

A Consensus document for Primary Care Physicians

PAKISTAN HYPERTENSION LEAGUE



GUIDELINES FOR DETECTION, CONTROL AND MANAGEMENT OF HYPERTENSION (HIGH BLOOD PRESSURE) IN PAKISTAN.

First Report of National Task Force (NTF-1)* on Hypertension,
Pakistan Hypertension League, 1998.

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INTRODUCTION:

High blood pressure is the single most common chronic health problem of the entire world today including Pakistan. There were 10.8 million hypertensives according to the national health survey 1994 in population estimated to be 91 million according to 1991 population estimate of Pakistan. There are now 12 million hypertensives in a population of 130 million according to 1998 estimates. Cardiovascular causes are major contributor to mortality in Pakistan (demographic survey Pakistan 1992). More than 60% of Pakistani patients are not aware that they are suffering from hypertension (compared to 30% unaware in USA). While only 3% hypertensives are adequately controlled in our population (compared to 27% controlled in USA). According to the recent PMRC survey in the entire country, 17.9% of population above the age of 15 suffers from hypertension, while one in 3 persons above the age of 45 suffers from hypertension. In short, Hypertension is a major cause of morbidity and second commonest cause of mortality in most developing countries (W.H.O. data), and, increasing severity of hypertension is directly related to increased morbidity and mortality.

BLOOD PRESSURE LEVELS AND TARGETS:

The normal level of blood pressure is <130 Systolic (mm Hg) and <85 mm Hg Diastolic. The ideal blood pressure is < 120 mm Hg Systolic and <80 mm Hg Diastolic.

A level of systolic BP 140 or more & diastolic of 90 mm Hg or more, persistent on repeat measurements at periodic intervals, is confirmatory of diagnosis of hypertension.

Target blood pressure for patient with diabetes mellitus is 130 mm Hg or less systolic and diastolic 85 mm Hg or less.

Target BP for renal disease patients is 120 mm Hg or less systolic and diastolic 75 mm Hg or less.

* See listing of members NTF-1 of PHL at end of this document.

Isolated systolic hypertension in elderly is abnormal and target for systolic levels is 140 to 150 mm Hg and diastolic BP 90 mm Hg or less.

CLASSIFICATION (INTERNATIONAL):

- A. *WHO-EMRO 96* I - Hypertension with no risk factors and no organ damage.
II - Hypertension with risk factors alone.
III - Hypertension with organ damage.
IV - Hypertension with risk factors and organ damage.

B. <i>THE SIXTH REPORT OF J.N.C. on Prevention, Detection, Evaluation & Treatment- USA 97</i>	Category	Systolic (mm Hg)	Diastolic (mm Hg)
	Optimal	<120	<80
	Normal	<130	<85
	High-normal	130-139	85-89
	Hypertension		
	Stage 1	140-159	90-99
	Stage 2	160-179	100-109
Stage 3	>180	>110	

Isolated Systolic Hypertension: Systolic 140 or more and DBP 90 mm Hg or less.

Stage I and II is more prevalent and maximum benefits accrue by treating this group of patients.

B.P. MEASUREMENT:

Hypertension should not be diagnosed on a single measurement. Initial elevated BP level should be confirmed at least on two or more separate visits over several weeks. If Systolic is > 200 and Diastolic > 120 mm Hg it will require immediate evaluation & treatment. Patient should be relaxed and BP should be recorded in BOTH ARMS and repeated after 5 minutes. If above normal values are obtained, the higher value should be taken as a valid measure of BP reading and the respective arm should be specified. Measurement should be taken preferably with mercury sphygmomanometer, a recently calibrated aneroid manometer or an approved calibrated electronic device.

