

Protocol for the identification and management of hypertension in adults in primary care

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Endorsing bodies:



Introduction

Hypertension is one of the most important modifiable risk factors for the development of cardiovascular disease, including heart attacks and strokes. It was estimated that, in 2000, up to 80 million Africans were hypertensive and this figure is expected to double by the year 2025.¹ In Kenya, even in rural areas, hypertension affects almost 1 in every 3 individuals aged 45 to 54 years and half of all adults over the age of 55.^{2,3} Nevertheless, in most Africans hypertension goes unrecognised and undiagnosed, and, worse still, even on treatment, blood pressure in the vast majority of hypertensive patients remains uncontrolled.^{1,2}

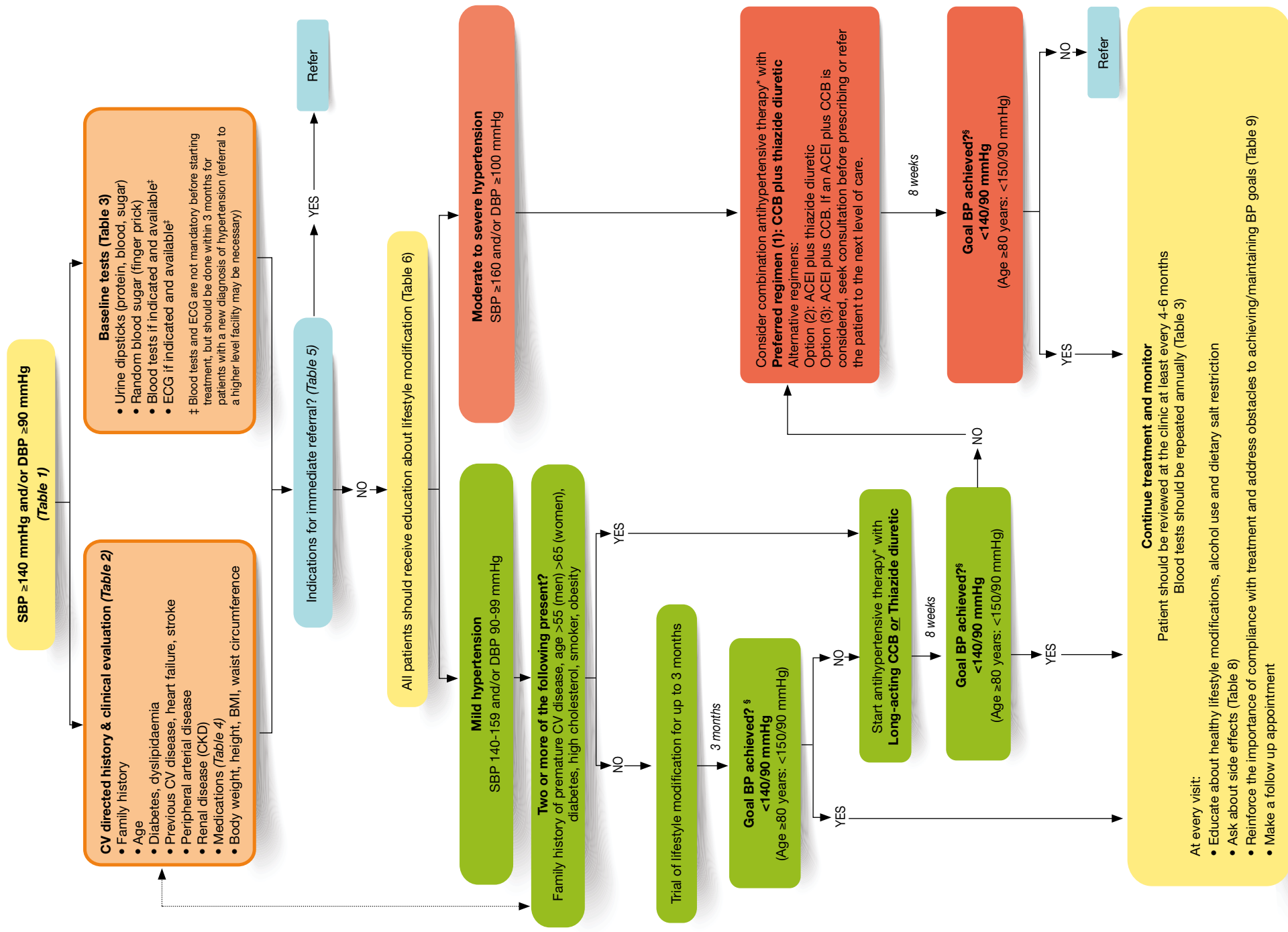
As such hypertension has been declared by the African Union as one of the greatest health challenges on the continent.¹

There is clearly a dire need to address this condition. A starting point would be that, at least, every adult patient attending a primary care clinic should have their blood pressure checked!

