In the name of God

BP Guideline in 2020

DR. SHAHRZAD SHAHIDI

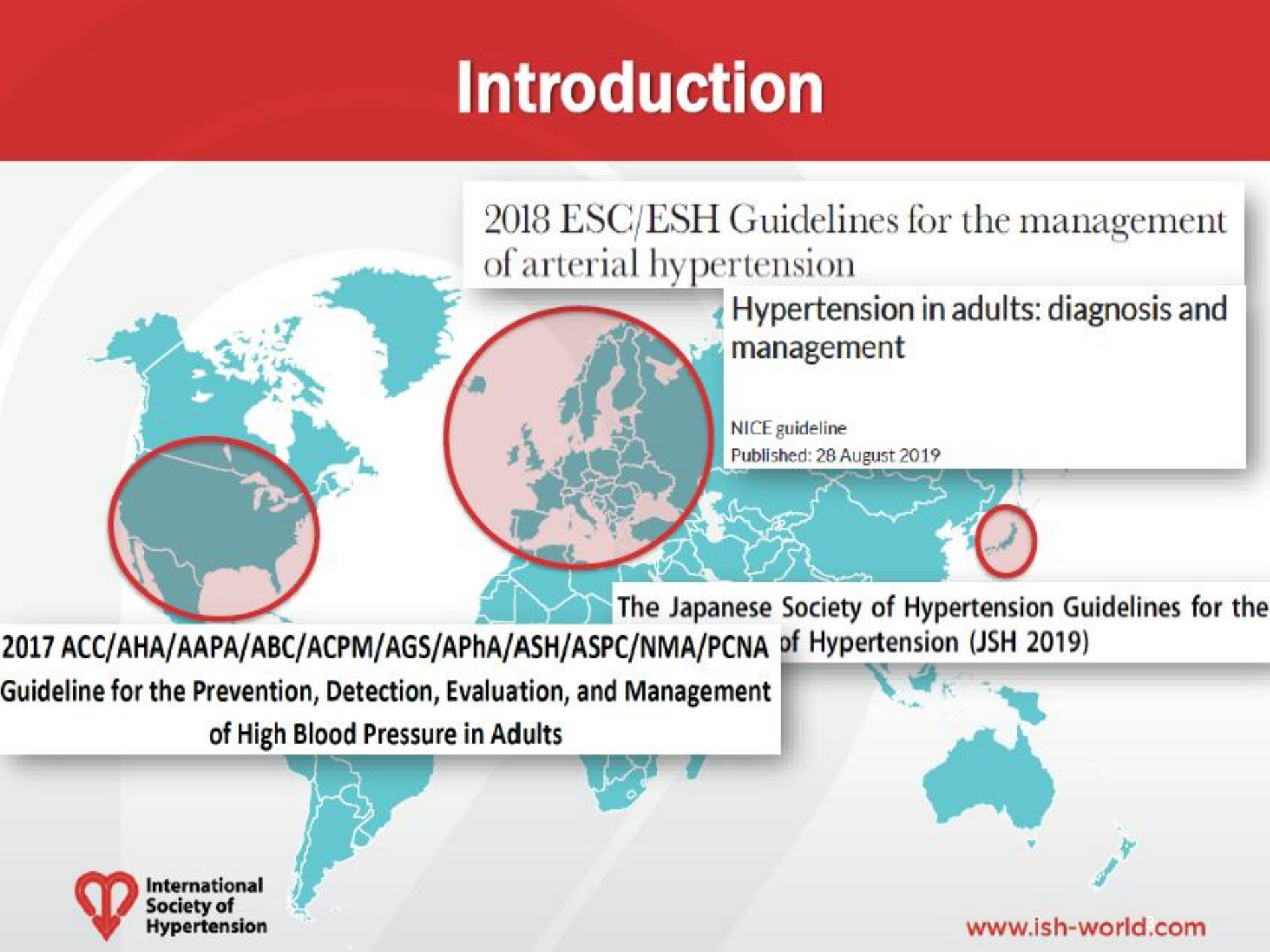
PROFESSOR OF NEPHROLOGY

ISFAHAN UNIVERSITY OF MEDICAL SCIENCES

Objects

1. Introduction
2. Definition
3. Diagnosis
4. Management
5. Follow up
6. HTN & CKD
7. ISH vs AHA Guidelines

Introduction



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Worldwide trends in blood pressure from 1975 to 2015: a pooled analysis of 1479 population-based measurement studies with 19·1 million participants

*NCD Risk Factor Collaboration (NCD-RisC)**

Summary

Background Raised blood pressure is an important risk factor for cardiovascular diseases and chronic kidney disease. We estimated worldwide trends in mean systolic and mean diastolic blood pressure, and the prevalence of, and number of people with, raised blood pressure, defined as systolic blood pressure of 140 mm Hg or higher or diastolic blood pressure of 90 mm Hg or higher.

