

Evaluation of Clinical Presentation and Various Causes of Hypertension in Young to Middle Aged Patients: An Observational Study in India

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Abstract

Introduction: Hypertension is the leading cause of death worldwide. It is estimated that >1 billion persons worldwide suffer from hypertension. One in five young adults in India has high blood pressure. High blood pressure (hypertension) is the leading global cause of premature death. It is a major risk factor for heart attack, stroke, heart failure, atrial fibrillation, chronic kidney disease. High blood pressure hits Indians at a younger age than western populations, and first heart attacks and strokes occur a decade earlier on average. Thus, there was a need to screen and promote healthy lifestyles early to avoid the crisis India is heading for. Therefore, we conducted this study in order to evaluate the clinical profile of hypertension in young to middle aged adults which will be helpful for early detection, diagnosis and treatment which will help avoid complications consequences in future.

Materials and Methods: Cross-sectional observational study of 116 individuals aimed to study of the clinical profile and various causes of young to middle aged hypertensive patients at a tertiary care hospital in India. All patients between age group of 18-40 years of both genders diagnosed as a hypertensive as per the existing guidelines.

Results: Renal causes (77%) was the most common etiology of young hypertension amongst study population followed by Endocrine cause (8%), Obstructive Sleep Apnea (3%). Most of the study population belongs to the age group of 35 to 40 years (39.7%) followed by 31 to 35 years (30.2%), 26 to 30 years (17.2%) and 18 to 25 years (12.9%).

Conclusion: This limited sample size study has shown that renal causes, predominantly parenchymal are a dominant cause of secondary hypertension in young adult population. Headache, palpitation, epistaxis and sweating are the major symptoms in this population. Considering the rising incidence of hypertension in the younger population we need to do screening on a mass scale to detect this ailment early. A high index of suspicion in a young to middle aged hypertensive to rule out renal causes could go a long way to prevent progression of these patients to end stage renal disease. Early diagnosis and treatment is essential to prevent further co-morbidities in these patients.

Keywords: hypertension, renal, young to middle aged.

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Introduction

Hypertension is the leading cause of death worldwide. It is estimated that >1 billion persons worldwide suffer from hypertension. Hypertension is defined as a persistent elevation of blood pressure >140/90 mmHg. One in five young adults in India has high blood pressure[1]. High blood pressure (hypertension) is the leading global cause of premature death It is a major risk factor for heart attack, stroke, heart failure, atrial fibrillation, chronic kidney disease[2-4]. High blood pressure hits Indians at a younger age than western populations, and first heart attacks and strokes occur a decade earlier on average. Thus, there is a need to screen and promote healthy lifestyles early to avoid the crisis India is heading for. Since, 18 to 40 years is the most productive group, there is a recent shift of focus on inculcation of healthy lifestyle among these age groups. A study by Kirkpantur A et al reports that the cause of hypertension in young adults is primary in more than two thirds of the total hypertensive[5].

The prevalence of hypertension among younger individuals, however, is on a steady rise. This may be attributed to several factors such as dramatic changes in lifestyle and stress patterns, improved detection rates due to better screening and a high prevalence of metabolic and dietetic coronary risk factors among adolescents of the middle- and upper-middle class[7,8].

Management of hypertension has varied widely among countries. Over 80 percent of cardiovascular deaths in developing countries have been a result of a lack of widespread diagnosis and treatment as compared to developed countries. In India, the incidence of cardiac disease is expected to rise in parallel with the

increase in life expectancy secondary to increases in per capita income and declining infant mortality[9]. Within India, there has been a greater prevalence of cardiovascular diseases in urban centres[10].

Therefore, we conducted this study in order to evaluate the clinical profile of hypertension in young adults which will be helpful to for early detection, diagnosis and treatment which will help avoid complications consequences in future.

Aims and Objectives

- To study of the clinical profile of young to middle aged hypertensive patients at a tertiary care hospital in India.
- To study the various causes of young hypertensive to middle aged group patients.

Materials and Methods

A) Study Type/Design: Cross-sectional observational study

B) Study Setting: The study was conducted in the Department of Medicine in a tertiary care Hospital.

C) Duration Of Study: From December 2019 to December 2021.

