
**HYPERTENSION: GLOBAL HEALTH IMPACT, PATHOGENESIS,
SYMPTOMS AND TREATMENT APPROACHES
(A COMPREHENSIVE REVIEW)**

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ABSTRACT:

Hypertension, also called high blood pressure, is a common global public health problem that poses one of the greatest risks for developing various cardiovascular diseases, strokes, and renal diseases. It is usually asymptomatic and is referred to as a “silent killer.” This article reviews various aspects of hypertension, including its epidemiology, pathogenesis, classifications, diagnostic techniques, and management options, including medical and non-medical therapies. Various other medical systems, such as Ayurveda, Homeopathy, Naturopathy, Siddha, Unani, and Acupuncture, are also considered.

INTRODUCTION:

High blood pressure can be described as an elevated level of blood pressure in the arteries. As per the World Health Organization (WHO), more than 1.2 billion individuals suffer from high blood pressure worldwide.

In India, statistics from the Ministry of Health and Family Welfare indicate that the prevalence rate is on the rise.

Factors responsible for high blood pressure include:

- Heart problems
- Strokes
- Kidney failure
- Early death

Epidemiology:

Hypertension is one of the important non-communicable diseases and an important risk factor for morbidity and mortality from cardiovascular diseases globally.

1. Burden of Hypertension Globally

As per WHO:

About 1.28 billion adults globally are affected by hypertension

Almost 46% are not aware of having hypertension About 1/5 people can control their blood pressure

Causes important diseases like:

- Heart diseases
- Stroke
- Renal failure

2. Epidemiology in India

As per the Ministry of Health and Family Welfare:

The prevalence rate among adults in urban area ranges between 25–30%

Among adults in rural area ranges between 10-20%

Increasing burden due to:

- Urbanization
- Sedentary lifestyles

- Changes in dietary habits

3. Distribution

a) Person:

Age: Increases with age

Gender: More prevalent among males at younger ages

More prevalent among females during and post menopause

Genetic factors play an important role

b) Place:

More prevalent in:

- Urban areas than rural areas
- Developed countries (increasingly becoming important in developing countries as well)

c) Time:

Globally increasing due to:

- Lifestyle factors
- Increasing age

4. Risk Factors/Determinants Non-modifiable: Age, Genetics, Sex

Modifiable:

- High sodium diet
- Being overweight or obesity
- Physical inactivity
- Alcohol consumption
- Smoking
- Psychological stress

5. Morbidity & Mortality

Important factor for:

- Cardiovascular diseases
- Stroke
- Chronic kidney disease
- Results in huge deaths every year globally

Classification of Hypertension:

Depending on blood pressure values:

Category	Systolic (mmHg)	Diastolic (mmHg)
Normal	Less than 120	Less than 80
Prehypertension	120-139	80-89
Stage 1	140-159	90-99
Stage 2	≥160	≥100

Pathophysiology:

Hypertension is due to complicated relations between genetics and environmental variables.

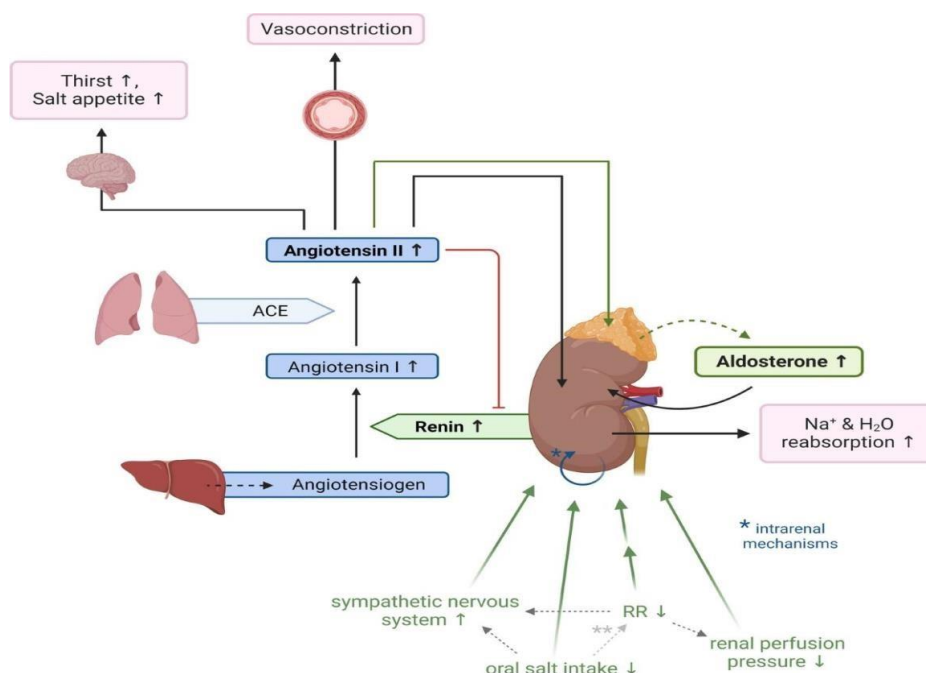
Major Pathological Processes

1. Increased Peripheral Resistance
2. Stimulation of the Renin-Angiotensin-Aldosterone System (RAAS)
3. Excitation of the Sympathetic Nervous System
4. Dysfunction of the endothelium
5. Fluid retention