In response to this need, this hypertension management protocol has been developed for use in Healthy Heart Africa demonstration sites, to guide identification and management of hypertension among adults in primary care. It is hoped that, in addition to improving the health and quality of life of our adult citizens, the experience and learnings resulting from implementation of this protocol will inform the development of the National Treatment Guidelines for Hypertension through the Ministry's Technical Working Group on Hypertension.

This protocol is for use in the demonstration sites of the Healthy Heart Africa project

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§ If goal BP is not achieved, assess compliance with medication, alcohol use and use of NSAIDs before deciding to intensify antihypertensive therapy (see Table 9)
* If no contraindications (Table 7)

ACEI: Angiotensin converting enzyme inhibitor; CCB: Calcium channel blocker; CKD: Chronic kidney disease; CV: Cardiovascular; DBP: Diastolic blood pressure; NSAIDs: Nonsteroidal anti-inflammatory drugs; SBP: Systolic blood pressure; < Less than; > Higher than; ; > Equal to or higher than

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Table 1. Measurement of blood pressure

- Patient should sit quietly for 3-5 minutes before measurement.
- Use correct size cuff and bladder.
- Measure BP while patient is sitting on a chair with back support and with the arm supported at the level of the heart. The patient's arm must be relaxed.
- Take 2 measurements at least 1-2 minutes apart.
- BP in both arms should be measured at the first visit and the arm with the highest BP should be used for future measurements.
- Elderly patients, diabetics and other patients complaining of symptoms suggestive of postural hypotension (e.g. dizziness, unsteadiness or fainting when changing posture) should also have their BP measured while standing, so that standing BP can be compared to sitting BP.

Classification of hypertension:

Mild hypertension: SBP 140-159 and/or DBP 90-99 mmHg

Moderate to severe hypertension: SBP ≥160 and/or DBP ≥100 mmHg

When to initiate antihypertensive therapy

Hypertension confirmed on at least 3 separate occasions within a 2 month period:

	SBP	DBP
All patients aged 18 to 79 years	≥140 mmHg	≥ 90 mmHg
Age 80 years and older	≥150 mmHg	≥ 90 mmHg

The overall health and frailty of an elderly person should be assessed before making a decision to start antihypertensive therapy. If there is doubt or concern about the health status of the patient, they should be referred to a doctor for further management.

Table 2. Ask about the presence of the following cardiovascular risk factors and associated clinical conditions

Major risk factors	Associated clinical conditions (these patients should be referred)
1. Family history of early onset cardiovascular disease (heart attack, stroke or peripheral arterial disease in men age <55 years or women aged <65 years)	1. Coronary heart disease (previous heart attack or angina-related chest pain)
2. Diabetes mellitus	2. Heart failure
3. Smoking	3. Chronic kidney disease (CKD)
4. Dyslipidaemia (previous diagnosis of high cholesterol)	4. Stroke or transient ischaemic attack
5. Age Men >55 years Women >65 years	5. Peripheral arterial disease
6. Obesity (BMI >30 kg/m ² ; waist circumference >94 cm in males; >80 cm in females)	

