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Clinical Profile of Hypertensive Patients in Tertiary Care Hospital in Ahilyanagar

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Abstract: Hypertension, commonly known as high blood pressure, is a prevalent cardiovascular condition characterized by elevated force of blood against arterial walls. It is classified into two main types: primary (essential) hypertension, which develops gradually over time without a clear cause, and secondary hypertension, which results from underlying conditions such as kidney disease, hormonal disorders, or certain medications. The condition is often termed the "silent killer" because it typically presents no symptoms until significant damage has occurred.

The primary risk factors for hypertension include genetic predisposition, age, obesity, sedentary lifestyle, high salt intake, excessive alcohol consumption, and chronic stress. If left unmanaged, hypertension can lead to severe complications such as heart disease, stroke, kidney failure, and cognitive decline. Recent studies have highlighted a significant link between intensive blood pressure control and a reduced risk of dementia, emphasizing the broader implications of hypertension on overall health.

Diagnosis is typically made through regular blood pressure measurements, with readings consistently at or above 130/80 mm Hg indicating hypertension. Management strategies encompass lifestyle modifications—including adherence to the DASH (Dietary Approaches to Stop Hypertension) diet, regular physical activity, weight management, and stress reduction—as well as pharmacological interventions tailored to individual patient needs. Early detection and proactive management are crucial in mitigating the long-term health risks associated with hypertension.

Keywords: hypertension

I. INTRODUCTION

Hypertension:

Hypertension, also known as high blood pressure, is a long-term medical condition in which the blood pressure in the arteries is persistently elevated. Millions of individuals worldwide impacted by this pervasive health issue, which is known as "Silent killer." The force that blood exerts as it passes through artery walls is known as blood pressure. Systolic pressure or diastolic pressure are the two values that make up this measurement, which is expressed in millimeters of mercury (mm Hg). BP is commonly expressed as the ratio of the systolic BP and the diastolic BP. **Systolic BP:** Systolic blood pressure is the pressure in arteries when heart beats.

Diastolic BP: diastolic blood pressure is the pressure when heart rests between beats.

Usually, signs of high blood pressure do not appear on their own. However, it is a significant risk factor for peripheral arterial disease, heart failure, atrial fibrillation, stroke, dementia, chronic renal disease, and vision loss. Over a billion people worldwide more than one in four men and one in five women have hypertension, making it a leading cause of premature death. Two-thirds of instances of hypertension are found in low- and middle-income nations, where the burden is disproportionately felt. This is mostly because of a rise in risk factors in those populations in recent decades.

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The overall prevalence of hypertension in adults in the United States was 31.9% under the old criteria (blood pressure, 140/90 mmHg) and 45.6% under the 2017 ACC/AHA guideline definition (BP 130/80 mmHg). Similarly, among those getting treatment with a target of less than 140/90 mmHg, the rate of hypertension control was 61.0%, but only 46.6% with a target of less than 130/80 mmHg. Treatment with antihypertensive medications that lower both BP and associated target organ damage can significantly lower the increased risk brought on by BP rise.

Worldwide, hypertension is the leading modifiable and major risk factor for CV events and mortality in adult. Hypertension is present in 69% of adults with a first Myocardial Infraction, in 77% of adults with a first stroke, in 74% of adults with Heart Failure, and in 60% of older adults with Peripheral Artery Disease.

Current approaches to hypertension management emphasize a multifaceted stratergy, including lifestyle modifications, pharmacological interventions, and personalized treatment plans tailored to individual patient needs. Digital health solutions, telemedicine and shared decision-making between healthcare providers and patient are increasingly integrated into hypertension care, aiming to improve access, adherence, and outcomes.

Stages of Hypertension:

BLOOD PRESSURE CATEGORY	SYSTOLIC (mm Hg)	DIASTOLIC (mm Hg)
Healthy	less than 120	and less than 80
Elevated	120–129	and less than 80
Stage 1 hypertension	130–139	or 80–89
Stage 2 hypertension	140 or higher	or 90 or higher
Hypertension crisis	over 180	or over 120

Blood Pressure Ranges

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Types of Hypertension:

There are two main types of hypertension: primary hypertension and secondary hypertension.

Primary hypertension

The most common type of high blood pressure is primary hypertension, also known as essential hypertension. It typically has no identifiable cause but develops gradually over time due to a combination of factors like age, genetics, and lifestyle.

According to the American Heart Association, behaviors such as smoking, excessive alcohol consumption, poor diet, and lack of exercise can contribute to its development. Fortunately, making healthy lifestyle changes—such as improving diet, increasing physical activity, and reducing alcohol and tobacco use—can help lower blood pressure and reduce the risk of serious complications.

Secondary hypertension

Secondary hypertension refers to elevated blood pressure that can be attributed to a specific cause or underlying health issue. The American Academy of Family Physicians (AAFP) estimates that approximately 5–10% of hypertension cases are categorized as secondary hypertension.

This type is generally more prevalent among younger individuals. As many as 30% of individuals aged 18–40 with high blood pressure is believed to have secondary hypertension.

Etiology:

Hypertension may be

- Primary (no specific cause—85% of cases)
- Secondary (an identified cause)

The cause of primary hypertension is not well defined. It is typically caused by a confluence of factors. Common causes include:

- Poor dietary habits, especially a diet high in sodium
- Lack of physical activity
- Excessive alcohol consumption.

