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RESEARCH ARTICLE

DEMOGRAPHIC PROFILE, AETIOLOGY AND CLINICAL FEATURES OF YOUNG HYPERTENSIVE PATIENTS ATTENDING A TERTIARY CARE CENTRE OF SOUTHERN RAJASTHAN

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ABSTRACT

Introduction: Hypertension is defined as any one of the following Systolic blood pressure >140 mmHg and Diastolic blood pressure >90 mmHg. Hypertension is a rapidly growing pandemic. It is no longer restricted to older adults as more young patients are being diagnosed with hypertension. Hypertension among young people is common, affecting 1 in 8 adults aged between 20 and 40 years. **Aims and Objectives:** To study the demographic profile, clinical presentation and the various etiological factors in young hypertensive patients. **Material and Methods:** The present cross sectional study was carried out in 200 young hypertensive patients with age <40 years in MBGH Hospital and RNT Medical College, Udaipur over a period of 12 months. **Result:** Majority of the patients 100 (50%) were in the age group 36-40 years. Males outnumbered females with M:F ratio of 1.8:1. Maximum incidence of hypertension was found in 89 (44.5%) farmers. Incidence of hypertension was almost equal in literate 101(50.5%) and illiterate 99(49.5%). Incidence of hypertension was more common in rural area 113(56.5%). Hypertension was more common 120(60%) among middle class socioeconomic status. Comorbidity was present in 122(61%) patients. The most common comorbidity was CKD54 (69.2%). Majority of the patients had BMI of 18.5-22.9 kg/m², i.e. normal weight. Maximum cases 105(52.5%) presented with ghabrahat, followed by vomiting 89(44.5%). 114(57%) were found to have a secondary cause of hypertension. Amongst the secondary causes of hypertension, the leading cause 86(75.4%) was renal parenchymal disease. **Conclusion:** Demographic profile, aetiology and clinical features vary considerably in young hypertensive patients as compared to older age groups. In our study, we found that hypertension was more common in males and secondary hypertension was more common than primary hypertension. Hence, it can reasonably be concluded that screening for hypertension among young individuals should be carried out frequently and search for the secondary cause should be done thoroughly before labeling it as primary hypertension.

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INTRODUCTION

Hypertension is defined as any one of the following^[1] Systolic blood pressure >140 mmHg and Diastolic blood pressure >90 mmHg. Hypertension is a rapidly growing pandemic. It is no longer restricted to older adults as more young patients are being diagnosed with hypertension. It is one of the leading causes of global burden of disease. Approximately 7.6 million deaths (13-15% of total) and 92 million disability adjusted life years worldwide were attributed to high blood pressure in 2001^[1]. An estimated 1.13 billion people worldwide have hypertension. In 2015, 1 in 4 men and 1 in 5 women had hypertension.

Cardiovascular diseases represent the main cause of death in developed countries, being responsible for about one third of deaths worldwide. Among various factors potentially involved in the pathogenesis of cardiovascular diseases, arterial hypertension still represents the most common risk factor for developing major cardiovascular complications including coronary artery disease, myocardial infarction, stroke, and congestive heart failure.^[2] Over the past, the identification of increased risk of hypertension has been practically restricted to adults or elderly individuals. This attitude has been developed and promoted at both national and local levels, mostly in view of the fact that the major proportions of acute cardiovascular events occurred in individuals age more than 40-45 years^[3].

The criterion for hypertension is changed time to time by Joint National Committee (JNC). The latest guidelines are JNC 8 being released in 2019. According to this : High normal: Systolic 130-139 mm Hg and/or diastolic 85-89 mm Hg. Grade 1: Systolic 140-159 mm Hg and/or diastolic 90-99 mm Hg. Grade 2: Systolic 160-179 mm Hg or greater and/or diastolic 100-109 mm Hg. Grade 3: Systolic 180 mm Hg or greater and/or diastolic 110 mm Hg or greater. Over the last decade, it has been demonstrated that the prevalence of mild hypertension or pre-hypertension in young age groups (18-40 years) is more common than expected and has been progressively rising over the years [4]. Longitudinal studies have reported that high blood pressure levels measured in childhood and adolescence often turned into stable hypertension in adulthood. This phenomenon, which is known as "BP TRACKING", can be described as "the fact that a certain level of BP in the early years of life may anticipate and predict BP levels in the later stages of life". [5-9] Hypertension among young people is common, affecting 1 in 8 adults aged between 20 and 40 years. This number is likely to increase with lifestyle behaviors and lowering of hypertension diagnostic thresholds. Early-life factors influence blood pressure (BP) although the mechanisms are unclear; BP tracks strongly within individuals from adolescence through to later life. Higher BP at a young age is associated with abnormalities on heart and brain imaging and increases the likelihood of cardiovascular events by middle age. However, diagnosis rates are lower, and treatment is often delayed in young people. This reflects the lack of high-quality evidence that lowering BP in young adults improves cardiovascular outcomes later in life. The definition of young in guidelines varies as below the age of 50, 40, and 30 year [10-12]. We have taken the guidelines between 18-40 years of age. Worldwide estimates of the prevalence of hypertension in the year 2000 among adults aged 20 to 29 years were 12.7% in men and 7.4% in women rising to 18.4% and 12.6%, respectively, in 30- to 39-year old [13]. The estimated prevalence of hypertension among those aged 18 to 39 years in the United States (2011–2012) was 7.3%. [14] Both studies defined hypertension as an average blood pressure of >140/90 mm Hg. Hypertension can have harmful health effects even at a young age.