Table 3. Routine evaluation			
Investigation		When to investigate	Interpretation & when to refer
A. Measurements			
Blood pressure		Every visit	See section 6.2
Body weight Height Body mass index (BMI)*		Every visit	BMI >25-30 kg/m ² = overweight BMI >30 kg/m ² = obese Overweight and obesity are associated with increased cardiovascular risk. Patients should receive lifestyle advice about maintenance of a healthy body weight.
Waist circumference		Every visit	Cut-off values for normal: Men <94 cm; Women: <80 cm Increased waist circumference is associated with increased cardiovascular risk. Patients should receive lifestyle advice on maintenance of a healthy body weight.
B. Investigations			
Urine dipstick	1. Protein	At first visit and thereafter yearly if normal, or when clinically indicated	If protein ≥ ++, refer for further investigation.
	2. Blood		If blood ≥ +, refer for further investigation.
	3. Sugar		If sugar is positive and no other symptoms of diabetes, repeat at next visit, and if second result is positive, refer for further investigation. If positive with symptoms of diabetes (recent onset of: always thirsty, drinking more fluids than normal, unexplained weight loss, unusual tiredness, frequent infections), then refer immediately for further investigation.
Random blood sugar (finger prick)		First visit and thereafter if clinically indicated	Normal values: 3.0-8.0 mmol/L. If abnormal, confirm with fasting plasma glucose test.

Laboratory blood tests (Patients with abnormal potassium, sodium, creatinine or FPG results should be referred immediately)	Potassium	Laboratory blood tests and ECG are not mandatory before starting treatment, but should be done within 3 months for patients with a new diagnosis of hypertension (referral to a higher level facility may be necessary). Thereafter, if initial tests are normal, repeat yearly, or when clinically indicated	Refer immediately if potassium is <3.6 mmol/l or >5.0 mmol/l. [†] Patients receiving a thiazide diuretic (single agent or in combination), ACE inhibitor or ARB should have their potassium checked every 6 months.
	Sodium		Sodium normal values: 50-200 mmol/l [†]
	Renal function (Creatinine, GFR)		Renal function should be assessed at a facility with available expertise for interpretation and management. Glomerular filtration rate (GFR) should be estimated (consult laboratory). Normal values for blood creatinine: female 46-92 µmol/l; male 58-110 µmol/l [†]
	Fasting plasma glucose (FPG)		FPG normal values: 4.1-6.0 mmol/l [†]
	Random total cholesterol (TC)		TC normal value is: <5.0 mmol/L. Patients with total cholesterol >5 mmol/L should be given lifestyle advice and have their cholesterol rechecked in 4-6 months. If the cholesterol remains elevated and there are other cardiovascular risk factors, then they may be considered for cholesterol-lowering medication. Patients with diabetes or established CVD and raised cholesterol should be referred.
ECG			The ECG should be interpreted by a clinical worker with the necessary expertise to do so.

* Body mass index is calculated by dividing body weight (kg) by the square of height in meters: weight (kg)/[height (m) x height (m)].

[†] Reference ranges may vary and should be confirmed with the laboratory providing the biochemistry results. Plasma creatinine may not be an accurate measure of renal function and renal tests should be interpreted by a clinician with the necessary expertise to do so. Abnormal results indicate immediate referral. Blood tests and ECG are not mandatory before starting treatment, but should be done within 3 months for patients with a new diagnosis of hypertension (referral to a higher level facility may be necessary).

Table 4. Drug interactions in patients with hypertension		
Medications that might aggravate hypertension	Drug interactions with antihypertensive agents	
<i>Prescription medications</i>	<i>Antihypertensive</i>	<i>Potential drug interactions with</i>
<ul style="list-style-type: none"> • Nonsteroidal anti-inflammatory drugs (NSAIDs) • Corticosteroids and anabolic steroids • Oral contraceptive and sex hormones • Vasoconstricting/sympathomimetic decongestants • Calcineurin inhibitors (cyclosporin, tacrolimus) • Erythropoietin and analogues • Antidepressants: Monoamine oxidase inhibitors (MAOIs), serotonin-norepinephrine reuptake inhibitors (SNRIs), selective serotonin reuptake inhibitors (SSRIs) 	Thiazide diuretics	Digoxin, lithium
	Long-acting calcium channel blockers	Grapefruit juice, simvastatin >20 mg/day
	ACE inhibitors and angiotensin receptor blockers	Thiazide diuretics, potassium-sparing diuretics, NSAIDs, lithium
<i>Others</i>		
<ul style="list-style-type: none"> • Stimulants including cocaine • Salt • Excessive alcohol intake • Traditional medicines (effect unknown) 		

