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SURVEY REPORT ON HYPERTENSION PATIENT

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ABSTRACT

Hypertension is a common chronic condition characterized by persistently elevated blood pressure and is a major contributor to global morbidity and mortality. Due to its asymptomatic nature, it often remains undetected until serious complications such as cardiovascular, renal, and neurological disorders develop. The present study was conducted to assess the prevalence, risk factors, associated comorbidities, and management practices of hypertension through a local population-based survey. A cross-sectional survey involving 250 individuals from specific area of Una and Nangal was carried out using a structured questionnaire. The data included a survey form where patient is asked for the demographic details, lifestyle habits, medical history, occupation and treatment adherence, where patient can be assessed with the specific reason of hypertension. The findings indicated that 170 out of 250 individuals (68%) were hypertensive. A significant number of patients also had comorbid conditions, particularly diabetes and cardiovascular disorders which indicates the highest rate of chronic disorders is on the peak and population has to aware to maintain the health care system. Lifestyle factors such as unhealthy diet, physical inactivity, smoking, alcohol consumption, and psychological stress were identified as major contributors to hypertension. The main objective of this survey is to focus on identifying the burden of the disease, their risk factors, the level of management of these diseases, evaluate prescribed treatment and analyze healthcare access. The study focused on the serious impact of diseases on health and aware people to add a valuable lifestyle to combat the problems and to low the risk over the age.

KEYWORDS: Hypertension; Blood pressure; RAAS; Risk factors; Comorbidities; Lifestyle factors; cardiovascular disease; Diabetes; Public health; Survey study.

1. **Survey Detail**

Survey Form

1. **Name of patient: -** _____
2. **Age: -** 20-30yr 30-40yr 40-50yr 50-60yr 60-70yr 80-90yr 90-100yr
3. **Gender:-**(Male/Female)
4. **Location: - (**a) Urban (b) Rural
5. **Education:** -(a) Blow 10 (b) 10th pass (c) 12th pass (d) Graduate (e) Post. graduate
6. **Occupation: - (**a) Business (b) Private job (c) Govt. job (d) No job
7. **Whether Hypertension: -**
8. **Genetic Reason:** -Yes No
9. **Lifestyle: -**

Smoking: - Yes No

Alcohol: - Yes No

Tobacco: - Yes No Physical Activity: -Yes No

10. **Medical history: -**_____

11.Whether: -		
Diabetes	Yes	No
Weight Gain	Yes	No
Obesity	Yes	No
Heart problem	Yes	No
Kidney problem	Yes	No
Stroke	Yes	No

12.Treatment Adherence: Strictly Ignored

Declaimer: The information proved by the patient is correct Patient Signature: -___

2. **Local survey on Hypertension**

- I have done local survey on Hypertension and its associated diseases. I have collected data of 250 patients from specific areas of Una (i.e. Kotla Kalan, Anjoli, Arniala, Haroli) and Nangal with different cases of HTN.
- Out of 250 patients,170 patients have HTN, with 38 patients withType-2 diabetes, which clearly indicates the patients are on high risk of morbidity.
- Data have revealed, majority of the cases are diabetes and heart blockages commonly associated with hypertension.

- Other side, few cases of Migraine, Stroke, Osteoarthritis, Arrhythmia, Depression etc. are also seen with HTN and need to resolve for future perspective.

3. Summary of collected data

Table 2 indicates the collective data of 250 patients where 68% cases is of only hypertension. Second leading case is of type-2 diabetes associated with hypertension with 15% out of 250 patients. Likewise; migraine, depression, cataract, cancer are also associated variably. It is also represented by the pie chart in fig. 1.