D) STUDY POPULATION

Sample Size – 150

Eligibility Criteria

Inclusion Criteria

1. All patients between age group of 18-40 years of both genders diagnosed as ahypertensive by the said criteria*.

Exclusion Criteria

Operational definitions were as follows

Blood pressure categories in the new guideline-(AHA GUIDELINES 2017)

Normal: Less than 120/80 mm Hg;

Elevated: Systolic between 120-129 and diastolic less than 80;

Stage 1: Systolic between 130-139 or diastolic between 80-89;

Stage 2: Systolic at least 140 or diastolic at least 90 mm Hg;

Hypertensive crisis: Systolic over 180 and/or diastolic over 120, with patients needing prompt changes in medication if there are no other indications of problems, or immediate hospitalization if there are signs of organ damage.

Methodology

Patients between 18 – 40 years of both genders of Out-Patient Department and In-Patient Department of a Tertiary Care Centre were screened for Hypertension:

On first reading found to be hypertensive.

Blood pressure was recorded on all four

limbs for 3 consecutive times.

Patient found to be hypertensive on all 3 readings were diagnosed as Hypertensive as per said criteria.

Diagnosed Hypertensives between 18 – 40 years of both genders were included in the study.

Complete evaluation was done of each patient according to the proforma prepared to facilitate a systematic study in all cases.

On clinical diagnosis of hypertension, the patients were subjected to further clinical and laboratory evaluation as mentioned in proforma 1 to find the cause and patients were evaluated and followed up to understand the clinical course and outcome. Standard operating protocols were followed for measuring the blood pressure in sitting posture

Statistical Analysis

All the collected data was entered in Microsoft Excel sheet and then transferred to SPSS software ver. 22 for analysis. Qualitative data was presented as frequency and percentages

Table 1: Age distribution amongst study population

Age group	Frequency	Percent
18 to 25 years	15	12.9
26 to 30 years	20	17.2
31 to 35 years	35	30.2
more than 35 years	46	39.7
Total	116	100.0

As seen in the above table, most of the study population belongs to the age group of more than 35 years (39.7%) followed by 31 to 35 years (30.2%), 26 to 30 years (17.2%) and 18 to 25 years (12.9%).

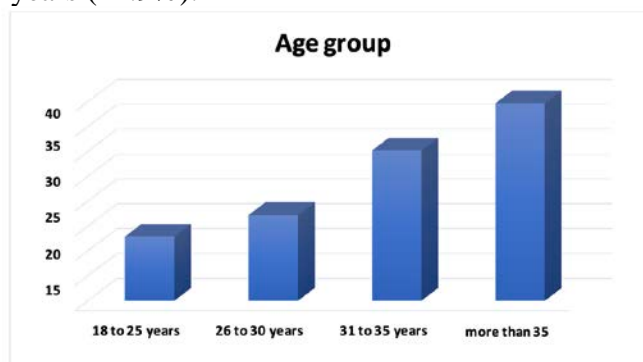


Table 2: Gender amongst study population

Gender	Frequency	Percent
Female	41	35.3
Male	75	64.7
Total	116	100.0

As seen in the above table, there was male predominance (64.7%) amongst study population as compared to female (35.3%).