Secondary hypertension has at least one distinct cause that healthcare providers can identify. Common causes of secondary hypertension include:

- Certain medications, including immunosuppressants, NSAIDs and oral contraceptives (the pill).
- Kidney disease.
- Obstructive sleep apnea.
- Primary aldosteronism (Conn's syndrome).
- Recreational drug use (amphetamines and cocaine).
- Renal vascular diseases, which are disorders that impact the flow of blood via the veins and arteries in your kidneys. One typical instance is renal artery stenosis.
- The use of tobacco, including vaping, smoking, and smokeless tobacco.
- Vascular abnormalities: aortic coarctation

Symptoms:

If your blood pressure is extremely high, there may be certain symptoms to look out for, including:

- Severe headaches
- Nosebleed
- Fatigue or confusion
- Vision problems
- Chest pain
- A hard time breathing

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- Irregular heartbeat
- Blood in the urine
- Pounding in your chest, neck, or ears
- Seizures Dizziness
- Nervousness
- Sweating
- Trouble sleeping
- Facial flushing
- Blood spots in eyes

Risk factors

High blood pressure has many risk factors, including:

• Underlying Health Condition:

Although the majority of hypertension cases are primary (multifaceted), secondary hypertension can be caused by or contribute to a number of underlying medical disorders. Hypertension can frequently be reversed by treating these diseases.

They include:

- elevated blood pressure
- overweight or obesity
- o diabetes
- o chronic kidney disease
- o pregnancy
- certain heart irregularities

• Age:

The risk of high blood pressure increases with age. Until about age 64, high blood pressure is more common in men. Women are more likely to develop high blood pressure after age 65.

Age range (years)	Prevalence of hypertension
18–39	22.4%
40–59	54.5%
60+	74.5%
All adults	45.4%

• Race.

High blood pressure tends to affect Black individuals more frequently and at an earlier age than white individuals.

• Family history.

Having a parent or sibling with high blood pressure increases your risk of developing the condition yourself.

• Obesity or being overweight.

Excess weight causes changes in the blood vessels, the kidneys and other parts of the body. These changes often increase blood pressure. Being overweight or having obesity also raises the risk of heart disease and its risk factors, such as high cholesterol.

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• Lack of exercise

A lack of regular exercise can lead to weight gain and elevate the risk of high blood pressure. People who are inactive also tend to have faster resting heart rates, which can put extra strain on the heart.

• Tobacco use or vaping.

Whether it's smoking, chewing tobacco, or vaping, these habits can cause a short-term spike in blood pressure. Over time, tobacco damages blood vessel walls and speeds up artery hardening. If you use tobacco, consider talking to a healthcare provider about ways to quit.

• Too much salt.

Consuming too much sodium can cause your body to hold onto extra fluid, which puts added pressure on blood vessels and raises blood pressure.

• Low potassium levels.

Potassium helps your body manage sodium levels and supports heart function. A potassium deficiency—caused by poor diet or health issues like dehydration—can disrupt this balance and affect blood pressure.

• Drinking too much alcohol.

Increased blood pressure, especially in men, has been associated with alcohol consumption.

• Stress.

brief rise in blood pressure might result from high amounts of stress. Stress-related behaviors like smoking, drinking alcohol, or eating more can raise blood pressure even more

- Certain chronic conditions. Kidney disease, diabetes and sleep apnea are some of the conditions that can lead to high blood pressure.
- Pregnancy. Sometimes pregnancy causes high blood pressure.

High blood pressure is most common in adults. But kids can have high blood pressure too. High blood pressure in children may be caused by problems with the kidneys or heart. But for a growing number of kids, high blood pressure is due to lifestyle habits such as an unhealthy diet and lack of exercise.

Pathophysiology:

A persistent increase in blood pressure, known as hypertension, raises morbidity and death and damages end organs over time. Vascular tone may be heightened due to increased α -adrenoceptor stimulation or increased production of peptides such endothelins or angiotensin. Blood pressure is the result of cardiac output and systemic vascular resistance. Vasoconstriction results from the last pathway, which is an increase in cytosolic calcium in vascular smooth muscle. A number of growth hormones, such as endothelin and angiotensin, raise pulse pressure because vascular remodeling, or the increase in vascular smooth muscle mass with aging, causes the aorta and elastic arteries to stiffen.

The autonomic nervous system plays an important role in the control of blood pressure. In hypertensive patients, both increased release of, and enhanced peripheral sensitivity to, norepinephrine can be found. Furthermore, there is heightened sensitivity to stressful stimuli. Reduced baroreceptor sensitivity and baroreflex resetting are further characteristics of arterial hypertension. The renin–angiotensin system is involved at least in some forms of hypertension (e.g. renovascular hypertension) and is suppressed in the presence of primary hyperaldosteronism. Elderly or black patients tend to have low-renin hypertension.

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Pathophysiology of Hypertension

Diagnosis:

High blood pressure (hypertension) is diagnosed if the blood pressure reading is equal to or greater than 130/80 millimeters of mercury (mm Hg). A diagnosis of high blood pressure is usually based on the average of two or more readings taken on separate occasions. Sphygmomanometer is used to measure B.P.

It take more than just a diagnosis of blood pressure to evaluate patient for hypertension. Along with identifying characteristics suggestive of secondary hypertension, it should also evaluate the risk of CVD, target organ damage, and concurrent clinical disorder that may impact blood pressure cause related target organ damage.



Tests:

• Ambulatory monitoring. To assess blood pressure at regular intervals over a period of six or twenty-four hours, a prolonged blood pressure monitoring test may be performed. This is called ambulatory blood pressure

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monitoring. However, not all medical facilities have access to the test's equipment. To find out if ambulatory blood pressure monitoring is a covered service, contact your insurance.

- Lab tests. Tests of the blood and urine are performed to look for diseases that can cause or exacerbate hypertension. For example, tests are performed to measure your blood sugar and cholesterol. Lab tests to assess thyroid, liver, and renal function may also be performed on you.
- **Cuff size**: The bladder size (six sizes are available) 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. If bladder is too small, spuriously high readings may result. The lower edge of the bladder should be withing 2.5 cm of the antecubital fossa.
- Manometer:

Mercury, aneroid or electronic devices used in measurement of blood pressure should be calibrated frequently and routinely against standards (typically every 6 months) to assure accuracy. Make sure the apparatus is clean, calibrated, loaded with non-leaking tubing, and has a cuff that fits correctly.

