JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

CURRENT MEDICINE IN HYPERTENSION - A GLOBAL REVIEW

[1]Bankar N. S; [2]Tathe P. R.
[1]Student; [2]Principal
Department of Pharmacology,
Samarth College of Pharmacy, Deulgaon Raja, Dist. Buldhana, M.S. (India)
Contact: 8010425242 Email Address: bankarnisha356@gmail.com

Abstract-
One of the most common preventable diseases that contributes to morbidity and mortality worldwide is hypertension. It increases the risk of cognitive decline, early mortality, cardiovascular illness, and renal failure. About 25% of persons in the UK suffer from hypertension, which also causes 1 in 8 primary care consultations. Only about 21% of hypertension individuals have their blood pressure sufficiently regulated, despite the fact that there are several appropriate medications available. Evaluation of target organ damage and possible secondary causes is necessary for effective hypertension therapy. Accurate blood pressure readings are essential for diagnosis and may include both at-home and clinic recordings in addition to ambulatory techniques. Both blood pressure and overall cardiovascular risk determine the course of treatment. The majority of patients need at least two drugs to obtain acceptable control, and there are evidence-based treatment algorithms to make the process of therapy simpler. Acute organ failure that necessitates immediate medical attention can result from extremely high blood pressure. Careful dosage titration, medication class combinations, patient education, lifestyle changes, and therapy compliance are all essential components of routine hypertension management.

Keywords-Hypertension, Mechanisms, Diagnosis, Medicine for hypertension, Treatment, Risk Factor.

INTRODUCTION OF HYPERTENSION-

High blood pressure, sometimes referred to as hypertension, is a chronic illness characterized by consistently high artery blood pressure.[1] Typically, symptoms of high blood pressure do not appear on their own. [2] It is a significant risk factor for peripheral arterial disease, heart failure, atrial fibrillation, stroke, dementia, chronic renal disease, and vision loss. [3,4,5,6] One of the leading causes of premature death in the globe is hypertension.[7] Primary hypertension and secondary hypertension are two categories for high blood pressure. Primary instances, which are characterized as high blood pressure brought on by general lifestyle and hereditary factors, account for 90–95 percent of cases.[8] Excess salt in the diet, being overweight, smoking, not exercising, and drinking alcohol are lifestyle factors that raise the risk. [2,8] The other 5–10% of instances are classified as secondary hypertension, which is high blood pressure with a known cause, such as birth control pill use, endocrine disorders, kidney artery stenosis, or chronic kidney disease.[8] Systolic (first number) and diastolic (second number) blood pressure measures are used to categorize blood pressure.[2] The normal resting blood pressure range for most persons is between 60 and 90 mmHg diastolic and 100 to 140 mmHg systolic. If an adult's resting blood pressure consistently remains at or over 130/80 or 140/90 mm/Hg, they are considered to have high blood pressure. [8,9,10]

Definitions of hypertension based on the 2013 ESH/ESC guidelines

Category	Subtype	Systolic BP (mmHg)	Diastolic BP (mmHg)
Office BP	NA	≥ 140	≥ 90
Ambulatory BP	Daytime (awake)	≥ 135	≥ 85
	Night time (asleep)	≥ 120	≥ 70
	24hr	≥ 130	≥ 80
Home BP	NA	≥ 135	≥ 85

ANTIHYPERTENSIVE AGENTS-

Hypertension (high blood pressure) is treated using a class of drugs called antihypertensives.[1] The goal of antihypertensive medication is to prevent the consequences of high blood pressure, including heart failure, stroke, myocardial infarction, and renal failure. Evidence suggests that a 5 mmHg drop in blood pressure can reduce the incidence of stroke by 34%, ischemic heart disease by 21%, dementia, heart failure, and mortality from cardiovascular disease. There are numerous kinds of antihypertensives, and they all lower blood pressure in different ways. ACE inhibitors, beta blockers, thiazide diuretics, calcium channel blockers, and angiotensin II receptor antagonists (ARBs) are a few of the most important and widely used medications.[2] The choice of first-line treatment for hypertension has been the focus of numerous extensive studies and the national guidelines that followed. Preventing the major consequences of hypertension, including heart attacks, strokes, and heart failure, should be the main objective of treatment. The age of the patient, related medical disorders, and end-organ damage all influence the kind and dosage of medication

that is given.[3] The cost, side effect profiles, and endpoint prevention capabilities of the various classes of antihypertensives vary. National healthcare budgets may suffer if more costly agents are chosen when less expensive ones would be just as effective.
When medication is required for high blood pressure, low-dose thiazide diuretics are the preferred first-line treatment, according to the best available evidence as of 2018.[5] NICE in the UK recommends an ACEi for patients under the age of fifty-five, despite clinical evidence that calcium channel blockers and thiazide-type diuretics are the most effective and cost-effective first-line therapies for the majority of people.

