



Fast track – ISH2022 KYOTO

Agreement regarding overcoming hypertension in the Asian Hypertension Society Network 2022

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Received: 27 July 2022 / Accepted: 27 July 2022 / Published online: 14 October 2022
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The global burden of hypertension has already been acknowledged. The reduction in blood pressure (BP) significantly reduces cardiovascular morbidity and mortality. Half of the world's population is concentrated in Asia, and this proportion is expected to continue to increase. As the population ages, the number of people suffering from hypertension is also expected to increase. It is critical to address hypertension in Asia. To do so, it is necessary to establish a common direction for the control of hypertension within the Asian region.

Within Asia, religions and cultures differ, and economic development differs from region to region. However,

despite this diversity, things will not progress efficiently or in a certain direction unless certain rules are in place. After convening the International Society of Hypertension (ISH) 2022 in Kyoto, Japan, we would like to present the direction agreed upon by the regional hypertension societies toward the goal of addressing hypertension in Asia. In particular, we focused on three points: target BP, sodium restriction, and out-of-office BP measurement.

Target blood pressure in hypertension treatment

Western countries have recently revised the major hypertension guidelines to make antihypertensive treatment more intensive, with a target BP lower than previously recommended. Regarding the diagnosis of hypertension, the definition is similar except for that use in Mongolia, which corresponds to the American Heart Association (AHA)/American College of Cardiology (ACC) BP guidelines (Table 1). As shown in Table 2, the ISH and AHA/ACC BP guidelines set a primary goal of antihypertensive therapy at a systolic BP (SBP) below 130 mmHg. The European Society of Cardiology (ESC)/European Society of Hypertension (ESH) BP guideline set the upper goal between 130 and 140 mmHg and set the target SBP at 120–130 mmHg in patients with diabetes and chronic kidney disease and 130–140 mmHg for older patients and those with coronary artery disease (CAD) and stroke. Table 2 lists the target BP goals for general and elderly patients and those with comorbidities in each Asian country and region according to each individual BP guideline. In general hypertensive patients, half of these guidelines set the target BP goal at 140/90 mmHg, while the others set it at 130/80 mmHg. The

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Table 1 Definition of hypertension

	Office BP	Home BP	ABPM		
			24-h	Daytime	Nighttime
ISH [21]	≥140/90	≥135/85	≥130/80	≥135/85	≥120/70
AHA/ACC [22]	≥130/80	≥130/80	≥125/75	≥130/80	≥110/65
ESC/ESH [23]	≥140/90	≥135/85	≥130/80	≥135/85	≥120/70
HOPE-ASIA [24]	≥140/90	≥135/85	≥130/80	≥135/85	≥120/70
Asian regions					
China [25]	≥140/90	≥135/85	≥130/80	≥135/85	≥120/70
India [26]	≥140/90	–	–	–	–
Indonesia	≥140/90	≥135/85	≥130/80	≥135/85	≥120/70
Korea [27]	≥140/90	≥135/85	≥130/80	≥135/85	≥120/70
Malaysia [28]	≥140/90	≥135/85	–	≥135/85	–
Mongolia [29]	≥130/80	≥130/80	≥125/75	≥130/80	≥110/65
Pakistan [30]	≥140/90	≥135/85	≥130/80	≥135/85	≥120/70
Philippines [31]	≥140/90	≥135/85	≥130/80	≥135/85	≥120/70
Singapore [32]	≥140/90	≥135/85	≥130/80	≥135/85	≥120/70
Sri Lanka [33]	≥140/90	≥135/85	≥130/80	≥135/85	≥120/70
Taiwan [34]	≥130/80	≥130/80	≥125/75	≥130/80	≥110/65
Thailand [35]	≥140/90	≥135/85	≥130/80	≥135/85	≥120/70
Vietnam [36]	≥140/90	≥135/85	≥130/80	≥135/85	≥120/70
Japan [37]	≥140/90	≥135/85	≥130/80	≥135/85	≥120/70