• ECG

The ECG may provide suggestive or supportive evidence of Hypertension can be indicated by the presence of right ventricular hypertrophy and strain, along with dilation of the right atrium. In patients with hypertension, right ventricular hypertrophy is seen on ECG in 87% of cases, while right axis deviation is observed in 79%. Nonetheless, the ECG's sensitivity (55%) and specificity (70%) are insufficient for it to serve as an effective screening tool for identifying significant hypertension. Additionally, a normal ECG does not rule out the possibility of severe pulmonary hypertension.

Treatment:

Less than 50% of individuals with hypertension have it managed effectively. But when the condition is detected early and treated properly, the outlook is good.

Sometimes high blood pressure can be treated solely through lifestyle changes, which are the first line of defense. In other cases, treatment requires both a healthy lifestyle and medications.

The treatment of hypertension consists of both nonpharmacological and pharmacological approaches.

Nonpharmacological Treatment:

Following are the nonpharmacologic way to treatment of hypertensions.

Dietary Salt Restriction

The restriction dietary sodium intake is below 1500 mg per day. Dietary salt reduction has been shown to benefit general hypertension patients, with a drop in systolic blood pressure of 5 to 10 mmHg and diastolic blood pressure of 2 to 6 mmHg.

Weight Loss

Weight loss has a clear benefit in term of reducing of blood pressure and also reduce the number of prescribed medicine so weight loss if the patient is over-weight or obese. Long term weight loss studies have indicated that 10 kg weight loss is associated with average reduction of systolic BP 6 mmHg and diastolic BP is 4.6 mmHg.

Physical Activity

Regular aerobic activity resulted in an average 4 mmHg drop in systolic blood pressure and a 3 mmHg drop in diastolic blood pressure. The patient is therefore advised to engage in resistance or aerobic exercise for 90 to 150 minutes per week. Therefore, it is recommended that all hypertensive patients exercise.

Moderate Alcohol Intake

All patient of hypertension advised for moderate of alcohol intake ≤ 2 drinks daily for men and ≤ 1 drink per day for woman will reduce systolic BP by 3 to 8

mmHg and diastolic BP by 1 to 4 mmHg.









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High Fiber and Low fat Diet

Consuming a diet high in fruits, vegetables, potassium, magnesium, and calcium, as well as a diet low in fat and saturated fat, is one way to prevent hypertension (DASH). decreased the hypertension patient's diastolic blood pressure by 5.5 mmHg and their systolic blood pressure by 11.4 mmHg. Consuming a lot of fruits and vegetables improves endothelial function in addition to lowering blood pressure.

Withdrawal of Interfering Medications

NSAIDs and other medications that may affect blood pressure control should be minimized or avoided when possible. If use is necessary, the lowest effective dose is recommended. Blood pressure should be monitored closely upon initiation, as antihypertensive therapy may require adjustment.

Pharmacological Treatment

Medication:

High blood pressure medications can be divided into the categories listed below, based on how they work. The drugs in each section are just a sampling of what's available.

Diuretics

Diuretics, often referred to as water pills, assist the kidneys in eliminating surplus water and salt. This leads to a decrease in the amount of blood that must flow through the blood vessels, ultimately lowering blood pressure. There are four major types of diuretics defined by how they work. They include:

- thiazide diuretics (chlorthalidone, Microzide, Diuril)
- potassium-sparing diuretics (amiloride, Aldactone, Dyrenium)
- loop diuretics (bumetanide, furosemide)
- combination diuretics, which include more than one variety used together

Thiazide diuretics tend to produce fewer side effects compared to the other types, especially when used in lower doses. If you are in the early stages of high blood pressure, it is advisable to use lower doses.

Beta-blockers

Beta blockers help the heart beat with less speed and force. The heart pumps less blood through the blood vessels with each beat, so blood pressure decreases. Some beta-blockers have extra effects that help relax blood vessels. Some examples of beta-blockers include:

- Atenolol
- Propranolol
- Metoprolol tartarate
- metoprolol succinate
- carvedilol

Alpha-beta-blockers

Alpha-beta-blockers have a combined effect. They belong to a category of beta-blockers that prevent catecholamine hormones from attaching to beta and alpha receptors.

Like alpha-1 blockers, they can lessen blood vessel constriction, and like beta-blockers, they can moderate the heartbeat's force and rate.

. Examples include:

- carvedilol
- labetalol hydrochloride

Angiotensin-converting enzyme (ACE) inhibitors

ACE inhibitors work by lowering the amount of a hormone called angiotensin II, which normally causes your blood vessels to tighten. With less of this hormone, your blood vessels can relax and open up, making it easier for blood to flow and helping to lower your blood pressure. Some ACE inhibitors include:

• benazepril hydrochloride

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- Captopril
- enalapril maleate
- Monopril
- lisinopril

Angiotensin II receptor blockers (ARBs)

ARBs, or angiotensin receptor blockers, help lower blood pressure by blocking a hormone that makes blood vessels tighten. Instead of letting the hormone do its job, these medications stop it from attaching to the blood vessels so the vessels stay relaxed and open, making it easier for blood to flow and lowering your blood pressure. Some examples include:

- candesartan
- eprosartan mesylate
- irbesartan
- Losartan potassium
 - telmisartan
 - valsartan

Calcium channel blocker

Calcium channel blocker limit calcium from entering the smooth muscle cells of the heart and blood vessels. This makes the heart beat less forcefully with each beat and helps blood vessels relax, lowering blood pressure. Examples of these medications include:

- Amlodipine besylate
- felodipine
- Diltiazem
- nicardipine
- verapamil hydrochloride

