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Ubiquity of Hypertension- Systematic Review

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ABSTRACT:

The prevalence, knowledge, diagnosis, treatment, and control of hypertension in an adult population-representative group were all discussed in this review. Due to its high prevalence and link to an increased risk of developing a number of diseases, hypertension is a significant health concern around the globe illness of the heart. Recent dramatic decreases in the mortality rates from coronary heart disease and stroke in industrialized nations are largely attributable to improvements in the diagnosis and management of hypertension. The rates of high blood pressure management in many of these nations have, however, actually slowed over the past few years. Globally, 1.2 billion individuals are anticipated to have hypertension by the year 2010. About 125 million people in the Eastern Mediterranean region suffer from hypertension, which has a frequency of 26% on average. More concerning is the rise in the frequency of heart failure, stroke, and other cardiovascular complications of high blood pressure, including end-stage renal disease.

Introduction: One of the most significant preventable sources of early morbidity and mortality in the UK is high blood pressure (hypertension). Significant risk factor for ischemic and hemorrhagic stroke is hypertension, heart attack, heart failure, chronic kidney illness, deterioration of cognitive function, and early mortality. Since blood pressure is typically distributed throughout the population, there is no natural cutoff point above or below which "hypertension" is unquestionably present. Each 2 mmHg increase in systolic blood pressure is linked to a 7% increase in the risk of dying from

ischemic heart disease and a 10% increase in the risk of dying from a stroke, indicating that the risk associated with rising blood pressure is constant. Hypertension is remarkably common in the UK and the prevalence is strongly influenced by age. In any individual person, systolic and/or diastolic blood pressures may be elevated. People under 50 are more frequently affected by high diastolic pressure. Systolic hypertension becomes a more serious issue as people mature due to the larger arteries' progressive stiffening and lack of compliance. Over half of people over the age of 60 and at least one-fourth of individuals have high

blood pressure.¹⁻⁵ One of the most frequent interventions in primary care, clinical management of hypertension cost the NHS £1 billion in drug costs alone in 2006.⁵⁻¹⁰

History of Hypertension. The knowledge of the cardiovascular system and the description of blood circulation in the book "De motu cordis" by physician William Harvey (1578-1657) are at the foundation of the modern history of hypertension. In 1733, English cleric Stephen Hales released the results of the first blood pressure measurement. Among others, Richard Bright in 1836 and Thomas Young in 1808 both described hypertension as an illness. Frederick Akbar Mahomed published the first account of high blood pressure in an individual without signs of kidney disease. (1849–1884) Otto Frank, a physiologist, coined the term "essential hypertension" (also known as "hypertonie essential") in 1925 to characterize high blood pressure for which no cause could be identified. Malignant hypertension was first used in 1928. was created by doctors at the Mayo Clinic to name a syndrome that included extremely high blood pressure, severe retinopathy, and adequate kidney function and typically ended in death within a year from strokes, heart failure, or kidney failure.¹¹⁻¹³ As a result, hypertension was frequently divided into "malignant" and "benign" categories. John Hay, a Liverpool University professor of medicine, stated in 1931: "There is some truth to the saying that the best When a man's high blood pressure is discovered, he is in danger because a fool will undoubtedly attempt to lower it."¹⁴⁻¹⁵ Famous US cardiologist Paul Dudley White shared this viewpoint in 1937, saying that "hypertension may be an important compensatory mechanism which should not be tampered with, even where it is certain that we could control it. People with "mild benign" hypertension, which is described as blood pressure up to levels of 210/100 mm Hg, do not require treatment, according to Charles Friedberg's 1949 classic textbook "Diseases of the Heart." Other population research funded by the National Institutes of Health later demonstrated that the

prevalence of hypertension and its complications was higher among African Americans.