Table 5. Indications for immediate referral
<p>The following patients should be referred for further investigation and medical care:</p> <ul style="list-style-type: none"> • All pregnant women. • People with HIV or AIDS. • Pre-existing diabetes. • Fasting plasma glucose (FPG) indicates diagnosis of diabetes. • Heart failure. • BP >180 mmHg systolic and/or >110 mmHg diastolic BP. • Abnormal results on urine dipsticks or blood tests (see Table 3). • Patients not reaching goal BP after a reasonable trial of optimised antihypertensive therapy (8 weeks). • Hypertensive patients aged 18 years or younger. • Secondary cause of hypertension is suspected. • Associated clinical condition: coronary heart disease, heart failure, chronic kidney disease, stroke or transient ischaemic attack, peripheral arterial disease. • Consider referral for patients aged 80 years or older with a first diagnosis of hypertension.

Table 6: Healthy lifestyle modification (should be discussed with all patients at every visit)
<ol style="list-style-type: none"> 1. How to lose weight if overweight and importance of maintenance of a healthy body weight. 2. Make healthy dietary choices <ul style="list-style-type: none"> • Include fresh fruit and vegetables, and fish; • Limit sugar intake (especially limit consumption of soft drinks); • Limit salt intake to less than 1 teaspoonful a day; • Safe alcohol consumption (less than 2 standard alcoholic drinks a day). 3. Don't smoke or use tobacco products. 4. Regular (daily) exercise. 5. If you are considering using any new medication, vitamins or supplements, including over-the-counter products and traditional medicines, speak to your healthcare provider first.

Antihypertensive class	Contraindications
Thiazide/thiazide-like diuretics	<ul style="list-style-type: none"> Gout
Long-acting calcium channel blocker	<ul style="list-style-type: none"> Tachyarrhythmias
ACE inhibitors and Angiotensin receptor blockers	<ul style="list-style-type: none"> Pregnancy Angioneurotic oedema High potassium Bilateral renal artery stenosis Avoid use in women with childbearing potential

Class	Examples	Usual monotherapy starting dose	Maximum daily dose	Possible side effects
Long-acting CCB	Amlodipine	2.5 or 5 mg OD	10 mg OD	Oedema Fatigue Headache Palpitations
	Felodipine	2.5 or 5 mg OD	10 mg OD	
	Nifedipine	Retard tabs: 20 mg BD LA tabs: 30 mg OD	Retard tabs: 20 mg BD LA tabs: 90 mg OD	
Thiazide diuretic	Chlorthalidone	12.5 mg OD	25 mg OD	Hypokalaemia Hyponatraemia, Hyperuricaemia Hypocalciuria Hyperglycaemia Dizziness Rash Dyslipidaemia
	Hydrochlorothiazide (HCTZ)	12.5 or 25 mg OD	50 mg OD	
	Metolazone	2.5 mg OD	5 mg OD	
Thiazide-like diuretic	Indapamide SR	1.5 mg OD	1.5 mg OD	
ACE inhibitor	Captopril	25 mg BD or TDS	50 mg TDS	Cough (ACEI) Dizziness Hyperkalaemia Increased serum creatinine Angioedema
	Enalapril	2.5-20 mg daily in 1 or 2 divided doses	40 mg daily in 1 or 2 divided doses	
	Lisinopril	10 mg OD	40 mg OD	
	Perindopril	5 mg OD	10 mg OD	
	Ramipril	2.5 mg OD	20 mg OD	
ARB	Candesartan	8 or 16 mg OD	32 mg OD	
	Irbesartan	150 mg OD	300 mg OD	
	Losartan	50 mg OD	100 mg OD	
	Telmisartan	40 mg OD	80 mg OD	
	Valsartan	80 mg OD	320 mg OD	
	Olmesartan	20 mg OD	40 mg OD	

CCB: Calcium channel blocker; ACE: Angiotensin converting enzyme; ARB: Angiotensin receptor blocker
OD: Administer once daily; BD: Administer twice daily; TDS: Administer 3 times daily

