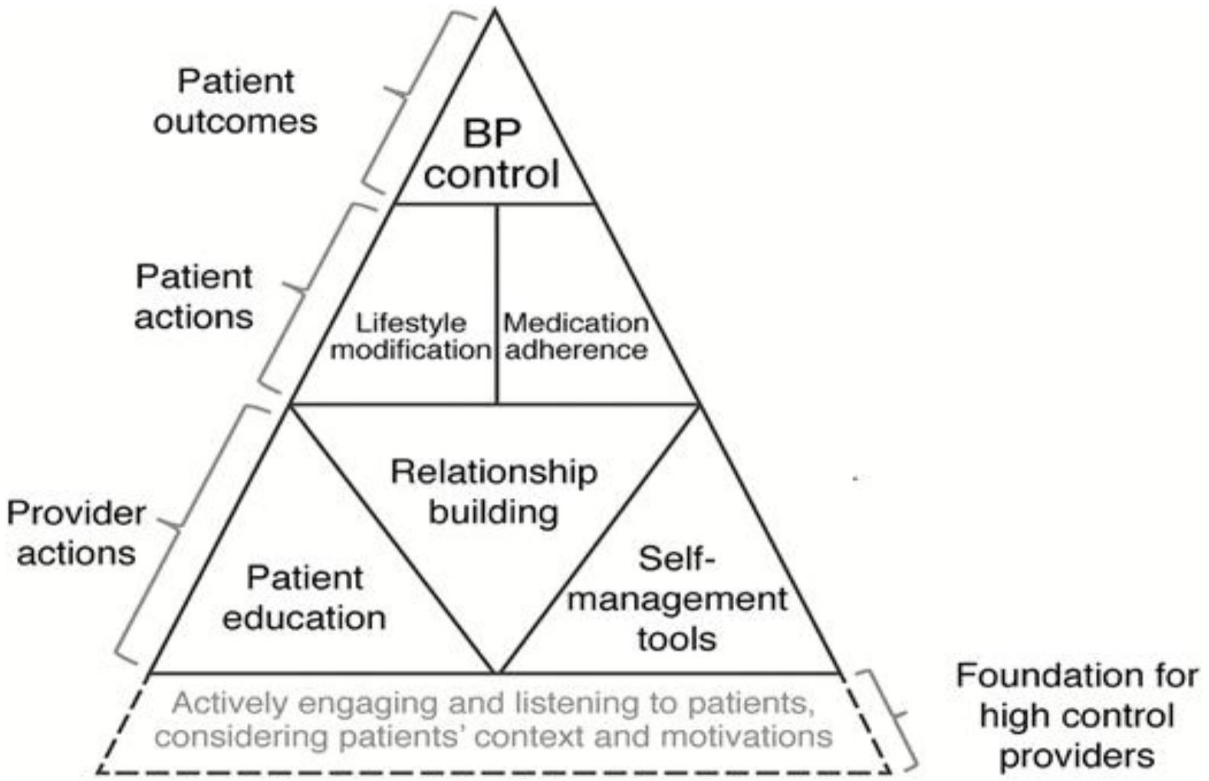
- Providers also described patients who misunderstand the ‘silent’ nature of hypertension and how BP medications function, citing examples such as patients who associate hypertension with certain symptoms and take medication only when symptoms are present.

- **‘Physicians, we can say whatever we want. If a patient does not participate, whatever we say is useless…I take my time with my patients. So it’s hard for a doctor to explain an hour with a patient that has multiple medical problems and see this patient in four to six weeks and nothing has changed and nothing has been done’.**

- **‘I think a lot of the challenges [for controlling hypertension] happen outside the office. …I can’t have someone go to their house and make sure they take their medications’**

Strategies for managing hypertension

Figure 1.



Patient Education

- Providers mentioned education on a variety of topics, including hypertension as a condition, its long-term consequences if left uncontrolled, lifestyle changes that can help improve BP and the importance of medication adherence to controlling BP.

- ‘I mean, I stress the strokes and the heart attacks for people who are starting on medication. I explain why we need to maintain that – keep hypertension – maintain the pressure normal. Stroke, heart attack, kidney disease. It’s really just a conversation’.

Relationship building

- High control providers additionally emphasized communication as a factor in fostering a strong relationship with patients, describing actively listening to the patient and eliciting his/her concerns. One provider summarized, ‘a good communicator is a good listener’.