TECHNIQUE OF MEASUREMENT:

The instrument should be placed on a horizontal surface with the mercury column vertical and the cuff adjusted firmly, but not too tightly so as not to interfere with blood flow in the arm. Some mercury manometers mounted on a stand have a slanted mercury column for ease of reading but are corrected for this tilt by the manufacturer. The examiner locates the brachial pulse in the antecubital fossa and places a stethoscope over the artery. The cuff is then inflated rapidly to 20-30 mm Hg above the pressure at which the radial pulse disappears to palpation. The cuff is gradually deflated at a constant rate of not more than 2-3 mm Hg per second. The mercury column is watched continuously and carefully. The point at which arterial sounds first appear is taken as the systolic pressure (Phase I). The point at which the arterial sounds disappear as is taken as the diastolic pressure (Phase V). Ambulatory BP monitoring may be required in certain situations. This methodology is rapidly evolving but is not yet part of standard routine evaluation.

Appropriate cuff size: Width of cuff bladder (cm) and length of inflatable bladder (cm):-

	WIDTH OF CUFF	LENGTH OF BLADDER
New born	2.5 - 4.0	5.0 - 10.0
Infant	6.0 - 8.0	12.0 - 13.5
Child	9.0 - 10.0	17.0 - 22.5
Adult	12.0 - 13.0	22.0 - 23.5
Large adult arm	15.5	30.0
Adult thigh	18.0	36.0

DETECTION:

- ▲ BP measurement on each patient visit, whatever the reason for visit.
- ▲ Health Surveys & Hypertension days.
- ▲ Casual BP reading should be repeated to establish the diagnosis of high blood pressure.

COMMUNITY PREVENTION OF HYPERTENSION:

Objectives :

- ▲ Reducing the risk of developing high blood pressure in the population as a whole.
- ▲ Identification of individuals with high BP who are at increased risk of development of complications.
- ▲ Development of model pilot projects in the country as per guidelines published by WHO/WHL/PHL.

Life Style modifications:

- Weight Reduction.
- Increase aerobic physical activity (30 to 45 min. walk most days of the week).
- Sodium moderation (not more 100 mmol per day or 6 gm sodium chloride).
- Avoid tobacco in any form.
- Control lipids, reduce intake of dietary saturated fats and cholesterol.
- Maintain adequate intake of dietary potassium, calcium and magnesium.
- Avoid alcohol intake.

EVALUATION OF PATIENT WITH HYPERTENSION:

Important Considerations:-

- Does the patient have primary or secondary (possibly reversible hypertension)?
- Is target organ damage present?
- Are there cardiovascular risk factors other than hypertension present?

Medical History:-

- Presenting complaints and duration.
- Previous history of myocardial infarction, stroke, diabetes and renal disease and peripheral vascular disease.
- Family history of hypertension, myocardial infarction, strokes, diabetes and peripheral vascular disease.

- Drug history, e.g. use of nonsteroidal anti-inflammatory drugs, oral contraceptives, corticosteroids.
- Previous therapies/previous adverse reactions to drugs.
- High risk behavior, such as smoking, stress prone personality.

Physical Examination:-

To look for sign of secondary hypertension such as:

- Cushing's syndrome
- Polycystic kidney
- Renal artery stenosis
- Phaeochromocytoma
- Coarctation of Aorta

To look for sign of organ damage such as:

- Left ventricular hypertrophy and failure (displaced apex impulse, gallop, rales)
- Retinal changes
- Peripheral pulse reduced
- Peripheral pulses a-synchronous
- Cerebrovascular disease

Minimum Investigations:-

- Urine analysis
- Blood Glucose
- ECG
- Serum Creatinine or blood urea nitrogen.
- X Ray chest PA view (not recommended by WHO/WHI. but recommended by PHIL in view of high prevalence of lung T.B).
- Haematocrit
- Serum potassium and sodium
- Serum cholesterol

TREATMENT OF PATIENTS WITH HYPERTENSION:

Treatment Objectives:-

- To achieve BP control and maintain SBP < 140 mm Hg & DBP < 90 mmHg
- Management of associated risk factors.