HISTORY OF HYPERTENSION-

The modern history of hypertension begins with the understanding of the cardiovascular system based on the work of physician William Harway (1578–1657), who described the circulation of blood in his book *De motu cordis*. The English clergyman Stephen Hales made the first published measurement of blood pressure in 1733. [11,12] Descriptions of what would come to be called hypertension came from, among others, Thomas Yung in 1808 and especially Richard Bright in 1836.[11] Bright noted a link between cardiac hypertrophy and kidney disease, and subsequently kidney disease was often termed Bright's disease in this period. In 1850 George Johnson suggested that the thickened blood vessels seen in the kidney in Bright's disease might be an adaptation to elevated blood pressure.[13] The term essential hypertension was coined by Eberhard Frank in 1911 to describe elevated blood pressure for which no cause could be found.[14] In 1928, the term Malignant hypertension was coined by physicians from the Mayo Clinic to describe a syndrome of very high blood pressure, severe retinopathy and inadequate kidney function which usually resulted in death within a year from strokes, heart failure or kidney failure.[15] that "benign" hypertension increased death and cardiovascular disease, and that these risks increased in a graded manner with increasing blood pressure across the whole spectrum of population blood pressure.Subsequently, the National Institutes Of Health also sponsored other population studies, which additionally showed that African Americans had a higher burden of hypertension and its complication. [16] The term essential hypertension was coined by Eberhard Frank in 1911 to describe elevated blood pressure for which no cause could be found.[14]

EPIDEMIOLOGY OF HYPERTENSION-

Adults-

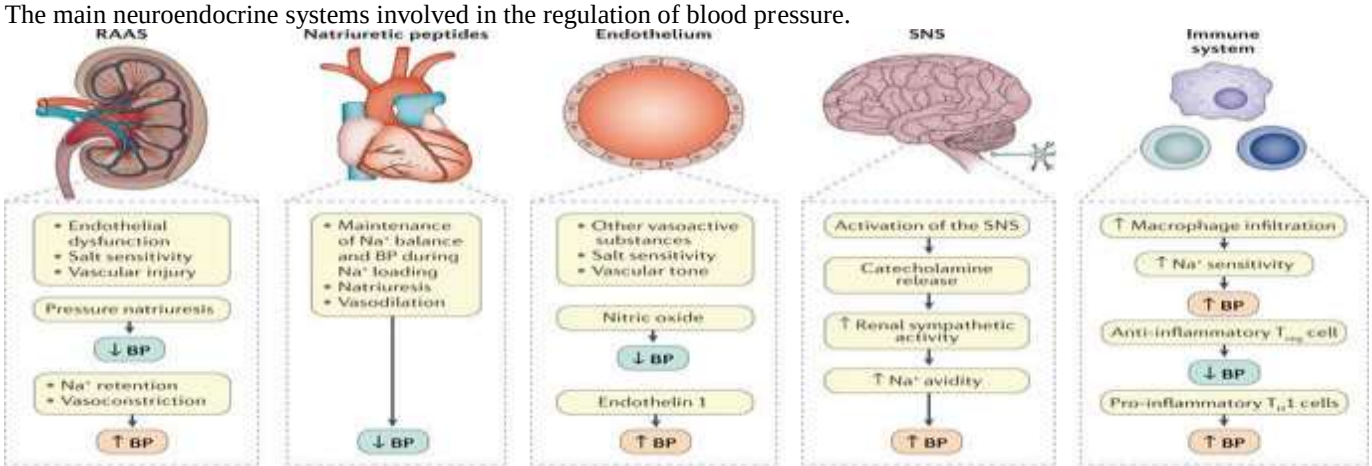
As of 2019, one in three or 33% of the World Population were estimated to have hypertension. [17,18] Of all people with hypertension, about 46% do not have a diagnosis of hypertension and are unaware that they have the condition. In 1975, almost 600 million people had a diagnosis of hypertension, a number which increased to 1.13 billion by 2015 mostly due to risk factors for hypertension increasing in low- and middle-income countries.[19] Men are somewhat more likely than women to have hypertension.[20] Men are more likely than women to have hypertension among those under 50, while the prevalence of hypertension is equal for men and women in those over 50.[20] Women are more likely than males to experience hypertension in those over 65.[21] As people age, hypertension becomes increasingly prevalent.[22] In high-, medium-, and low-income nations, hypertension is prevalent. [23,24] People from lower socioeconomic backgrounds are more likely to have it.[25] Hypertension is around twice as common in diabetics.[26]In 2019, the Americas had the lowest rates of diagnosed hypertension (18% for both sexes) and Africa had the highest (30% for both sexes). Within areas, rates also differ significantly; in Peru, they are as low as 22.8% for males and 18.4% for women, while in Paraguay, they are as high as 61.6% for men and 50.9% for women.[20]

Children-among the United States, the prevalence of high blood pressure among children and adolescents has risen throughout the past 20 years. [27] Compared to adults, childhood hypertension—especially in pre-adolescents—occurs more frequently as a result of an underlying illness.The most frequent secondary cause of hypertension in kids and teenagers is kidney illness. However, the majority of instances are caused by primary or essential hypertension. [28]

MECHANISMS / PATHOPHYSIOLOGY-

BP regulation-

Blood volume, cardiac output (the volume of blood pumped by the heart per minute), and the balance of arterial tone—which is influenced by both intravascular volume and neurohumoral systems—are some of the cardiovascular system parameters that determine blood pressure (BP). The renin-angiotensin-aldosterone system (RAAS), the function of natriuretic peptides and the endothelium, the sympathetic nervous system (SNS), and the immune system are all intricately intertwined in maintaining physiological blood pressure levels.
Over time, increases in mean blood pressure, blood pressure variability, or both can result from malfunction or disruption of components involved in blood pressure control in any of these systems. This can cause damage to target organs (e.g., left ventricular hypertrophy and chronic kidney disease) and cardiovascular disease outcomes.[49]
The main neuroendocrine systems involved in the regulation of blood pressure.