- ‘I think the bigger impact would be contacting patients at home… You know, “have you taken your meds, have you made an appointment with your doctor.” Something other than what happens in the office… Because a patient has certain expectations of what happens in the office and I think unless they have a follow up, you don’t make much of an impact’.

Improvement of hypertension diagnosis by identification of different blood pressure phenotypes through combined use of office and out-of office BP monitoring

- **Although office BP (OBP) measurement is still the most common used technique for screening and diagnosis of hypertension, it is intrinsically inaccurate and importantly influenced by measurement errors and observer's bias.**

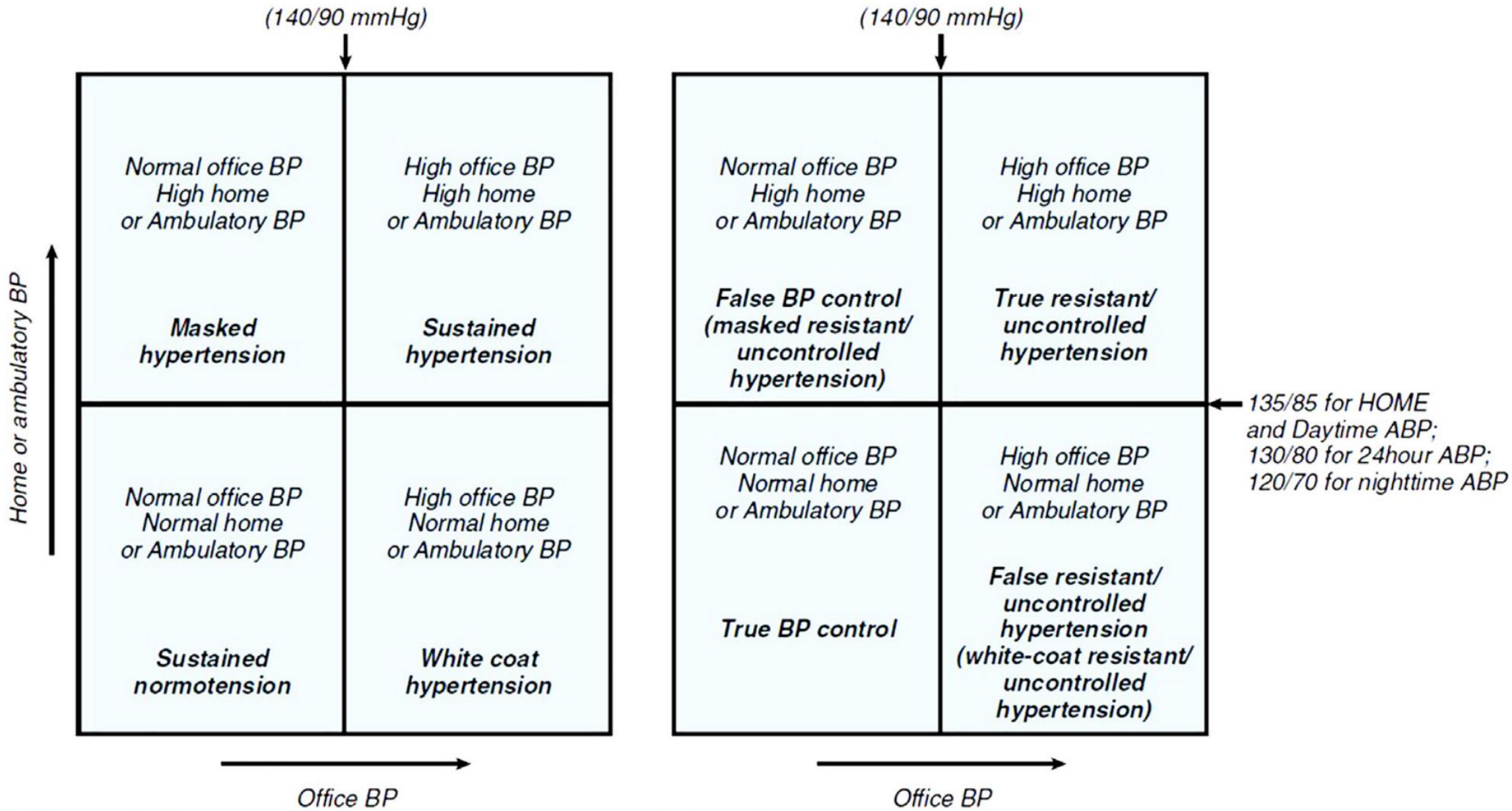
- **OBP measurements are also affected by a random error, related to the fact that spot BP assessment during consultation does not faithfully reflect subjects' exposure to BP load in real life conditions.**
- **which has stimulated the introduction of outof-office BP monitoring methods, including ambulatory BP monitoring (ABPM) and home BP monitoring (HBPM)**

