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Review Article

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## A Review on Hypertension and Its Management in Health Care Practice

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### ABSTRACT

Hypertension is a Persistent elevation of blood pressure more than 140/90. Hypertension is an important cardiovascular diseases it affects the morbidity and mortality in society. By 2025, it is projected that 29% of the world's population will have Hypertension. The treatment of hypertension significantly reduces the cardiovascular mortality and morbidity. The Elevated high blood pressure is a silent kill the person. Essential hypertension lacks identifiable causes. The secondary hypertension can occur a result of drugs or biologicals, disease states. The Hypertension can be caused by the abnormalities in the genetic factors, endocrine factors, renal system factors, high fatty levels in the body, high salt intake .The symptoms like headache, papiledema, palpitations, tachycardia, ache, weight gain, polyurea. The rennin angiotensin aldosterone system, Baro receptor pathway, chemoreceptor pathways regulates the hypertension pathways. The Stress, alcohol, Smoking, obesity is the Major Risk factors for the developing disease. The blood pressure was measured through Spigmomanometer. The diagnosis of the disease through Physical Examination, fundoscopic examination, cardio pulmonary examinations, peripheral examinations. The management of disease through Diuretics, beta blockers, calcium channel blockers, ACE Inhibitors, AT1-Antagonist, reserpine, central sympatholytics, vasodilators, labetalol alpha blockers are used.

**Keywords:** Palpitations, Genetics, Treatment, Diseases, Baroreceptor ,Chemoreceptor.

### ARTICLE INFO

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### 1. Introduction

- ❖ Blood Pressure (BP) follows a circadian Rhythm with BP levels Reduced during sleep and Gradually Increased in the Early Morning Hours in most of the individuals.
- ❖ In patients with Hypertension, fall in Night-Time BP Rise in BP during the Early Morning hours is associate with a Higher Chances of stroke and an increased Risk for other cardiovascular complications.
- ❖ The Researches recommend the dosing of Anti Hypertensive Agents in the evening or Bed Time Hours in Patients with Hypertension in order to preserve the normal circadian Pattern of BP.
- ❖ Hypertension is a Common Non Infectious Disease and Preventable Cardiovascular Risk Factor, Affecting About 1.7 Million Deaths/year worldwide [1].
- ❖ Hypertension is a Risk Factor for stroke and coronary heart disease, and is contributor to the onset and Progression of chronic heart failure and chronic kidney failure.
- ❖ Hypertension, or High Blood pressure, is the Essential Risk Factor for the Development of cardiovascular disease (CVD) includes both (I H D) and Cerebrovascular events.
- ❖ The clinical trials were Explained the benefits of Blood Pressure control with drugs to Reduce cardiovascular System Morbidity And Mortality.

#### Systolic Blood Pressure

- ❖ Represents The Pressure While The Heart Is Beating
- ❖ A Normal Systolic Blood Pressure Is 140 mm Hg

#### Diastolic Blood Pressure

- ❖ Represents the Pressure when the heart is resting between beats.
- ❖ A normal diastolic Blood Pressure is 90 mm Hg or below.

#### Classification of BP levels (According To the British Hypertension Society)

Table 1

Category	Systolic BP (mm Hg)	Diastolic BP (mm Hg)
Optimal	< 120	< 80
Normal	< 130	< 85
High Normal	130 - 139	85 - 89
Grade 1 (mild)	140 - 159	90 - 99
Grade 2(moderate)	160 - 179	100 - 109
Grade 3 (severe)	> 180	> 110

### 2. Types of Hypertension

There are two types

1. **Primary or Essential Hypertension** (97-98%) has no clear cause But Appears To Be the result of An genetic and environmental factors.
2. **Secondary Hypertension** (2-3%) is caused by a specific cause involving kidneys or endocrine system [2].

#### Measurement of Blood Pressure

##### Equipment: Spigmomanometer

#### Cuff size

The bladder size should encircle at least 80% of the arm circumference and cover two thirds of the Arm length if not, place the bladder over the Brachial Artery. The lower edge of the Bladder should be within 2.5 cm of the antecubital fossa.

#### Manometer

Mercury or Electronic Devices used in Measurement of Blood Pressure.