Renin-Angiotensin-Aldosterone System-

The RAAS has a wide range of effects on blood pressure regulation, including mediating Na+ retention, salt sensitivity, vasoconstriction, endothelial dysfunction, vascular injury, and pressure natriuresis, which is the mechanism by which increases in renal perfusion pressure (the gradient between renal arterial and venous blood pressure) result in decreased Na+ reabsorption and increased Na+ excretion22. It also plays a significant role in the pathophysiology of hypertension.[49]

Although the RAAS is found at the cellular level in many organs, its most important function is to assist in the regulation of pressure-volume homeostasis in the kidney, where it suppresses in volume expanded (fluid overload) conditions and maintains perfusion in volume depleted states (i.e., when the volume of extracellular fluid is reduced due to fluid loss and sodium). The kidney's juxtaglomerular cells produce and store renin and its precursor pro-renin, which are then released in response to different stimuli Renin's primary job is to break down angiotensinogen into angiotensin I. At the core of the RAAS's pathogenetic function in hypertension is angiotensin II, which is created when angiotensin I is broken down by the angiotensin-converting enzyme (ACE).[50]

Natriuretic Peptides-

Salt sensitivity and hypertension are significantly influenced by atrial natriuretic peptide (ANP) and brain natriuretic peptide (BNP). During Na+ loading, their significant natriuretic and vasodilator qualities enable the maintenance of blood pressure and Na+ balance ANP and BNP are released by atrial and ventricular stretch in response to a Na+ load. This causes systemic vasodilation, lowers plasma volume (because fluid moves from the intravascular to the interstitial compartment), and lowers blood pressure. Natriuretic peptides suppress renal Na+ reabsorption directly and indirectly, and they raise glomerular filtration rate by increasing efferent arteriolar tone in volume-expanded situations.

Direct effects include blockage of the distal nephron's epithelial sodium channel and decreased activity of the sodium-glucose co-transporter and Na+-K+-ATPase in the proximal tubule. Renin and aldosterone release inhibition are examples of indirect effects.[55]

The Endothelium-

Through NO, the endothelium plays a significant role in regulating vascular tone and salt sensitivity. Among the several vasoactive chemicals produced by endothelial cells, NO is the most crucial for controlling blood pressure. Endothelial cells continuously release NO in response to flow-induced shear stress, which causes guanylate cyclase to be activated and intracellular cyclic guanosine monophosphate to be generated, which relaxes the vascular smooth muscle. In humans and animals, hypertension develops when constitutively expressed endothelial NO synthase (eNOS) is inhibited, which interrupts NO production. Research assessing NO activity in people has shown that individuals with hypertension produce less NO overall than normotensive controls.[51]

Sympathetic Nervous System-

Numerous experimental models have been used to define the role of the SNS in the pathophysiology of hypertension. Increased renal sympathetic nerve activity and the corresponding rise in renal sodium reabsorption are important contributors to the maintenance of persistent hypertension, as shown by models of obesity-related hypertension.[52]

In a different animal model, rats given daily phenylephrine infusions for eight weeks experienced hypertension during the infusions; after stopping the phenylephrine, their blood pressure returned to normal when fed a low-salinity diet, but they relapsed when fed a high-salinity diet.[53]

Inflammation and the immune system-

The development of hypertension and associated target organ damage is significantly influenced by inflammation. Increased vascular permeability and the production of strong mediators such metalloproteinases, NO, cytokines, and reactive oxygen species are linked to inflammation. In order to reduce the lumen diameter of resistance vessels—small arteries and arterioles that are heavily innervated by autonomic nerves and the main vessels involved in blood pressure regulation—and to promote vascular fibrosis, which results in increased vascular resistance and stiffness, cytokines mediate the formation of neo-intima, a new or thickened layer of arterial intima. By boosting the local synthesis of angiotensinogen and angiotensin II and encouraging salt and volume retention in hypertension, cytokines also have an impact on renal tubular function.[54]

SIGN AND SYMPTOMS-

However, the vast majority of hypertensive individuals are asymptomatic, meaning they do not experience any signs of their condition. One of the most noticeable symptoms of hypertension in patients with high blood pressure (often 180/120 mm Hg or more) is a headache.

Others symptoms that present include-Lightheadedness.

- Dizziness
- Vomiting
- Nausea
- Chest pain
- Confusion
- Anxiety
- Nosebleeds
- Buzzing in the ears
- Difficulty breathing
- Abnormal heart rhythm
- Blurred vision or other vision changes

In addition to headaches, some individuals with high blood pressure also experience lightheadedness, vertigo, tinnitus (ear ringing or hissing), altered vision, or fainting spells.