- **combined use of office and out-of-office blood pressure (BP) measurements allows identification of a number of specific BP patterns, characterized by discrepant levels of office and out -of-office BP.**

- **In untreated patients, these conditions are defined as white coat hypertension (WCH, elevated office and normal out-of office BP), or masked hypertension (MH, normal office and elevated out-of-office BP), respectively.**

- **In treated patients, these conditions are defined as white coat uncontrolled hypertension (WCUH, with uncontrolled office and normalized out-of-office BP), and masked uncontrolled hypertension (MUCH, with normalized office and uncontrolled out-of-office BP in spite of treatment), respectively.**

- . **Evidence has been provided in this regard showing that both WCH and MH in untreated individuals and WCUH and MUCH in treated patients are associated to an increased risk of major cardiovascular outcomes and hypertension related hospitalization.**


(140/90 mmHg)
Normal office BP
High home
or Ambulatory BP
Masked
hypertension
High office BP
High home
or Ambulatory BP
Sustained
hypertension
Normal office BP
Normal home
or Ambulatory BP
Sustained
normotension
High office BP
Normal home
or Ambulatory BP
White coat
hypertension
Home or ambulatory BP
Office BP
A. Untreated subjects
(140/90 mmHg)
Normal office BP
High home
or Ambulatory BP
False BP control
(masked resistant/
uncontrolled
hypertension)
High office BP
High home
or Ambulatory BP
True resistant/
uncontrolled
hypertension
Normal office BP
Normal home
or Ambulatory BP
True BP control
High office BP
Normal home
or Ambulatory BP
False resistant/
uncontrolled
hypertension
(white-coat resistant/
uncontrolled
hypertension)
135/85 for HOME
and Daytime ABP;
130/80 for 24hour ABP;
120/70 for nighttime ABP
Office BP
B. Treated hypertensive patients

- **From a practical perspective, whenever ABPM is not available, difficult to access or not well tolerated by patients, some of its advantages can be nevertheless obtained through use of HBPM.**

- **Average HBP values are more reproducible than OBP and as reproducible as average ABP values, or even better.**

- **The better reproducibility of average HBP levels is related to the inclusion of a higher number of readings in its assessment. Indeed, HBPM has experienced an exponential diffusion in recent years, due to progress in technology leading to the availability of small, accurate, user-friendly and relatively inexpensive BP monitoring devices**

- **In most current hypertension guidelines, both HBPM and ABPM are recommended in order to improve diagnosis and management of hypertension with indication to use them as complementary and not as alternative diagnostic methods.**

Improvement of hypertension control

- **Recent reports indicate that BP control remains far from adequate regardless of global location, with only 60% of treated subjects achieving control of their BP values .**

- **Major causes for this failure include poor patients' adherence to long-term therapy and therapeutic inertia (defined as failure by a physician to titrate or modify antihypertensive therapy in the setting of identified poor BP control)**

- **Low adherence to antihypertensive treatment is the most common cause of treatment resistance and is associated with an increased risk of cardiovascular morbidity and mortality.**

- **According to a large meta-analysis of prospective epidemiological studies, about 9% of cardiovascular disease events may be attributable to poor adherence to cardiovascular medications.**

- . **The factors driving to non-adherence in a given patient can vary depending on the patient's profile, including fear of possible or experienced adverse events, lack of information, actual or perceived lack of treatment benefit, forgetfulness, complexity of dosing regimen and polypharmacy.**

- **Physician's inertia, i.e. the failure to initiate therapy or to intensify or change therapy in patients with elevated BP values, and a poor patient–physician communication are also contributing factors for failure to achieve BP targets**

- **Pharmacological regimens considering duration of action of antihypertensive drugs and treatment simplification to improve 24 h BP control and to reduce BP variability.**

- **BP fluctuations over a 24h period are characterized by substantial reductions during sleep, a rapid rise upon awakening, and a variable magnitude during the awake state, depending on a person's activities and emotional state.**

- **The nocturnal BP is now recognized as superior to daytime BP in predicting cardiovascular risk**

- **An increased BP variability throughout the 24h has been shown to carry prognostic information in addition to that carried by average 24h BP levels, being associated with increased organ damage and incidence of cardiovascular morbidity and mortality.**