Table 1: Summary of collected data

Disease	Number of Patients	Percentage (%)
Hypertension	170	68
Type-2 Diabetes	38	15
Cardio Problems	Arrhythmia 3 Heart Blockage 6	3.6
Cancer	Malignant 2 Benign 4	2.4
Cataract	7	2.8
Depression	6	2.4
Migraine	4	1.6
Others	10	4

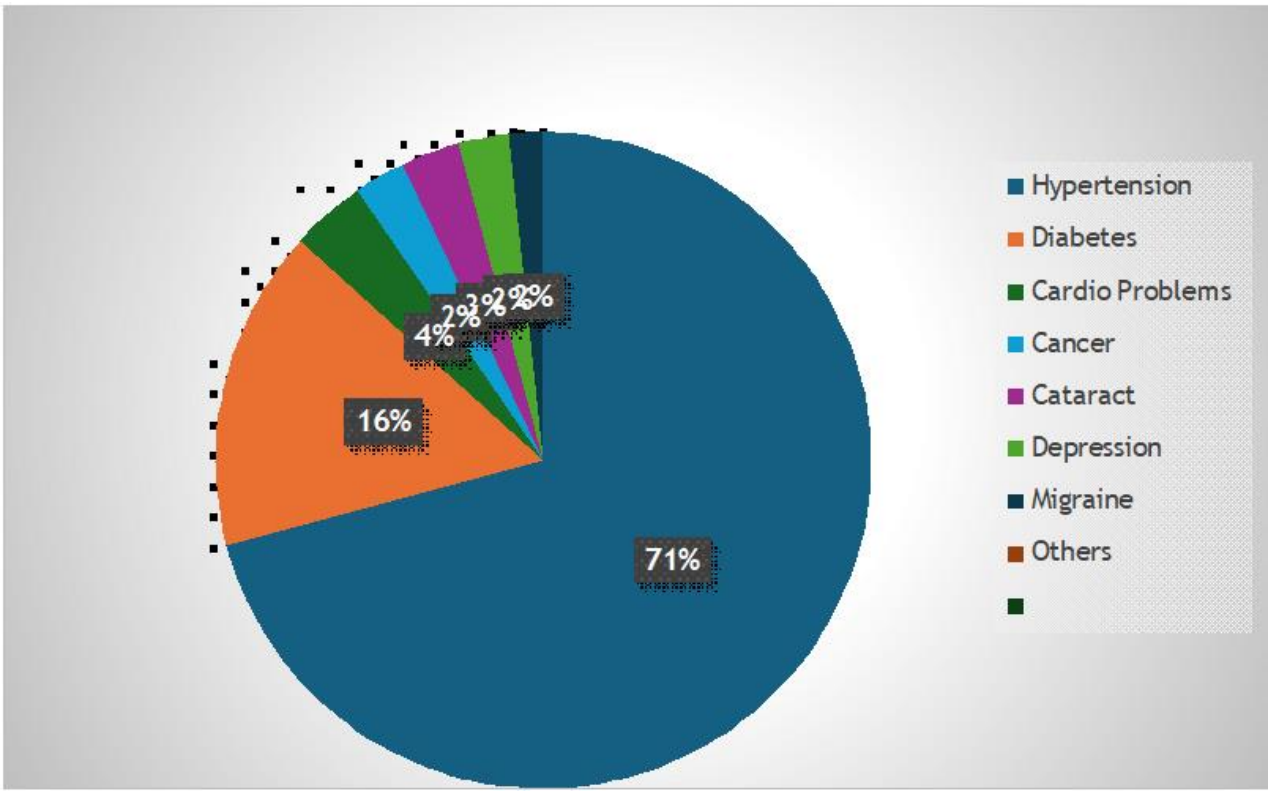


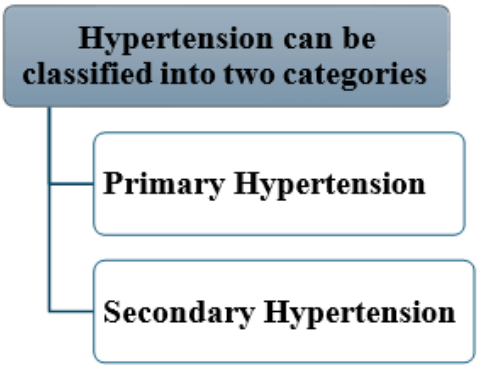
Fig. 1: Prevalent rate of hypertension of 250 patients.