ABPM ambulatory blood pressure, AHA/ACC American Heart Association/American College of Cardiology, BP blood pressure, ESC/ESH European Society of Cardiology/European Society of Hypertension, ISH International Society of Hypertension

increase in the prevalence of diabetes is a common problem in Asia, and more than 60% of diabetic patients live in Asia [1]. In diabetic patients, three guidelines set an SBP target of 140 mmHg, while the others set a lower target of 130 mmHg. Regarding chronic kidney disease, there is wide variation in target BP, with some countries/regions setting higher targets than those used in the general population and others setting lower targets. Of note, six guidelines divided the BP target into <130 mmHg and <140 mmHg depending on the presence or absence of proteinuria or albuminuria. Population aging is considered a common challenge in Asian countries/regions. As expected, most countries/regions have set higher BP target for older patients, while cutoff BP values according to age are variable. This contrasts with the AHA/ACC guideline, in which the target SBP of elderly patients is not different from that in non-elderly patients. In high-risk patients with a history of CAD, the target BP is 130/80 mmHg in most countries/regions, while in China, the target is less than 140/90 mmHg. The increasing prevalence of heart failure is a global challenge, including in Asian countries/regions. A few countries/regions have set a target BP for hypertensive patients with heart failure, but all set it at less than 130/80 mmHg. Finally, stroke prevention is one of the most important goals of antihypertensive therapy in Asian hypertensive patients, given the differences in disease structure compared to that

in the West. In contrast to the standardized target BP for CAD patients, several countries/regions have set their own target BP for patients with previous stroke at higher than 130/80 mmHg. A recent randomized clinical trial in China confirmed the benefit of intensive BP treatment based on office BP, which may influence future guidelines in Asian countries/regions [2]. Given the diversity of Asian countries and regions, setting a common antihypertensive target might be difficult at this time [3]. Nevertheless, sharing a consensus that each country or region should aim for a target BP to optimize hypertension treatment in Asia is the right approach.

Sodium restriction

Research shows a strong relationship between the amount of salt consumed and increased levels of BP. However, the associations may differ by individual (i.e., salt sensitivity) [4]. Frequently observed associations between very low salt intake and excess mortality have been reported, but the associations may be confounded by other factors such as reverse causality of poor health and low salt intake [5]. A reduction in dietary salt intake leads to not only a reduction in BP but also a reduction in cardiovascular morbidity and mortality. A recent Cochrane review suggested that

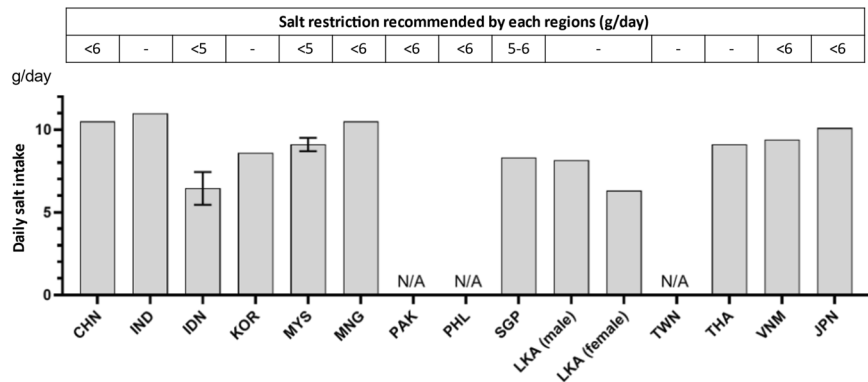
Table 2 Target office blood pressure of hypertension treatment for the patients with comorbidity