However, rather than the high blood pressure itself, these symptoms may be linked to connected worry. [39]

CAUSES OF HYPERTENSION-

Primary hypertension can result from multiple factors, including:

- Blood plasma volume
- Hormone activity in people who manage blood volume and pressure using medication
- Environmental factors, such as stress and lack of exercise
- Diabetes, due to kidney problems and nerve damage
- Kidney disease
- Pheochromocytoma, a rare cancer of an adrenal gland
- Cushing syndrome that corticosteroid drugs an cause
- Congenital adrenal hyperplasia, a disorder of the cortisol-secreting adrenal glands
- Hyperthyroidism, or an overactive thyroid gland
- Pregnancy
- Sleep apnea
- Obesity

A family history of hypertension and poorly managed stress can both increase the chance of developing hypertension.

DIAGNOSIS OF HYPERTENSION-

Persistently elevated resting blood pressure is the basis for diagnosing hypertension. A diagnosis of hypertension requires elevated blood pressure readings on at least two different occasions. [40] To detect high blood pressure, a blood pressure test is performed. A blood pressure test can be performed to screen for high blood pressure (hypertension) or as part of a regular health examination. Millimeters of mercury (mm Hg) are used to measure blood pressure.

Two figures make up a blood pressure measurement-

- The top number (systolic) is the pressure of the blood flow when the heart muscle squeezes (contracts), pumping blood.
- The bottom number (diastolic) is the pressure in the arteries measured between heartbeats.

A measurement of 120 to 129 millimeters of mercury (mm Hg) with a bottom number below (but not beyond) 80 mm Hg is considered elevated blood pressure. To assess blood pressure at regular intervals over a period of six or twenty-four hours, a prolonged blood pressure monitoring test can be performed. Ambulatory blood pressure monitoring is the term for this. However, not all medical facilities have access to the test's equipment. To find out if ambulatory blood pressure monitoring is a covered service, contact your insurance.

Tests

If you have elevated or high blood pressure, your health care provider may do blood and urine tests to check for conditions that can cause it. Tests may include:

- Complete blood count
- Cholesterol test (lipid profile)
- Blood sugar (glucose) test
- Kidney function tests
- Thyroid function tests

Other tests may also be done.

You might also have an electrocardiogram (ECG/EKG) to check how the heart is beating. An electrocardiogram (ECG) is quick and painless.

During an ECG, sensors (electrodes) are attached to the chest and sometimes to the arms or legs. Wires connect the sensors to a machine, which prints or displays results.[41]

Most health care professionals will use these guidelines from the ACC and AHA to diagnose high blood pressure.

Medicine for high blood pressure-

If lifestyle changes do not decrease a person's blood pressure, then the person may need medications.

A doctor will evaluate and choose treatment such as which medications to use, based on what other medical problems the person has.[47]

Examples of medications that decrease blood pressure include:

- Diuretics, which increase urination to get rid of extra fluid.
- Beta blockers, which slow down the heart rate.
- ACE inhibitors, which relax the arteries.
- Several types of medicine are used to treat high blood pressure. Your provider will decide, with you, which type of medicine is right for you. You may need to take more than one type.
- Each type of blood pressure medicine listed below comes in different brand and generic names.
- One or more of these blood pressure medicines are often used to treat high blood pressure:
- **Diuretics** are also called water pills. They help your kidneys remove some salt (sodium) from your body. As a result, your blood vessels don't have to hold as much fluid and your blood pressure goes down.
- Angiotensin-converting enzyme inhibitors (also called ACE inhibitors) reduce the production of angiotensin II in your body. This helps relax your blood vessels, which lowers your blood pressure.
- Angiotensin II receptor blockers (also called ARBs) reduce the action of angiotensin II in your body. This helps relax your blood vessels, which lowers your blood pressure.
- Calcium channel blockers relax blood vessels by reducing calcium entering cells in the wall of the blood vessels.

One category of blood pressure medicines that has been commonly used but is now usually only used if the drugs above are not adequate or cannot be used is beta-blockers. These medicines make the heart beat at a slower rate and with less force.

Side effect of high blood pressure medicines-

Most blood pressure medicines are easy to take, but all medicines have side effects. Most of these are mild and may go away over time.

Some common side effects of high blood pressure medicines include:

- Cough
- Diarrhea or constipation
- Dizziness or lightheadedness
- Erection problems
- Feeling nervous
- Feeling tired, weak, drowsy, or a lack of energy
- Headache
- Nausea or vomiting
- Skin rash
- Weight loss or gain without trying

List of Medicines for High Blood Pressure (Hypertension)

There are several types of high blood pressure medicines, each working in different ways to lower blood pressure. Your doctor may prescribe one or a combination of medicines based on your condition.[48]