Methods For this analysis, we pooled national, subnational, or community population-based studies that had measured blood pressure in adults aged 18 years and older. We used a Bayesian hierarchical model to estimate trends from 1975 to 2015 in mean systolic and mean diastolic blood pressure, and the prevalence of raised blood pressure for 200 countries. We calculated the contributions of changes in prevalence versus population growth and ageing to the increase in the number of adults with raised blood pressure.

Lancet 2017; 389: 37–55

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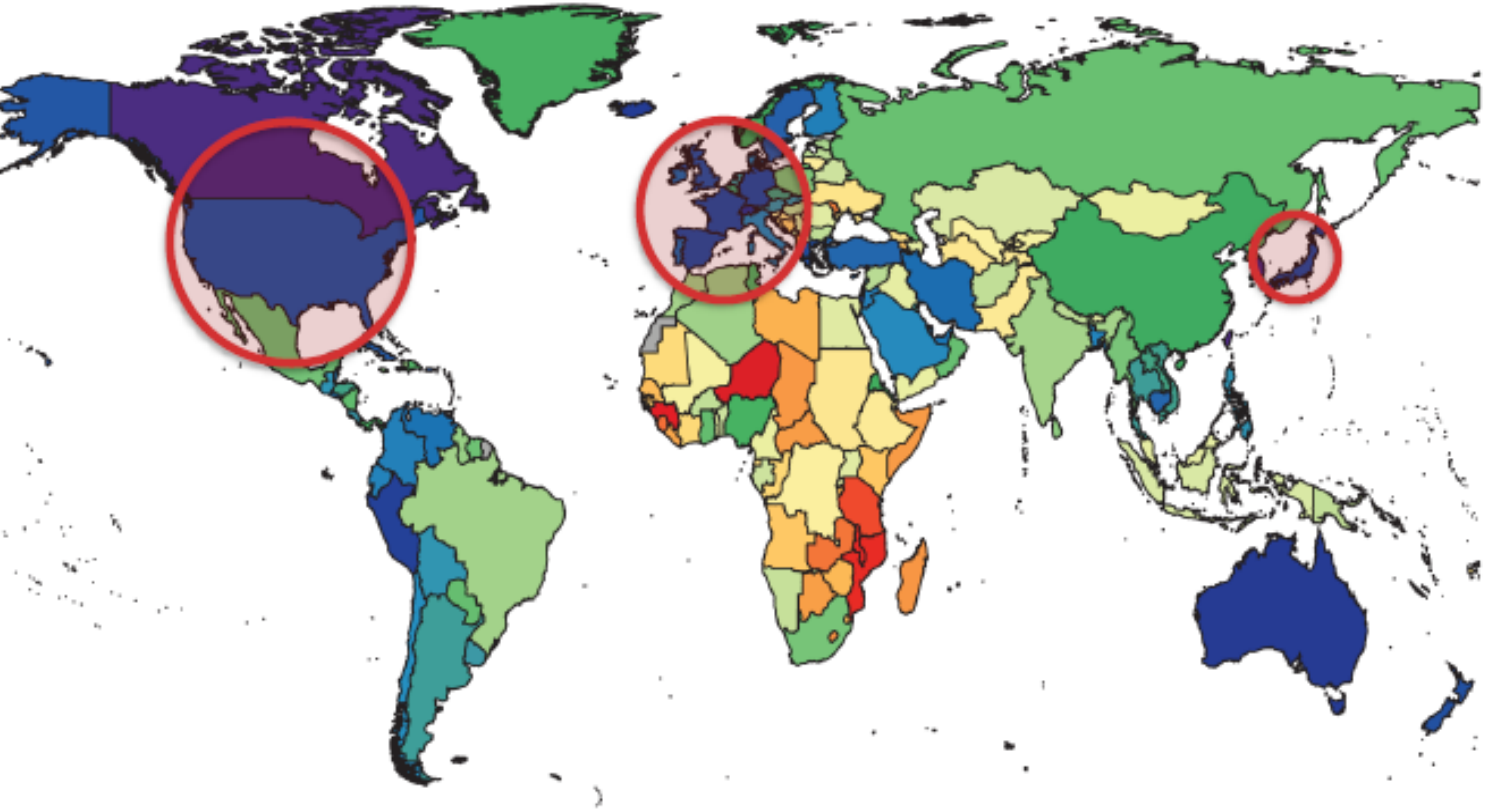
This online publication has been corrected. The corrected version first appeared at thelancet.com on September 24, 2020