Reason for noncompliance	Solution
1. Forgets to take medication	<ol style="list-style-type: none"> 1. Explain and simplify (if possible) dosing regimen. 2. Offer suggestions for reminders (e.g., keep your medication next to your toothbrush; take your medication with breakfast). 3. Enlist the assistance of family members to remind the patient to take his/her medication. 4. Reinforce the importance of taking medication every day and correct dose. 5. Alcohol use is a common reason for forgetting medication and clinic visits. Patients should be educated about the effects of alcohol and the importance of moderating alcohol use.
2. Patient feels well and does not see the need to take medication	<ol style="list-style-type: none"> 1. Offer counselling and education about hypertension and the importance of treatment in preventing complications. 2. Antihypertensive treatment will not cure hypertension.
3. Side effects	<ol style="list-style-type: none"> 1. Ask about side effects and determine whether they are due to the antihypertensive therapy or another co-administered medication. 2. If side effects are mild and manageable, or expected to be transient, reinforce the importance of compliance with treatment and perseverance. 3. If side effects are intolerable, consider changing to an appropriate antihypertensive from another class (if not contraindicated). If this is not possible, then refer the patient to tertiary care.
4. Tablets have run out	<ol style="list-style-type: none"> 1. Emphasise the importance of attending scheduled appointments at the clinic to have blood pressure checked. 2. Enough medication should be prescribed to last the patient until their next visit. 3. Explain to the patient what they should do if their medication is running out and how to obtain more.
5. Patient cannot afford medication	<ol style="list-style-type: none"> 1. Switch to a less expensive treatment option.
6. Distance & time taken to reach clinic, transport difficulties	<ol style="list-style-type: none"> 1. Cell phone (SMS) reminders. 2. Community contacts.

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2015

1. Definitions and abbreviations

ACEI: Angiotensin converting enzyme inhibitor	DM: Diabetes mellitus
ARB: Angiotensin receptor blocker	DBP: Diastolic blood pressure
BMI: Body mass index	SBP: Systolic blood pressure
CCB: Calcium channel blocker	> Higher than
CKD: Chronic kidney disease	≥ Higher or equal to
CV: Cardiovascular	< Less than
CVD: Cardiovascular disease	

2. Target audience

This hypertension treatment protocol aims to assist all healthcare workers who care for adult patients in primary care facilities.

3. Technique for accurate measurement of blood pressure (Table 1)^{4-6]}

All patients over the age of 18 years should have their blood pressure checked at every clinic visit.

3.1 General principles for manual and digital devices

1. The BP measuring device must be known to be accurate. A manual device (sphygmomanometer) requires regular maintenance and calibration at least once a year. Digital machines must be validated.
2. The patient should not smoke or consume any caffeine-containing beverage (e.g., coffee, tea, cool drink) in the 30 minutes before BP measurement.
2. The bladder inside the sphygmomanometer cuff should be the correct size for the patient. The bladder length should be long enough to wrap 80% to 100% around the arm.
3. The lower edge of the cuff should be placed 3 cm above the inner crease of the elbow. The cuff bladder should be centred over the brachial artery (approximately midway between the shoulder and the elbow crease).

4. For an accurate measurement, the patient should be rested comfortably in the seated position with their back supported for 5 minutes before BP is measured. BP is measured with the patient in this seated position.
5. The arm should be free of clothing and supported by a table or bed, so that the cuff is at the level of the heart.
6. Patients should not talk while the BP is being measured. Legs should not be crossed.
7. At the first visit, BP should be measured in both arms. If BP is consistently higher in one arm, then that arm should be used to measure blood pressure in future.
8. BP should be measured twice with at least 1-2 minutes in between. Unless they are very different, the higher of the two readings should be recorded. If the two readings are very different, additional readings should be taken.
9. BP may be measured in the supine position (lying down), especially in elderly patients and those with diabetes. When measuring BP with the patient in the supine position, the arm should be supported at the level of the heart.
10. Elderly patients, diabetics and other patients complaining of symptoms suggestive of postural hypotension (e.g. dizziness, unsteadiness or fainting when changing posture) should also have their BP measured while standing, so that standing BP can be compared to sitting BP.

3.2 Measurement technique when using a manual BP machine

1. Feel for the radial pulse at the wrist. Rapidly pump up the cuff to approximately 30 mmHg above the level at which the radial pulse can no longer be felt.
2. Place the diaphragm of the stethoscope over the brachial artery at the elbow crease.
3. Gently open the valve of the cuff so that it deflates at approximately 2 mmHg for every heartbeat.
4. Read the systolic level at the first appearance of a clear tapping sound and the diastolic level at the point where the sounds disappear. The closest 2 mmHg on the mercury scale should be recorded at the appearance and disappearance of the sounds.