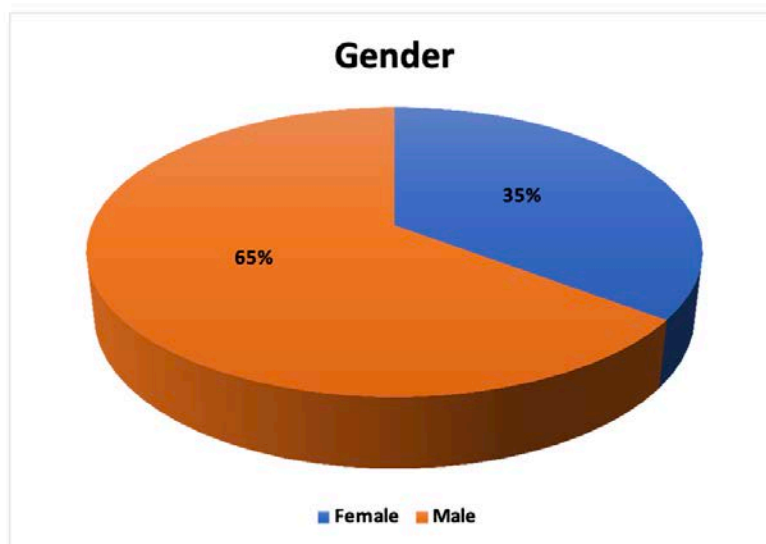


Table 3: Clinical Features Amongst Study Population

Clinical features	Frequency	Percent
Headache	85	73.3
Hematuria	14	12.1
Edema	20	17.2
Dyspnea	4	3.4
Palpitation	30	25.9
Sweating	62	53.4
Epistaxis	23	19.8

As seen in the above table, Headache (73.3%) was the most common clinical features amongst study population followed by Sweating (53.4%) and Palpitation (25.9%).

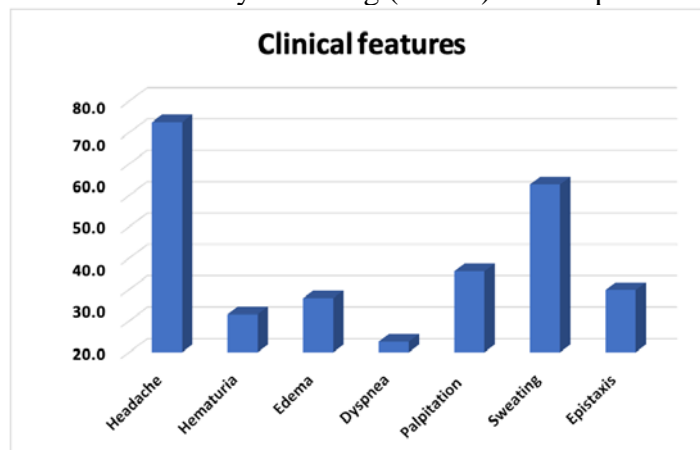
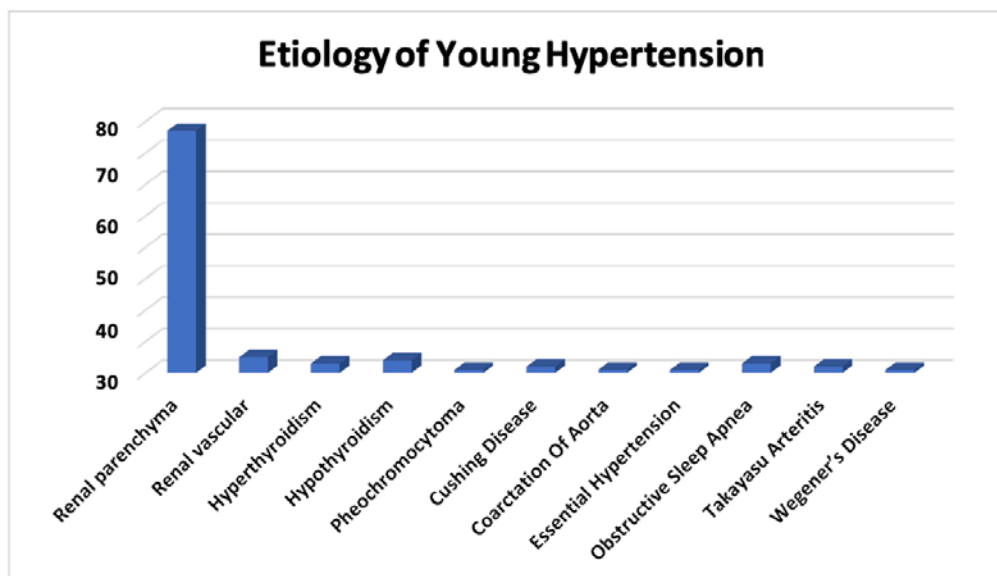


Table 4: Etiology of young hypertension amongst study population

Etiology of Young Hypertension		Frequency	Percent
Renal causes	Renal parenchyma	89	77
	Renal vascular	6	5
Endocrine cause	Hyperthyroidism	4	3
	Hypothyroidism	5	4
	Pheochromocytoma	1	1
	Cushing Disease	2	2
Coarctation Of Aorta		1	1
Essential Hypertension		1	1
Obstructive Sleep Apnea		4	3
Vasculitis	Takayasu Arteritis	2	2
	Wegener's Disease	1	1
Total		116	100

As seen in the above table, Renal parenchyma (77%) was the most common etiology of young hypertension amongst study population followed by Endocrine cause (8%), Obstructive Sleep Apnea (3%).