General Considerations:-

The benefit of treating even mild hypertension is well supported by clinical evidence. Recently concluded Hypertension Optimal Treatment trial (HOT) has established safety and benefits of reducing pressure to DBP levels as low as less than 80 mm Hg resulting in reduced cardiovascular events especially in the presence of Diabetes and renal disease. The stepped care approach to reducing BP has proved its benefit by reducing complications of Hypertension. However, the heterogeneity of Hypertension i.e. volume dependent, renin dependent, cardiogenic varieties, endothelial dysfunction and others, will require individualization of treatment of Hypertension in future.

The optimal drug formulation should provide 24 hours efficacy with preferably a once daily dose with at least 50% of the peak effect remaining at the end of 24 hours. Long acting formulations that provide 24 hours efficacy are to be preferred over short acting agents because they are likely to improve compliance, provide sustained control of Hypertension and protect against sudden rise of BP due to

circadian reasons or stress situations.

Combination of different hypertensive agents provide additional efficacy and reduce dose dependent side effects and may potentiate the effects of the other agent e.g. low dose combination of a diuretic and ACE inhibitor may reduce proteinuria more than either drug alone.

When a third drug is needed, one of them should be a diuretic if not initially used.

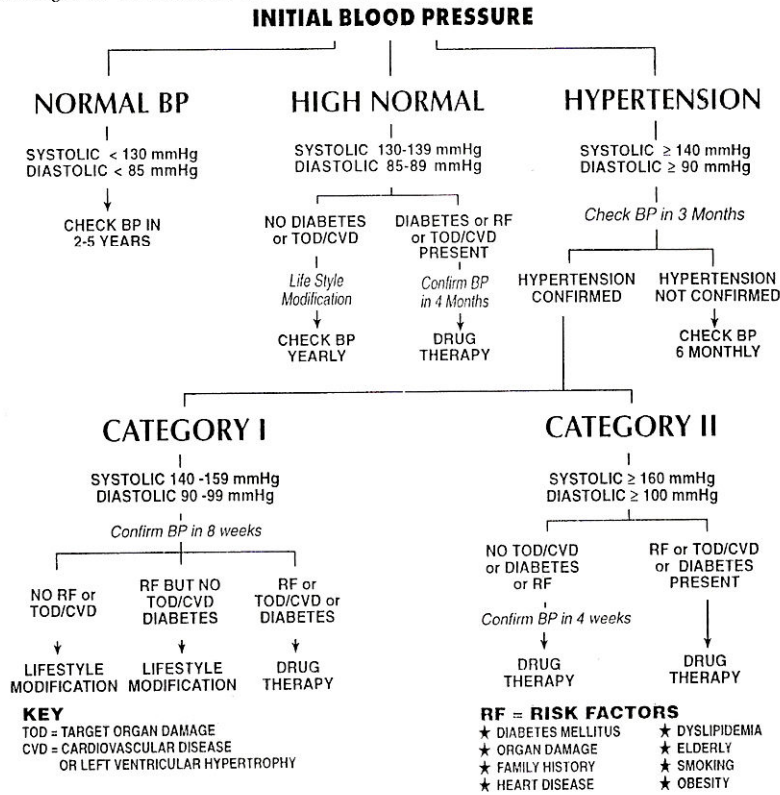
Special situations like childhood hypertension, pregnancy, renal disease, cerebro-vascular or other concomitant disease may influence choice of initial agent.

Economic considerations are very important and affect compliance in a major way along with other variables.

Most authorities agree that benefit of anti hypertensive treatment is determined more by relative or absolute risk of developing stroke, renal or cardiac disease rather than a predetermined BP level determined in a clinical setting.

RISK STRATIFICATION AND TREATMENT:

(Following is the consensus of NTF-1 of PHL on this subject).



