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REVIEW ARTICLE

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A REVIEW ON HYPERTENSION

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ABSTRACT

Hypertension, a major global public health concern. It is one among the leading disease in the world. The prevalence is high in urban than in rural areas. More than 40% of individuals are with history of hypertension. The recent surveys indicate that death rate due to hypertension is globally increasing. More than half of the people with hypertension are currently not following the therapy. The aetiology involves a composite of pathophysiological, environmental and mental conditions besides genetics. It is a key indicative for cardiac diseases. For successful preventative and control plans, knowledge about the prevalence of hypertension and its related disease is crucial. In spite of its available therapy still there is requirement for a therapeutic monitoring for better outcome.

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INTRODUCTION

Hypertension is not a chronic condition but it is related to cardiovascular disorders in the elderly. Despite being one of the most common causes of cerebrovascular illnesses, it is a variable component that can be changed. Hypertension is a strong and independent prognostic factor for renal and cardiovascular illness and is also strongly linked to higher rates of morbidity and death from congestive heart failure, myocardial infraction, cerebrovascular disease and renal insufficiency. A significant decline in cardiovascular mortality and a delay in the onset of renal illness as a result of treating hypertension. The cause of secondary hypertension can be determined and accounts for roughly 5-10% of all occurrences of hypertension. Even after a thorough medical investigation, the aetiology of the remaining 95% of cases remains unknown (primary hypertension). The standard for defining the different grades for hypertension have been revised and updated by the world health organization (WHO) and the International society of hypertension (ISH). The segregation of hypertension according to the systolic and diastolic blood pressure as per standards is listed in table1 below (Addo, 2007). It is challenging to determine a cut-off value that distinguishes between pathological and normal blood pressure readings. Intervention studies that emphasize the health advantages of lowering blood pressure have indirectly estimates the recognized cut-off value between hypertension and normal arterial pressure. The most recent National American guidelines for hypertension state that systolic and diastolic blood pressure values of 120-139 mm Hg and

80-89 mm Hg respectively are considered to be in the precursor stage of hypertension because they are linked to a higher risk of developing hypertension as opposed to lower arterial pressure values (Babatsikou, 2010).

Table 1. Systolic and diastolic blood pressure values (SBP, DBP, mm Hg) in the normal blood pressure range and for the various hypertension grades

Grades	Systolic blood pressure (mm Hg)	Diastolic blood pressure (mm Hg)
Optimum	<120	<80
Average normal	120-129	80-84
High normal	130-139	85-89
Mild (grade 1)	140-159	90-99
Moderate (grade 2)	160-179	100-109
Severe (grade 3)	≥180	≥110
Isolated systolic hypertension	≥150	≤90

Types of hypertension: Depending upon the etiology two types of hypertension existnamely primary hypertension or essential hypertension and secondary hypertension.

Primary hypertension: Primary hypertension is generally considered when the cause for incidence cannot be identified. 90-95% of adult cases of hypertension are primary or essential hypertension. It mostly affects teenagers and young adults.It is typically diagnosed with stage

1 (mild) hypertension and is linked to a positive family history of the condition.

Secondary hypertension: 2-10% of hypertension cases in adults are of secondary hypertension. Children with stage II hypertension, those who are extremely young and whose clinical characteristics point to systemic disorders linked to hypertension should all be evaluated for secondary hypertension (Anyagbu, 2014).

Pathophysiology of hypertension

Objectives

1. Recognize the hemodynamic factors that contribute to systemic hypertension.
2. Identify both primary and secondary hypertension.
3. Recognize the kidney's involvement in systemic hypertension, innocent bystander or provocateur.
4. Understand the part that aldosterone, the sympathetic nervous system and angiotensin II play in the etiology of hypertension.

Chronic high blood pressure or hypertension damages end organs over time and raises morbidity and death rates (Hemmelgarn, 2006). Systemic vascular resistance and cardiac output combine to form blood pressure. Elevated alpha-adrenoceptor activation or increased production of peptides like angiotensin II or endothelins can cause an increase in vascular tone. Vasoconstriction is the end results of an increase in cytosolic calcium in vascular smooth muscle. Several growth hormones such as endothelins and angiotensin induce the aorta to stiffen because of an increase in vascular smooth muscle mass known as vascular remodelling with aging. When the pulse pressure is raised by elastic arteries. Controlling blood pressure is mostly dependent on the autonomic nervous system. Increased peripheral norepinephrine sensitivity and release are both observed in hypertension individuals. Furthermore, there's heightened reactivity to stressful stimuli. Reduced baroreceptor sensitivity and a resetting of the baroreflexes are two further characteristics of arterial hypertension. The renin-angiotensin system is inhibited when primary hyperaldosteronism is present and is implicated in certain types of hypertension such as renovascular hypertension. Patients who are elderly or black typically have low renin elevated blood pressure (Hemmelgarn *et al.*, 2005).

Symptoms of hypertension: The symptoms that were most frequently mentioned are:

- Headaches
- Lightheadedness
- Hot flashes
- Diarrhea
- Mood problems reduced vision
- Backache
- Palpitations
- Constipation
- Heaviness in the chest were among the other responses (Bulpitt, 1979).

Extra dosages of one patient's medication were being used to relieve her excruciating headaches. Due to their perception of the treatment's ineffectiveness, many patients assumed that lowering their blood pressure would make them feel better, which could lead to poor compliance.

Risk factors for hypertension:

- Globally, hypertension is a risk factor for the burden and mortality of cardiovascular disease (WHO, 2011).
- It's an illness linked to unhealthy lifestyles choices such as smoking, eating poorly, being overweight or obese and drinking alcohol, not exercising and leading a sedentary lifestyles. Changes in lifestyle and risky health behaviours are

also significantly influenced by an individual's assessment of their hypertension (Kusuma, 2009).