3.3 Record the following:

- 1] Systolic and diastolic BP.
- 2] Right or left arm used.
- 3] Position in which the BP was measured (sitting, supine, standing).
- 4] Heart rate.

3.4 White coat hypertension

In some patients without hypertension, visiting the clinic and measuring BP may result in a high BP reading (white coat hypertension). Patients with mildly increased blood pressure (systolic BP 140-159 mmHg and/or diastolic 90-99 mmHg) at the first visit should have their BP measurement repeated on at least 3 separate occasions within 2 months to confirm the diagnosis of hypertension before antihypertensive medication is considered.^[6]

3.5 Isolated systolic hypertension

High systolic blood pressure (≥ 140 mmHg) may occur with a normal diastolic blood pressure (< 90 mmHg). Systolic hypertension should be confirmed on at least 3 occasions within 2 months. If isolated systolic hypertension is confirmed, the patient should be treated in the same way as those with high systolic and diastolic blood pressures.

4. Screening and baseline investigations

4.1 History

A careful history should be taken to identify the presence of risk factors or associated clinical conditions that increase the risk of cardiovascular events (Table 2). Patients should be asked about previous medical diagnoses and current symptoms that require further investigation or referral. In patients with hypertension who are aged younger than 30 years, secondary causes of hypertension should also be considered.

4.2 Current medication

Patients should be asked about medications and other substances that might aggravate hypertension or interact with prescribed antihypertensive medication (Table 4). Patients with comorbidities requiring medications that complicate the management of hypertension should be referred.

Because their effect in combination with antihypertensive treatment is unknown, patients who are considering using traditional medicines should be encouraged to discuss this with their medical practitioner first.

4.3. Routine investigations^[4-6]

Routine investigations are listed in Table 3. Blood tests and ECG are not mandatory before starting treatment, but should be done within 3 months for patients with a new diagnosis of hypertension (referral to a higher level facility may be necessary). Blood tests, including tests for renal function, should be repeated annually.

5. Indications for immediate referral

Indications for immediate referral are listed in Table 5.

5.1 How to refer

Use the standard referral form provided by the Ministry of Health. Include the patient's name, next of kin and contact details.

5.2 Who to refer to

Refer to the next level of care, addressed to the medical officer/physician (whichever is applicable).

6. Approach to management of adult patients with high blood pressure

6.1 Lifestyle modification^[4,6,7]

At every clinic visit, all patients should receive advice about lifestyle modification. Healthy lifestyle choices can reduce blood pressure and cardiovascular risk and reduce the dose and number of antihypertensive medications required.

6.1.1 Weight loss and maintenance of a healthy weight

- I. If the patient is overweight, they should be encouraged to lose weight. Even small amounts of weight loss can be beneficial to health.
- II. Explain how to lose weight:
 - a) Reduce the number of calories consumed (food and drink): eat less (reduce portion sizes) and drink water instead of cool drinks, fruit juice or alcoholic drinks.
 - b) Increase activity, especially if sedentary. Participate in regular (daily) exercise.
- III. In some patients (especially elderly patients) it may be more realistic to maintain current weight and to avoid gaining additional weight.
- IV. All patients should be advised to maintain a healthy body weight.
- V. At every visit, the patient's body weight and waist circumference (and, if practical, BMI) should be measured and discussed with the patient. Realistic goals should be set for the next visit (see Table 3).

6.1.2 Salt restriction

- I. Dietary salt intake should not exceed 1 teaspoon full (6 g) per day.
- II. Avoid adding salt to food and avoid foods with high salt content.
- III. Processed foods often contain high amounts of salt. Examples include bread, processed meat and cheese, margarine, packet soups, salty snacks, tinned foods and cereals.

6.1.3 Limit alcohol consumption. It is preferable to stop drinking alcohol completely

- I. No more than 2 standard drinks a day for men and 1 standard drink a day for women.
- II. 1 standard drink is equivalent to: 25 ml spirits (e.g., whisky, brandy, vodka) or 125 ml (one standard glass) wine or 340 ml beer.

