**Hypertension**

medical condition in which the blood pressure in the arteries is **persistently** elevated in which office SBP values ≥140 mmHg and/or diastolic BP (DBP) values ≥90 mmHg.

Long-term high blood pressure is a major risk factor for stroke, coronary artery disease, heart failure, atrial fibrillation, peripheral arterial disease, vision loss, chronic kidney disease, and dementia.

Classification of Blood pressure according to severity

**Classification of office blood pressure****and definitions of hypertension grade**

|  |  |  |  |
| --- | --- | --- | --- |
| **Category**  | **Systolic (mmHg)**  |   | **Diastolic (mmHg)**  |
| Optimal  | <120  | and  | <80  |
| Normal  | 120–129  | and/or  | 80–84  |
| High normal  | 130–139  | and/or  | 85–89  |
| Grade 1 hypertension  | 140–159  | and/or  | 90–99  |
| Grade 2 hypertension  | 160–179  | and/or  | 100–109  |
| Grade 3 hypertension  | ≥180  | and/or  | ≥110  |
| Isolated systolic hypertension | ≥140  | and  | <90  |

The overall prevalence of hypertension in adults is around 30 − 45%, with a global age-standardized prevalence of 24 and 20% in men and women, respectively, in 2015. This high prevalence of hypertension is consistent across the world, irrespective of income status, i.e. in lower, middle, and higher income countries. Hypertension becomes progressively more common with advancing age, with a prevalence of >60% in people aged >60 years. As populations age, adopt more sedentary lifestyles, and increase their body weight,

the prevalence of hypertension worldwide will continue to rise. It is estimated that the number of people with hypertension will increase by 15–20% by 2025, reaching close to 1.5 billion.

**Pathophysiology**

In most people with established essential hypertension, increased resistance to blood flow (total peripheral resistance) accounts for the high pressure while cardiac output remains normal. The increased peripheral resistance in established hypertension is mainly attributable to structural narrowing of small arteries and arterioles

**Prevention**

* maintain normal body weight for adults (e.g. [body mass index](https://en.wikipedia.org/wiki/Body_mass_index) 20–25 kg/m2)
* reduce dietary sodium intake to <100 mmol/ day (<6 g of sodium chloride or <2.4 g of sodium per day)
* engage in regular aerobic physical activity such as brisk walking (≥30 min per day, most days of the week)
* avoid alcohol consumption and smoking.
* consume a diet rich in fruit and vegetables (e.g. at least five portions per day);

**Classification of Hypertension according to cause**

**1…..Essential Hypertension** (also called **primary** hypertension, or **idiopathic** hypertension) is the form of hypertension that has no identifiable secondary cause. It is the most common type affecting 85% of those with high blood pressure. The remaining 15% is accounted for by various causes of secondary hypertension.

Risk factors

1. **Genetic variation**
* Having a personal family history of hypertension increases the likelihood that an individual develops it.
* Essential hypertension is four times more common in black than white people, accelerates more rapidly and is often more severe with higher mortality in black patients.
* More than 50 genes have been examined in association studies with hypertension, and the number is constantly growing. One of these genes is the angiotensinogen (AGT) gene.
1. **Aging**

One possible mechanism involves a reduction in vascular compliance due to the stiffening of the arteries. Other is increase co-morbidities with age.

1. **Obesity**

Obesity can increase the risk of hypertension to fivefold as compared with normal weight, and up to two-thirds of hypertension cases can be attributed to excess weight. More than 85% of cases occur in those with a Body mass index (BMI) greater than 25 kg/m2

1. **Salt**

Approximately one third of the essential hypertensive population is responsive to sodium intake.

1. **Diabetes**

Hypertension can also be caused by [Insulin resistance](https://en.wikipedia.org/wiki/Insulin_resistance) and/or [hyperinsulinemia](https://en.wikipedia.org/wiki/Hyperinsulinemia%22%20%5Co%20%22Hyperinsulinemia), which are components of [syndrome X](https://en.wikipedia.org/wiki/Metabolic_syndrome), or the [metabolic syndrome](https://en.wikipedia.org/wiki/Metabolic_syndrome).

1. **Lack of exercise**

Inactivity and sedentary life style leads to increase Blood pressure , Regular physical exercise reduces blood pressure.

1. **stress**

**2….Secondary hypertension** it is a type of hypertension which is caused by an identifiable underlying primary cause. It is much less common than essential hypertension, affecting only 10-15% of hypertensive patients. It has many different causes including endocrine diseases, kidney diseases, and tumors. It also can be a side effect of many medications.

* 1. **Causes In the kidneys**

**Renovascular** hypertension, It has two main types: **fibromuscular** **dysplasia** and **atherosclerosis** of the renal artery resulting in stenosis, decreased perfusion of renal tissue due to stenosis of a main or branch renal artery that will activates the renin–angiotensin system.