Medicine Name	Composition
S Amoline 5 Tablet	S Amlodipine 5 mg
Bisoline AM 5 Tablet	Amlodipine (5mg) + Bisoprolol (5mg)
Nebizem SM Tablet	Nebivolol (5mg) + S-Amlodipine (2.5mg)
Amoline LH Tablet	Amlodipine 5mg, Losartan Potassium 50mg
Telmizem AMH Hypertension Tablet	Telmisartan (40 mg) + Amlodipine (5 mg)
Amoline 2.5 Tablet	Amlodipine Besylate (2.5 mg)
Amoline NB Hypertension Tablet	Amlodipine 5 mg + Nebivolol 5 mg
Teimizem 80 AM Tablet	Telmisartan 80 mg + Amlodipine 5 mg
Telmizem 40 AM Tablet	Telmisartan 40 mg + Amlodipine 5 mg
Amoline 10 Tablet	Amlodipine (as besylate) 10mg
Ramnil AM 5 Tablet	Amlodipine 5mg + Ramipril 5mg
Olmezem 40 AM Tablet	Olmesartan Medoxomil 40mg + Amlodipine
Olmezem 20 AM Tablet	Olmesartan Medoxomil 20mg + Amlodipine
Metolash AM 50 Tablet	Metoprolol Tartrate (As Succinate) 50 mg
Losarum 50 AM Tablet	Losartan Potassium 50 mg & Amlodipine 5 mg
Amoline LS Tablet	Amlodipine 5mg + Lisinopril 5mg
Amoline H Tablet	Amlodipine 5mg + Hydrochlorothiazide 12.5mg
Amoline AT Tablet	Amlodipine 5mg + Atenolol 50mg
Amoline 5 Tablet	Amlodipine (as Besylate) 5mg
Olmezem 40 Tablet	Olmesartan Medoxomil 40mg
Olmezem 20 H Tablet	Olmesartan Medoxomil 20mg + Hydrochlorothiazide
Telmizem 40 Tablet	Telmisartan 40mg
Olmezem 20 Tablet	Olmesartan Medoxomil 20mg
Tenolzee 50 Tablet	Atenolol 50mg
Telmizem 80 Tablet	Telmisartan 80mg Tablet

How to Choose the Right Medicine for Hypertension

Choosing the best blood pressure medicine depends on:

- **Severity of Hypertension:** Mild cases may require diuretics, while severe cases may need a combination of drugs.
- **Age and Health Conditions:** Older adults and people with diabetes or kidney disease may need specific medications.
  Possible Side Effects: Some medicines may cause dizziness, fatigue, or other side effects.
- **Doctor's Recommendation:** Always follow your doctor's advice for the best results.

List of Generic Medicines for High Blood Pressure in India

Generic Salt Name	Use
Amlodipine	Used to treat high blood pressure and chest pain (angina). It works by relaxing the blood vessels so the heart doesn't have to pump as hard.
Losartan	Used to treat high blood pressure and protect the kidneys from damage due to diabetes. It helps relax blood vessels by blocking certain chemicals in the body.
Ramipril	Commonly used to treat high blood pressure and reduce the risk of heart attacks, strokes, and kidney damage. It works by relaxing blood vessels.
Hydrochlorothiazide	A diuretic used to treat high blood pressure by helping the kidneys remove excess sodium and water, lowering blood volume and pressure.

Carvedilol	Used for high blood pressure and heart failure. It works by slowing the heart rate and relaxing blood vessels.
Bisoprolol	Used for high blood pressure and heart problems. It helps lower heart rate and reduces the force of contraction of the heart, thus lowering blood pressure.
Enalapril	Used to treat high blood pressure and heart failure by relaxing blood vessels, making it easier for the heart to pump blood.
Telmisartan	Used to treat high blood pressure and reduce the risk of cardiovascular events, such as stroke or heart attack, by relaxing blood vessels.

TREATMENT OF HYPERTENSION-

Treatment for what was referred to as "hard pulse disease" in the past involved applying leeches or bloodletting to reduce the amount of blood. Hippocrates, Galen, Cornelius Celsus, and the Yellow Emperor of China all supported this.

A dietary program and lifestyle modifications, such as avoiding wine, meat, and pastries, reducing the amount of food consumed in a meal, maintaining a low-energy diet, and the dietary usage of spinach and vinegar.

During the 19th and 20th centuries, three treatment modalities—strict sodium restriction (such as the rice diet , sympathectomy (surgical ablation of portions of the sympathetic nervous system), and pyrogen therapy (injection of substances that caused a fever, indirectly lowering blood pressure)—were employed before an effective pharmaceutical treatment for hypertension became possible. All of these approaches had a number of negative effects.

Sodium thiocyanate, the first medication for hypertension, was introduced in 1900 but was unpopular and had numerous negative effects.[29]

Tetramethylammonium chloride, hexamethonium, hydralazine, and reserpine (derived from the medicinal plant Rauwolfia serpentina) were the most widely used and relatively successful of the several medications that were produced following World War II.