5. INTRODUCTION

Hypertension, commonly referred to as high blood pressure, is a chronic, progressive, and largely asymptomatic medical condition characterized by a sustained elevation in arterial blood pressure. It is clinically defined as a persistent systolic blood pressure of ≥130 mmHg and/or a diastolic blood pressure of ≥80 mmHg. Over the past few decades, hypertension has emerged as one of the most significant global public health challenges due to its high prevalence, silent progression, and strong association with life-threatening complications such as cardiovascular disease, stroke, renal failure, and premature mortality.[1,2]

Blood pressure is influenced by multiple physiological mechanisms, including cardiac output, vascular resistance, blood volume, and neurohormonal regulation. Any imbalance in these systems can lead to persistent elevation of blood pressure. The pathophysiology of hypertension is complex and multifactorial, involving genetic, environmental, behavioral, and metabolic factors. Dysregulation of the renin–angiotensin–aldosterone system (RAAS), increased sympathetic nervous system activity, endothelial dysfunction, and vascular remodeling all play critical roles in the development and progression of hypertension.[3]

3.1 Classification of Hypertension:



1. Primary (Essential) Hypertension

Primary hypertension is the most common form, accounting for approximately 90–95% of all cases. It is characterized by a gradual increase in blood pressure over time without any identifiable specific cause. Instead, it results from a combination of genetic, environmental, and lifestyle factors that collectively influence blood pressure regulation.[4,5]

The development of primary hypertension is often associated with several well-established risk factors:

- Family history
- Advancing age
- Overweight and obesity
- High sodium intake
- Physical inactivity
- Excessive alcohol consumption
- Smoking
- Chronic stress

2. Secondary Hypertension: Secondary hypertension accounts for a smaller proportion of cases but is clinically significant because it has an identifiable and often treatable underlying cause. Unlike primary hypertension, it tends to develop suddenly and may result in more severe elevations in blood pressure. Common causes of secondary hypertension include:

- Kidney diseases (e.g., chronic kidney disease, glomerulonephritis)
- Endocrine disorders (e.g., hyperthyroidism, Cushing's syndrome, primary aldosteronism)
- Renal artery stenosis
- Obstructive sleep apnea
- Certain medications (e.g., oral contraceptives, corticosteroids, NSAIDs)
- Congenital abnormalities of blood vessels[6]