See Comment page 3

*NCD Risk Factor Collaboration members are listed at the end of

Introduction



Lancet 2017; 389: 37–55

Age-standardised mean systolic blood pressure (mm Hg)

140
135
130
125
120
115
110

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

Circulation. 2016;134:441–450

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Introduction

The ***ISH 2020 Global Hypertension Practice Guidelines*** were thus developed based on evidence criteria,

a) to be used globally
b) to be fit for application in low-resource and high-resource settings by advising on ESSENTIAL and OPTIMAL standards of care; and
c) to be concise, simplified and easy to use by clinicians, nurses and community health workers, as appropriate.

Case

خانم ۴۵ ساله متاهل به علت گر گرفتگی گهگاه مراجعه کرده این مشکل از حدود ۲ ماه قبل شروع شده است سیکل ماهیانه منظم و مشابه قبل است در طی ۲ سال گذشته چند نوبت BP چک شده که حدود 140/100 mmHg بوده به وی گفته شده در اثر استرس است و داروئی تجویز نشده . رژیم غذائی را رعایت می کند و در طی ۶ ماه اخیر ۳ کیلوگرم کاهش وزن داشته است سابقه بیماری خاصی در گذشته نمی دهد سابقه HTN در مادر و خواهر بزرگتر دارد.

PE: RR: 16/min, BP:160/100 mmHg , PR: 82/min, T: 36 C ,

W: 74 kg, H: 156 cm

در معاینه سایر قسمتها نکته خاصی ندارد.

سوال 1

در مورد تشخیص بیمار کدام مورد صحیح است؟

A. مبتلا به HTN است
B. جهت تشخیص قطعی نیاز به کنترل مجدد BP در مطب است
C. جهت تشخیص قطعی نیاز به HBPM است
D. جهت تشخیص قطعی نیاز به ABPM است

Definition of Hypertension

ESSENTIAL

Hypertension based on Office-, Ambulatory (ABPM)- and Home Blood Pressure (HBPM) measurement

		SBP / DBP (mmHg)
Office BP		≥ 140 and/or ≥ 90
ABPM	24h average	≥ 130 and/or ≥ 80
	Day Time (or awake) average	≥ 135 and/or ≥ 85
	Night Time (or asleep) average	≥ 120 and/or ≥ 70
HBPM		≥ 135 and/or ≥ 85

Definition of Hypertension

ESSENTIAL

Classification of hypertension based on Office blood pressure (BP) measurement

Category	Systolic (mmHg)		Diastolic (mmHg)
Normal BP	< 130	and	< 85
High-normal BP	130–139	and/or	85–89
Grade 1 Hypertension	140–159	and/or	90–99
Grade 2 Hypertension	≥ 160	and/or	≥ 100