**Table 5: Family history amongst study population**

Family history	Frequency	Percent
NO	52	44.8
YES	64	55.7
Total	116	100.0

As seen in the above table, family history of hypertension was observed in 55.7% of study population.

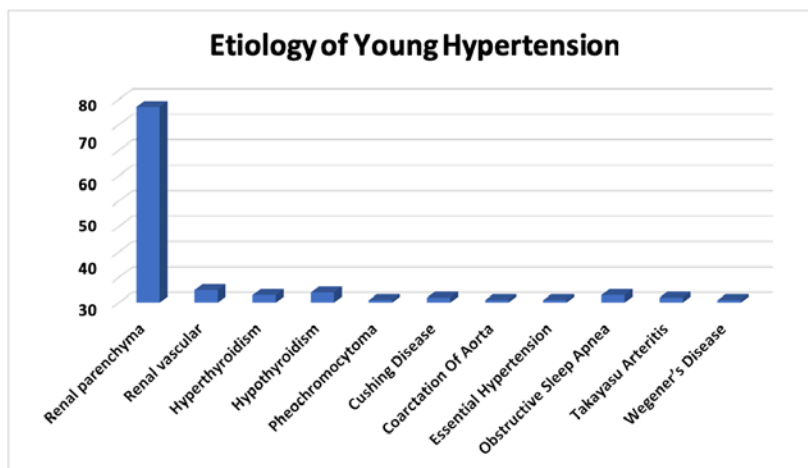


Table 6: NO. of PTS presented with hypertensive crisis amongst study population

No. of Pts presented with hypertensive Crisis	Frequency	Percent
NO	108	93.1
YES	8	6.9
Total	116	100.0

As seen in the above table, 6.9% of study population presented with hypertensive crisis.

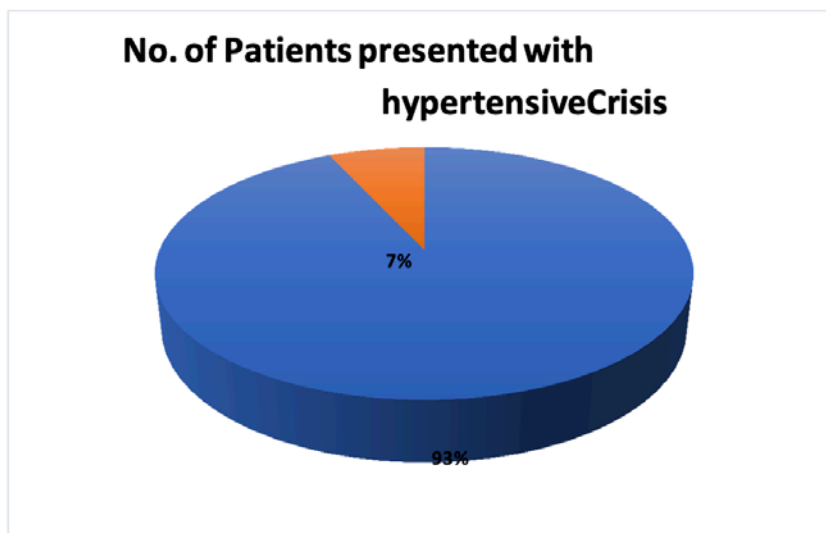


Table 8: ECG findings amongst study population

ECG findings	Frequency	Percent
LVH	32	28
Normal	84	72
Total	116	100

As seen in the above table, LVH (28%) was the most common abnormal ECG findings amongst study population.