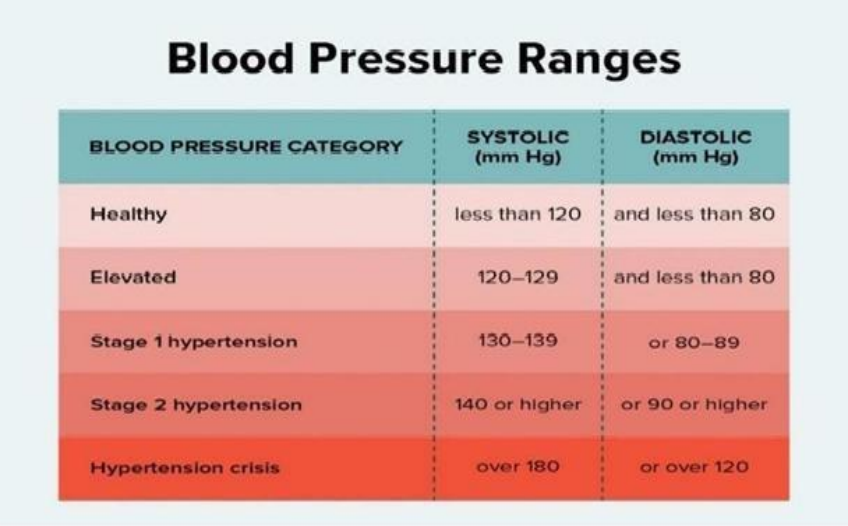


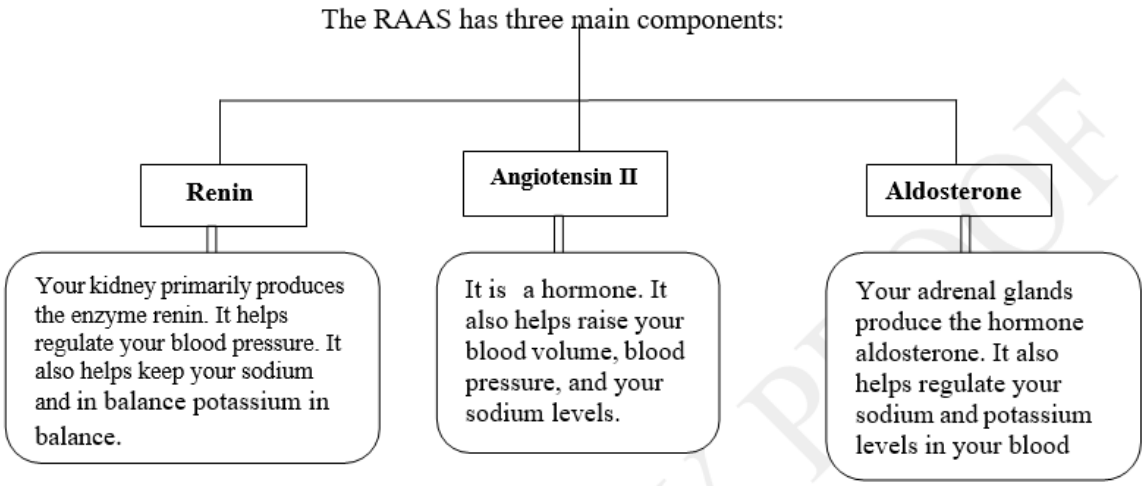
Fig. 2: Classification of Blood Pressure

3.2 RAAS Mechanism in Hypertension

RAAS Mechanism in Hypertension: The renin-angiotensin-aldosterone system (RAAS) is a complex of hormones, proteins, enzymes, and reactions that helps control your blood pressure

and blood volume. The RAAS helps control your blood pressure by raising:[6,7]

- Sodium(salt) reabsorption in your kidneys
- Water reabsorption (retention)
- Vascular tone (how much your blood (vessels constrict)



4. Hypertension Associated with Heart Disorder

Hypertension, or high blood pressure, is also known as a "silent killer" because it usually doesn't have any symptoms, but it also creates severe and long-term issues for your body.

When your blood pressure is always high, it's like too much water pressure in hose, which damages the walls of the arteries and makes your heart work much harder.[8]

Complications during hypertension:

Heart Problem: -A Heart problem is any condition that affects the structure or functioning of the heart. The heart is the organ that pumps blood throughout the body.[9]

Table 2: Serious consequences on Heart[10,11]

Sr. No	Issue name	Impact	Causes	Symptoms
1	Coronary Artery Disease	Narrowing or blockage of the arteries of heart	Fatty deposits in the arteries	Chest pain Heart Attack.
2	Heart Failure	The heart is not pumping blood well enough.	Fatigue, Swelling in legs, and Breathlessness	High pressure in the arteries
3	Arrhythmia	Rhythm of the heartbeat is abnormal	Heart may beat too fast, too slower irregularly	
4	Heart Valve Disease	The valve soft heart are not functioning well enough.	Blood is not flowing well through the heart	

Mechanism of Action: - Complex mechanisms of hypertensive heart disease (HHD). As HHD progresses, the level of cardiac fibrosis increases, while the heart has different macroscopic manifestations. Multiple factors, including neurohormones, metabolic remodeling, inflammation, and gut microbiota, among others, contribute to this progression. LVEF, left ventricular ejection fraction; NPR, natriuretic peptide receptors; RAAS, renin-angiotensin aldosterone system.[12,13]

5. Hypertension Associated with Brain Disorder

Hypertension-associated brain disorders comprise a range of neurological conditions that develop as a consequence of persistently elevated blood pressure. Chronic hypertension causes structural and functional damage to cerebral blood vessels, including narrowing, thickening, and loss of elasticity. These vascular changes lead to reduced cerebral blood flow and impaired delivery of oxygen and essential nutrients to brain tissue. Over time, this results in neuronal injury, disruption of normal brain function, and increased risk of serious complications such as stroke, vascular dementia, and cognitive decline. Additionally, prolonged hypertension can weaken blood vessel walls, making them more susceptible to rupture and hemorrhage, further contributing to brain damage.[14]