- **the most appropriate agents would be those with a duration of action of 24h or longer, which can be prescribed for once-daily dosing without compromising BP control at the end of the dosing period, thus preserving a physiologic circadian BP pattern and contributing to buffer short term BP fluctuations.**

Indices to quantify consistency of BP control over 24h

- **Indices to assess consistency of BP control throughout the dosing interval, proposed over the years, include trough-to-peak ratio (T/P), smoothness index (SI), and treatment on variability index (TOVI).**

- **The 24h trough-to-peak ratio expresses the pharmacological effect of a drug at the end of dosing time (trough) relative to its peak effect. The closer an agent is to a 100% trough-to-peak ratio, the more uniform the 24h coverage and therefore BP control is.**

- **The Smoothness index (SI) is aimed at providing information on both the degree of 24 h BP reduction and the distribution of such a reduction over the 24h period.**

- **SI is obtained by first calculating the average BP values for each hour of the 24 h monitoring period, both before and during treatment.**

- **From these values, all hourly changes in BP induced by treatment are obtained, and the average of these hourly values (ΔH) is computed together with its SD, which represents the dispersion of the antihypertensive effect over the 24 hourly values. Finally, the SD is normalized by dividing its value for ΔH, and the inverse of this ratio indicating the degree of 'smoothness' of BP reduction by treatment is termed 'smoothness index'.**

- **Treatment On Variability Index (TOVI) is the most recent index for estimating the effect of antihypertensive treatment on BP variability.**

- **TOVI indeed reflects the impact of a given treatment both on 24 h mean BP levels and on absolute estimates of 24 h BPV, also accounting for the circadian BP fluctuations.**

- **TOVI is estimated as the ratio between mean 24-h BP reduction by treatment and a measure of short-term variability in BP under the same treatment.**

Indices to assess consistency of BP control by treatment.

Index	Meaning	Calculation	Formula
Smoothness Index (SI)	reflects the degree of BP reduction over the entire 24h period	Ratio between the mean of hourly BP reductions (ΔH) and its standard deviation ($SD_{\Delta H}$) [64].	$SI = \frac{\text{Average } \Delta H}{SD\Delta H}$
Through:peak ratio (T/P)	reflects the pharmacological effect of a drug at the end of dosing interval (trough) relative to its peak effect	Ratio between the BP reduction at the end of the between-dose interval (through) and the BP reduction at the time of the maximal drug effect (peak). [65]	$T/P\ ratio = \frac{\Delta_{Trough}}{\Delta_{peak}}$
Treatment On Variability Index (TOVI)	reflects the impact of a given treatment both on 24 h mean BP levels and on absolute estimates of 24 h BPV, thus accounting for circadian BP fluctuations, as well as for the dependence of 24-h SD on 24-h mean BP levels	ratio between the mean of 24-hourly BP reductions and the weighted 24-h SD (wSD) assessed under treatment. [66]	$TOVI = \frac{\text{Average } \Delta 24h\ BP}{wSD}$

Use of ABPM to assess 24 h BP control by treatment

- **Patients who appeared to be well controlled based on clinic BP values were found to be at higher risk of coronary and stroke events if night-time systolic BP was elevated.**

Fixed-dose combinations to simplify therapeutic regimen

- **Use of fixed-dose combination treatment not only allows to achieve a more powerful BP reduction than monotherapies, but also carries the advantage of simplifying the therapeutic regimen, with a potential beneficial impact on patients' adherence and compliance with prescribed antihypertensive treatment.**

- **It is well known that high complexity of antihypertensive regimen (i.e. several medications and a high frequency of administration during the day), is a major barrier for patients' adherence to anti-hypertensive treatment.**

- **In recognition of this, 2018 ESC/ESH hypertension guidelines have recommended simplifying the therapeutic regimen as a means to improve patients' adherence to treatment.**

- **These guidelines, firmly recommended a single-pill combination of two antihypertensive agents as first-line treatment in the majority of patients with hypertension, other than low-risk grade I and the frail elderly.**

- **Thus, contemporary single-pill combination therapy appears to offer a number of potential advantages over monotherapy including a more rapid reduction in BP and greater likelihood of achieving BP targets, reduced pill burden and improved patient's adherence.**

Key Messages

- **Medication adherence was a challenge to managing hypertension in primary care.**
- **Education, relationship building and self-management were key strategies.**
- **Providers with high blood pressure control actively engaged their patients.**
- **Quality improvement efforts should consider including communication training**

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- ***Thank You***