NOTE:

- ▲ Lifestyle modifications should be adjunctive therapy for all patients who are recommended pharmacologic therapy.
- ▲ For patients with multiple risk factors : smoking, dyslipidemia, DM, Men aged >60 years & postmenopausal women, family history of cardiovascular disease in women under age 65 or men under 55 and for those with heart failure, renal insufficiency, or diabetes, early drug therapy and stricter BP control with life style and risk factor modification is mandated.

MANAGEMENT STEPS:

Non Pharmacological (Life Style Modification):-

- ▲ reduce fat intake
- ▲ reduce salt (do not add)
- ▲ take regularly dynamic exercise (e.g. walking)
- ▲ reduce weight (if obese)
- ▲ reduce alcohol

Pharmacological (Drug Therapy):- See Appendix for drug formulations.

- ▲ Start with a diuretic or a beta-blocker unless contraindicated.
- ▲ Start with an ACE inhibitor in a diabetic unless contraindicated.
- ▲ Use smaller doses of 2-3 drugs in combination rather than large dose of one drug.

1. Diuretics:

- ▲ Along with B-blockers, diuretics are the only group with proven benefit in reducing cardiovascular morbidity and stroke.
- ▲ Avoid thiazide diuretic in diabetics when serum creatinine is > 2.5 mg.
- ▲ Care is required in the use of potassium sparing diuretics + an ACE inhibitor may be hazardous and oral K⁺ supplement should be avoided in such patients. The dose dependent side effects are hypokalemia, hyperuricaemia and adverse effect on lipid profile.
- ▲ Thiazide diuretics are economical.

2. Beta-blockers:-

- ▲ Beta blockers (non-ISA) and diuretics are the only proven pharmacologic agents in reducing cardiovascular morbidity and mortality and strokes.
- ▲ Avoid B-Blockers in Patients with Bronchial asthma, conduction disorders & manifest heart failure.
- ▲ Important side effect may be sexual dysfunction and peripheral vasoconstriction.
- ▲ May prevent sudden cardiac death.
- ▲ Sudden withdrawal of Bet-Blocker therapy may be associated with angina or acute myocardial infarction.
- ▲ A wide variety of beta blockers is available which are more or less equally effective but difference in their respective side-effect profile may determine the choice in treating particular disease or individual patient.
- ▲ Some agents such as carvedilol (beta-blocker with vasodilator properties secondary to alpha one blocking activity), bisoprolol and metoprolol are also being used in treatment of CCF.

3. ACE-Inhibitors:-

- ▲ Useful in hypertension with LV dysfunction and after M.I.
- ▲ Decrease LV hypertrophy-preferred agent in IMH presence.
- ▲ Reduce CV morbidity and mortality in pts. with CHF and acute M.I. and with low ejection fraction.
- ▲ Can be used as first choice agent.
- ▲ Persistent dry cough is a common side-effect.
- ▲ Angio-neurotic edema is a rare but serious side effect.
- ▲ Contraindicated in renal artery stenosis and pregnancy.

4. Calcium Antagonists:-

- ▲ Have variable effects depending on site of action.
- ▲ Obstinate constipation, vasodilatation and conduction disturbances are the main side effects depending on the choice of the agent.
- ▲ Avoid their use in acute ischemic syndromes.
- ▲ No adverse metabolic side-effects.
- ▲ Long acting preparations are preferred over short acting preparations as they are less likely to have adverse effect on cardiovascular system.

5. Angiotensin II Receptor Antagonists:-

- ▲ Same benefits as ACE-inhibitors.
- ▲ Side effect of cough is greatly minimized because it does not interfere with bradykinin system.
- ▲ The blockage of other enzyme system may result in complete blockade of A-II effect thus improving efficacy and may help in prevention or reducing sudden death.
- ▲ Most expensive amongst the anti-hypertensive drugs.

6. Centrally Acting Agents:-

- ▲ Are not recommended as first choice agents.