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ISH vs ACC/AHA Guidelines

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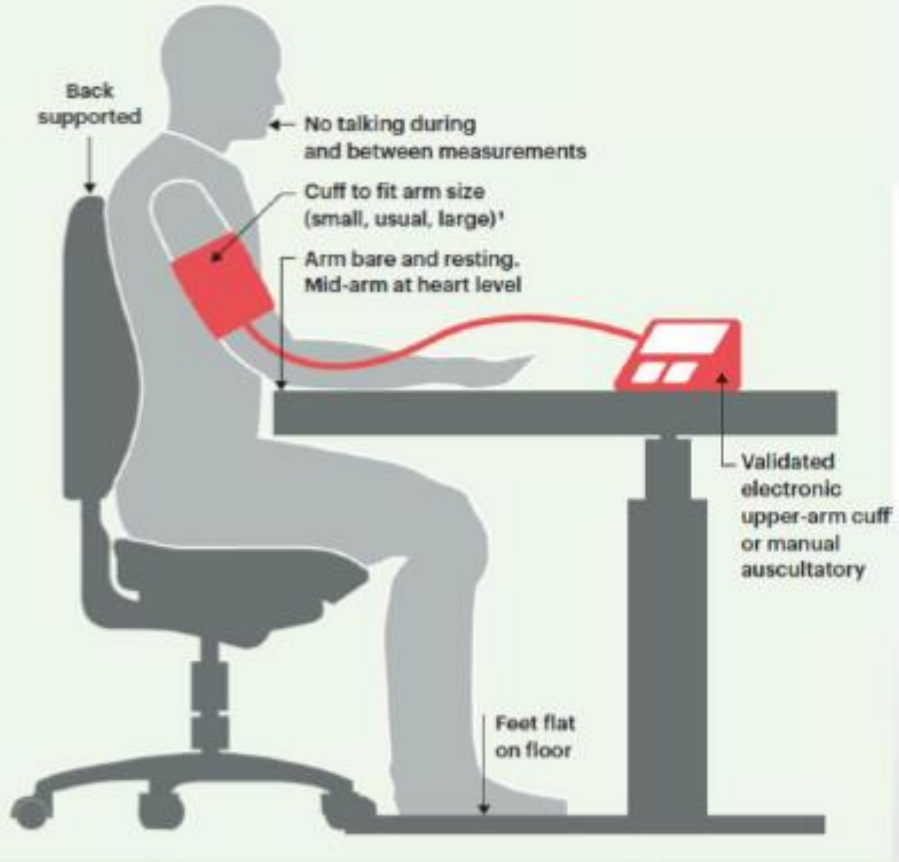
	Systolic (mmHg)		Diastolic (mmHg)
Normal BP	<130	and	<85
High-normal BP	130-139	and/or	85-89
Grade 1 Hypertension	140-159	and/or	90-99
Grade 2 Hypertension	≥160	and/or	≥100

American Heart Association. AMERICAN COLLEGE of CARDIOLOGY

	SBP		DBP
Normal	<120 mm Hg	and	<80 mm Hg
Elevated	120–129 mm Hg	and	<80 mm Hg
Hypertension			
Stage 1	130–139 mm Hg	*or*	80–89 mm Hg
Stage 2	≥140 mm Hg	*or*	≥90 mm Hg

Blood Pressure Measurement and Diagnosis of Hypertension

ESSENTIAL



Office Blood Pressure Measurement

- 2-3 office visits at 1-4-week intervals.
- Whenever possible, the diagnosis should not be made on a single visit (unless BP ≥180/110 mmHg and CVD).
- If possible and available the diagnosis of hypertension should be confirmed by out-of-office measurement.

Blood Pressure Measurement and Diagnosis of Hypertension

ESSENTIAL

OFFICE BP MEASUREMENT

Conditions	Device	Protocol
Position	**Cuff**	**Interpretation**
• Setting • Body position • Talking	• Validated electronic upper-arm cuff (www.stridebp.org) • Alternatively manual auscultatory device • Cuff size	• Average 2nd-3rd measurement • 2-3 office visits required

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Paused

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World Hypertension League

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STRIDE BP is an international scientific non-profit organization founded by hypertension experts with the mission of improving the diagnosis and management of hypertension.

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ONLY 8% OF BLOOD PRESSURE DEVICES ON THE MARKET APPROVED BY THE STRIDE BP

STRIDE BP has approved **310** and recommends as preferred only **170** of the over **4,000** electronic blood pressure monitors currently available on the market

stridebp.org/bp-monitors

Home

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Office/Hospital

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Ambulatory

Download

Children

Download

Pregnancy

Download

VALIDATED DEVICES FOR OFFICE / CLINIC BP MEASUREMENT

Preferred devices (35)

A&D UM-101
A&D UM-211
Accoson Greenlight 300
Andon iHealth BP3
Andon iHealth Clear BPM1 *
Andon iHealth Ease BP3L *
Andon iHealth Neo BP5S *
Andon iHealth Track KN-550BT *
Andon KD-558BR *
Andon KD-5920 *
Andon KD-5923 *
Andon KD-5965
Artsana Pic Indolor Professional
Dinamap ProCare 400
Erkameter 125 PRO
InBody BPBIO250
InBody HBP570 *
Microlife 3AS1-2
Microlife VSA (BP3GP1-1L) *
Microlife WatchBP Office
Microlife WatchBP Office (BP3SK1-3B) *
Microlife WatchBP Office ABI
Microlife WatchBP Office AFIB *
Microlife WatchBP Office Central *
Nissei DM3000
Omron HBP T105
Omron HBP-1300
Omron HBP-1320
Omron HBP-9030 *
Omron M3500
Raycome RBP-1200
RisingSun RS-651
Rossmax AC1000f
Suntech CT40
Welch Allyn ProBP 2000