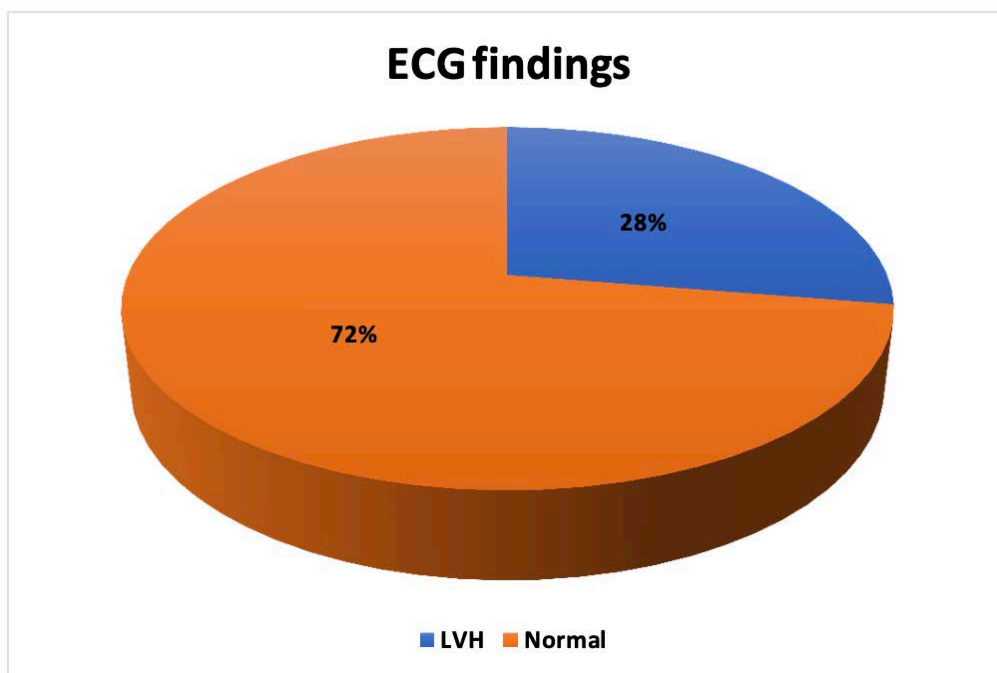


Table 9: 2D ECHO cardiography findings amongst study population

2D Echocardiography	Frequency	Percent
Mild Concentric LVH	28	17.2
Moderate Concentric LVH	18	14.7
Normal	68	52.6
Severe Concentric LVH	2	.9
Total	116	100.0

As seen in the above table, Mild Concentric LVH (24%) was the most common abnormal 2D Echocardiography findings amongst study population followed by Moderate Concentric LVH (16%) and Severe Concentric LVH (2 %)

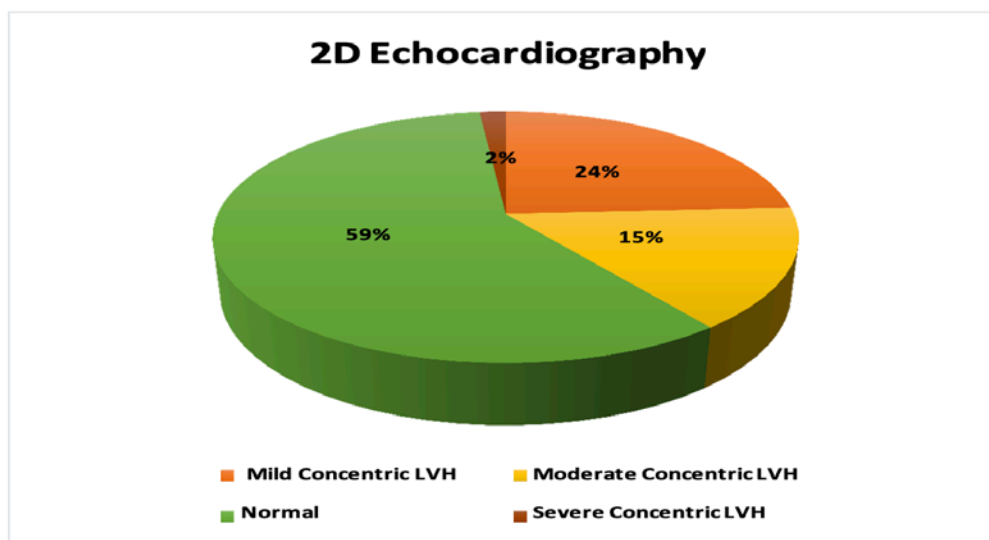


Table 10: Fundus examination findings amongst study population

Fundus	Frequency	Percent
Grade 1	20	17.2
Grade 2	10	8.6
Grade 3	6	5.2
Grade 4	5	4.3
Normal	75	64.7
Total	116	100.0

As seen in the above table, Grade 1 retinopathy (17.2%) was the most common fundus examination findings amongst study population followed by Grade 2 (8.6%), Grade 3 (5.2%) and Grade 4 (4.3%).

