**HYPERTENSION**

Blood pressure is defined as the force exerted by blood against the walls of the arteries through the circulatory system.

Hypertension is a sustained elevation of blood pressure. It is also called silent killer because it often causes no symptoms for many years, even decades, until it finally damages certain critical organs. Hypertension occurs in more than two third of individual after age of 65.

According to the JNC-7 **Hypertension** is defined as a systolic BP greater than 140 mm of Hg and diastolic BP greater than 90 mm of Hg based on two or more contacts with a health care provider or over a sustained period.

Classification of blood pressure for adult according to AHA and JNC-8:

|  |  |  |
| --- | --- | --- |
| **Blood Pressure Classification** | **Systolic Blood Pressure**  **(mmHg)** | **Diastolic Blood pressure (mmHg)** |
| Normal | < 120 | < 80 |
| Elevated | 120 – 129 | < 80 |
| Stage 1 Hypertension | 130 – 139 | 80 – 89 |
| Stage 2 Hypertension | ≥ 140 | ≥ 90 |
| Hypertensive Crisis | > 180 | > 120 |

Epidemiology:

* An estimated 1.28 billion adults aged 30-79 years worldwide have hypertension, most (two-thirds) living in low- and middle- income countries.
* An estimated 46% of adults with hypertension are unaware that they have the condition.
* Less than half of adults (42%) with hypertension are diagnosed and treated.
* Approximately 1 in 5 adults (21%) with hypertension have it under control.
* Hypertension is a major cause of premature death worldwide.
* One of the global targets for noncommunicable diseases is to reduce the prevalence of hypertension by 33% between 2010 and 2030.
* **World Health Organization (WHO, 2023)**

**Types of Hypertensions (HTN):**

1. Primary or Essential Hypertension:

* 90 to 95% of all cases of HTN are primary hypertension which is defined as high blood pressure with no apparent cause, however there are number of factors associated with HTN development such as genetics, diet, weight, and lifestyle. (Especially genetics plays an important role).

1. Secondary Hypertension:

* 5 to 10% of all cases of HTN are secondary hypertension which is defined as high blood pressure caused by preexisting physical condition such as kidney disease, thyroid condition, diabetes etc.

1. White coat Hypertension:

* It is hypertension in people who are normotensive except when their blood pressure is measured by health professionals. An intermitted Vaso vagal response accounts for the transient elevation of blood pressure.

1. Isolated systolic Hypertension:

* It occurs when the systolic blood pressure is 140 or higher but the diastolic blood pressure remains less than 90 mm Hg. It is thought to emerge because of increased cardiac output or atherosclerosis induced changes in the blood vessels compliance or both in older adults.

1. Malignant Hypertension:

* Persistent severe Hypertension characterized by a diastolic blood pressure above 110 to 120 mm Hg that results when hypertension is left untreated or is unresponsive to treatment and become a truly sever emergency condition. It is a syndrome of markedly elevated blood pressure associates with papilledema.

**Risk Factors of Hypertension:**

Though the exact cause of hypertension is usually unknown, there are several factors that have been highly associated.

Non-Modifiable risk factors

* Genetics and family history
* Age
* Gender
* Ethnicity

Modifiable risk factors

* Sedentary lifestyle and lack of physical activity
* Increasing intake of salt and fat
* Stress
* Smoking and alcohol consumption
* Obesity or being overweight,
* Secondary disease conditions such as renal failure, diabetes mellitus etc.

**Pathophysiology of Hypertension:**

Risk Factors

Kidney release renin

Renin help convert Angiotensinogen to Angiotensin I in liver

Angiotensin I is converted into Angiotensin II (potent vasoconstrictor) in the lungs

Angiotensin II causes arterial constriction and Aldosterone secretion in the kidney

Aldosterone causes sodium and water to be retained in the system

Retained sodium and water increase blood volume

Increased blood volume causes arterial constriction which increases peripheral vascular resistance

Increased blood volume and vascular resistance

Hypertension

**Clinical features:**

* Usually asymptomatic until it becomes severe and target organ develop disease.
* Fatigue, tiredness, confusion, nose bleeding, nausea, and vomiting
* Reduced activity tolerance
* Dizziness, buzzing in ears.
* Palpitation, excessive perspiration
* Angina, dyspnea, and anxiety

Advanced disease may produce symptoms:

* Early morning headache
* Retinal hemorrhage
* Papilledema
* Left ventricular hypertrophy and heart failure.
* Blurred vision
* Spontaneous nose bleedings

**Diagnostic Investigation:**

* History taking
* Physical examination
* Blood Pressure Monitoring
* ECG (Electrocardiogram)
* Laboratory test-BUN, serum creatinine, electrolytes
* Fasting blood glucose level
* Serum cholesterol and triglyceride level
* Complete blood count

**Management:**

**Non-Pharmacological Approach**: May be effective in initial therapy for individual with stage 1 HTN. These individuals should practice non-pharmacological approach for 6-month trial. If the non-pharmacological approach does not reduce blood pressure, then pharmacological management as an adjuvant therapy.