6.1.4 Stop smoking and avoid the use of all other tobacco products (e.g. snuff)

6.1.5 Make healthy dietary choices

A healthy diet consists of the following: fresh fruit and vegetables, legumes, low-fat dairy products, dietary and soluble fibre, whole grains and lean meats (e.g. chicken), vegetable oils and nuts. Patients should be encouraged to eat more fish. Sugar should be used sparingly and foods with a high sugar content should be avoided (e.g., sugar-sweetened drinks). Dietary advice should be practical and relevant to the patient's culture, religion and the local availability of food choices. Portion sizes must be explained.

6.1.6 Regular physical exercise

Advise at least 30 minutes exercise per day, for at least 3 days a week for at least 3 months to achieve physical fitness, and then continue indefinitely. Exercise should be at least moderate intensity. Examples include brisk walking, swimming, cycling, or jogging.

6.2 When to initiate antihypertensive therapy and goals of treatment

The diagnosis of hypertension and decision to begin antihypertensive medication requires high SBP and/or DBP measurements confirmed on at least 3 separate occasions within a 2 month period:^[6]

Confirmed BP values indicating hypertension treatment is warranted		
Patient	Confirmed BP	
	SBP	DBP
All adult patients	≥140 mmHg	≥ 90 mmHg
Age 80 years and older	≥150 mmHg	≥ 90 mmHg

The overall health and frailty of an elderly person should be assessed before making a decision to start antihypertensive therapy. If there is doubt or concern about the health status of the patient, they should be referred to a doctor for further management.

Treatment goals with lifestyle modification and antihypertensive medication are as follows:^[8]

Patient	BP goal	
	SBP	DBP
All adult patients	<140 mmHg	< 90 mmHg
Age 80 years and older	<150 mmHg	< 90 mmHg

6.3 Follow-up for hypertensive patients on treatment

Initially, patients should be seen at 4 week intervals to assess antihypertensive efficacy, check for side effects and adjust medication as appropriate. The aim of therapy is to control BP without side effects. Patients should be advised to return earlier if they feel unwell or experience new symptoms (e.g., headache, persistent cough). Once goal BP has been achieved, the patient should be followed up every 4-6 months.

6.4 Antihypertensive medication

In all patients, unless there are contraindications, a long-acting calcium channel blocker (CCB) or thiazide diuretic, or a combination of these two agents, is the preferred treatment. Contraindications to antihypertensive medications are listed in Table 7.

6.4.1 Mild hypertension: SBP 140-159 and/or DBP 90-99 mmHg

Patients with mild hypertension and no other CV risk factors or associated conditions may be given a trial of lifestyle modification over a 3 month period. If BP goals are not achieved with lifestyle modification, or if the patient has ≥2 other CV risk factors in addition to hypertension, or associated medical conditions (Table 2), start antihypertensive medication with either a CCB or thiazide diuretic (see Table 8).

If BP goals are not achieved after 8 weeks, switch to combination therapy. The preferred combination therapy is CCB plus thiazide diuretic.

6.4.2 Moderate to severe hypertension: SBP ≥160 and/or DBP ≥100 mmHg

Start with combination therapy:

- CCB plus thiazide diuretic is the preferred option.
- Alternative options are ACE inhibitor (ACEI) plus thiazide diuretic or ACEI plus CCB.
- If an ACEI plus CCB is considered, the patient and choice of antihypertensive therapy should be discussed with a doctor before prescribing, or refer the patient to the next level of care.
- If necessary, where an ACEI is appropriate, but there are contraindications or intolerable side effects, an angiotensin receptor blocker (ARB) may be considered. Similarly, an ARB/thiazide combination may be used instead of an ACEI/thiazide combination.
- If necessary, a thiazide-like diuretic (Indapamide) may be used instead of a thiazide diuretic.

Patients not reaching their goal BP after 8 weeks on combination therapy should be referred to the next level of care.

6.4.3 Once-daily medications are preferred

6.4.4 Fixed-dose single pill combination therapy is preferred

Where combination therapy is used, and where it is available, a fixed-dose single pill combination is preferred, because it increases compliance and adherence to therapy, resulting in better blood pressure control.^[4]

6.4.5 Combinations that should be avoided

An ACEI and ARB should never be used together in the same patient. Different antihypertensive medications from the same class should not be combined.