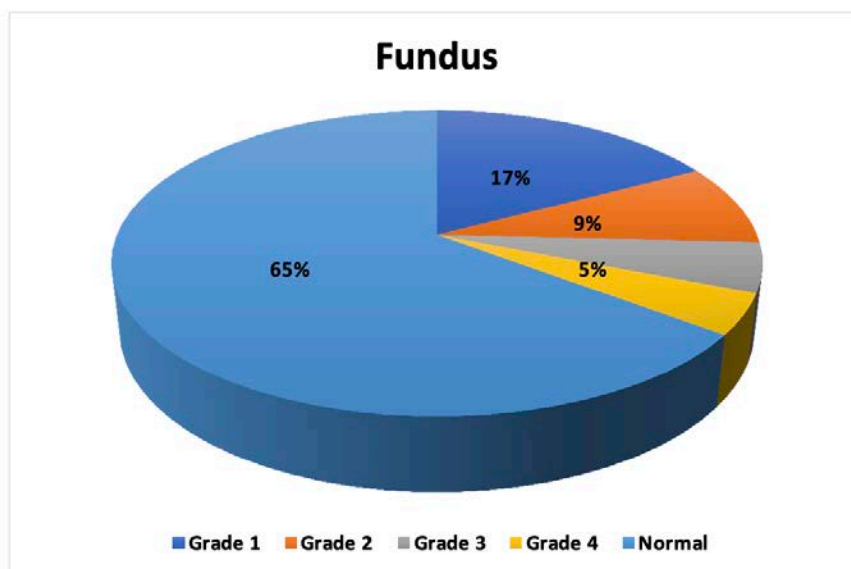
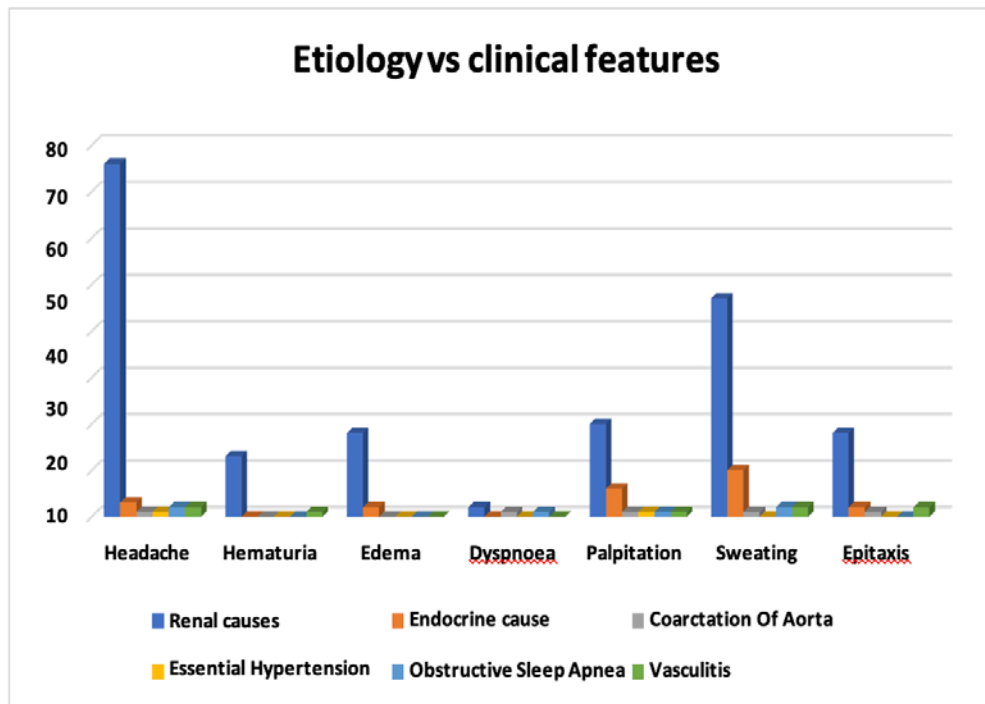