#### Technique and precautions

##### Number of readings

- ❖ On each occasion, take at least two readings.
- ❖ If Readings vary by More than 5 mmHg, take Additional Readings until two or more are close. Multiple measurements should be taken in Patients with irregular pulse (eg: atrial fibrillation) and in older patients with systolic Hypertension.
- ❖ For diagnosis purpose at least two sets of readings is needed.

##### Performance

- ❖ The stethoscope placed near the brachial artery by using the bell with minimal Pressure exerted on the skin. Too Great Pressure is excreted with the stethoscope Estimating that the systolic Blood Pressure and underestimates the Diastolic Blood Pressure.

#### Sphygmomanometers

- ❖ There are three types of sphygmomanometers used to measure the blood pressure they are: mercury, aneroid, and digital.
- ❖ Reading Blood Pressure by Auscultation is considered. the gold standard by the Heart, Lung and Blood Institute of the NIH [3].

#### Circumstance

- ❖ A Quiet warm setting is maintained.
- ❖ Avoiding the consumption of caffeine, smoking or alcohol for Preceding 30 minutes.
- ❖ Question about the most recent meal or evacuation of bowels or bladder. Distended
- ❖ Abdominal viscera cause blood pressure elevation presumably because of anxiety sympathetic stimulation and Pain.
- ❖ The geriatrics having lowered blood pressure Post-Prandially.

#### Subject

- **Position:** supine, seated, standing.
  - ❖ During sitting, the subject's arm should be flexed.
  - ❖ The flexed elbow should be positioned at the level of the heart.
  - ❖ The subject is anxious, wait a few minutes before taking the Pressure.

#### Procedures

- ❖ The cuff is properly sized.
- ❖ The length of the cuff's bladder should be at least equal to 80% of the circumference of the upper arm.
- ❖ Wrap the cuff around the upper arm with the cuff's lower edge one inch above the Ante cubital fossa [4].
- ❖ Lightly press the stethoscope's bell over the brachial artery just below the cuff's edge..

- ❖ Rapidly inflate the cuff to 180 mmHg. Release air from the cuff at a moderate rate (3 mm/sec).
- ❖ Listen with the stethoscope and simultaneously observe the sphygmomanometer.
- ❖ The first knocking sound (Korotkoff) is the subject's systolic pressure. When the knocking sound disappears, that is the diastolic pressure (such as 120/80).
- ❖ Record the pressure in Both Arms and note the Difference; also Record the subject's Position (supine), which arm was used, and the cuff size (small, standard or large adult cuff).
- ❖ If the subject's Pressure is elevated, Measure Blood Pressure two additional times, waiting a few minutes between measurements.
- ❖ Blood Pressure is more than 180/120 mmhg requires Immediate Attention!

### Precautions

- ❖ The instruments require periodic calibration.
- ❖ Larger cuff is required for obese or heavily muscled subjects.
- ❖ Smaller cuff is suitable for Pediatric Patients.
- ❖ Don't place or tie the cuff over clothing.
- ❖ The subject's arm should be flexible.
- ❖ Properly identification of "auscultatory gap." Is needed.

## 3. Causes

### Causes of Primary Hypertension

Many Patho-Physiological Mechanisms contribute to the Development of Primary Hypertension. The factors include:

- ❖ Genetics
- ❖ High salt intake
- ❖ Reduced Physical Activity
- ❖ Obesity
- ❖ Insulin resistance
- ❖ Renin – Angiotension system ( RAAS)
- ❖ Sympathetic Nervous System
- ❖ Intrauterine Nutrition And Low Birth Weight

### Causes of Secondary Hypertension

#### 1. Endocrine causes:

- ❖ Cushing's syndrome
- ❖ Conn's syndrome
- ❖ Pheochromocytoma
- ❖ Hyper / Hypothyroidism
- ❖ Acromegaly
- ❖ Hyperparathyroidism
- ❖ Exogenous Hormones, e.g. contraceptive pills, glucocorticoids.

#### 2. Renal causes:

- ❖ Glomerulonephritis
- ❖ Diabetic Nephropathy
- ❖ Polycystic kidney disease
- ❖ Renal Artery Stenosis.