In the short term, it is associated with higher rates of left ventricular hypertrophy [15] and alterations in brain volume and white matter hyper intensity volume, suggesting that hypertension in young adults may impact cardiovascular and brain health [16,17] The Strong Heart Study assessed clinical and echo cardiographic features in 1940 native Americans aged 14 to 39 years. Individuals with pre-hypertension (blood pressure, 120–139/80–89 mm Hg) and hypertension (blood pressure \geq 140/90 or use of antihypertensive medications) had higher rates of left ventricular hypertrophy than normotensive individuals of the same age [15] In the long term, multiple studies have demonstrated increased rates of cardiovascular disease and mortality in young people with hypertension. Hypertension can be broadly classified into two categories [1].-

PRIMARY HYPERTENSION AND SECONDARY HYPERTENSION: Primary hypertension tends to be familial and is likely to be the consequence of an interaction between environmental and genetic factors. The prevalence of primary hypertension increases with age and individuals with relatively high blood pressures at younger ages are at increased risk for the subsequent development of hypertension. Secondary causes of hypertension include renal, renovascular, neurogenic, endocrinal, coagulation and various other miscellaneous causes. The demographic profile, clinical presentation and aetiology may vary depending upon different factors. Hence, this study was planned to see the demographic profile, aetiology, and clinical presentation in patients attending OPDs, and indoors of MB Government Hospital, RNT Medical College, Udaipur.

AIMS AND OBJECTIVES

- To study the demographic profile in young hypertensive patients with respect to age, gender, occupation, educational status, and socio-economic status.

- To study the clinical presentation among young hypertensive patients.
- To study the various etiological factors amongst the young hypertensive patients.

MATERIAL AND METHODS

STUDY SITE: Patients admitted in medicine, cardiology and nephrology wards as well as those visiting these OPDs of M. B. Govt. Hospital, RNT Medical College, Udaipur were enrolled and drop outs were excluded.

STUDY DESIGN: Hospital based cross sectional study.

STUDY PERIOD: Every eligible case of young hypertensive patient admitted in wards and visiting outdoors of M. B. Govt. Hospital, RNT Medical College, Udaipur was studied till sample size achieved.

STUDY POPULATION: Patients admitted in wards and visiting outdoors of M. B. Govt. Hospital, RNT Medical College, Udaipur diagnosed with hypertension were enrolled in the study after taking proper informed consent.

Inclusion Criteria: Age group 18-40 years with Hypertension

Exclusion Criteria

- Age above 40 years and below 18 years.
- Evidence of active infection of any kind (Acute or chronic)
- Non-consenting individuals

STUDY METHOD

After an informed consent all subjects were thoroughly assessed at presentation, investigated and treated according to the protocol. Their detailed clinical history, demographic profile and socio-economic status (according to Kuppuswamy Scale) were recorded. Address and contact number of patients were also taken for further communication. General physical examination as well as complete systemic examination was done. A diagnosis of hypertension was made according to the definition given in Harrison 19th edition. Blood pressure of >140/90 fulfils the requirement to diagnose hypertension in young patients. [1] Different epidemiologic profile, etiological factors and clinical presentation were measured and noted according to standard protocol among both the cases i.e., Hypertensive patients and age and sex matched controls.