	General	Comorbidity					
		Diabetes	CKD	Elderly	CAD	Heart failure	Stroke
ISH [21]	–	<130/80	<130/80	<140/90	<130/80	<130/80	<130/80
AHA/ACC [22]	–	<130/80	<130/80	<130	<130/80	<130/80	<130/80
ESC/ESH [23]	–	120–130/70–79	120–130/70–79	130–140/70–79	130–140/70–79	–	130–140/70–79
HOPE-ASIA	–	–	–	–	–	–	–
Asian regions							
China [25]	<140/90	<130/80	<140/90 ^a <130/80 ^b	<150/90	<140/90	<130/80	<140/90
India [26]	<140/90	<140/80	<140/80	<140/80 ⁱ 140–145 ^j	–	–	<135/85
Indonesia	<130/70–79	<130/70–79	<140/70–79	<130–139/70–79 ^k <130–139/70–79 ^l	<130/70–79	–	<130
Korea [27]	<140/90	<140/85	<140/90 ^c <130/80 ^d	<140/90	<130/80	<130/80	<130/80
Malaysia [28]	<140/90	<140/80	<140/90 ^e <130/80 ^f	<140 ^k <150 ^j	<130/80	–	<140/90 <130/80 ^q
Mongolia [29]	<130/80	<130/80	<130/80	<150/80	<130/80	–	–
Pakistan [30]	<140/90	<130/80	<130/80	<140/90 ^k <150/90 ^j	<130/80	<130/80	<130/80
Philippines [31]	<130/80	120–130/90	<140/90 ^g <130/80 ^h	<140/90 ^j	–	–	<130/80
Singapore [32]	<140/90	<140/80	<130/80	<140/90 ⁱ <150/90 ^j	–	–	–
Sri Lanka [33]	<130/80	–	<130/80	<140/80	<130/80	–	–
Taiwan [34]	<130/80	<130/80	<130 <120 ^f	<130 ⁿ	<130/80	<130	<130/80
Thailand [35]	120–130/70–79	120–130/70–79	120–130/70–79	130–139/70–79 ⁿ	120–130/70–79	120–130/<80	120–130/70–79
Vietnam [36]	<140/80	120–130/<80	120–130/70–79	<140/80 ^o	120–130/70–79	110–130/<80	120–130/70–79
Japan [37]	<130/80	<130/80	<140/90 ^a <130/80 ^b	<130/80 ^p <140/90 ^m	<130/80	–	<130/80

AHA/ACC American Heart Association/American College of Cardiology, BP blood pressure, CAD coronary artery disease, CKD chronic kidney disease, ESC/ESH European Society of Cardiology/European Society of Hypertension, ISH International Society of Hypertension

^aUrine protein (–), ^bUrine protein (+), ^cUrine albuminuria (–), ^dUrine albuminuria (+), ^eUrine protein <1 g/day, ^fUrine protein ≥1 g/day, ^gLow cardiovascular risk and CKD stage 3 or 4, ^hHigh cardiovascular risk or CKD stage 3, ⁱ55–79 years, ^j≥80 years, ^k65–79 years, ^l<80 years, ^m≥75 years, ⁿ≥65 years, ^o≥70 years, ^p65–75 years, ^qLacuna stroke, ^rIf well-tolerated

Fig. 1 Daily salt intake and salt restriction recommended by each regions



restricted dietary salt, compared with high salt intake, reduced mean arterial pressure by 0.4 mmHg in white individuals with normal BP and by 4 mmHg in white individuals with hypertension [6]. Weak evidence indicated that these effects may be slightly greater in African American and Asian individuals. Asians have been shown to be more likely to have higher salt sensitivity than people of European origin [4]. Most guidelines from Asian countries/

regions suggest a low salt intake, defined as <2–2.4 g of sodium (equivalent to <5–6 g of sodium chloride) per day to reduce high BP and to improve cardiovascular outcomes (Fig. 1). Globally, the usual sodium intake is between 3.5 and 5.5 g per day (equivalent to 9–12 g of daily salt), with higher levels in Asian populations and lower levels in an isolated tribe (Yanomami Indians) inhabiting the tropical equatorial rainforest of northern Brazil and southern