1. Lifestyle modification:

* Weight reduction: Maintain normal body weight (BMI, 18.4 – 24.9 kg/m2).
* Engage in regular aerobic physical activity.
* Brisk walking at least 30 minutes per day 4-5 times a week.
* Stop smoking.
* Limit alcohol consumption (not more than 1 oz daily).

1. Dietary changes (DASH Diet approach to stop HTN)

* Consumption of whole grain, fruits, and vegetables.
* Lowering consumption of red meat, sweets, sugar.
* Low sodium in diet, Reduce dietary sodium intake to no more than 100mmol/day (2.4 gm sodium or 6 gm sodium chloride).
* Low fat dairy products or low in saturated fat.
* Adequate intake of potassium, calcium, and magnesium.

1. Reduction of psychological stress

* Bio-feedback training
* Meditation
* Relaxation technique
* Yoga, laughter

**Pharmacological Approach:**

* Either diuretics or beta blockers for non-complicated HTN in low dose, is used if not fall BP than 140/90 the dose is increase.
* If BP is less than 140/90 for a year, gradual reduction in type and dose of medicine is done.
* ACE inhibitor: Reduce the conversion of Angiotensin I to Angiotensin II and prevent vasoconstriction and promote vasodilation. For example: Captopril, Ramipril.
* Diuretics: Inhibits sodium reabsorption in the Distal Convoluted Tubules (DCT), ascending limb and Loop of Henle in kidney and eliminate sodium and water in urine. For example: Chlorothiazide, Furosemide.
* Beta blocker: Blocks the β-adrenergic responses to catecholamine stimulation. Inhibits secretion of renin and decreases heart rate, cardiac output, and contractility. For example: Atenolol, Propranolol.
* Calcium channel blocker: Relaxes smooth muscles in the arterial walls, cause vasodilation and decreases systemic vascular resistance. It slows. the inflow of calcium into the vascular smooth muscle cells that helps dilation of arthritis. There by decreases heart rate and contractility. For example: Amlodipine.

**Nursing Management:**

Nursing Assessment:

* Family history of HTN
* Previous episodes of high blood pressure
* Dietary habit, excessive salt intake, cigarette smoking
* Lipid abnormalities
* Episodes of headache, weakness, muscle cramp, tingling. palpitations, sweating, visual disturbances.
* Other disease process such as gout, diabetes.
* Measure the Blood pressure (under the same conditions each time and avoid taking blood pressure readings immediately after stressful situations).
* Auscultate heart rate and palpate peripheral pulses and determine respirations.
* Look for edema, spasm, and hemorrhage of the eye vessels.

Nursing Diagnosis:

* Activity intolerance related to imbalance between oxygen supply and demand.
* Ineffective tissue perfusion related to impaired circulation.
* Knowledge deficit related to lack of information about the disease process and self-care.
* Anxiety related to disease process/treatment/complications.
* Ineffective management of therapeutic regimen related to medication side effects and difficult lifestyle adjustments.

Nursing Intervention:

* Provide basic education regarding cause, risk factors, complications, and management of hypertension.
* Exercise: Brisk walking a day for 30-45 minutes can lower systolic pressure by about 10 mmHg.
* Limit/avoid alcohol intake: Alcohol intake increases the risk of coronary artery occlusion.
* Stop smoking as it causes vasoconstriction.
* Reduce intake of sodium.
* Maintain intake of potassium, calcium, and magnesium (fruit and vegetable), are associated with decreases risk of hypertension.
* Low fat diet, especially saturated fat to be avoided.
* Manage stress: meditation, biofeedback, these methods may work by decreasing the daily release of epinephrine and nor epinephrine by the adrenal medulla.
* Emphasize the concept of controlling hypertension rather than curing.
* Encourage self-management by directing lifestyle modification such as decreasing sodium intake, saturated fat (animal source, fried foods, fast. foods) and increase food containing fruits, vegetables.
* Explain the patient that the goal of treatment is to control Blood pressure, reduce possibility of complications and use the minimum number of drugs with lowest dosage necessary to accomplish this.

**Complications of Hypertension:**

* Coronary Artery Disease
* Atherosclerosis
* Myocardial Infraction
* Left Ventricular Hypertrophy
* Heart Failure
* Cerebrovascular Disease (STROKE)
* Peripheral Vascular Disease
* Nephrosclerosis
* Retinal Damage

**Prevention of Hypertension:**

* Eat healthy diet.
* Exercise
* Lose weight.
* Limit salt and caffeine intake.
* Stop smoking.
* Reduce alcohol consumption.