BLOOD PRESSURE CLASSIFICATION	SYSTOLIC, MM HG	DIASTOLIC, MM HG
NORMAL	<120	And <80
PREHYPERTENSION	120-139	Or 80-89
STAGE 1 HYPERTENSION	140-159	Or 90-99
STAGE 2 HYPERTENSION	>160	Or >100
ISOLATED SYSTOLIC HYPERTENSION	>140	And <90

Blood Pressure measurement was done with standard Mercury Sphygmomanometer with average of two measurements obtained 5 min apart after subjects had rested for at least 10 minutes relaxed and in supine position with mercury dropping by 2mmhg/beat. Routine blood investigations [Complete hemogram, Liver function test, Kidney function test, Erythrocyte Sedimentation Rate (ESR), T3, T4, TSH, HbA1c, Random blood sugar, Serum electrolytes, Lipid profile] Urine routine microscopy and albumin/creatinine ratio, Radiological investigations [Ultrasonography of whole abdomen and pelvis, Renal artery doppler] were done during examination. Coagulation profile, Autoimmune profile, Plasma metanephrine level, 2D Echo cardiography, CT scan brain, MRI Brain, CT abdomen were done as per requirement. If these investigations point towards some rare secondary cause of hypertension then subsequently relevant investigations were performed. All the information was recorded in predesigned proforma formed in Microsoft excel for final analysis.

STATISTICAL ANALYSIS

Summary statistics was done by Proportion, Mean, Median and Standard Deviation. The inferential statistics was done by ANOVA and Pearson's correlation. All measurements were done using SPSS version 21.0. 'p' value <0.05 were considered statistically significant.

RESULTS

Table 1. Demographic Profile

Age Group	Frequency	Percent
20-25 yr	32	16.0
26-30 yr	28	14.0
31-35 yr	40	20.0
36-40 yr	100	50.0
Gender	Frequency	Percent
F	70	35.0
M	130	65.0
Education	Frequency	Percent
Literate	101	50.5
Illiterate	99	49.5
Residence	Frequency	Percent
Rural	113	56.5
Urban	87	43.5
SES	Frequency	Percent
Middle	80	40.0
Lower	120	60.0
Occupation	Frequency	Percent
Service	48	24.0
Farmer	89	44.5
House wife	63	31.5

Table 1 shows that majority of the patients 100 (50%) were in the age group 36-40 years, followed by 40 (20%) of 31-35 years, 32 (16%) of 20-25 years and 28 (14%) of 26-30 years age group. 130 (65%) were male, and 70 (35%) were female leading to a M:F ratio of 1.8:1. 101 (50.5%) were literate, while 99 (49.5%) were illiterate. 113 (56.5%) were from rural area, while 87 (43.5%) were from urban area. 120 (60%) were from middle class socioeconomic status, while 80 (40%) were from lower class socioeconomic status. 89 (44.5%) were farmer by occupation, followed by housewife 63 (31.5%), followed by services provider 48 (24%).

Table 2. Comorbidities And BMI

Comorbidity	Frequency	Percent
Yes	122	61
No	78	39
BMI (kg/m ²)	Frequency	Percent
<18.5	2	1.0
18.5-22.9	149	74.5
23-24.9	36	18.0
25-29.9	13	6.5

Table 2 shows that comorbidity was present in 122 (61%) patients. Majority of the patients had BMI OF 18.5-22.9 Kg/m², i.e. normal weight. 36(18%) had BMI of 23-24.9Kg/m², i.e. overweight followed by 13(6.5%) of 25-29.9Kg/m², i.e. pre-obese. Only 2 (1%) patients were underweight with BMI of <18.5Kg/m².

Table 3. Clinical Features

SYMPTOMS	FREQUENCY	PERCENTAGE
Headache	50	25
Blurring Of Vision	10	5
Vertigo	8	4
Ghabrahat	105	52.5
Vomiting	89	44.5
Shortness Of Breath	86	43
Abdominal Pain	28	14
Pedal Edema	61	30.5
Decreased Urine Output	40	20
Generalized Anasarca	9	4.5
Easy Fatiguability	41	20.5
Lower Limb Weakness	8	4
Slurring Of Speech	2	1

Table 3 shows that maximum cases 105 (52.5%) presented with ghabrahat, followed by vomiting 89 (44.5%), shortness of breath 86 (43%), pedal edema 61 (30.5%), headache 50 (25%), easy fatiguability 41 (20.5%), decreased urine output 40 (20%), abdominal pain 28 (14%), blurring of vision 10 (5%), generalized anasarca 9 (4.5%), vertigo 8 (4%), lower limb weakness 8 (4%), and slurring of speech 2 (1%).

Table 4. Aetiology

Aetiology	Frequency	Percent
Primary cause	86	43
Secondary cause	114	57

Table 4 shows that 114 (57%) were found to have a secondary cause of hypertension, while remaining 86(43%) were categorized to be having primary hypertension.