These were all poorly received. [30,31] The first well-tolerated oral medications were discovered.[31]

Changing your lifestyle can help control and manage high blood pressure. Your health care provider may recommend that you make lifestyle changes including:

- Eating a heart-healthy diet with less salt
- Getting regular physical activity
- Maintaining a healthy weight or losing weight
- Limiting alcohol
- Not smoking
- Getting 7 to 9 hours of sleep daily

Often lifestyle changes aren't enough to treat high blood pressure. If they don't help, your provider may recommend medicine to lower your blood pressure.[42]

Lifestyle changes-

Hypertension can often be fixed with changes in diet or lifestyle. The 2004 British Hypertension Society suggests that people with high blood pressure:[44]

- Lose weight if they are overweight or obese
- Exercise regularly
- Decrease the amount of salt they eat
- Reduce or avoid alcohol consumption
- Eat a lot of fruits and vegetables
- Reduce stressful environments
- Getting enough rest

PREVENTION OF HYPERTENSION-

Much of the disease burden of high blood pressure is experienced by people who are not labeled as hypertensive.[32]

Consequently, population strategies are required to reduce the consequences of high blood pressure and reduce the need for antihypertensive medications.

Lifestyle changes are recommended to lower blood pressure.

Recommended lifestyle changes for the prevention of hypertension include:

- maintain normal body weight for adults (e.g. body mass index below 25 kg/m^2)
- reduce dietary sodium intake to <100 mmol/day (<6 g of salt (sodium chloride) or <2.4 g of sodium per day)
- engage in regular aerobic physical activity with moderate intensity (minimum 150 minutes per week) [33]
- limit alcohol consumption, max 1 drink for women and 2 for men per day [34]
- consume a diet rich in whole grains, fruits, and vegetables, such as the DASH diet
- not smoking [33]
- stress reduction and management, e.g. by meditation and yoga [33]

Effective lifestyle modification may lower blood pressure as much as an individual antihypertensive medication. Combinations of two or more lifestyle modifications can achieve even better results [33]

There is considerable evidence that reducing dietary salt intake lowers blood pressure, but whether this translates into a reduction in mortality and cardiovascular disease remains uncertain.[36]

Estimated sodium intake ≥6 g/day and <3 g/day are both associated with high risk of death or major cardiovascular disease, but the association between high sodium intake and adverse outcomes is only observed in people with hypertension.[37]

Consequently, in the absence of results from randomized controlled trials, the wisdom of reducing levels of dietary sodium intake below 3 g/day has been questioned.[36] ESC guidelines mention periodontitis is associated with poor cardiovascular health status.[38]

RISK FACTOR OF HYPERTENSION-

Among the major risk factors for hypertension, half of the patients with the condition reported having experienced the risk factors.

Triglycerides, which account for 30% of all hypertensive patients, diabetes (15–20%), overweight/obesity (40%), metabolic syndrome (40%), lipid disorders (25%), and unhealthy daily routines like heavy drinking, smoking, and a sedentary lifestyle are other risk factors. [43]

Additional Risk Factors-

- Sex (male>female)
- Early-onset menopause
- Obesity
- Smoking
- Age greater than 65 years
- Elevated serum uric acid
- Diabetes
- Chronic inflammatory diseases
- Heart rate greater than 80 beats/min
- Cardiovascular risk
- High LDL /triglyceride
- Psychiatric disorders
- Genetic background with CVD and hypertension
- Socioeconomic or psychosocial factors
- Psychosocial stressors
- Chronic obstructive pulmonary disease.

MEDICATION-

Specific drugs can be used by individuals to treat hypertension. Doctors frequently advise starting with a low dose.

Typically, antihypertensive medicines only cause modest adverse effects. In order to control their blood pressure, patients with hypertension will eventually need to mix two or more medications.

Medications for hypertension include:

- Diuretics, including thiazides, chlorthalidone and indapamide.
- Beta-blockers and alpha-blockers
- Calcium-channel blockers
- Central agonists
- Peripheral adrenergic inhibitor
- Vasodilators
- Angiotensin-converting enzyme (ACE) inhibitors
- Angiotensin receptor blockers

COMPLICATIONS OF HYPERTENSION-

Long-term hypertension can result in issues from atherosclerosis, which narrows blood arteries when plaque builds up on their walls.

Due to the increased effort required for the heart to pump blood, this constriction contributes to hypertension.

Hypertension-related atherosclerosis can lead to:

- Heart failure and heart attacks
- Aneurysm, or abnormal bulge in the wall of an artery that can burst
- Kidney failure
- Stroke
- Amputation
- Hypertensive retinopathies in the eye which can lead to blindness.

The 130mmHg systolic value denotes the pressure experienced as the heart circulates blood throughout the body.

The 80mmHg diastolic value represents the pressure experienced as the heart relaxes and fills with blood.

Hypertension can cause many problems, including heart attack, stroke, congestive heart failure, kidney failure, vision loss, Metabolic syndrome, Dementia.[45]

To stay healthy, most people should try to keep their blood pressure below 140/90 mmHg.[46]

CONCLUSION-

Globally, hypertension is common, and as the population ages, the number of persons with hypertension is increasing. As a result, identifying, treating, and managing hypertension is a massive problem. The focus of current work is on identifying and treating middle-aged and older adults with hypertension. Because the prevalence of hypertension increases linearly with age, prevention strategies including eating a balanced diet and getting regular exercise should begin early in life. Early detection and therapy are crucial for people who have already developed hypertension. Since current antihypertensive medications are not always effective when taken alone, many individuals require a mix of medications. The selection of such medications must to be logical and supported by data.