Alpha-1 blockers

When you're under stress, your body releases certain hormones—like adrenaline (also called epinephrine) and norepinephrine. These hormones make your heart beat faster and cause your blood vessels to tighten, which raises your blood pressure. Some of your blood vessels have what's called alpha-1 receptors. When those stress hormones attach to these receptors, the muscles around the vessels tighten, making the vessels narrower and increasing blood pressure. Alpha-1 blockers are medicines that stop those hormones from connecting to the receptors. This helps keep the blood vessels relaxed and open, so blood can flow more easily—and that helps bring your blood pressure down. Examples of these drugs include:

- Doxazosin mesylate
- prazosin hydrochloride
- terazosin hydrochloride

Alpha-2 receptor agonists (central agonists)

When an alpha-2 receptor is actuated, the generation of norepinephrine is blocked. This diminishes the sum of norepinephrine delivered. Less norepinephrine implies less narrowing of blood vessels and lower blood weight. Since alpha-2 receptor agonists can work within the brain and central anxious framework, they're too known as central agonists. This makes these solutions valuable for treating a huge run of wellbeing conditions past tall blood weight. Examples include:

- Methyldopa
- clonidine hydrochloride

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- guanabenz acetate
- Clonidine
- Tizanidine
- lofexidine

Vasodilators

Vasodilators relax the muscles in blood vessel walls, particularly those of arterioles, which are tiny arteries. Blood can pass through the blood vessels more readily as a result of their widening. This lowers blood pressure. Examples include:

- Hydralazine hydrochloride
- Minoxidil
- Nitroglycerin

Prevention:

Lifestyle changes:

A critical step in preventing and treating high blood pressure is a healthy lifestyle. You can lower your blood pressure with the following lifestyle changes:

• Eating a healthy diet.

To help manage your blood pressure, you should limit the amount of sodium (salt) that you eat and increase the amount of potassium in your diet. It is also important to eat foods that are lower in fat, as well as plenty of fruits, vegetables, and whole grains. The DASH eating plan is an example of an eating plan that can help you to lower your blood pressure.

Getting regular exercise.

Getting regular oxygen consuming work out (such as brisk strolling at slightest 30 minutes a day, a few days a week). Check out a yoga course. Look for out exercises that get your heart beating, like biking or swimming. Over the course of a week, point to work out reliably for at slightest 2 1/2 hours add up to.

Being a healthy weight.

Obesity or being overweight raises your risk of high blood pressure. You can lower your chance of developing additional health issues and manage high blood pressure by maintaining a healthy weight.

Limiting alcohol.

Excessive alcohol use can cause blood pressure to rise. Additionally, it adds calories, which could lead to weight gain.

Not smoking.

Smoking cigarettes increases blood pressure and increases the risk of heart attack and stroke. Don't start if you don't smoke. If you smoke, ask your physician for assistance in determining the most effective method for quitting.

Managing Stress.

Consider the stressful aspects of your life and make the necessary changes. Think about having frequent massages, studying meditation or anger management techniques, or speaking with a counselor.

Get enough sleep.

Getting enough sleep is important to your overall health. It also helps keep your heart and blood vessels healthy. Not getting enough sleep on a regular basis is linked to an increased risk of heart disease, high blood pressure, and stroke.

Reduce sodium intake.

Reducing the amount of sodium in diet to less than 1,500 milligrams a day if have high blood pressure; healthy adults should try to limit their sodium intake to no more than 2,300 milligrams a day (about 1 teaspoon of salt). Many processed foods have a lot of salt in them. For instance, soups, condiments, a tomato sauce can have as

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much as 75% of the total amount of salt you need each day. Read food labels carefully and don't sprinkle more on when cook or before eat.

Materials and Methods:

STUDY AREA:

The study was conducted in tertiary care hospitals (Apex hospital, heartbeat hospital, radiant life hospital) in A. Nagar district.

SOURCE OF DATA:

The source of data for a case report on hypertension typically comes from the medical records and clinical documentation of the patient treated at the hospital and hospital wards. Here's how the data for a hypertension case report can be sourced:

- Patient Medical Records: The primary source of data for a hypertension case report is the patient's medical records, which include details of the patient's medical history, physical examination findings, laboratory test results. Diagnostic imaging studies, medication history, and treatment interventions.
- Clinical Documentation: Clinical notes, progress reports, consultation notes, and discharge summaries documented by healthcare providers involved in the patient's care provide valuable information about the course of the patient's hypertension, associated comorbidities, treatment response, and outcomes.
- Diagnostic Tests and Results: Data from diagnostic tests such as blood pressure measurements, electrocardiography (ECG), echocardiography, ambulatory blood pressure monitoring (ABPM), laboratory tests (e.g. renal function tests, electrolyte levels), and imaging studies (e.g. renal ultrasound, echocardiography) contribute to the diagnostic evaluation and management of hypertension.
- Medication History: Information about the patient's current and previous medication regimen for hypertension, including drug names, dosages, frequencies, and durations of treatment, is obtained from medication reconciliation records and pharmacy records.
- Patient Interviews: Direct interviews with the patient or caregivers may provide additional insights into the patient's symptoms, lifestyle factors, medication adherence, and response to treatment.
- Follow-up Data: Longitudinal data collected during follow-up visits, including blood pressure measurements, medication adjustments, adverse events, and clinical outcomes (e.g. cardiovascular events, hospitalizations). Contribute to assessing the effectiveness and safety of hypertension management stratergies.
- Ethical Considerations: It's essential to ensure patient confidentiality and adhere to ethical standards when accessing and using patient data for case report purposes. Data should be de-identified or anonymized to protect patient privacy and comply with regulatory requirements.