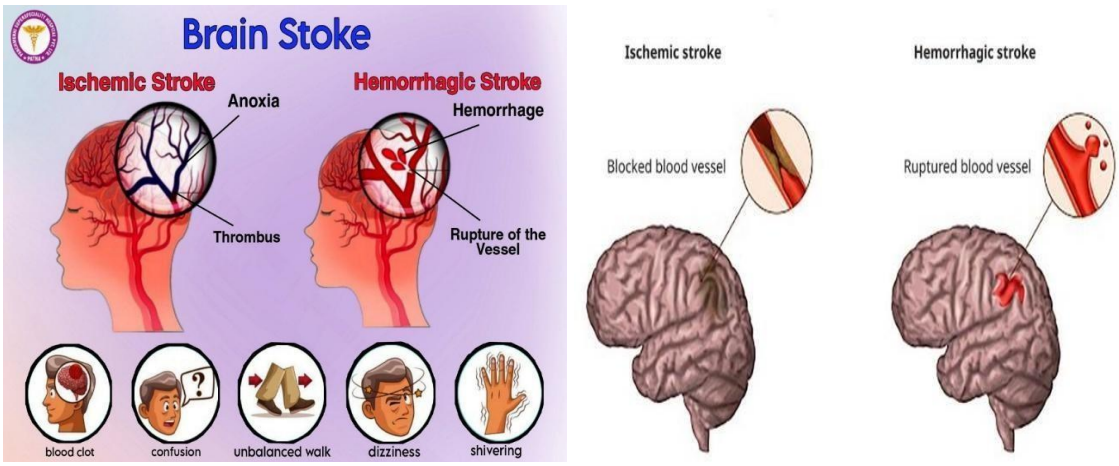


Fig. 3: Association of Brain Stoke with Hypertension

Mechanism of Action:

This is how hypertension (high blood pressure) can cause a stroke, as shown in the above diagram. Chronic high blood pressure results in an increase in shear stress on the walls of cerebral blood vessels.

This results in:

- Hypertrophy of the walls of the arterioles
- Arteriosclerosis
- Endothelial dysfunction[15]

Management and Prevention

1. Lifestyle Modifications:

- **Healthy Diet:** Salt consumption to be reduced(<5g/day). Fruits, vegetables, and whole grain foods to consumed.
- **Physical Activity**: At least 30min. of moderate intensity activity to be achieved daily (e.g., walking, cycling, swimming).
- **Weight Management:** Normal BMI to be maintained (18.5 to24.9 kg/m²).

  Even 5-10% weight loss can cause a significant reduction in BP.
- **Alcohol & Smoking Avoidance** Excessive consumption of alcohol can cause an increase in BP. Smoking can cause damage to vessels → accelerates stroke.
- **Stress Management** Relaxation techniques to be adopted (e.g., meditation, yoga, deep breathing). 7 to 8 hours of sleep to be maintained for healthy BP[16,17]

6. Hypertension Induced Kidney disorders

Kidney Problem: - Hypertension (high blood pressure) damages kidneys because the high pressure of the blood causes damage and narrowing of the small blood vessels in the kidneys. This results in reduced blood flow, making it difficult for kidneys to filter waste from the blood, resulting in scarring, fluid buildup, and ultimately kidney disease.[18,19]

Mechanism of Action:

Chronic hypertension exerts sustained high pressure on the renal arteries, leading to damage of the small renal blood vessels (arterioles). Over time, this results in narrowing and thickening of the vessel walls, a process known as arteriolosclerosis, which reduces blood flow to the nephrons. The reduced perfusion causes glomerular injury and sclerosis, lowering the glomerular filtration rate (GFR). In response, the kidneys activate the renin–angiotensin–aldosterone system (RAAS), which increases levels of angiotensin II, a potent vasoconstrictor. Angiotensin II not only raises vascular resistance but also stimulates sodium and water retention through aldosterone, further elevating blood pressure. This creates a vicious cycle of worsening hypertension and progressive nephron damage, ultimately leading to chronic kidney disease (CKD), also referred to as hypertensive nephropathy.[20,21]