**polycystic kidney** disease which is a cystic genetic disorder of the kidneys, PKD, which is characterized by the presence of multiple cysts in both kidneys,

**Tumors** of the kidneys can cause hypertension like hypernephroma (RCA)

**Chronic kidney disease** like chronic renal failure, glomerulonephritis.

* 1. **The Endocrine system**

[**Pheochromocytoma**](https://en.wikipedia.org/wiki/Pheochromocytoma) – a tumor which results in an excessive secretion of norepinephrine and epinephrine which promotes vasoconstriction

[**Hyperaldosteronism**](https://en.wikipedia.org/wiki/Hyperaldosteronism) ([Conn's syndrome](https://en.wikipedia.org/wiki/Conn%27s_syndrome)) tumor secrets aldosterone.

[**Cushing's syndrome**](https://en.wikipedia.org/wiki/Cushing%27s_syndrome) – an excessive secretion of glucocorticoids

[**Acromegaly**](https://en.wikipedia.org/wiki/Acromegaly)pituitary tumor that secrets excess growth hormone

[**Hyperthyroidism**](https://en.wikipedia.org/wiki/Hyperthyroidism) excess secretion of thyroid hormone

[**Hypothyroidism**](https://en.wikipedia.org/wiki/Hypothyroidism) decrease secretion of thyroid hormone

### Other causes of secondary hypertension

* [Obstructive sleep apnea](https://en.wikipedia.org/wiki/Obstructive_sleep_apnea)
* [Scleroderma](https://en.wikipedia.org/wiki/Scleroderma)
* [Pregnancy](https://en.wikipedia.org/wiki/Pregnancy):.
* [Drugs](https://en.wikipedia.org/wiki/Medication): In particular, [alcohol](https://en.wikipedia.org/wiki/Alcohol_%28drug%29), [NSAIDs](https://en.wikipedia.org/wiki/Non-steroidal_anti-inflammatory_drug), [Steroid](https://en.wikipedia.org/wiki/Steroid) use, oral contrceptives
* [Coarctation of the aorta](https://en.wikipedia.org/wiki/Coarcation_of_the_aorta)
* [White coat hypertension](https://en.wikipedia.org/wiki/White_coat_hypertension), that is, elevated blood pressure in a clinical setting but not in other settings, probably due to the anxiety some people experience during a clinic visit.
* Perioperative hypertension is development of hypertension just before, or during or after [surgery](https://en.wikipedia.org/wiki/Surgery). It may occur before surgery during the induction of [anesthesia](https://en.wikipedia.org/wiki/Anesthesia); intraoperatively mostly by pain-induced [sympathetic nervous system](https://en.wikipedia.org/wiki/Sympathetic_nervous_system) stimulation; n addition, hypertension may develop perioperatively because of discontinuation of long-term antihypertensive medication.

### Resistant hypertension

Resistant hypertension is defined as high blood pressure that remains above a target level, in spite of being prescribed three or more antihypertensive drugs simultaneously with different [mechanisms of action](https://en.wikipedia.org/wiki/Mechanism_of_action).   Some common secondary causes of resistant hypertension include [obstructive sleep apnea](https://en.wikipedia.org/wiki/Obstructive_sleep_apnea), , [renal artery stenosis](https://en.wikipedia.org/wiki/Renal_artery_stenosis), [coarctation of the aorta](https://en.wikipedia.org/wiki/Coarctation_of_the_aorta%22%20%5Co%20%22Coarctation%20of%20the%20aorta), and [primary aldosteronism](https://en.wikipedia.org/wiki/Primary_aldosteronism).

**Refractory hypertension**

Refractory hypertension is characterized by uncontrolled elevated blood pressure despite five or more antihypertensive agents of different classes, including a long-acting thiazide-like diuretic, a calcium channel blocker, and a blocker of the renin-angiotensin system.

**Investigation**

Kidney = Microscopic urinalysis, protein in the urine, BUN, creatinine, abdominal ultrasound with Doppler of renal arteries.

Endocrine system= Serum sodium, potassium, calcium, Thyroid Stimulation Hormone , serum and urine epinehrines. Steroid and growth hormone.

Heart and great vessels= ECG , Echo study , CXR and Chest CT.

**Management**

### Lifestyle modifications

The first line of treatment for hypertension is lifestyle changes, including dietary changes, physical exercise, and weight loss

**Medication**

First-line medications for hypertension include [**thiazide-diuretics**](https://en.wikipedia.org/wiki/Thiazide), [**calcium channel blockers**](https://en.wikipedia.org/wiki/Calcium_channel_blockers)( amlodipine, nifedipine), [**angiotensin converting enzyme inhibitors**](https://en.wikipedia.org/wiki/Angiotensin_converting_enzyme_inhibitor) (**ACE** inhibitors like lisinopril, enilapril captopril), and [angiotensin receptor **blockers**](https://en.wikipedia.org/wiki/Angiotensin_II_receptor_antagonist) (ARBs like valsartan, candesartan), alpha receptors blockers like labetolol. Most people require more than one medication to control their hypertension

**Complication.**

**1-ischemic heart disease, 2- strokes, 3-peripheral vascular disease, 4-heart failure, 5-aortic aneurysms, 6-chronic kidney disease, 7-atrial fibrillation.**

**Hypertension is also a risk factor for 8-cognitive impairment and dementia.**

**Other complications include 9- hypertensive retinopathy .**