Validated devices (10)

1. Andon iHealth View BP7S
2. Omron HEM-907
3. Andon KD-723
4. Rossmax Mandaus II
5. BpTRU BPM-100
6. Spengler Pro M
7. Dinamap ProCare
8. Suntech 247
9. Mindray Datascope Accutorr Plus
10. Welch Allyn Vital Signs

Blood Pressure Measurement and Diagnosis of Hypertension

ESSENTIAL

BP Measurement Plan according to Office BP levels

Office blood pressure levels (mmHg)		
<130/85	130-159/85-99	>160/100
• Remeasure within 3 years (1 year if other risk factors).	• If possible confirm with out-of-office measurement. • Alternatively confirm with repeated office visits.	• Confirm within a few days/weeks.

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Blood Pressure Measurement and Diagnosis of Hypertension

OPTIMAL

Office Blood Pressure

Initial evaluation

- Measure BP in both arms. Difference >10 mmHg: use arm with higher BP; >20 mmHg: consider further investigation.

Standing BP

- In treated patients when symptoms of postural hypotension.
- At first visit in elderly and diabetics.

Unattended BP

- More standardized. Lower BP levels with uncertain threshold.
- Out-of-office BP again needed in most cases

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جواب سوال 1

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A. مبتلا به HTN است
B. جهت تشخیص قطعی نیاز به کنترل مجدد BP در مطب است
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D. جهت تشخیص قطعی نیاز به ABPM است

سوال 2

در مورد تعریف Unattended BP کدام مورد صحیح است؟

A. کنترل فشارخون در مطب بدون حضور همراه

B. کنترل فشارخون بطور اتوماتیک در مطب بدون حضور هر فردی در اتاق

C. کنترل فشارخون بطور اتوماتیک در مطب توسط پرستار ماهر در حضور همراه

D. کنترل فشارخون در منزل و اطلاع آن بوسیله همراه بدون حضور بیمار

Automated OBP (AOBP) technique or Unattended BP

- **Methodology adopted in SPRINT (SBP Intervention Trial), used a fully automated oscillometric device with the patient sitting alone in the examination room for 5 minutes, after which 3 readings were taken automatically at 1-minute intervals with all 3 values averaged.**

Automated OBP (AOBP) technique or Unattended BP

- **Human involvement was reduced to the minimum, eliminating the "white coat effect," & AOBP readings correlated more closely with those of ABPM than conventional office recordings.**

جواب سوال 2

در مورد تعریف Unattended BP کدام مورد صحیح است؟

A. کنترل فشارخون در مطب بدون حضور همراه

B. کنترل فشارخون بطور اتوماتیک در مطب بدون حضور هر فردی در اتاق

C. کنترل فشارخون بطور اتوماتیک در مطب توسط پرستار ماهر در حضور همراه

D. کنترل فشارخون در منزل و اطلاع آن بوسیله همراه بدون حضور بیمار

Blood Pressure Measurement and Diagnosis of Hypertension

OPTIMAL

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	Home BP Monitoring	Ambulatory BP Monitoring
Conditions	As for office blood pressure *(see above)*.	Routine working day.
Position	As for office BP *(see above)*.	Avoid strenuous activity. Arm still and relaxed during each measurement.
Device	Validated electronic (oscillometric) upper-arm cuff device (www.stridebp.org, and ***Section 11: Resources***)	
Cuff	Size according to the individual's arm circumference	
Measurement protocol	**Before each visit to the health professional:** • 3–7-day monitoring in the morning (before drug intake if treated) and the evening. • Two measurements on each occasion after 5 min sitting rest and 1 min between measurements. **Long-term follow-up of treated hypertension:** • 1–2 measurements per week or month.	• 24-hour monitoring at 15 – 30 min intervals during daytime and nighttime. • At least 20 valid daytime and 7 nighttime BP readings are required. If less, the test should be repeated.
Interpretation	• Average home blood pressure after excluding readings of the first day ≥ 135 or 85 mmHg indicates hypertension.	• 24-hour ambulatory blood pressure ≥ 130/80 mmHg indicates hypertension (primary criterion). • Daytime (awake) ambulatory blood pressure ≥ 135/85 mmHg and nighttime (asleep) ≥ 120/70 mmHg indicates hypertension