7. Alpha Adrenergic Blocking Agents:-

- ▲ Effective as major sub-group.
- ▲ Useful in COPD, diabetes mellitus, peripheral vascular disease and hyperlipidemia.
- ▲ Side effects include headache, dizziness, weakness, mild fluid retention and orthostatic hypotension.
- ▲ Lowest dose should be given initially at bed time.
- ▲ Useful in symptoms due to enlarged prostate.

8. Vasodilators:-

- ▲ Useful in hypertensive emergencies.

HYPERTENSION IN SPECIAL SITUATIONS: (See details in separate publication)

Pregnancy:

HTN affects a significant number of pregnant women & incidence has not declined in our country. It is responsible for 18.6% mortality due to maternal death (SOGP-survey, 1989-90).

HBP may be:-

- a) Chronic HBP.
- b) Pre-eclampsia.
- c) Pre-eclampsia superimposed on chronic HBP.
- d) Transient HBP.

Pre-eclampsia is pregnancy specific HBP associated with proteinuria, edema and with abnormal coagulation & liver profile.

Methyldopa is safest agent.

In hypertensive crisis I/V Hydralazine, oral nifedipine & I/V methyldopa and rarely I/V nitropruside may be used for refractory cases. Magnesium sulphate I/V should be made available for control of eclamptic fits.

Primary prevention is important with regular ante-natal screening & checkup.

Hypertension in renal disease:

Blood Pressure should be lowered to 130/85 or lower.

It should be in the range of 120/75 if proteinuria is in excess of one gram.

All types of anti-hypertensive are effective but ACE inhibitor should be used preferably for type I Diabetic Nephropathy, patients with proteinuria > 1 gm, in patients with renal insufficiency the renal functions should be monitored.

Loop diuretics are preferred if indicated.

ACE inhibitors & some Calcium antagonist reduce proteinuria.

Protein restriction is advocated.

Data from a local centre found Hypertension as Primary cause of renal failure in 23% of cases. Diabetic ESRD are 90% Hypertensive.

HBP & diabetes mellitus:

As many a 50% diabetics may have HBP.

Desirable BP is 130/85 or less.

ACE inhibitors are preferred agents in nephropathy.

Calcium antagonist, Alpha Blocker, Beta Blockers & diuretics in low dosage are effective.

Recently concluded UK PDS (UK Prospective Diabetic Survey) did not find any additional advantage for ACE inhibitors over Beta-Blockers.

Strict blood pressure control was most important in reducing adverse cardiovascular events.

HBP & elderly:

Isolated systolic HBP should be treated.

Measurement of BP should also be in standing position.

Diuretic, longacting preparation calcium antagonists, Beta-Blockers or ACE inhibitors can used.

Alpha-blockers may cause hypotension.

HBP in children:

See detailed separate PHL publication.

HBP & associated cardiovascular disease:

ACE inhibitors in LV dysfunction & Post-Myocardial infarction.

Preferably Beta-Blockers or longacting preparation of calcium antagonist may be used.
 ICH should be aggressively treated.
 Other risk factors like Hyperlipidemia, obesity, smoking should be managed.

Hypertension and Neurological disease:

Effective therapy with anti hypertensive treatment reduces mortality due to strokes by 40%.
 In hypertensive emergencies & stroke, sudden lowering of blood pressure is avoided.
 Nifedipine S/L use carries risks. It may be given orally at frequent intervals if desired.
 The goal of therapy is to control BP gradually and to avoid postural hypotension.
 Patients in chronic phase of CVA need to control BP as incidence of stroke is directly related to level of BP.
 Primary prevention of stroke is through effective control of BP.
 Data from local hospitals has recorded I Hypertension as major cause of stroke .
 Recent HOT trial has documented efficacy of reducing adverse cardiovascular events (Stroke and IHD) by addition of Aspirin 75 mg to anti-hypertensive treatment.