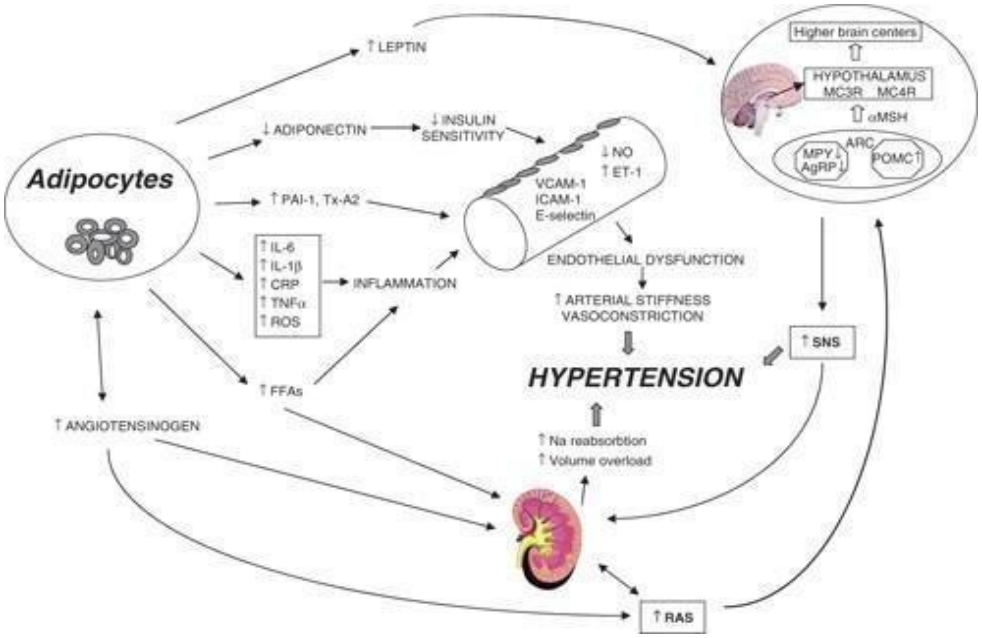


Fig. 4: Mechanism of action of kidney disorder linked with hypertension.

Prevention

- Healthy Lifestyle & Stress Management
- Balanced diet with low salt intake. Regular exercise.
- Healthy body weight & Regular Health Check-ups[22,23]
- Practice relaxation techniques such as meditation and/or yoga. Adequate sleep: 7-8 hours every day.
- Early detection of Hypertension prevents serious complications such as Heart Failure and Chronic Kidney Disease.[24]

CONCLUSION

Hypertension is a major chronic health condition with a high prevalence and significant impact on multiple organ systems. The findings from this survey highlight that a large proportion of the studied population is affected, often in association with comorbidities such as diabetes and cardiovascular disorders. Lifestyle factors including poor diet, physical inactivity, stress, smoking, and alcohol consumption play a key role in its development and progression. The involvement of the renin–angiotensin–aldosterone system (RAAS) further explains the underlying mechanism contributing to sustained elevated blood pressure and organ damage.

Overall, early detection, regular monitoring, and appropriate management through lifestyle modification and pharmacological therapy are essential to control hypertension and prevent

complications. Increasing public awareness and promoting preventive strategies can significantly reduce the burden of this condition.

Future Perspectives

The future of hypertension management is increasingly focused on advanced, integrated, and preventive approaches rather than simple blood pressure control. Digital and AI-based hypertension care is emerging as a key strategy, involving remote blood pressure monitoring, artificial intelligence–driven prediction models, and personalized risk assessment to improve early diagnosis and long-term management. The concept of digital hypertension, emphasized by researchers like Kario K, includes smart platforms and wearable technologies that enhance patient adherence and enable continuous monitoring. In parallel, novel therapeutics are being developed, including RNA interference drugs such as Zilberman studied by Desai AS, which target the renin–angiotensin–aldosterone system for long-lasting blood pressure control. Other promising treatments include aldosterone inhibitors like bacteriostat and long-acting injectable therapies that may reduce dosing frequency and improve compliance.

Furthermore, precision medicine is shaping the future of hypertension care by enabling genomic and biomarker-based treatment strategies, allowing clinicians to set patient-specific blood pressure targets for more effective outcomes. Early detection and population screening are also gaining importance, particularly through the integration of wearable health devices and large-scale community-based screening programs, especially in low-income countries where hypertension often remains undiagnosed. Lifestyle and public health interventions continue to play a critical role, with emphasis on salt reduction strategies (especially relevant in countries like India), diet-based prevention models, and behavioral interventions aimed at reducing risk factors. Finally, there is a growing shift toward a multisystem disease prevention approach, where the goal is not only to control blood pressure but also to prevent major complications such as heart failure, stroke, and chronic kidney disease, thereby reducing overall morbidity and mortality associated with hypertension.

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