METHODS OF DATA ENTRY:

The method of data entry for hypertension typically involves capturing CASE CLERKING PROFILE form the coding frame generated captured the followings: record date, case identification number, name of patients, age, sex, locality and the name of pathologist, Here's a step-by-step guide to the data entry process:

Chief Complaint: Document the patient's primary reasons for the visit, such as symptoms related to hypertension (e.g., headaches, dizziness, chest pain. shortness of breath, palpitations) or concerns about elevated blood pressure.

History of Present Illness (HPT): Record the onset, duration, severity, and progression of hypertension-related symptoms. Document any precipitating or exacerbating factors, associated symptoms, and patterns of blood pressure fluctuations. Include details about recent changes in medication regimen, lifestyle factors, or other events impacting blood pressure control.

Past Medical History: Gather information about the patient's medical history including previous diagnoses, treatments, and outcomes. Document any history of hypertension, cardiovascular disease, diabetes mellitus, renal disease, or other chronic conditions. Record details about previous treatments for hypertension, including medications, lifestyle modifications, and interventions.

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Past Medication History: Document the patient's past and current medication regimen, including prescription medications, over-the-counter drugs, supplements, and herbal remedies Record details about medication names. dosages, frequencies, routes of administration, and durations of treatment.

Family History: Record information about the patient's family history of hypertension, cardiovascular disease, diabetes mellitus, renal disease, or other hereditary conditions. Document details about affected relatives, their relationship to the patient, and their age of onset of relevant conditions.

Social History: Gather information about the patient's lifestyle habits and environmental factors that may impact hypertension. Record details about tobacco use, alcohol consumption, dietary habits, physical activity level. occupation, and psychosocial stressors.

Physical Examination: Document findings from the physical examination relevant to hypertension assessment, including blood pressure measurements, heart rate, respiratory rate, and general appearance.

Laboratory Tests: Record results from laboratory tests used to evaluate hypertension and its complications, including blood tests (e.g., renal function tests, electrolyte levels, lipid profile, glucose), urine analysis, and imaging studies (e.g., echocardiography, renal ultrasound).

Other Diseases: Document any coexisting medical conditions or diseases that may impact hypertension management, such as obesity, obstructive sleep apnea, hyperthyroidism, or chronic kidney disease, diabetes mellitus.

Final Diagnosis: Summarize the patient's diagnosis based on the comprehensive assessment of their medical history, physical examination findings, laboratory test results, and diagnostic imaging studies.

Day-wise Assessment: Record the patient's progress and response to treatment on a day-by-day basis during hospitalization or outpatient visits. Document changes in symptoms, blood pressure measurements, medication adjustments, and any complications or adverse events encountered.

Discharge Medication: Specify the medications prescribed at discharge for hypertension management and any other relevant conditions. Include details about medication names, dosages, frequencies, routes of administration, and instructions for use.

SOAP Analysis: Perform a SOAP (Subjective, Objective, Assessment, Plan) analysis of the patient's hypertension management. Document subjective data (e.g. symptoms reported by the patient), objective data (e.g. physical examination findings, laboratory results), assessment (e.g. diagnosis, treatment response), and plan (e.g., treatment interventions, follow-up care).

Problems with Drug Therapy: Identify and document any problems or challenges encountered with the patient's drug therapy for hypertension. This may include medication side effects, drug interactions, non-adherence to treatment, or inadequate response to therapy.

II. DISCUSSION

CASE 1. A 42 Year Male Patient admitted with complaint of the acc. Hypertension, pressure on chest, sweating, uneasiness, dysponea. Hence admitted in Radiant life hospital A. Nagar for further management. On admission patient, c/o, PR-88/min, BP-180/100 mmhg, SPO₂-97, RR- 20/min, CVS- S_1S_2 +. Patient managed with inj. Nitroplus, inj. Monocef, inj. Pan 40, inj. Emset, tab. Sorbitrate, inj. Eldervit, inj. Thiamine, tab. Ecosprin 150 mg, tab. Clopitab 75 mg, tab. Atorva 40. Patient responded well to given treatment. Patient has no complications and patient has symptomatically much better, hence advising discharge. On discharge, the patient has no symptoms and is hemodynamically stable.

CASE 2. A 65 Year Female Patient admitted with complaint of the acc. Hypertension, anxiety, UL severe pain, chest pain. Hence admitted in Apex hospital A. Nagar for further management. On admission patient, c/o, PR-80/min, BP-140/80 mmhg, SPO₂-98, RR- 21/min, CVS- S_1S_2 +. Patient managed with inj. dynapar, inj. Monocef, inj. Pan 40, inj. Emset, tab. Pregalin, tab. Zerodol, tab. Vertin, tab. Korandil, tab. Defort, inj. Nitroglycerin, tab. Etizola, syp. orofer XT Patient responded well to given treatment. Patient has no complications and patient has symptomatically much better, hence advising discharge. On discharge, the patient has no symptoms and is hemodynamically stable.

CASE 3. A 40 Year male Patient admitted with complaint of the acc. Hypertension, giddiness, chest discomfort, breathlessness. Hence admitted in Heartbeat hospital A. Nagar for further management. On admission patient, c/o, PR-121/min, BP-200/100 mmhg, SPO₂-98, RR- 20/min, CVS- S_1S_2 +. Patient managed with tab. Amlovas, inj. Pan 40, inj.

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Emset, tab. temson trio, tab. Nicardia, tab. Nebivolol, tab. Torsemide, inj. Meropenem. Patient responded well to given treatment. Patient has no complications and patient has symptomatically much better, hence advising discharge. On discharge, the patient has no symptoms and is hemodynamically stable.