#### 3. Other causes

- ❖ Contraction of the aorta
- ❖ Pregnancy associated Hypertension
- ❖ Acute stress
- ❖ Obesity

- ❖ Sleep Apnea
- ❖ Pregnancy
- ❖ Excessive Liquorice Consumption
- ❖ Certain Prescription Medicines
- ❖ Herbal Remedies And Illegal Drugs

### Etiology

#### It includes:

- ❖ Smoking
- ❖ Alcohol
- ❖ High Fat Intake
- ❖ Low Fiber Diet
- ❖ Endocrine Disorders
- ❖ Taxaemia During Pregnancy
- ❖ Increase Serum Rennin Level,
- ❖ Hypersensitivity Of Sympathetic System,
- ❖ Over Weight
- ❖ Eat Too Much Salt
- ❖ Do Not Have Enough Exercise
- ❖ Stress
- ❖ (Genetics)
- ❖ Are 40 Years Or Older
- ❖ diabetes
- ❖ Kidney Diseases

### Epidemiology

- ❖ In India, hypertension affected more than 100 million individuals in August 2015.
- ❖ In 2000, nearly one billion people or 26% of the adult population of the world had hypertension.
- ❖ However rates vary markedly in different regions with rates as low as 3.4% (men) and 6.8% (women) in rural India and as high as 68.9% (men) and 72.5% (women) in Poland.
- ❖ In Europe Hypertension occurs more than 70 million in 2013.
- ❖ In 1995 It Was Estimated That 43 Million People In The United States Had Hypertension Or Were Taking Antihypertensive Medication, Almost 24% Of The Adult United States Population [5].
- ❖ The Prevalence Of Hypertension In The United States Is Increasing And Reached 29% In 2004.
- ❖ In 2006 Hypertension Affects 76 Million US Adults (34% Of The Population)
- ❖ African American adults have among the highest rates of hypertension in the world at 44% it is more common in blacks, Filipinos, and native Americans and less in whites and Mexican Americans, rates increase with age, and is greater in the southeastern united states.

## 4. Pathophysiology

- ❖ The increased resistance to blood flow (Total peripheral resistance) contributes for the High Pressure. The raised in peripheral resistance in hypertension promotes to structural narrowing of small arteries and arterioles.
- ❖ Hypertension is associates with decreased peripheral resistance, which may increase venous return, increase cardiac Preload and ultimately causes the diastolic dysfunction.

- ❖ The endothelial dysfunction and vascular inflammation may also contribute to increased peripheral resistance and vascular Damage in hypertension.
- ❖ The RAAS system enhances the rennin release and sodium, water retention, plasma ECF. Concentration enhancing in the total peripheral vascular resistance, cardiac output promotes to cause the hypertension.
- ❖  $B.P.=Cardiac\ output \times Heart\ rate$

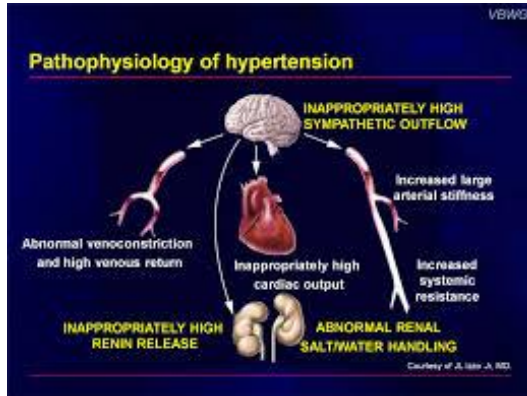


Figure 1

### Signs and symptoms

Hypertension is Rarely Accompanied by Any symptoms, and its identification is usually through screening.

- ❖ Headache, Tachycardia, Orthostatic Hypertension, Weight gain, Edema,
- ❖ Light Headedness, Muscle Weakness, Recurrent Acne
- ❖ Vertigo, Muscle Weakness, Nausea, vomiting, Diarrhoea
- ❖ Tinnitus (Buzzing Or Hissing In The Ears)
- ❖ Altered Vision Or Fainting in Episodes[6]
- ❖ Papilledema, Proteinuria, Hematuria, Polyuria.
- ❖ Sweating, Seizure, Coma, Confusion, Palpitation, Cramps, Weakness, Vision loss, Weight Gain, Edema, Menstrual Irregularities