Epidemiology: Approximately one billion people worldwide and roughly 45% of all adults-struggle with hypertension. The prevalence is high across all socioeconomic and income levels, rises with age, and affects as many as 60% of people over 60 (NCD, 2015).

Diagnosis of hypertension

- The healthcare provider evaluates the patient and enquires about symptoms in order to diagnose high blood pressure.
- Blood pressure readings are taken using a sphygmomanometer. A cuff is tied on left arm and pressure is applied. The blood pressure reading is varied based upon the fitness of cuff. If the blood pressure is too high or too low, the readings may vary. The cuff is inflated using a device or a small hand pump⁽¹⁰⁾.

Tests for evaluating hypertension

Ambulatory observation: Blood pressure monitoring (BPM) for six or twenty-four hours at regular intervals by using an extended blood pressure monitoring test. The readings of blood pressure should be done regularly in proper manner by physicians or health care supervisor (Appel, 1993).

Laboratory examinations: Tests are performed on blood and urine to look for illness that may aggravate or cause high blood pressure. For instance, monitoring of blood sugar level and cholesterol level. Additionally, laboratory testing to assess thyroid, liver, renal function may be required. The laboratory investigations can preliminarily help in screening out hypertension.

Electrocardiogram: An electrocardiogram is a non-invasive test used to record the electrical activity of heart. The instrument contains sticky patches called Electrodes are placed on the chest and sometimes on the arms or legs. An ECG records electrical impulses that coordinate with heart. ECG gives a clean index of disorders in heart. It is a preliminary diagnostic laboratory test used to investigate the abnormal functioning of heart (Bird, 2020).

Treatment of hypertension: Pharmacological and non-pharmacological methods are used to treat hypertension. The choice of treatment is based on the presence or absence of pre-existing CKD, DM, and CV.

Non-pharmacological Treatment: The non-pharmacologic ways to treat hypertensions are.

Dietary Salt Restriction: Dietary salt intake is restricted to less than 1500 mg daily (Bossone, 2002). Reduced dietary salt has been shown to be beneficial for general hypertension patients, with reductions of 2 to 6 mmHg in diastolic blood pressure and 5 to 10 mm Hg in systolic blood pressure (Aburto, 2013).

Weight Loss: Losing weight can help lower blood pressure and cut down the number of medications prescribed, especially for patients who are overweight or obese. Research on long-term weight loss has shown that a 10 kg weight loss is linked to an average 6 mmHg systolic and 4.6 mmHg diastolic blood pressure drop (He, 2013).

Physical Activity: An average of 4 mmHg was lost in systolic blood pressure and 3 mmHg in diastolic blood pressure after regular aerobic activity (Neter, 2003). Hence, it is advised that the patient engage in 90-150 minutes of aerobic or resistance training per week. So, exercise is recommended for all hypertension patients (Cornelissen and Smart, 2013).

Moderate alcohol intake: Every patient with hypertension is encouraged to consume alcohol in moderation; for example, <2 drinks for men and <1 drink for women per day will lower systolic and diastolic blood pressure by 3 to 8mmHg and 1 to 4 mmHg, respectively (Carlson, 2014).

High fibres and low fat diet: Consuming a diet heavy in fruits and vegetables, low in saturated fat and high in potassium, magnesium, and calcium is part of the Dietary Approach to Preventing Hypertension (DAPH). Decreased the patient's hypertension-related systolic blood pressure by 11.4 mmHg and diastolic blood pressure by 5.5 mmHg (Xin, 2001)

Pharmacological treatment: It gets harder to maintain blood pressure at the desired level with lifestyle changes alone as it rises, necessitating antihypertensive medication treatment. The drugs used in treatment of hypertension are:

Diuretics

- **Thiazides:** Hydrochlorothiazide, Chlorthalidone, Indapamide
- **High ceiling:** Furosemide
- **K⁺ sparing:** Spironolactone, Amiloride

ACE inhibitors: Captopril, Enalapril, Lisinopril, Perindopril, Ramipril, Fosinopril

Angiotensin (AT₁ receptor) blockers: Losartan, Candesartan, Irbesartan, Valsartan, Telmisartan.

Direct renin inhibitor: Aliskiren

Calcium channel blockers: Verapamil, Diltiazem, Nifedipine, Felodipine, Amlodipine, Nitrendipine, Lacidipine

Beta-Adrenergic blockers: Propranolol, Metoprolol, Atenolol

Beta+alpha adrenergic blockers: Labetalol, Carvedilol

Alpha adrenergic blockers: Prazosin, Terazosin, Doxazosin, Phentolamine, Phenoxybenzamine

Central sympatholytics: Clonidine, Methyldopa

Vasodilators:

- **Arteriolar:** Hydralazine, Minoxidil, Diazoxide
- **Arteriolar+venous:** Sodium nitroprusside

These are the prescribed drugs for treatment of hypertension. For better therapy combination of drugs is used in treatment. The therapy changes from patient to patient taking into consideration of their blood pressure, physical and mental health of the patient (Xin, 2001; Whelton, 1997; Kostis et al., 2005; Buhler et al., 2005; Steptoe et al., 2004; Sica, 2005 and Seventh Report of the Joint National Committee on Prevention, 2003).

CONCLUSION

To create effective prevention and control programs, it is critical to collect information on hypertension. Awareness is important, as the condition is becoming a significant public health concern in many developing nations. Optimizing the effectiveness of these programs is especially crucial in these nations to reduce the amount of time it takes to achieve successful hypertension control.

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