REFERENCE-

1. Naish J, Court DS (2014). Medical Sciences (2 ed.). Elsevier Health Sciences. p. 562. Whelton, P.K., et al. (2018) 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: A Report of the American College of

Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. Journal of the American College of Cardiology, 71, e127-e248
2. About High Blood Pressure'' Centers For Disease Control And Prevention (CDC). 15 May 2024. Archived from the original on 20 May 2024. Retrieved 22 May 2024.
3. Muntner, P., et al. (2018) Poten Itial US Population Impact of the 2017 ACC/AHA High Blood Pressure Guideline. Circulation, 137, 109-118.
4. Lackland DT, Weber MA (May 2015). "Global burden of cardiovascular disease and stroke: hypertension at the core". The Canadian Journal of Cardiology. **31** (5): 569–571.
5. Nelson M. drug treatment of elevated blood pressure Australian Prescriber (33): 108–112. Archived from the original on 26 August 2010. Retrieved August 11, 2010.
6. Mendis S, Puska P, Norrving B (2011). (PDF) (1st ed.). Geneva: World Health Organization in collaboration with the World Heart Federation and the World Stroke Organization. p. 38. Archived from the original (PDF) on 17 August 2014.
7. Hernandorena I, Duron E, Vidal JS, Hanon O (July 2017). "Treatment options and considerations for hypertensive patients to prevent dementia". Expert Opinion on Pharmacotherapy (Review)
8. Wright JM, Musini VM, Gill R (April 2018). Wright JM first line drugs for hypertension The Cochrane Database of Systematic Reviews. **2018**
9. Lau DH, Nattel S, Kalman JM, Sanders P (August 2017). Circulation (Review). **136** (6): 583–596.
10. Hypertension, World Health Organization (WHO). 16 March 2023. Retrieved 22 May 2024.
11. Poulter NR, Prabhakaran D, Caulfield M (August 2015). "Hypertension". Lancet. **386** (9995): 801–812.
12. Whelton PK, Carey RM, Aronow WS, Casey DE, Collins KJ, Dennison Himmelfarb C, DePalma SM, Gidding S, Jamerson KA, Jones DW, MacLaughlin EJ, Muntner P, Ovbiagele B, Smith SC, Spencer CC, Stafford RS, Taler SJ, Thomas RJ, Williams KA, Williamson JD, Wright JT (June 2018 Hypertension.
13. Mancia G, Kreutz R, Brunström M, Burnier M, Grassi G, et al. (1 December 2023. Journal of Hypertension. **41** (12): 1874–2071.
14. Esunge PM (October 1991. Journal of the Royal Society of Medicine. **84** (10): 621.
15. Kotchen TA (October 2011). Hypertension.
16. Johnson G (1850) Medico-Chirurgical Transactions.
17. Paul I. Korner Professor of Medicine Monash University (Emeritus) and Director of the (11 May 2007). Oxford University Press, USA.
18. Keith NM, Wagener HP, Kernohan JW (1928). "The syndrome of malignant hypertension". Arch. Intern. Med. **41** (2): 141–188
19. Dustan HP, Roccella EJ, Garrison HH (September 1996). "Controlling hypertension. A research success story". Archives of Internal Medicine. **156** (17): 1926–35
20. National Heart, Lung, and Blood Institute. 10 September 2015 Archived from the original on 6 April 2016. Retrieved 6 March 2016.
21. Geneva World Health Organization (WHO). 19 September 2023.
22. Howard-Jones, Norman (1974). "Introduction (PDF). World Health Organization. pp. 9–11 Archived (PDF) from the original on 20 August 2017. Retrieved 3 January 2018.
23. Ezzati M, Zhou B, Carrillo-Larco RM, Danaei G, Riley LM, et al. (NCD Risk Factor Collaboration) (11 September 2021). The Lancet.
24. Mancia G, Kreutz R, Brunström M, Burnier M, Grassi G, et al. (1 December 2023. Journal of Hypertension
25. Pouiter NR, Prabhakaran D, Caulfield M (August 2015). "Hypertension". Lancet. **386** (9995): 801–812.
26. Lackland DT, Weber MA (May 2015). "Global burden of cardiovascular disease and stroke: hypertension at the core". The Canadian Journal of Cardiology. **31** (5):
27. Hypertension, World Health Organization (WHO). 16 March 2023. Retrieved 22 May 2024.
28. Leng B, Jin Y, Li G, Chen L, Jin N (February 2015 Journal Hypertension.
29. Petrie JR, Guzik TJ, Touyz RM (May 2018). The Canadian Journal of Cardiology.
30. Falkner B (July 2010. Pediatric Nephrology.
31. Luma GB, Spiotta RT (May 2006). American Family Physician. **73** (9): 1558–1568 from the original on 26 September 2007
32. Esunge PM (October 1991. Journal of the Royal Society of Medicine.
33. Lyons HH, Hoobler SW (February 1948). "Experiences with tetraethylammonium chloride in hypertension". Journal of the American Medical Association.
34. Falk JM, Froentjes L, Kirkwood JE, Heran BS, Kolber MR, Allan GM, Korownyk CS, Garrison SR (17 December 2024. The Cochrane Database of Systematic Reviews.
35. Williams B, Poulter NR, Brown MJ, Davis M, McInnes GT, Potter JF, Sever PS, McG Thom S (March 2004). Journal of Human Hypertension. **18** (3): 139–185.
36. Mancia G, Kreutz R, Brunström M, Burnier M, Grassi G, et al. (1 December 2023. Journal of Hypertension.
37. Hypertension, World Health Organization (WHO). 16 March 2023. Retrieved 22 May 2024.
38. Williams B, Poulter NR, Brown MJ, Davis M, McInnes GT, Potter JF, Sever PS, McG Thom S (March 2004. Journal of Human Hypertension. **18** (3): 139–185.
39. Evidence-based policy for salt reduction is needed". Lancet. **388** (10043): 438. July 2016
40. Mente A, O'Donnell M, Rangarajan S, Dagenais G, Lear S, McQueen M, Diaz R, Avezum A, Lopez-Jaramillo P, Lanas F, Li W, Lu Y, Yi S, Rensheng L, Iqbal R, Mony P, Yusuf R, Yusoff K, Szuba A, Oguz A, Rosengren A, Bahonar A, Yusufali A, Schutte AE, Chifamba J, Mann JF, Anand SS, Teo K, Yusuf S (July 2016).