### Diagnosis

- ❖ A chest X-ray or an echocardiogram may also be performed to look for signs of heart enlargement or damage to the heart
- ❖ Physical examination
- ❖ Fundoscopic examination
- ❖ Cardio pulmonary examination
- ❖ Peripheral examination
- ❖ Identification of cushings syndrome
- ❖ Kidney function test
  - Thyroid function test
  - Blood sugar levels test
  - Blood test

### Non-Pharmacological Therapy for Hypertension Management

Five lifestyle modifications are recommended by JNC 7 for reducing blood pressure:

- Reducing sodium intake,
- Increasing exercise,
- Moderating alcohol consumption,

- Following the Dietary Approaches to Stop Hypertension (DASH) eating plan
- Losing weight. These modifications have Been Proven to Reduce Blood Pressure, although their direct impact on Morbidity and Mortality is not yet known.

### Sodium Reduction

- ❖ The Recommended sodium intake is less than 100 mEq per L per day for all patients with hypertension or pre hypertension [7].
- ❖ Limiting Alcohol Consumption
- ❖ for Drinkers, intake should be limited to 1 oz of Alcohol per day (2 oz of 100-proof whiskey, 8 oz of wine or 24 oz of beer) in most men and half that Amount in women and small men.
- ❖ Dietary Changes
- ❖ the Diet Rich in Fruits and vegetables High in low-fat Dairy Products, Potassium, Magnesium, and calcium; and low in total saturated fats.
- ❖ DASH Diet: The DASH diet Advocates increased usage of Fruits, vegetables and low-fat Dairy Products and includes whole grains, nuts, Poultry and fish [8].

### Mediterranean Diet:

**Animal Products:** Meat and meat Products have been shown to Raise BP whereas fish has been shown to reduce BP, probably because of the higher quantities of omega-3 fatty acids.

### Fish oil supplementation

Omega-3 polyunsaturated fatty acid (commonly called fish oil) supplements at high doses (> 3 g/day) can lower BP in Hypertensive by an Average of 4 mmHg systolic and 2.5 mmHg diastolic [9].

**Fiber:** The Average increase of 14 g/day of supplemental fiber reduced the Average systolic and Diastolic BP by 1.15 and 1.65 mmHg respectively

### Calcium

Calcium supplementation of 400-2000 mg/day is associated with small reductions in systolic and diastolic Blood Pressures, viz., of 0.9 to 1.4 mmHg and 0.2 to 0.8 mmHg [10].

### Dietary Poly Phenols

- ❖ Poly Phenols like Phytoestrogen, grape seed Proanthocyanidins, Tea catechins, wine Polyphenols and Procyanidins in cocoa, appear to have 'Blood Pressure'-lowering effects. These effects have seen to be enhanced by other dietary constituents like onions, garlic and olive oil.

### Increased Physical Activity

- ❖ Increasing aerobic physical activity such as brisk walking, jogging, swimming or bicycling has been shown to lower BP.
- ❖ Physical Activity has been shown to reduce systemic vascular resistance, most likely due to a decrease in the activity of the sympathetic nervous system.

### Weight Loss

- ❖ A Reduction of 10 lb can help reduce Blood Pressure or Prevent Hypertension. A reduction of approximately 20 lb (9 kg) may produce a Reduction in systolic Blood Pressure of 5 to 20 mm Hg.

- ❖ Overweight (body mass index > 25 kg/m<sup>2</sup>) has been seen in Epidemiologic studies to be an important risk factor for higher Blood Pressure [11].

#### Increased Potassium Intake

- ❖ Potassium intake can be increased by consuming foods such as fruits and vegetables that are rich in potassium, rather than supplements. However, the BP reduction from low salt intake is highest when Potassium intake is low. Most trials had diets with 4.7 g/day (120 mmol/day) of Potassium [12].
- ❖ It is for individuals with stage 3 or 4 chronic kidney disease that is, with an estimated Glomerular Filtration rate <60 ml/min/1.73m<sup>2</sup> - should Restrict intake of Potassium.