Table 5. Secondary causes of hypertension

Secondary cause	Frequency	Percent
Renal Parenchymal	86	75.4
Reno Vascular	9	7.9
Glomeulonephritis	2	1.8
Neurogenic	0	0.0
Adrenal	0	0.0
Coagulational	0	0.0
Endocrinal	17	14.9

Table 5 shows that amongst the secondary causes of hypertension, the leading cause 86(75.4%) was renal parenchymal disease, followed by 17(14.9%) endocrinal cause, followed by 9(7.9%) renovascular cause, and 2(1.8%) glomerulonephritis as the cause of secondary hypertension.

DISCUSSION

The present study was conducted in 200 cases of young hypertensive patients admitted in various medical, cardiology and nephrology wards as well as those visiting these OPDs of M. B. Govt. Hospital, RNT Medical College, Udaipur. In the present study, we found that majority of the patients 100 (50%) were in the age group 36-40 years, followed by 40 (20%) of 31-35 years, 32 (16%) of 20-25 years and 28 (14%) of 26-30 years age group. Chioloro et al. observed that 19 % of 14, 000 participants aged between 24 and 32 years included in the National Longitudinal Study of Adolescent Health had high blood pressure levels^[18]. Zhao Y et al. surveyed 2060 people between 23 and 25 years, reported a prevalence of 13.5 % of individuals having borderline blood pressure values and 9.5% of individuals having essential hypertension, respectively^[19]. Zhao and colleagues enrolled 85, 371 young subjects of the Chinese province of Shandong, reporting an increasing prevalence of hypertension from 1991 to 2007 with values ranging between 4.4 and 14.1% in people aged from 18 to 29 years, and between 7.9 and 28.5 % in those aged from 30 to 39 years^[20]. Malhotra P et al. conducted a study in a population in rural Haryana and the prevalence of hypertension in a population whose

age ranged between 16 to 70, was reported at 3.5% in men and 5.8% in women.^[21] The third NHANES study showed that the prevalence of hypertension increased with increasing age. The prevalence of hypertension was 7.3% in those aged 18–39, 32.4% in those aged 40–59, and 65.0% in those aged 60 years. A study done by Shukla A et al. on an apparently healthy Western Indian population found the prevalence of hypertension among those less than 40 years to be 11%.^[22] A study from Karnataka done by Prashanth HL et al., looking at the prevalence of hypertension in 991 individuals between the ages of 20 and 40 found it to be nearly 8%.^[23] Thus, age is a non-modifiable risk factor for developing hypertension. In the present study, 130 (65%) were male, and 70 (35%) were female leading to a M:F ratio of 1.8:1. Kearney PM et al. estimates the worldwide prevalence of hypertension in the year 2000 among adults aged 20 to 29 years as 12.7% in men and 7.4% in women rising to 18.4% and 12.6%, respectively, in 30- to 39-year olds^[13]. In Chennai Urban Rural Epidemiology Study (CURES), hypertension was present in 20% [men: 23.2% vs. women: 17.1 %, $p < 0.001$] of the study population.^[24] On the basis of occupation, the present study was showing that 89 (44.5%) were farmer by occupation, 63 (31.5%) were housewife, and 48 (24%) were services provider. A study conducted by Grotto I et al. among 11, 053 Israeli male military officers, found that systolic and diastolic blood pressures were highest among low ranking officers. Higher mean systolic blood pressures were also noted among office workers as compared to physical workers.^[25] In the present study, 101 (50.5%) were literate, while 99 (49.5%) were illiterate. A study conducted by Babu GR et al. among Information Technology professionals, found a high prevalence of hypertension (31%) and prehypertension (45.7%) with high work place related stress.^[26] The RECORD Cohort Study (Residential Environment and CO Ronary heart Disease) from France, studied the relationship between socioeconomic status and hypertension among 5941 participants aged 30-79 years and found an inverse relationship between systolic blood pressure and decreasing individual education and decreasing residential neighbourhood education.^[27] In the present study, 113 (56.5%) were from rural area, while 87 (43.5%) were from urban area. Das et al, studied the prevalence of hypertension in an urban population in West Bengal, and found it to be 24.9%. They also noted that 58.7% of the study subjects had prehypertension.^[28] Yadav et al, have reported the age and sex matched prevalence of hypertension in an urban population of Lucknow to be 32.2%. They also found the prevalence of prehypertension in this same population to be 32.3%. The ICMR-INDIAB study, which looked at the prevalence of hypertension in urban and rural populations in three states and a union territory (Tamil Nadu, Jharkhand, Chandigarh and Maharashtra) found the prevalence of hypertension to be significantly higher among urban than rural populations. Prashanth HL et al. compared rural and urban populations in Karnataka and found the prevalence of hypertension among 991 individuals between the ages of 20 and 40 to be 8.79% in the urban population and 7.30% in the rural population.^[23]