Table 3 Recommendation of out-of-office blood pressure

	HBPM	ABPM
ISH	<ul style="list-style-type: none"> • Out-of-OBP measurements are more reproducible than office measurements, more closely associated with hypertension-induced organ damage and the risk of CV events and identify the WCHT and MHT phenomena • Out-of-OBP measurement is often necessary for the accurate diagnosis of hypertension and for treatment decisions. In untreated or treated subjects with office BP classified as high-normal BP or grade 1 hypertension (130–159/85–99 mmHg), the BP level needs to be confirmed using HBPM or ABPM 	<ul style="list-style-type: none"> • Out-of-OBP measurements are recommended to confirm the diagnosis of hypertension and for titration of BP-lowering medication, in conjunction with telehealth counseling or clinical interventions • Out-of-OBP measurement with ABPM and/or HBPM, provided that these measurements are logistically and economically feasible • Out-of-OBP (i.e., ABPM or HBPM) is specifically recommended for a number of clinical indications, such as identifying WCHT and MHT, quantifying the effects of treatment, and identifying possible causes of side effects
AHA/ACC ESC/ESH	<ul style="list-style-type: none"> • Out-of-OBP measurements are recommended to confirm the diagnosis of hypertension and for titration of BP-lowering medication, in conjunction with telehealth counseling or clinical interventions • Out-of-OBP measurement with ABPM and/or HBPM, provided that these measurements are logistically and economically feasible • Out-of-OBP (i.e., ABPM or HBPM) is specifically recommended for a number of clinical indications, such as identifying WCHT and MHT, quantifying the effects of treatment, and identifying possible causes of side effects 	<ul style="list-style-type: none"> • Out-of-OBP measurements are recommended to confirm the diagnosis of hypertension and for titration of BP-lowering medication, in conjunction with telehealth counseling or clinical interventions • Out-of-OBP measurement with ABPM and/or HBPM, provided that these measurements are logistically and economically feasible • Out-of-OBP (i.e., ABPM or HBPM) is specifically recommended for a number of clinical indications, such as identifying WCHT and MHT, quantifying the effects of treatment, and identifying possible causes of side effects
HOPE-ASIA Asian regions		
China [25]	<ul style="list-style-type: none"> • HBPM can be used to evaluate antihypertensive efficacy and long-term BP variation for days, weeks, months or even years, and can help to enhance patient's awareness of health participation, improve patient's compliance and adherence to treatment, and is suitable for long-term BP monitoring of patients 	<ul style="list-style-type: none"> • At present, the major clinical use of ABPM are: to diagnose WCHT, MHT and isolated nocturnal hypertension; to observe abnormal BP rhythm and variation; to evaluate the efficacy of antihypertensive therapy and BP control over all time periods (including morning and sleep)
India		
Indonesia	<ul style="list-style-type: none"> • Establish a diagnosis of hypertension (detect white-coat hypertension and Mask hypertension). Monitor BPV, in hypertensive patients receiving treatment. Assess the effectiveness of treatment, dose adjustment, patient compliance 	<ul style="list-style-type: none"> • Confirmation of patient with resistant hypertension, WCHT, OSA, Evaluate the effect of therapy on the 24-h BP profile
Korea [27]	<ul style="list-style-type: none"> • Recommended for diagnosis of sustained HT, MHT and WCHT 	
Malaysia [28]	<ul style="list-style-type: none"> • A HBPM or ABPM should be done to exclude isolated office hypertension 	
Mongolia		
Pakistan	Refer to ISH guideline	
Philippines [31]	In office and out-of-OBP recommendation using a digital device, Manual still recommended if digital device not available provided that person getting it is well trained.	
Singapore [32]	<ul style="list-style-type: none"> • Younger patients • Those with target organ damage but without raised OBP 	<ul style="list-style-type: none"> • Younger patients • Those with target organ damage but without raised OBP • Doubt of diagnosis of hypertension • Older, cognitively impaired, anxious or OSA patients, in whom HBPM might be unreliable or inappropriate
Sri Lanka		
Taiwan [34]	<ul style="list-style-type: none"> • HBPM is recommended as the foundation for the diagnosis and grading of hypertension, and also for the treatment thresholds and targets 	<ul style="list-style-type: none"> • ABPM parameters provide better information on cardio and cerebrovascular risk than office BP • ABPM should be considered in all patients with elevated BP, particularly those with unstable office or home BP, or whom are suspected to have white-coat or masked hypertension, or progressive hypertension-mediated organ damage
Thailand [35]	<ul style="list-style-type: none"> • Out-of-OBP measurements, including HBPM or ABPM are also advocated to confirm the diagnosis of hypertension, identify WCHT or MHT, evaluate BP variation, and to assess antihypertensive treatment efficacy 	
Vietnam [36]	<ul style="list-style-type: none"> • HBPM is also an effective method used to evaluate treatment therapy efficacy, titrate antihypertensive therapy, and diagnose WCH, MHT, and hypertension in pregnancy. Meanwhile, HBPM results must be consulted by the physician, and must not be used by the patient to titrate the patient's medication without permission from a physician 	
Japan [37]	<ul style="list-style-type: none"> • The clinical availability, feasibility and diagnostic value of HBPM are highly appraised 	<ul style="list-style-type: none"> • ABPM should be performed, if possible, as a complementary measure for hypertension diagnosis by home/OBP measurement