Table 11: Etiology of Young Hypertension vs Clinical features amongst study population

Etiology of Young Hypertension	Headache	Hematuria	Edema	Dyspnea	Palpitation	Sweating	Epistaxis
Renal causes (Vascular)	4	3	2	0	3	4	1
Renal causes (Parenchymal)	72	10	16	2	17	43	17
Endocrine cause	3	0	2	0	6	10	2
Coarctation Of Aorta	1	0	0	1	1	1	1
Essential Hypertension	1	0	0	0	1	0	0
Obstructive Sleep Apnea	2	0	0	1	1	2	0
Vasculitis	2	1	0	0	1	2	2
Total	85	14	20	4	30	62	23



As seen in the above table, all clinical features like headache, Hematuria, edema, dyspnea, palpitation, sweating and Epistaxis was observed most commonly in renal etiology followed by Endocrine causes

Discussion

Blood pressure is a continuously distributed variable in populations. There is no natural dividing line between high and normal blood pressure. However, WHO in its expert committee report has arbitrarily defined hypertension in adults as a systolic blood pressure equal to or greater than 140 mmHg and/or a diastolic pressure equal to or greater than 90 mm Hg[11]. The epidemiological studies have demonstrated that hypertension is potentially as injurious in the young as in the old and is an important risk factor for most cardiovascular complications including congestive cardiac failure, stroke, myocardial infarction and sudden death.

Hypertension has been found to be highly correlated with reduced life expectancy, the higher the blood pressure, and the shorter the life. The natural course of hypertension spans some 15 to 25 years starting on the average around age 35

years and often ending in premature death around the age of 50 years. Hypertension is a growing health problem in Asia[12,13].

In the present study, most of the study population belongs to the age group of more than 35 years (39.7%) followed by 31 to 35 years (30.2%), 26 to 30 years (17.2%) and 18 to 25 years (12.9%). Similar results were reported by Prasad et al., with prevalence of 11.91% (n=183/1537) in South Asian young population[14]. Another study from state of Karnataka reported prevalence of 17.7% (n=65/367) in age group of 30-39 years[15]. In apparently healthy young (18-40 years) individuals, Shukla et al., reported HTN prevalence of 11% (n=186/1735). Similarly, Aggarwal et al., studied young individuals with acute coronary artery disease (CAD) and observed HTN prevalence of 10.66% (n=13/122) in patients without CAD and 19.66% (n=46/234) among those who had CAD[17].

Age group	Prasad et al., ¹⁶	Rao CR et al., ¹⁷	Shukla et al., ¹⁸	Present study
18 to 25 years	34.6 ± 4.5	17.70%	11%	12.9
26 to 30 years				17.2
31 to 35 years				30.2
more than 35 years				39.7

In the present study, there was male predominance (64.7%) amongst study population as compared to female (35.3%). Prasad et al., reported significantly higher prevalence in men (14.30%, n=146/1022) than women (7.18%, n=37/515) in South Asian young adults.¹⁴ Similarly, from Vietnam, Minh et al., reported higher prevalence of HTN in men (10.8%) than women (4.2%) in age group of 25-34 years[18]. A recent analysis in individuals aged 18-49 years (mean age 34 years, n=27 081), reported

isolated systolic HTN (ISH: systolic BP > 140 and diastolic BP < 90), isolated diastolic HTN (IDH: systolic BP < 140 and diastolic BP > 90) and systolic-diastolic HTN (SDH: systolic BP > 140 and diastolic BP > 90) in 25.3%, 3.7% and 19.8% in men respectively and 12.9%, 2.9% and 9.7% women respectively[19]. Everett et al., found that women are less likely to be hypertensive than men in young age (12% vs 27% respectively) and there is low awareness of HTN amongst both men and women[20].