Appendix:

ANTIHYPERTENSIVE AGENTS
 (currently available in Pakistan)

Therapeutic Category	Usual dosage (mg/day)	Dose Frequency (per day)	
<u>Thiazide Diuretics and related agents:</u>			
Hydrochlorothiazide	12.5 - 50	once	
Indapamide	2.5 m 5	once	
Bendrofluzide	2.5 mg	once	
<u>Loop diuretics</u>			
Furosemide	20 - 480	twice	
Bumetanide	1 - 5	twice	
Ethacrynic Acid	50 - 100	twice	
<u>Potassium Sparing Diuretics</u>			
Amiloride	5 - 10	once or twice	usually used in combination with other diuretics.
Triamterene	50 - 150	once or twice	
Spironolactone	50 - 400	once or twice	
<u>Diuretic Combinations (fixed dose)</u>			
Hydrochlorothiazide + Triamterene			
Hydrochlorothiazide + Amiloride			
Frusemide + Amiloride			
Frusemide + Sprionolactone			
Hydrochlorothiazide + Spirionolactone			

(Contd...) ANTIHYPERTENSIVE AGENTS

Therapeutic Category	Usual Dosage (mg/day)	Dose Frequency (Per Day)
<u>Diuretic combination with other antihypertensives (selected)</u>		
Captopril + Hydrochlorothiazide		
Enalapril + Hydrochlorothiazide		
Atenolol + Hydrochlorothiazide		
Pindolol + Clopamide		
<u>Calcium antagonists</u>		
Diltiazem	60-360	thrice
Diltiazem (sustained release)	120-360	twice
Verapamil	80-480	twice
Verapamil (long acting)	120-480	once or twice
<u>Dihydropyridines</u>		
Amlodipine	2.5-10	once
Felodipine	5-20	once
Isradipine	2.5-10	twice
Nicardipine	60-120	thrice
Nifedipine	20-120	thrice
(Longacting)	30-90	once/twice
Nimoldipine	360 mg	Thrice to six times daily
<u>Centrally acting alpha 2-agonists</u>		
Clonidine	0.5-1.2	twice/thrice
Methyldopa	250-750	twice/thrice
Imidazoline receptor stimulating agent	0.3 to 0.6	once
<u>Direct vasodilators</u>		
Hydralazine	25-100	twice to four times
Minoxidil	2.5-50 mg	once or twice
<u>Adrenergic inhibitors:</u>		
<u>Beta-blocker:</u>		
Atenolol	25-100	once/twice
Bisoprolol	5-20	
Metoprolol	25-200	once/twice
Metoprolol (extended release)	50-200	
Nadolol	20-240	
Propranolol	20-320	twice/trice once
Propranolol (SR)	60-240	

(Contd...) ANTIHYPERTENSIVE AGENTS

Therapeutic Category	Usual Dosage (mg/day)	Dose Frequency (Per Day)
<u>Beta-blocker with intrinsic sympathomimetic activity (ISA):</u>		
Acebutolol	200-1200	twice/thrice
Carvedilol	12.5-50	once
Pindolol	10-45	twice/thrice
<u>Alpha+beta blocker:</u>		
Labetalol	200-1200	twice
<u>Alpha-receptor blockers:</u>		
Doxazosin	1.0-16	once
Prazosin	1.0-20	twice or thrice
Terazosin	1.0-20	once
Trandopril	0.5-4	once
<u>ACE inhibitors</u>		
Benazepril	10.0-40	once or twice
Captopril	12.5-150	twice
Cilazapril	1-5.0	once
Enalapril	2.5-20	once or twice
Fosinopril	10.0-40	once
Lisinopril	2.5-40	once
Perindopril	2-8 mg	once
Quinapril	5.0-80	once or twice
Ramipril	1.25-10	once or twice
Trandaperil	0.5-4	once daily
<u>Angiotensin II receptor antagonist</u>		
Losartan	50-100	once
Valsartan		once

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