Definition of Hypertension. Mean arterial pressure is also elevated in people with hypertension, but it is not typically evaluated in people. Hypertension is described as an abnormal elevation in diastolic pressure and/or systolic pressure. The diastolic number was prioritized when evaluating hypertension in previous years. Systolic pressure increases ("systolic hypertension") are linked to a higher risk of coronary and cerebrovascular disease, though. (e.g., stroke). We now understand the significance of both systolic and diastolic pressure readings. The following illustrates various phases of hypertension, per the most recent U.S. national guideline.¹⁶⁻²⁰

Symptoms of high blood pressure. Patients with isolated hypertension are typically asymptomatic, but they can rarely experience symptoms like tinnitus, facial flushing, dizziness, headaches (especially pulsating migraines behind the eyes that start in the morning), and blurred vision. Having extremely high diastolic blood pressure Accelerated hypertension is defined as systolic blood pressure (SBP) >240 mmHg or diastolic blood pressure (DBP) >120 mmHg.

The symptoms of accelerated hypertension include confusion, blurred vision, vertigo, and vomiting. Malignant hypertension, also known as hypertensive crisis, is a medical emergency that necessitates an instant decrease in blood pressure when hypertension results in increased intracranial pressure (pressure the skull exerts on the brain tissue and brain fluid). End-organ damage could be evident with this condition. Untreated high blood pressure over time can harm vital systems like the heart, kidneys, and eyes, which can result in complications like angina, heart attacks, or heart failure, stroke, kidney failure, peripheral arterial disease, and retinopathy. (Eye damage).²⁰⁻²⁵

Types of high blood pressure

There are two main types of high blood pressure:

A. Essential (primary) hypertension

- a. The main form of high blood pressure – accounts for around 90–95% of cases
- b. Has no single identifiable cause
- c. Potential causes include genetic and environmental factor

B. Secondary hypertension

- a) Rare forms of high blood pressure
- b) Caused by another medical condition or treatment
- c) Causes include kidney problems (renovascular hypertension), adrenal gland tumors, thyroid disease, and narrowing of the aorta (the main artery that takes blood from the heart to the rest of the body)
- d) Other types of high blood pressure include:
- e) Isolated systolic hypertension – the systolic pressure (top number) is raised but the diastolic pressure is normal
- f) Isolated diastolic hypertension – the diastolic pressure (bottom number) is raised but the systolic pressure is normal
- g) White coat hypertension – where the blood pressure is raised due to the stress of a visit to the doctor or nurse

Pathophysiology**Objectives**

1. Understand the hemodynamic determinants of systemic hypertension.
2. Recognize primary and secondary forms of hypertension.
3. Understand the role of the kidney in systemic hypertension: innocent bystander or instigator.
4. Recognize the role of Angiotensin II, aldosterone, and the sympathetic nervous system in the pathogenesis of hypertension.

Chronically elevated blood pressure, or hypertension, damages end organs over time and raises morbidity and death rates.²⁵⁻³⁰ The sum of systemic vascular resistance and heart output determines blood pressure. Increased - adrenoceptor stimulation or increased production of peptides like Angiotensin or endothelin may both contribute to elevated vascular tone. The last

route is a rise in cytosolic calcium that causes vasoconstriction in vascular smooth muscle. Because the aorta and elastic arteries stiffen with age and several growth factors, such as Angiotensin and endothelins, increase the vascular smooth muscle bulk known as vascular remodeling, the pulse pressure rises. The regulation of blood pressure is largely dependent on the autonomic nervous system. Norepinephrine is released more frequently and has greater peripheral sensitivity in hypertensive individuals. The responsiveness to stressful stimuli has also grown. Baroreflexes are reset and baroreceptor sensitivity is reduced, which are additional characteristics of arterial hypertension. The renin-angiotensin system is suppressed in the presence of primary hyperaldosteronism and is at least partially implicated in some types of hypertension (such as renovascular hypertension). Patients who are older or who are dark often have low-renin hypertension.