6.4.6 Side effects

Side effects that require change in treatment should be managed as follows:

- Monotherapy: Change to low dose combination therapy
- Combination therapy: Change to an alternative combination therapy

6.4.7 What to do if goal BP is not achieved and when to step up therapy

- Confirm that the patient is taking his/her medication as instructed (i.e., every day, the correct dose, the correct number of times per day, at the correct time of day). If necessary ask the spouse or another family member to confirm this information.
- If the patient has not been taking their medication as prescribed, determine reasons for this and address them appropriately (Table 9).
- Ask about use of other prescribed medicines, over-the-counter medicines and traditional medicines (see Table 4). In particular, NSAIDs reduce the efficacy of some antihypertensive medications.
- If it has been confirmed that the patient is compliant with therapy, then treatment may be intensified as described in sections 6.4.1 and 6.4.2.
- At any of the stages above, if the antihypertensive agent is perceived to be ineffective (e.g., minimal or no change in blood pressure after 8 weeks) or is causing side effects, then it may be replaced by a different antihypertensive drug.^[9]
- If goal BP is still not achieved after optimising combination therapy and drug doses, then the patient should be referred.

7. Patient education

Patients need to understand the importance of compliance with treatment and regular follow up. At every visit, the following issues should be discussed:

1. Antihypertensive treatment is not a cure for high blood pressure.
2. Possible complications of uncontrolled hypertension.
3. Compliance with medication and importance of regular follow-up clinic appointments.
4. How and when to take medication.
5. Healthy lifestyle modifications.

6. Moderate use of alcohol and adverse effects of excessive alcohol use.
7. Using nonsteroidal anti-inflammatories (NSAIDs) may reduce the efficacy of antihypertensive medication. The effect of traditional medicines is uncertain. Therefore, before using them, patients should be encouraged to discuss these medications with their healthcare provider.

8. Other antihypertensive medications for specialist use

Table 10 lists the usual doses and possible side effects of other antihypertensive medications that are not recommended for starting treatment in primary care. These antihypertensive medications should be initiated and adjusted by specialists only.

Table 10. Other antihypertensive agents (not first or second line therapies)

Class	Examples	Usual monotherapy starting dose	Maximum daily dose	Possible side effects
Beta blockers	Carvedilol	6.25 mg BD	25 mg BD	<ul style="list-style-type: none"> • Aggravated congestive heart failure • Malaise • Hypotension • Bradycardia
	Atenolol	25 mg - 50 mg OD	200 mg OD	
	Metoprolol XL / Regular	25 mg OD (XL) 100 mg OD or BD (Regular)	100 mg OD (XL) 200 mg OD (Regular)	
	Propranolol	40 mg BD	80 mg BD	
	Nebivolol	2.5 mg OD	5 mg OD	
	Bisoprolol	2.5 mg OD	10 mg OD	
Centrally acting agents	Methyldopa	250 mg BD or TDS	1000 mg/day	<ul style="list-style-type: none"> • Angina • Orthostatic hypotension • Gynaecomastia • Rash
	Clonidine	0.1 mg BD	2.4 mg/day	
	Prazosin	1 mg BD-TDS	20 mg/day	
	Terazosin	1 mg OD	20 mg/day	
	Phenoxybenzamine	10 mg BD	40 mg TDS	
Potassium sparing diuretics	Triamterene	25 mg OD or in divided dose	100 mg OD or in divided dose	<ul style="list-style-type: none"> • Hyperkalaemia • Headache
	Amiloride	5 mg OD or in divided dose	10 mg OD or in divided dose	
Loop Diuretics	Furosemide	20 mg OD	80 mg OD or in divided dose	<ul style="list-style-type: none"> • Hyperuricaemia • Hypokalaemia
	Torsemide	5 mg OD	20 mg OD	
Vasodilators	Hydralazine	25 mg BD or TDS	150 mg/day	<ul style="list-style-type: none"> • Hypotension • Palpitations

OD: administer once daily; BD: administer twice daily; TDS: administer 3 times daily

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