#### Other Lifestyle Interventions

##### Smoking Cessation

- ❖ Nicotine released while smoking cigarettes is believed to impact blood pressure through arousal of the sympathetic nervous system followed by the Release of Norepinephrine and Epinephrine.
- ❖ Cigarette use causes a 4-mm Hg increase in systolic blood pressure and a 3-mm Hg increase in Diastolic Blood Pressure compared with Placebo.

##### Dietary Supplements

- ❖ Vitamin C, omega-3 fatty acids, coenzyme Q10, and magnesium have been purported to reduce blood pressure [13]. However, their use in management of hypertension is not recommended because of the lack of data from well-designed randomized controlled trials [14].

##### Meditation

- ❖ Meditation includes a variety of techniques, such as repetition of a word or Phrase (the mantra) and careful attention to the process of Breathing, to achieve a state of inner calm, Detachment, and Focus.
- ❖ Yoga is also widely believed to Reduce Blood Pressures.

## 5. Conclusion

Hypertension is a category of non-communicable diseases. Imparting the awareness on the disease and drug therapy management, we can prevent the progression of its complications. The awareness is needed for the society towards the management of the disease regarding usage of the medications. The proper guidelines, training, awareness is needed for the physicians as well as health care practioners is required [15]. The disease related problems and drug related problems can be minimized through establishing and maintaining counseling centers, highly health care practice standards in the hospitals.

## 6. References

- [1] He FJ, Macgregor GA. Effect of Longer-Term Modest Salt Reduction on Blood Pressure. *Cochrane Database Syst Rev* 2004;CD004937.
- [2] Fagard RH, Cornelissen VA. Effect Of Exercise On Blood Pressure Control In Hypertensive Patients. *Eur J Cardiovasc Prev Rehabil* 2007; 14:12-7.

- [3] Dickinson HO, Mason JM, Nicolson DJ, Campbell F, Beyer FR, Cook JV, Et Al. Lifestyle Interventions To Reduce Raised Blood Pressure: A Systematic Review Of Randomized Controlled Trials. *J Hypertens.* 2006; 24: 215-33.
- [4] Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. Global Burden Of Hypertension: Analysis of Worldwide Data. *Lancet.* 2005; 365: 217-223.
- [5] Singh RB, Suh IL, Singhvp, Et Al. Hypertension Andstroke In Asia: Prevalence, Control And Strategies Indeveloping Countries For Prevention. *J Humhypertens.* 2000; 14:749-763.
- [6] Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. Global Burden of Hypertension: Analysis of Worldwide Data. *Lancet.* 2005; 365: 217-223.
- [7] Singh RB, Suh IL, Singhvp, Et Al. Hypertension Andstroke In Asia: Prevalence, Control And Strategies In developing Countries For Prevention. *J Humhypertens.* 2000; 14:749-763.
- [8] Carter BL, Ardery G, Dawson JD, Et Al. Physician Andpharmacist Collaboration To Improve Blood Pressurecontrol. *Arch Intern Med.*2009; 169(21):1996-2002.
- [9] Roumie CL, Elasy TA, Greevy R, Et Al. Improving blood Pressure Control through Provider Education, Provider Alerts, And Patient Education. *Ann Internmed.* 2006; 145:165-175.
- [10] Bosworth HB, Olsen MK, Grubber JM, Et Al. Two self-Management Interventions To Improve Hypertension Control. *Ann Intern Med.* 2009; 151:687-695.
- [12] J. L. Vachieri and S. Gaine, "Challenges In the Diagnosis and Treatment Of Pulmonary Arterial Hypertension," *European Respiratory Review*, Vol. 21, Pp. 313-320, 2012.
- [13] L. M. Brown, H. Chen, S. Halpern Et Al., "Delay In Recognition of Pulmonary Arterial Hypertension: Factors Identified from the REVEAL Registry," *Chest*, Vol. 140, No. 1, Pp. 19-26, 2011.
- [14] D. S. O'Callaghan and M. Humbert, "A Critical Analysis of Survivalin Pulmonary Arterial Hypertension," *European Respiratory Review*, Vol. 21, No. 125, Pp. 218-222, 2012.
- [15] T. Housten-Harris, "The Nurse Specialist And Practical Issues In The Care of Pulmonary Arterial Hypertension Patients," *International journal Of Clinical Practice, Supplement*, No. 158, Pp. 10-18,2007.