سوال 3

دراین بیمار تمامی اقدامات تشخیصی ضروری است به جز؟

A. CBC , Uric acid

B. Na , K , U/A

C. Cr , eGFR

D. ECG

E. Lipid profile , FBS

Diagnostic and Clinical Tests

ESSENTIAL

- **Medical History** (BP, risk factors, co-morbidities, signs/symptoms of secondary hypertension…)
- **Physical Examination** (circulation, heart, other systems)
- **Lab Investigations** (Na^+, K^+, creatinine, eGFR, dipstick lipids, Fasting Glucose where available)
- **12 lead ECG** (AF, LV hypertrophy, IHD…)

OPTIMAL

- **Additional tests to consider** (extended biochemistry, cardiac/kidney/brain/vascular imaging, fundoscopy…)

جواب سوال 3

دراین بیمار تمامی اقدامات تشخیصی ضروری است به جز؟

A. CBC , Uric acid

B. Na , K , U/A

C. Cr , eGFR

D. ECG

E. Lipid profile , FBS

Cardiovascular Risk Factors

- **More than 50% of hypertensive patients have additional CV risk factors**
- **Most commonly:** Met Syn, T2DM, lipid disorders, ↑ uric acid
- **CV risk assessment is important and should be assessed in all hypertensive patients**
- **Consider increased risk with:** chronic inflammatory disease, COPD, psychiatric disorders, psycho-social stressors

Cardiovascular Risk Factors

Other risk factors, HMOD, or disease	High-normal SBP 130–139 DBP 85–89	Grade 1 SBP 140–159 DBP 90–99	Grade 2 SBP ≥160 DBP ≥100
No other risk factors	Low	Low	Moderate -- High
1 or 2 risk factors	Low	Moderate	High
≥3 risk factors	Low -- Moderate	High	High
HMOD, CKD grade 3, diabetes mellitus, CVD	High	High	High

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Hypertension-mediated Organ Damage

HMOD Assessment

ESSENTIAL

- Serum creatinine
- eGFR
- Dipstick urine test
- 12-lead ECG

OPTIMAL

- Brain
- Eyes
- Heart
- Kidneys
- Arteries

Serial assessment of HMOD
may help to determine efficacy of treatment

Exacerbators & Inducers of Hypertension

Most common medications that can increase BP

- Non-selective or traditional NSAIDs
- Combined oral contraceptive pill
- Select anti depressant medications including tricyclic antidepressants and SNRIs
- Acetaminophen when used almost daily and for prolonged periods

Exacerbators & Inducers of Hypertension

- The effect of Anti-retroviral therapy is unclear as studies demonstrate either no effect on BP or some increase.
- Alcohol raises BP regardless of the type of alcoholic drink.
- Limited evidence on herbal and other substances.
- Ma Huang, Ginseng at high doses and St. John's Wort reported to increased BP.

Ma Huang

افدرا

St. John Wort

علف چای، گُل راعی یا هزارچشم

Ginseng

سوال 4

دراین بیمار علاوه بر LSM چه اقدام درمانی توصیه می کنید؟

A. فقط LSM برای ۳ تا ۶ ماه
B. والزارتان ۸۰ میلیگرم روزانه
C. لوزارتان H روزی ۱ عدد
D. والزارتان/آملودیپین ۵/۸۰ روزی ۱ عدد
E. هیدروکلروتیازید ۱۲/۵ میلیگرم روزانه

Non-pharmacological Treatment

- Healthy lifestyle choices can prevent or delay the onset of high BP and can reduce CV risk
- Lifestyle modification is often the first line of antihypertensive treatment.
- Modifications in lifestyle can also enhance the effects of antihypertensive treatment.

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Non-pharmacological Treatment - Diet

- Reducing salt added when preparing foods and at the table. Avoid or limit consumption of high salt foods.
- Eating a diet rich in whole grains, fruits, vegetables, poly-unsaturated fats and dairy products, such as DASH diet.
- Reducing food high in sugar, saturated fat and trans fats.
- Increasing intake of vegetables high in nitrates (leafy vegetables and beetroot). Other beneficial foods and nutrients include those high in magnesium, calcium and potassium (avocados, nuts, seeds, legumes and tofu).