Mechanism of RAAS

Renin → Angiotensin I → Angiotensin II Actions of Angiotensin II

- Vasoconstriction
- Aldosterone release
- Increased blood pressure



Signs & Symptoms:

Hypertension usually does not have any signs or symptoms.

Symptoms when present include:

- Headache
- Dizziness
- Vision problems
- Chest pain
- Breathlessness

Diagnosis:

- Blood pressure measurement (several times)
- Ambulatory BP measurement
- Laboratory investigations:
 - Cholesterol levels
 - Glucose
 - Kidney functioning
- ECG and echocardiogram

Treatment of Hypertension:

The management of Hypertension includes the lowering of high blood pressure levels, prevention of any complications, and reducing morbidity and mortality rates.

1. Non-Pharmacological Treatment

It refers to lifestyle changes that have to be done initially by everyone with hypertension:

- Restrict salt intake (<5g/day)
- Exercise daily (brisk walking is recommended)
- Maintain weight loss
- Healthy eating (fruits and vegetables)
- Reduce alcohol consumption
- Quit smoking

2. Pharmacological Treatment (Drug therapy)

a) Diuretics

Thiazides: Hydrochlorothiazide, Chlorthalidone, Indapamide High ceiling:Furosemide, etc.

K⁺ Sparing: Spironolactone, Amiloride

b) ACE inhibitors

Captopril, Enalapril, Lisinopril, Perindopril, Ramipril, Fosinopril, etc.

c) Angiotensin (AT1 receptor) blockers

Losartan, Candesartan, Irbesartan, Valsartan, Telmisartan

d) Direct renin inhibitor Aliskiren

e) Calcium channel blockers

Verapamil, Diltiazem, Nifedipine, Felodipine, Amlodipine, Nitrendipine, Lacidipine, etc.

f) B Adrenergic blockers

Propranolol, Metoprolol, Atenolol, etc

g) $\beta + \alpha$ Adrenergic blockers

Labetalol, Carvedilol

h) α Adrenergic blockers

Prazosin, Terazosin, Doxazosin, Phentolamine, Phenoxybenzamine

i) Central sympatholytics

Clonidine, Methyldopa

j) Vasodilators

Arteriolar: Hydralazine, Minoxidil, Diazoxide

Arteriolar + venous: Sodium nitroprusside

3. Other Treatment Methods

a) Ayurvedic Medicine

Uses plants such as:

- Ashwagandha
- Arjuna
- Brahmi
- Methodology:
- Lowers stress
- Enhances heart functionality

b) Homeopathy Medicine

Under “Like cures like” theory Medication includes:

- Natrum muriaticum
- Baryta muriatica

c) Naturopathy

- Nutritional intake (low salt content, vegetarianism)
- Yoga and meditation
- Water treatment

d) Siddha & Unani

- Utilizes herbal and mineral compositions
- Maintains equilibrium of humoral balance

e) Acupuncture & Acupressure

Activates certain points Methodology:

- Controls autonomic nervous system
- Control stress and anxiety

Complications

The consequences of uncontrolled hypertension include:

- Heart: Heart disease, heart failure, left ventricle enlargement
- Brain: Cerebrovascular accident, TIA
- Kidney: Renal dysfunction, renal failure
- Eyes: Hypertensive retinopathy, visual impairment
- Vessels: Hardening and narrowing of arteries (atherosclerosis),

PAD Prevention of Hypertension:

The main methods of Preventing Hypertension are as follows:

- Reduced intake of salt (less than 5 g/day)
- Healthy body weight
- Exercise (30 minutes a day)
- Healthy eating habits (Fruits/Vegetables/Low Fat)
- Quit smoking & limited alcohol consumption

- Stress management (Yoga/Meditation)
- Regular blood pressure monitoring

CONCLUSION:

Hypertension is one of the biggest threats to world health with growing cases, more so in the developing nations. Timely diagnosis, treatment, and changes in lifestyle play a key role in avoiding its adverse effects. A mixture of medicinal and non-medicinal techniques can help in managing hypertension.

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