Diagnosis. A blood pressure reading that remains consistently high is used to identify hypertension. This traditionally calls for three different sphygmomanometer readings at a monthly delay. A thorough history and physical evaluation should be included in the initial assessment of hypertensive patients. The need to avoid misdiagnosing people with white coat hypertension has caused a shift in procedures in light of the accessibility of ambulatory blood pressure monitors and home blood pressure machines. The current recommended practice in the United Kingdom is to monitor a single elevated clinic reading over the period of seven days with ambulatory measurement, or less ideally, with home blood pressure monitoring.³¹⁻³³

Equipment

- a) **Cuff size:** The bladder size (there are six sizes) should encompass two-thirds of the arm's length and at least 80% of the arm's circumference; if not, the bladder should be placed over the brachial artery. If the bladder is too small, falsely elevated readings could occur. The antecubital fossa and the lower

edge of the bladder should be separated by no more than 2.5 centimeters.

- b) **Manometer** Mercury, aneroid, or electronic blood pressure measuring equipment should be regularly calibrated against standards (typically every six months) to ensure precision. Make sure the apparatus is in good functioning condition, including being clean, calibrated, full of non-leaking tubing, and has a cuff that is the right size.
- c) **ECG:** By displaying right ventricular hypertrophy and strain, as well as right atrial dilation, the ECG may offer indicative or supportive proof of hypertension. On the ECG, 87% of individuals with hypertension have right ventricular hypertrophy, and 79% of them have right axis deviation. The ECG's sensitivity (55%) and specificity (70%) are insufficient as a screening instrument for identifying significant hypertension, though. A healthy ECG does not rule out the possibility of serious PH.
- d) **Chest radiograph.** At the time of diagnosis, the chest radiograph is abnormal in 90% of IPAH cases. Findings include central pulmonary arterial dilatation in contrast to periphery blood vessel "pruning" (loss). In more severe instances, right atrial and ventricular enlargement can be seen and gets worse. The chest radiograph makes it possible to fairly rule out associated moderate-to-severe lung disease or pulmonary venous hypertension brought on by left heart abnormalities. However, moderate post-capillary pulmonary hypertension, including left heart disease or pulmonary veno-occlusive disease, is not always present on a normal chest radiograph.

Causes of high blood pressure

Essentially, Blood pressure is the outcome of cardiac output and peripheral vascular resistance (Blood

pressure=cardiac output x peripheral vascular resistance). Therefore, the maintenance of normal blood pressure is

dependent on the balance between cardiac output and peripheral vascular resistance.

A. Essential Hypertension

The pathogenesis of essential hypertension is multifactorial and highly complex. Many factors (and risk factors) have been implicated in the genesis of essential hypertension, which includes the following:

- Increased sympathetic nervous system activity.
- Increased production of sodium-retaining hormones and vasoconstrictors.
- Deficiencies of vasodilators such as prostacyclin and nitric oxide.
- Inappropriate or increased renin secretion, resulting in increased production of angiotensin II and aldosterone.³³⁻³⁵
- Genetic predisposition.

B. Secondary hypertension

Common identifiable causes of hypertension are the following:

- Renal** parenchymal disease, Renal vascular disease, Renin-producing tumors, Primary sodium retention (Liddle's syndrome), Increased intravascular volume
- Endocrine** Acromegaly, Hypothyroidism, Hyperthyroidism, Hyperparathyroidism, Adrenal cortical Cushing syndrome, Primary aldosteronism, Apparent mineralocorticoid excess
- Adrenal medulla** Pheochromocytoma, Carcinoid syndrome, Drugs and exogenous hormones, Neurological causes, Increase intracranial pressure, Quadriplegia, Guillain–Barre syndrome, Idiopathic, primary, or familial dysautonomia, Obstructive sleep apnea (OSA), Diseases of the aorta, Rigidity of the aorta, Coarctation of the aorta

1. Risk factors for high blood pressure

The following are risk variables linked to an increase in blood pressure higher sodium consumption over time, lowered nutritional calcium, magnesium, and potassium intakes, insulin resistance and diabetes mellitus, excessive drinking, smoking, and insufficient exercise, Obesity, High amounts of stress can cause hypertension and other conditions like lung or left heart disease.