THE DASH DIET
WHAT CAN I EAT?
YES
FRUITS
VEGETABLES
WHOLE GRAINS
HEALTHY DAIRY
LEAN MEATS
NUTS, SEEDS, AND LEGUMES
HEALTHY VEGETABLE-BASED OILS
NO
SUGARY PRODUCTS
FULL FAT DAIRY AND CHEESE
ENRICHED GRAINS
ELEVATED SODIUM LEVELS
ALCOHOL

Non-pharmacological Treatment - Lifestyle

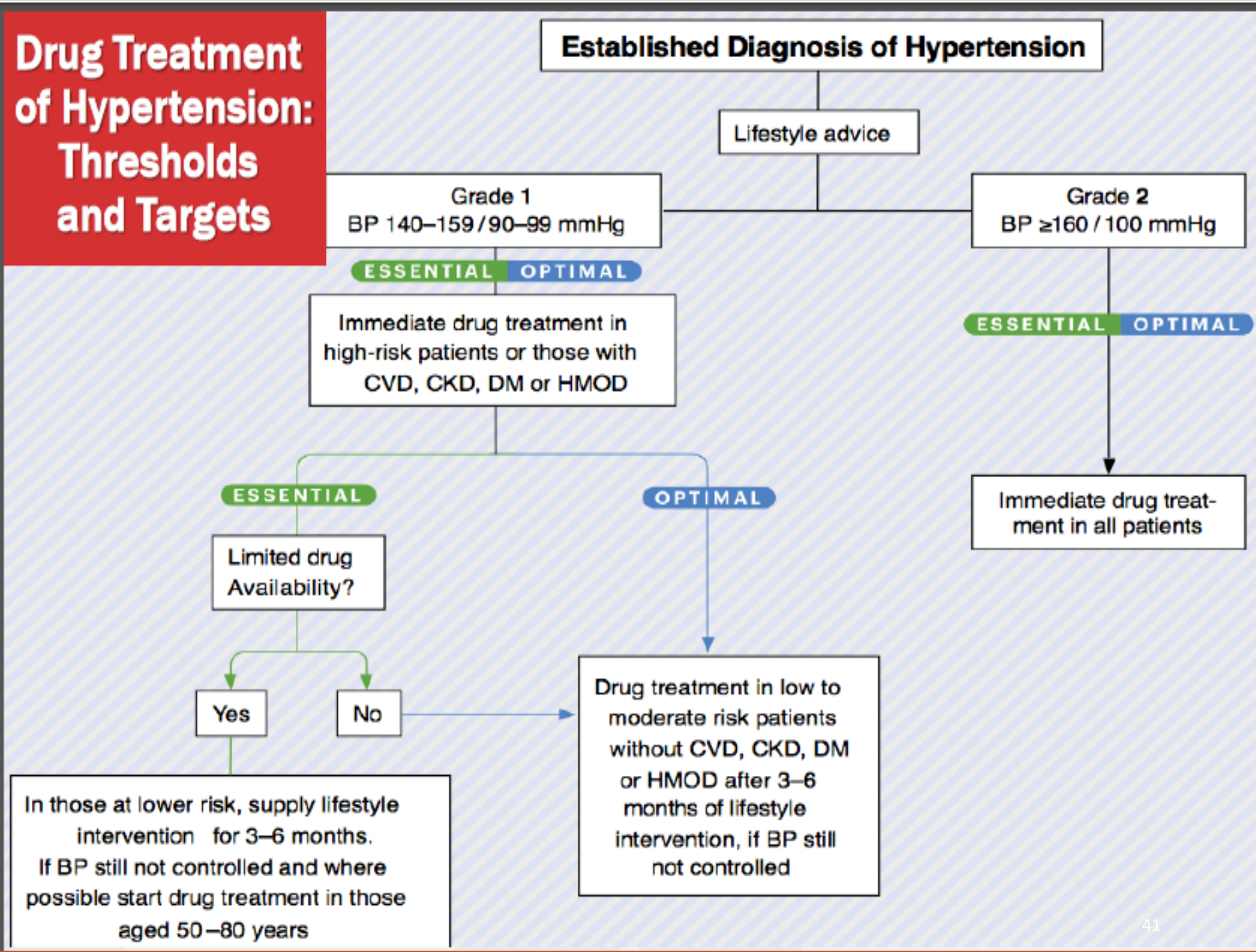
- Smoking cessation.

- Engage in regular moderate intensity aerobic and resistance exercise, 30 minutes on 5 – 7 days per week or HIIT (High Intensity Interval Training).

- Reduce stress and introduce mindfulness.

- Reduce exposure to air pollution and cold temperature.