41. Perk J, De Backer G, Gohlke H, Graham I, Reiner Z, Verschuren M, Albus C, Benlian P, Boysen G, Cifkova R, Deaton C, Ebrahim S, Fisher M, Germano G, Hobbs R, Hoes A, Karadeniz S, Mezzani A, Prescott E, Ryden L, Scherer M, Syvänne M, Scholte op Reimer WJ, Vrints C, Wood D, Zamorano JL, Zannad F (July 2012).
42. Marshall IJ, Wolfe CD, McKevitt C (July 2012).
43. Whelton PK, Carey RM, Aronow WS, Casey DE, Collins KJ, Dennison Himmelfarb C, DePalma SM, Gidding S, Jamerson KA, Jones DW, MacLaughlin EJ, Muntner P, Ovbiagele B, Smith SC, Spencer CC, Stafford RS, Taler SJ, Thomas RJ, Williams KA, Williamson JD, Wright JT (June 2018)
44. https://www.mayoclinic.org/diseases-conditions/prehypertension/diagnosis-treatment/drc-20376708
45. https://www.mayoclinic.org/diseases-conditions/high-blood-pressure/diagnosis-treatment/drc-20373417
46. Lopez et al., 2006; Tunstall-Pedoel et al., 2004; Neaton et al., 1992.
47. Williams, B; Poulter, NR, Brown, MJ, Davis, M, McInnes, GT, Potter, JF, Sever, PS, McG society (March 2004). "Guidelines for management of hypertension: report of the fourth working party of the British Hypertension Society, 2004-BHS IV". Journal of Human Hypertension 18 (3):
48. Arguedas, J. A.; Perez, M. I.; Wright, J. M. (Jul 8, 2009). Arguedas, Jose Agustin (ed.). "Treatment blood pressure targets for hypertension". Cochrane Database of Systematic Reviews (3): CD004349.
49. Williams, B; Poulter, NR, Brown, MJ, Davis, M, McInnes, GT, Potter, JF, Sever, PS, McG society (March 2004). "Guidelines for management of hypertension: report of the fourth working party of the British Hypertension Society, 2004-BHS IV". Journal of Human Hypertension 18 (3):
50. Bakris GL, Sorrentino MJ. Systemic hypertension: mechanisms, diagnosis, and treatment. In: Libby P, Bonow RO, Mann DL, Tomaselli GF, Bhatt DL, Solomon SD, eds. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. 12th ed. Philadelphia, PA: Elsevier; 2022:chap 26.Flack JM. Arterial hypertension. In: Goldman L, Cooney KA, eds. Goldman-Cecil Medicine. 27th ed. Philadelphia, PA: Elsevier; 2024:chap 64.
51. https://zeelabpharmacy.com/blog/medicine-for-high-blood-pressure?srsltid=AfmBOorrB-INajRUCfZgbn8YHzl6p9OcJYSt1mmr86yom0B2tGjWNlBQ
52. Hall ME & Hall JE Pathogenesis of Hypertension. Hypertension: A Companion to Braunwald's Heart Disease
53. Singh A & Williams GH Textbook of nephro-endocrinology
54. Woodard GE & Rosado JA Chapter 3 Natriuretic Peptides in Vascular Physiology and Pathology. in International review of cell and molecular biology 268, 59–93 (2008).
55. DiBona GF Sympathetic Nervous System and Hypertension.
56. Feng W, Dell'Italia LJ & Sanders PW Novel Paradigms of Salt and Hypertension. J. Am. Soc. Nephrol 28, 1362–1369 (2017).
57. Harrison DG & Bernstein KE Inflammation and Immunity in Hypertension. Hypertension: A Companion to Braunwald's Heart Disease 60–69 (2018).
58. Woodard GE & Rosado JA Chapter 3 Natriuretic Peptides in Vascular Physiology and Pathology. in International review of cell and molecular biology 268, 59–93 (2008).