ABPM ambulatory blood pressure monitoring, *AHA/ACC* American Heart Association/American College of Cardiology, *BP* blood pressure, *ESC/ESH* European Society of Cardiology/European Society of Hypertension, *HBPM* home blood pressure monitoring, *ISH* International Society of Hypertension, *OBP* office blood pressure, *OSA* obstructive sleep apnea, *WCHT* white-coat hypertension

Venezuela [7]. In the current survey, which was based on a literature review, the average consumption of sodium among most Asian populations appears to be greater than the recommended amount (Fig. 1). However, the assessments of sodium intake were not standardized in the current study. Demographic characteristics and population structure were also not matched across studies. The DASH-Sodium trial suggested that beyond lowering sodium intake, an overall modification of the dietary pattern was important for lowering BP, including increasing dietary potassium and fiber intake. A recent large, cluster-randomized trial in China suggested that individuals who consume a potassium-containing salt substitute (75% sodium chloride, 25% potassium chloride), rather than typical salt (100% sodium chloride), not only had lower BP but also had lower rates of stroke, major cardiovascular events, and death from any cause [6]. Therefore, an assessment of the dietary pattern beyond estimation of sodium intake is warranted in future surveys.

Out-of-office blood pressure

Home BP monitoring (HBPM) and ambulatory BP monitoring (ABPM) have been widely used and recommended in BP guidelines for the evaluation of out-of-office BP measurements. There is a large amount of evidence that HBPM and ABPM provide greater clinical value than office BP. Table 3 shows the recommendation of out-of-office BP in the US, Europe, and Asian countries and regions. The ISH, AHA/ACC and ESC/ESH guidelines recommend the use of HBPM or ABPM to reach an accurate diagnosis of hypertension, including white-coat hypertension and masked hypertension. In addition, HBPM and ABPM are recommended for quantifying the effects of BP-lowering therapy. Several regions in Asia do not refer to HBPM or ABPM, which is probably due to the insufficient environment for the use of HBPM or ABPM, while the others recommend the use of HBPM and ABPM to diagnose the phenotypes of hypertension and to evaluate anti-hypertensive treatment efficacy, similar to the ISH, AHA/ACC and ESC/ESH guidelines. Asians have some important characteristics of hypertension and related cardiovascular diseases [8, 9]. In Asians, the slope of the association between increasing BP and the risk of cardiovascular events is steeper than that in Westerners [10]. Asians are known to be more prone to stroke, particularly hemorrhagic stroke, exhibiting a closer association with hypertension than that observed in Westerners [11]. Masked hypertension, defined as controlled office BP but uncontrolled home or ambulatory BP, occurs in more than 25% of hypertensive patients treated with antihypertensive medications [12]. Masked hypertension includes morning and nocturnal hypertension

and is more common in Asian populations [13]. The reason for this may be due to high salt intake and high salt sensitivity in Asians [8, 9]. Morning hypertension and excessive morning BP surges are risk factors for atherosclerotic cardiovascular events [14–16], and uncontrolled nocturnal hypertension is associated with a residual risk of cardiovascular events, such as heart failure [17–19]. Recently, a prospective study of ABPM in a Japanese population showed that nocturnal hypertension was a significant independent risk factor for cardiovascular events, particularly heart failure, and a riser pattern, in which BP is higher in nighttime than in daytime, was associated with a residual risk of heart failure, even in patients with well-controlled hypertension [20]. These findings of the association of hypertension phenotypes with an increased risk of cardiovascular events strongly support the recommendation of out-of-office BP use to guide the management of hypertension in the Asian population (Table 3). The promotion of the validation and widespread use of out-of-office BP measurement is needed throughout Asia.

With regard to these three points regarding hypertension, there is a diversity in Asian countries and regions. However, our challenge is how to find and realize “unity” in our field. Here, to achieve the goal of overcoming hypertension and reducing hypertension-related disease in Asian countries and regions, hypertension societies in Asian countries and regions express the following statement:

- (1) Achievement of optimal control of blood pressure.
- (2) Maintenance of sodium reduction.
- (3) Active use of out-of-office blood pressure monitoring.

Compliance with ethical standards

Conflict of interest The authors declare no competing interests.

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