Out of 200 patients, 120 (60%) were from middle class socioeconomic status, while 80 (40%) were from lower class socioeconomic status. The RECORD Cohort Study (Residential Environment and CO Ronary heart Disease) from France, studied the relationship between socioeconomic status and hypertension among 5941 participants aged 30-79 years and found an inverse relationship between systolic blood pressure and decreasing individual education and decreasing residential neighbourhood education.^[27] Out of 200 cases taken, comorbidity was present in 122 patients. Not much data is available on this. Majority of the patients had BMI OF 18.5-22.9 kg/m², i.e. normal weight. 36 (18%) had BMI of 23-24.9 kg/m², i.e. overweight followed by 13 (6.5%) of 25-29.9 kg/m², i.e. pre-obese. Only 2 (1%) patients were underweight. Wolf HK et al postulated that the risk of hypertension is five times more in obese individuals in comparison to those whose weight is normal^[29]. The prevalence of hypertension in a cohort of 1464 African individuals was estimated to be 8.5% for women and 21.2 % for men aged between 18 and 40 years old and seems to be characterized by a high body mass index^[30]. Of the 200 cases taken, maximum cases 105 (52.5%) presented with ghabrahat, followed by vomiting 89 (44.5%), shortness of breath 86

(43%), pedal edema 61 (30.5%), headache 50 (25%), easy fatiguability 41 (20.5%), decreased urine output 40 (20%), abdominal pain 28 (14%), blurring of vision 10 (5%), generalized anasarca 9 (4.5%), vertigo 8 (4%), lower limb weakness 8 (4%), and slurring of speech 2 (1%). Not much data is available upon the presentation of young hypertensive patients. Out of 200 patients studied, 114 (57%) were found to have a secondary cause of hypertension, while remaining 86(43%) were categorized to be having primary hypertension. Amongst the secondary causes of hypertension, the leading cause 86 (75.4%) was renal parenchymal disease, followed by 17 (14.9%) endocrinal cause, followed by 9 (7.9%) renovascular cause, and 2 (1.8%) glomerulonephritis as the cause of secondary hypertension. According to Association of Physicians of India, essential HTN is the most common form of HTN in general population accounting for up to 95% cases of HTN.^[31] In young individuals also, essential HTN remains the primary diagnosis of HTN. Panja et al., followed individuals in 18-30 year age group from Northern India and observed that essential HTN remained common aetiological group (34.8%)^[32]. Camelli et al., reported common occurrence of secondary HTN before 40 years and observed the prevalence of about 30%^[33]. A prospective study conducted in Sweden by Berglund G et al, among 7455 men aged 47 to 54 found the prevalence of secondary hypertension to be 11%. The commonest cause being renal parenchymal disease.^[34] Observations by Panja et al., suggest that renal disease is the most common aetiology of secondary HTN in young Indians (26.4%)^[32]. Viera AJ et al state that ruling out bilateral renal artery stenosis is important in young individuals. It should be suspected in cases of rapidly progressive oligouric renal failure^[35]. Our study showed that secondary causes of hypertension are more common than primary hypertension in young hypertensives.

CONCLUSION

The present cross sectional study was carried out in 200 young hypertensive patients with age <40 years in MBGH Hospital and RNT Medical College, Udaipur over a period of 12 months and we conclude as follows

- Incidence of hypertension was more in males as compared to females and more common in 36-40 years age group.
- Hypertension was more common in farmers as compared to housewives.
- Incidence was almost similar in both literate and illiterate individuals.
- Incidence was more in rural areas as compared to urban areas.
- Higher socioeconomic status individuals had higher incidence of hypertension.
- CKD and diabetes mellitus were the most common comorbidity associated with hypertension.
- Majority of the individuals had normal weight but risk and incidence of hypertension increases with increase in weight and BMI.
- Majority of the patients presented with non specific symptoms like ghabrahat and vomiting.
- Secondary hypertension was more common than primary hypertension in our study.
- Among the secondary causes, renal parenchymal disease was the leading cause followed by endocrinal causes.

Thus, it can be reasonably concluded that hypertension is on the rise with its incidence increasing in younger age group. With secondary causes emerging to be the prominent cause of hypertension in younger age group as compared to primary hypertension, detailed examination and investigations should be carried out to identify and establish the secondary cause of hypertension. Further studies should be done to identify other secondary causes of hypertension and modifiable factors leading to hypertension in younger age group so that the disease can be diagnosed and treated early in its course.

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