CASE 4. A 50 Year male Patient admitted with complaint of the acc. Hypertension, pressure on chest, sweating, anxiety. Hence admitted in Radiant life hospital A. Nagar for further management. On admission patient, c/o, PR-87/min, BP-180/100 mmhg, SPO₂-98, RR-20/min, CVS- S_1S_2 +. Patient managed with inj. Pan 40, inj. Emset, inj. Nitroplus, inj. monocef, tab. Sorbitrate, inj. Thiamine, tab. Ecosprin 150 mg, tab. Clopitab 75 mg, inj. Eldervit, tab. Atorva 40. Patient responded well to given treatment. Patient has no complications and patient has symptomatically much better, hence advising discharge. On discharge, the patient has no symptoms and is hemodynamically stable.

CASE 5. A 80 Year Female Patient admitted with complaint of the acc. Hypertension, pressure on chest, general weakness. Hence admitted in Apex hospital A. Nagar for further management. On admission patient, c/o, PR-87/min, BP-200/90 mmhg, SPO₂-97, RR- 24/min, CVS- S_1S_2 +. Patient managed with inj. Pan 40, inj. Emset, inj. Lobet, tab. Prazopress XT, tab. Crocin. Patient responded well to given treatment. Patient has no complications and patient has symptomatically much better, hence advising discharge. On discharge, the patient has no symptoms and is hemodynamically stable.

CASE 6. A 55 Year Female Patient admitted with complaint of the acc. Hypertension, irrelevant talk, irritable, fever and cold. Hence admitted in Apex hospital A. Nagar for further management. On admission patient, c/o, PR-126/min, BP-199/85 mmhg, SPO₂-96, RR- 20/min, CVS- S_1S_2 +. Patient managed with inj. Pan 40, inj. Emset, inj. Monocef, tab. Acivir, inj. Eldervit, tab. Ecosprin, tab. Amlo AT, tab. Provit, inj. Levocet-m. Patient responded well to given treatment. Patient has no complications and patient has symptomatically much better, hence advising discharge. On discharge, the patient has no symptoms and is hemodynamically stable.

CASE 7. A 70 Year male Patient admitted with complaint of the acc. Hypertension, breathlessness, cerebral vascular accident. Hence admitted in Apex hospital A. Nagar for further management. On admission patient, c/o, PR-84/min, BP-185/80 mmhg, SPO₂-98, RR- 20/min, CVS- S_1S_2 +. Patient managed with inj. Emset, inj. Clavam, inj. Hydrocort, tab. Atorec, inj. Rantac, tab. Ecosprin, inj. Dexa, neb. D+B, syp. Tus Q- Dx Patient responded well to given treatment. Patient has no complications and patient has symptomatically much better, hence advising discharge. On discharge, the patient has no symptoms and is hemodynamically stable.

CASE 8. A 65 Year Female Patient admitted with complaint of the acc. Hypertension, breathlessness, pedal edema, weakness, decrease oral intake. Hence admitted in Apex hospital A. Nagar for further management. On admission patient, c/o, PR-78/min, BP-170/80 mmhg, SPO₂-98, RR- 20/min, CVS- S_1S_2 +. Patient managed with inj. Pan 40, inj. Emset, inj. Monocef, tab. prazopress XL, cap. Ecosprin gold 20, inj. Dytor, syp. Duphalac, tab. Cartel m. Patient responded well to given treatment. Patient has no complications and patient has symptomatically much better, hence advising discharge. On discharge, the patient has no symptoms and is hemodynamically stable.

CASE 9. A 55 Year male Patient admitted with complaint of the acc. Hypertension, breathlessness, severe headache, chronic kidney disease. Hence admitted in Apex hospital A. Nagar for further management. On admission patient, c/o, PR-78/min, BP-180/80 mmhg, SPO₂-97, RR- 18/min, CVS- S₁S₂+. Patient managed with inj. Pan 40, inj. Emset, inj. Xone, tab. Prazopress XL, tab. Napra D, inj. Aminophylline. Patient responded well to given treatment. Patient has no complications and patient has symptomatically much better, hence advising discharge. On discharge, the patient has no symptoms and is hemodynamically stable.

CASE 10. A 50 Year male Patient admitted with complaint of the acc. Hypertension, headache, giddiness. Hence admitted in Apex hospital A. Nagar for further management. On admission patient, c/o, PR-87/min, BP-190/130 mmhg, SPO₂-97, RR- 20/min, CVS- S_1S_2 +. Patient managed with inj. Pan 40, inj. Emset, inj. Lobet, tab. Telma Amh, tab. Vertin 16 mg, tab. Pan 40, tab. Calpol, tab. Prazopress XL. Patient responded well to given treatment. Patient has no complications and patient has symptomatically much better, hence advising discharge. On discharge, the patient has no symptoms and is hemodynamically stable.

CASE 11. A 75 Year Female Patient admitted with complaint of the acc. Hypertension, dry cough, chest pain, weakness, nausea. Hence admitted in Radiant life hospital A. Nagar for further management. On admission patient, c/o, PR-76/min, BP-220/110 mmhg, SPO₂-98, RR- 22/min, CVS- S₁S₂+. Patient managed with inj. Pan 40, inj. Emset, inj.

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Monocef, syp. Tus Q, inj. Vitcofol, tab. Nicardia, tab. Temson 40, inj. Eldervit, inj. Xone, inj. Nitroplus, tab. Niftran. Patient responded well to given treatment. Patient has no complications and patient has symptomatically much better, hence advising discharge. On discharge, the patient has no symptoms and is hemodynamically stable.

CASE 12. A 48 Year Female Patient admitted with complaint of the acc. Hypertension, cough, bipedal edema. Hence admitted in Apex hospital A. Nagar for further management. On admission patient, c/o, PR-90/min, BP-190/100 mmhg, SPO₂-97, RR- 20/min, CVS- S_1S_2 +. Patient managed with inj. Pan 40, inj. Emset, inj. Monocef, inj. Lasix, inj. Xone, tab. Sorbitrate, inj. lobet. Patient responded well to given treatment. Patient has no complications and patient has symptomatically much better, hence advising discharge. On discharge, the patient has no symptoms and is hemodynamically stable.