Gender	Prasad et al. ¹⁶	Minh et al.	Everett et al., ²²	present study
Female	7.18%	4.20%	12%	35.30%
Male	14.30%	10.80%	27%	64.70%

In the present study, Headache (73.3%) was the most common clinical features amongst study population followed by Sweating (53.4%) and Palpitation (25.9%).

In the present study, Renal causes (77%) was the most common etiology of young hypertension amongst study population followed by Endocrine cause (8%), Obstructive Sleep Apnea (3%). Among secondary causes, renal disease (parenchymal and vascular) remains most common cause of HTN in young individuals. Observations by Panja et al., suggest that renal disease is the most common aetiology of secondary HTN in young Indians (26.4%).

In the present study, family history of hypertension was observed in 55.7% of study population. Similar results were seen

in a studies where higher prevalence of hypertension was found with family history of hypertension. The prevalence of hypertension was high in participants with positive family history[21,22]. This may be because a positive family history of hypertension is usually associated with a positive family history of obesity, central obesity, or metabolic syndrome.

In the present study, 6.9% of study population presented with hypertensive Crisis.

In the present study, LVH (28%) was the most common abnormal ECG findings amongst study population. This finding was comparable with the study conducted by Kejriwal A et al., in which 28.0% of patients had LVH[23].

ECG changes	Kejriwal A et al ²⁵	Present study
LVH	28%	25%
Normal		65.50%

In the present study, Mild Concentric LVH (24%) was the most common abnormal 2D Echocardiography findings amongst study population followed by Moderate Concentric LVH (16%) and Severe Concentric LVH (2 %)

In the present study, Grade 1 retinopathy (17.2%) was the most common fundus examination findings amongst study population followed by Grade 2 (8.6%), Grade 3 (5.2%) and Grade 4 (4.3%). This finding was comparable with the study conducted by Kejriwal A et al., in which out of 50 patients, 34 (78%) were normal, 1 (2%) were grade 2, 7 (14.0%) were grade 2, 6 (12.0%) were grade 3 and 2 (4.0%) were grade 4 fundus.

Limitation o Study

1. Sample size was reduced due to prevailing pandemic of Covid 19.
2. ABPM (ambulatory BP measurement) was not done.
3. Observer error was kept in mind while recording blood pressure for digital machine

Summary and Conclusion:

- Most of the study population belongs to the age group of 35 to 40 years (39.7%) followed by 31 to 35 years (30.2%), 26 to 30 years (17.2%) and 18 to 25 years (12.9%).
- There was male predominance (64.7%) amongst study population as compared to female (35.3%).
- Headache (73.3%) was the most common clinical features amongst study population followed by Sweating (53.4%), Palpitation (25.9%), Hematuria (12.1%) and Proteinuria

(23.5 %).

- Renal causes (77%) were the most common etiology of young hypertension amongst study population followed by Endocrine cause (8%), Obstructive Sleep Apnea (3%).
- Amongst the Renal causes Renal Parenchymal disease was most common and then Reno-vascular cause in our study population.
- Family history of hypertension was observed in 55.7% of study population.
- In 6.9% of study population presented with **hypertensive Crisis**.
- LVH (28%) was the most common abnormal ECG findings amongst study population.
- Mild Concentric LVH (24%) was the most common abnormal 2D Echocardiography findings amongst study population followed by Moderate Concentric LVH (16%) and Severe Concentric LVH (2 %)
- Grade 1 retinopathy (17.2%) was the most common fundus examination findings amongst study population followed by Grade 2 (8.6%), Grade 3 (5.2%) and Grade 4 (4.3%).

This limited study has shown that renal causes predominantly parenchymal is a dominant cause of secondary hypertension in young adult population. Headache, palpitation, epistaxis and sweating are the major symptoms in this population. Considering the rising incidence of hypertension in the younger population. We need to do screening on a mass scale to detect this early. A high index of suspicion in a young Hypertension to rule out renal causes could go a long way to prevent progression of these patients to End Stage Renal Disease. Method of Screening for hypertension also needs to be emphasized in the given population.

Early diagnosis and treatment is essential to prevent further co-morbidities in these Patients.

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