2. **Therapy & Care.** A multi-pronged strategy can be used to treat elevated blood pressure, including dietary modifications, medication, and exercise. Discover the various ways to manage hypertension here.
3. **Treatment for hypertension.** There are many ways to treat high blood pressure, including medication and behavioral modifications. Learn more about lowering blood pressure in this summary.
 - a) **Smoking and High Blood Pressure** Did you realize that smoking increases the risk of developing heart disease and high blood pressure? Learn more about stopping and how to prevent a relapse by getting advice.
 - b) **Hypertension and Stress** Unmanaged tension can result in emotional, psychological, and even physical issues, such as high blood pressure and coronary artery disease. Learn how to reduce stress and enhance a positive outlook, as well as how to recognize the signs of dangerous stress.
 - c) **Alternative and Complementary Medicine for Hypertension.** There are numerous complementary and alternative therapies that are thought to be successful in managing hypertension. Find out the details of your choices.
 - d) **Drugs for High Blood Pressure.** Your doctor can choose from hundreds of various high blood pressure medications. These medicines lower blood pressure in a number of different methods.
 - e) **Calcium Channel Blockers.** Blood pressure-lowering medications called

calcium channel blockers are used. In order to widen blood vessels and facilitate easier heart pumping, they function by slowing the entry of calcium into the cells that line the walls of the heart and blood vessels [36-40].

- f) **ACE Inhibitors** High blood pressure medications called angiotensin-converting enzyme (ACE) inhibitors widen or dilate your blood vessels to increase the volume of blood your heart pumps and reduce blood pressure.
- g) **Diuretics (Water Pills).** For high blood pressure, diuretics, commonly known as "water pills, help your body get rid of unneeded water and salt through the urine. Getting rid of excess salt and fluid helps lower blood pressure.
- h) **Beta-Blockers.** Drugs called beta-blockers are used to lower blood pressure. They prevent the heart from being impacted by the sympathetic nerve system. Fish oil supplements with omega-3 the past 10 years, many Americans have turned to omega reduce it, while" In omega-3 fish oil supplements. Dietary fish a fish oil supplements have benefits for healthy people and also those with heart.

Care for High Blood Pressure

Table 1: Main side-effects of antihypertensive drugs ⁴⁰⁻⁴⁸

Drug	Main side-effects
Diuretics	
Thiazides	Hypokalaemia, hypomagnesaemia, hyperuricaemia
Loop diuretics	Hypocalcaemia and ototoxicity may occur
K-sparing diuretics	Hyperkalaemia
Adrenergic inhibitors	

Acting within neurons	Nasal congestion, lethargy, sexual dysfunction,
Reserpine	depression
guanethidine	Postural hypotension
α-agonists	
Methyldopa	Sedation, dry mouth, impotence, galactorrhea
clonidine	Inflammatory side effects, withdrawal syndrome
α -adrenergic receptor	First-dose hypotension, dizziness, weakness
β -adrenergic receptor	Bradycardia, fatigue, insomnia, bizarre dreams
α -/ β - blockers	Nausea, fatigue, postural hypotension, hepatotoxicity
Direct vasodilators	
Hydralazine	Tachycardia, flushing, headache, angina,
minoxidil	Hirsutism, pericardial effusion, ascites
Calcium antagonists	
Diltiazem	First-degree AV block, bradycardia,
Verapamil	Constipation
dihydropyridines	Ankle oedema, flushing, tachycardia
ACE inhibitors	Cough, rash, hyperkalaemia, angioedema

4. Conclusion

Worldwide, hypertension is a common condition, and as the population ages, the prevalence of the condition increases. As a result, diagnosing, treating, and controlling hypertension is a massive issue. The goal of current endeavors is to identify and treat hypertension in middle-aged and elderly people. The straight Measures to avoid hypertension, such as a healthy diet and regular exercise, should begin early in life due

to the increase in the prevalence of hypertension with aging. For those who have already developed hypertension, early diagnosis and treatment is important. Existing antihypertensive drugs are not ideal individually and so a combination of drugs is needed in a large proportion of patients. The choice of such drugs should be rational and evidence-based.⁴⁹⁻⁵⁰

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