CASE 13. A 56 Year Female Patient admitted with complaint of the acc. Hypertension, sweating, slurred speech, left sided facial deviation. Hence admitted in Apex hospital A. Nagar for further management. On admission patient, c/o, PR-78/min, BP-180/120 mmhg, SPO₂-97, RR- 20/min, CVS- S_1S_2 +. Patient managed with inj. Pan 40, inj. Emset, inj. Xone, inj. Lobet, inj. Clexone, tab. Clopitab, tab. Stamlo, tab. Ecosprin, tab. Atorec 40. Patient responded well to given treatment. Patient has no complications and patient has symptomatically much better, hence advising discharge. On discharge, the patient has no symptoms and is hemodynamically stable.

CASE 14. A 52 Year male Patient admitted with complaint of the acc. Hypertension, backache, leg pain tingling sensation, giddiness, facial puffiness, fever. Hence admitted in Apex hospital A. Nagar for further management. On admission patient, c/o, PR-95/min, BP-220/90 mmhg, SPO₂-95, RR- 24/min, CVS- S_1S_2 +. Patient managed with inj. Pan 40, inj. Emset, inj. Monocef, tab. Acivir, inj. Eldervit, tab. Sobosis forte, inj. Meropenem, inj. Perphalgen, inj. Vintor, inj. PCM, tab. Nicardia, inj. Zostum, tab. Ultracet, tab. Cornirite, inj. Myoril. Patient responded well to given treatment. Patient has no complications and patient has symptomatically much better, hence advising discharge. On discharge, the patient has no symptoms and is hemodynamically stable.

CASE 15. A 50 Year male Patient admitted with complaint of the acc. Hypertension, slurred speech, nausea, drowsiness, shortness of breath. Hence admitted in Apex hospital A. Nagar for further management. On admission patient, c/o, PR-50/min, BP-200/90 mmhg, SPO₂-98, RR- 22/min, CVS- S_1S_2 +. Patient managed with inj. Pan 40, inj. Emset, inj. Lobet, tab. Ecosprin, tab. Atorec, inj. Clexane, inj. Xone, tab. Clopitab, tab. Stamlo 5, tab. Telma Amt. Patient responded well to given treatment. Patient has no complications and patient has symptomatically much better, hence advising discharge. On discharge, the patient has no symptoms and is hemodynamically stable.

CASE 16. A 67 Year Female Patient admitted with complaint of the acc. Hypertension, pressure on chest, general weakness. Hence admitted in Heartbeat hospital A. Nagar for further management. On admission patient, c/o, PR-68/min, BP-220/90 mmhg, SPO₂-98, RR- 24/min, CVS- S_1S_2 +. Patient managed with inj. Pan 40, inj. Emset, inj. Lobet, tab. Prazopress XL. Patient responded well to given treatment. Patient has no complications and patient has symptomatically much better, hence advising discharge. On discharge, the patient has no symptoms and is hemodynamically stable.

CASE 17. A 50 Year male Patient admitted with complaint of the acc. Hypertension, nasal bleeding, headache, general weakness, chest pain. Hence admitted in Apex hospital A. Nagar for further management. On admission patient, c/o, PR-93/min, BP-198/83 mmhg, SPO₂-95, RR- 24/min, CVS- S₁S₂+. Patient managed with inj. Pan 40, inj. Emset, inj. Monocef, inj. Pause, inj. Sylate, tab. Sinarest, inj. Eldervit, inj. Clavum, tab. Nicardia, inj. Levoflox, tab. Pause 500. Patient responded well to given treatment. Patient has no complications and patient has symptomatically much better, hence advising discharge. On discharge, the patient has no symptoms and is hemodynamically stable.

CASE 18. A 52 Year male Patient admitted with complaint of the acc. Hypertension, severe headache, vision changes, chest pain, shortness of breath, dizziness. Hence admitted in Heartbeat hospital A. Nagar for further management. On admission patient, c/o, PR-95/min, BP-180/90 mmhg, SPO₂-95, RR- 24/min, CVS- S_1S_2 +. Patient managed with inj. Pan 40, inj. monocef, inj. Febrinil, inj. Epidosin, inj. Xone, inj. Lasix, tab. Napra D, tab. Ecosprin AV75, tab. Taxim o-200, inj. Emset. Patient responded well to given treatment. Patient has no complications and patient has symptomatically much better, hence advising discharge. On discharge, the patient has no symptoms and is hemodynamically stable.

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CASE 19. A 48 Year male Patient admitted with complaint of the acc. Hypertension, chest pain, fever and vomiting. Hence admitted in Apex hospital A. Nagar for further management. On admission patient, c/o, PR-92/min, BP-150/90 mmhg, SPO₂-97, RR- 20/min, CVS- S_1S_2 +. Patient managed with inj. Pan 40, inj. Emset, inj. Monocef, inj. Lasix, inj. Dynapar, inj. PCM, tab. Temson 40. Patient responded well to given treatment. Patient has no complications and patient has symptomatically much better, hence advising discharge. On discharge, the patient has no symptoms and is hemodynamically stable.

CASE 20. A 52 Year male Patient admitted with complaint of the acc. Hypertension, chest pain. Hence admitted in Apex hospital A. Nagar for further management. On admission patient, c/o, PR-78/min, BP-130/90 mmhg, SPO₂-95, RR- 20/min, CVS- S₁S₂+. Patient managed with inj. Pan 40, inj. Emset, inj. Monocef, inj. Dynapar, tab. Metrosartan CH tab. Ondero met. Tab. Zerodol SP, tab. Pan D. Patient responded well to given treatment. Patient has no complications and patient has symptomatically much better, hence advising discharge. On discharge, the patient has no symptoms and is hemodynamically stable.