Drug Treatment of Hypertension: Thresholds and Targets



Drug choice & Sequencing

ESSENTIAL

- Use whatever drugs are available with as many of the ideal characteristics (see ***Table 9***) as possible.
- Use free combinations if SPCs are not available or unaffordable
- Use thiazide diuretics if thiazide-like diuretics are not available
- Use alternative to DHP-CCBs if these are not available or not tolerated (i.e. Non-DHP-CCBs: diltiazem or verapamil).

OPTIMAL

Ideally Single Pill Combination Therapy (SPC)

Step 1 Dual low-dose# combination	**A + C** [a, b, c]
Step 2 Dual full-dose combination	**A + C** [a, b]
Step 3 Triple combination	**A + C + D**
Step 4 (Resistant Hypertension) Triple Combination + Spironolactone or other drug*	**A + C +D Add Spironolactone (12.5 – 50 mg o.d.)**[d]

ESSENTIAL and OPTIMAL

Monotherapy

1. Low risk grade 1 HTN
2. ≥ 80 years old
3. Frailer patients

Drug Treatment of Hypertension

Summary 1

In established hypertension, uncontrolled by lifestyle measures:

Drug Treatment Threshold

≥140/90 mmHg (raising to ≥160/100 mmHg for those at lowest risk)

Drug Treatment Target

OPTIMAL

<65 years: <130/80 mmHg
≥65 years: <140/90 mmHg

ESSENTIAL

reduce BP by ≥20/10 mmHg

جواب سوال 4

دراین بیمار علاوه بر LSM چه اقدام درمانی توصیه می کنید؟

A. LSM برای ۳ تا ۶ ماه
B. والزارتان ۸۰ میلیگرم روزانه
C. لوزارتان H روزی ۱ عدد
D. والزارتان/آملودیپین ۵/۸۰ روزی ۱ عدد
E. هیدروکلروتیازید ۱۲/۵ میلیگرم روزانه

سوال 5

دراین بیمار قواصل ویزیت چند ماه یک بار است؟

A. ۱

B. ۲

C. ۳

D. ۶

جواب سوال 5

دراین بیمار قواصل ویزیت چند ماه یک بار است؟

A. ۱

B. ۲

C. ۳

D. ۶

Resistant Hypertension

- Suspect resistant hypertension if office BP >140/90 mmHg on treatment with at least 3 antihypertensives (in maximal or maximally tolerated doses) including a diuretic.
- Exclude pseudo-resistant hypertension (white-coat effect, non-adherence to treatment, incorrect BP measurements, errors in antihypertensive therapy) and substance-induced hypertension as contributors.
- Optimise health behaviours and lifestyle.

Resistant Hypertension

- Consider changes in the diuretic-based treatment prior to adding the fourth antihypertensive medication.
- Add a low dose of spironolactone (if serum potassium is <4.5 mmol/L and eGFR is >45 ml/min/1.73 m^2).
- Consider amiloride, doxazosin, eplerenone, clonidine and beta-blockers as alternatives to spironolactone. If unavailable, consider any antihypertensive class not already in use.
- Optimally, consider referring to a specialist centre with sufficient expertise/resources.

سوال 6

دراین بیمار بعد از کنترل BP فواصل ویزیت چند ماه یک بار می شود؟

A. ۱-۳

B. ۳-۶

C. ۶-۱۲

D. بسته به سن بیمار و نوع دارو فواصل ویزیت تغییر می کند

جواب سوال 6

دراین بیمار بعد از کنترل BP فواصل ویزیت چند ماه یک بار می شود؟

A. ۱-۳

B. ۳-۶

C. ۶-۱۲

D. بسته به سن بیمار و نوع دارو فواصل ویزیت تغییر می کند

HTN & CKD

- BP should be lowered if ≥140/90 mm Hg & treated to a target <130/80 mm Hg (<140/80 in elderly patients).
- RASI are first-line drugs because they reduce albuminuria in addition to BP control.
- CCBs & diuretics (loop-diuretics if eGFR <30 ml/min/1.73m2) can be added.

ISH vs ACC/AHA Guidelines

- Blood pressure definitions of normal blood pressure **stages of hypertension are different**.
- Inclusion of **high-normal blood pressure** category.
- Blood pressure value **thresholds for treatment are therefore different** (i.e., treatment initiated at lower blood pressure in ACC/AHA guidelines).
- Adoption of ESSENTIAL vs. OPTIMAL throughout ISH guidelines.

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