III. CONCLUSION

Hypertension remains a significant global health challenge, often termed the "silent killer" due to its asymptomatic nature. Despite its prevalence, nearly half of adults with hypertension are unaware of their condition, underscoring the importance of regular blood pressure monitoring and public health initiatives to raise awareness. Recent studies have highlighted the broader implications of hypertension management, revealing a significant link between intensive blood pressure control and a reduced risk of dementia. This finding emphasizes the importance of comprehensive cardiovascular health management in preserving cognitive function, particularly in aging populations. In conclusion, hypertension is a preventable and manageable condition. Through early detection, lifestyle modifications, and appropriate medical interventions, individuals can significantly reduce their risk of severe complications, including heart disease, stroke, kidney failure, and cognitive decline. Collective efforts at the individual, community, and policy levels are essential to combat the global burden of hypertension and enhance public health outcomes.

REFERENCES

- [1]. Williams, B. Mancia, G., Spiering, W. et al. (2018). 2018 ESC/ESH Guidelines for the management of arterial hypertension: The Task Force for the management of arterial pertension of the European Society of Cardiology (ESC) and the European Society of Hypertension (ESH). European Heart Journal, 39(33), 3021-3104
- [2]. Whelton, P.K., Carey, R.M., Aronow, W.S. al. (2018).2017 ct ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: A Report of the American College of Cardiology/American Heart Association Task Force Clinical Practice Guidelines, Journal of the American College of Cardiology. 71(19), 127-248
- [3]. James Beckerman, MD, FACC. (2024, August 7). An overview of high blood pressure treatment. WebMD. https://www.webmd.com/hypertension-high-blood-pressure/hypertension-treatment-overview
- [4]. John P. Cunha, DO, FACOEP. (2022, May 12). 4 Stages of Hypertension (High Blood pressure): Symptoms, causes, treatment. eMedicineHealth. https://www.emedicinehealth.com/what are the stages of hypertension/article em.htm
- [5]. Webster, H. (2023, October 27). What types of hypertension are there? https://www.medicalnewstoday.com/articles/types-of-hypertension
- [6]. American College of Cardiology. New ACC/AHA High Blood Pressure Guidelines Lower Definition of Hypertension (https://www.acc.org/latest-in-cardiology/articles/2017/11/08/11/47/mon-5pm-bp-aha-2017).Accessed 5/1/2023.
- [7]. High blood pressure (hypertension) Symptoms & causes Mayo Clinic. (2024, February 29). Mayo Clinic. https://www.mayoclinic.org/diseases-conditions/high-blood-pressure/symptoms-causes/syc-20373410

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Volume 5, Issue 11, April 2025



- [8]. Seed, S. (2024, April 3). Symptoms of high blood pressure. WebMD. https://www.webmd.com/hypertension-high-blood-pressure/hypertension-symptoms-high-blood-pressure
- [9]. Rawat, S., Ashok, P. K., Papola, R., & Gyani Inder Singh Institute of Professional Studies. (2023). A REVIEW ARTICLE ON HYPERTENSION. In International Journal of Novel Research and Development (Vol. 8, Issue 9) [Journal-article]. https://www.ijnrd.org/papers/IJNRD2309090.pdf
- [10]. Edwards, J. M. (2022, December 9). *12* causes of high blood pressure (and how to prevent it). Healthline. https://www.healthline.com/health/high-blood-pressure-hypertension/causes-of-high-blood-pressure
- [11]. Weir, M. R. (2025, February 11). Hypertension. MSD Manual Professional Edition. https://www.msdmanuals.com/professional/cardiovascular-disorders/hypertension/hypertension
- [12]. Roger Scott Blumenthal, M.D., & Michael Joseph Blaha, M.D. M.P.H. (2023, October 25). High blood pressure: Prevention, treatment and research. Johns Hopkins Medicine. https://www.hopkinsmedicine.org/health/conditions-and-diseases/high-blood-pressure-hypertension/highblood-pressure-prevention-treatment-and-research
- [13]. High blood pressure medications: MedlinePlus Medical Encyclopedia. (n.d.). https://medlineplus.gov/ency/article/007484.htm
- [14]. James Beckerman, MD, FACC. (2024, August 7). An overview of high blood pressure treatment. WebMD. https://www.webmd.com/hypertension-high-blood-pressure/hypertension-treatment-overview
- [15]. Crowley, S.D., Gurley, S.B., Herrera, M.J., et al. (2006). Angiotensin II causes hypertension and cardiac hypertrophy through its receptors in the kidney. Proceedings of the National Academy of Sciences of the United States of America, 103(47), 17985-17990.
- [16]. The Healthline Editorial Team & Alana Biggers, M.D., MPH. (2024, June 6). Treatment options for high blood pressure (Hypertension). Healthline. https://www.healthline.com/health/high-blood-pressurehypertension-treatment
- [17]. Preventing high blood pressure. (2024, December 13). High Blood Pressure. https://www.cdc.gov/high-blood-pressure/prevention/index.html
- [18]. NCD Risk factor collaboration (NCD-Risc). (2017). Worldwide trends in blood pressure from 1975 to 2015: a pooled analysis of 1479 population-based measurement studies with 19-1 million participants. The lancet, 389(10064), 37-55.
- [19]. T. Anantha Lakshmi, M. Ramesh, B. Mounika, K. Bhuvaneswari, Sreekanth Nama & Priyadarshani Institute of Pharmaceutical education & research. (2013). Review on Hypertension. In International Journal of Current Trends in Pharmaceutical Research (Vol.1(2): 88-96). https://www.researchgate.net/publication/255964632.
- [20]. Goit, L.N. and Yang, S.N. (2019). Treatment of Hypertension: A Review. Yangtze Medicine, 3, 101-123. https://doi.org/10.4236/ym.2019.32011



