Assessment of Various Clinical Presentations, Laboratory Parameters and Electrocardiographic Findings of Hypertensive Patients in a Tertiary Care Hospital

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ABSTRACT

Background: Hypertension is the most widely prevalent, largely preventable risk factor for death and disability due to cardiovascular diseases. It is a silent killer as very rarely any symptom can be detected in its early stages until a severe medical crisis like heart attack, stroke, or chronic kidney disease occurs.[1]

Objectives: The objectives were to assess the prevalence, to identify the risk factors of hypertension and to assess the clinical presentation, laboratory findings and electrocardiographic findings in hypertensive patients.

Methodology: A descriptive cross-sectional, hospital-based study was conducted for a period of six months on 141 subjects having hypertension. A written informed assent was obtained from all the subject representatives before inclusion in the study. . The study results were analysed by descriptive statistical analysis.

Results: The prevalence of hypertension was 6.26%. The major risk factor was age 100(70.9%) and least risk factor was obesity19 (13.5%). The clinical presentations seen were weakness 93(65.9%) and headache 45(31.9%) The total mean blood pressure of the subjects were 179/103 mmHg. ECG findings commonly found were to be sinus tachycardia 55(39%), T-wave changes 31(21.9%), LVH strain (24.8%), ST-T changes 36 (25.5%), and Sinus rhythm 43(37.5%).

Conclusion: The studies give the idea about major clinical presentation, Laboratory parameters, ECG findings and risk factors in the hypertensive patients. The identification of the risk factors helps in planning techniques for reducing hypertension.

***Key words*:** Hypertension; risk factor; clinical presentation; laboratory parameters; ECG.

INTRODUCTION

Hypertension is the most widely prevalent, largely preventable risk factor for death and disability due to cardiovascular diseases. Hypertension (HTN) is defined as a persistent elevated systolic or diastolic blood pressure equal to or more than 140/90 mmHg in adults aged 18 years and over.[1]

Around 7.5 million deaths happen annually due to high blood pressure, which accounts for nearly 12.8% of all deaths. It is predicted to be increased to 1.56 billion adults with hypertension in 2025.[2]

Hypertension is directly responsible for 57% of all stroke deaths and 24% of all coronary heart disease (CHD) deaths in India. The precursory studies in India in the last decades have reported varying prevalence of hypertension ranging from 17-47% in the adult population.[3]

Besides patient's geographical region, the demographic details (sex, age, income, education, occupation, control of tobacco consumption and obesity) may also play a role in disease's prevalence.[4]

Various risk factors have been associated with hypertension including; age,

sex, race, decrease physical activity, obesity, smoking, dietary, hormonal changes which play key role in the development of hypertension.[5]

Clinical assessment of each subject included taking patient profile data on the presence of some of the accompanying symptoms like chest pain, shortness of breath, headache, nausea and vomiting, epistaxis, anxiety, cramping, focal neurological signs and visual disturbances. The subjects provide data on the duration of hypertension, the antihypertensive therapy used and the presence of other associated diseases (coronary heart disease, heart failure, stroke and diabetes).[6]

HTN has an influence on hematological parameter such as hematocrit (HCT), hemoglobin (Hgb), red blood cell (RBC) count, white blood cell (WBC) count and platelet (PLT) count. The impaired hematological parameters may strongly indicate hypertensive end-organ damage specifically kidney failure. Specifically increased Hgb level may cause left ventricular hypertrophy while low Hgb levels causes anemia and heart failure.[7]

The electrocardiogram (ECG) is a routine, accessible, cost-effective, and recommended diagnostic tool for the initial evaluation and follow-up of hypertensive patients.[8]

Lifestyle is a vital issue in managing hypertension since optimal therapy of the disease involves consideration of the patient's age, sex, race, diet, exercise, tobacco use, co-morbid conditions, use of antihypertensive drug treatment, compliance, and achievement of blood pressure control.[9]

The identification of the risk factors helps in planning techniques for reducing the preventable risk factors such as weight, excess salt intake, cigarette smoking and alcohol use. The goal is to prevent short and long term complications and thus assuring a better quality of life.[10]

MATERIALS AND METHODS

This is a hospital based descriptive cross-sectional study conducted in the departments except orthopaedics and OBG of Basaveshwara Medical College & Research Centre, Chitradurga for a period of 6 months. A total of 141subjects who satisfied the study criteria and assent to participate in this study were included in the study. The complete project was done after obtaining the permission granted by the ethical committee of Basaveshwara Medical College Hospital& Research Centre, Chitradurga, Vide number: SJMCP/IEC/ PHARM D/08/2018-2019/11.

Study Criteria
Inclusion Criteria:
- The patient of age greater than 18 years.
- Both male and female according to JNC 8 guidelines (SBP greater than 140: DBP greater than 90).
- Patients having a history of diabetes mellitus, ischemic heart disease, respiratory diseases and cerebrovascular accidents.
- Patients needing ICU and ventilatory support.

Exclusion Criteria
- Patient less than 18 years and pregnant women.
- Patients on any medication or on hormonal therapy that may affect blood pressure findings.

Statistical Analysis
The collected data was entered in Microsoft excel 2013 version and Descriptive method was used for the analysis.

RESULTS

This study was conducted in adults with hypertension in all the departments except orthopaedics and OBG, who were presented to the in-patient department of the hospital, were reviewed daily. The prevalence of hypertension was 6.26% (141/2251). The study included a total of 141 subjects and the maximum number of subjects comes under the age of 5 1-60

(27.7%) and minimum number of subjects comes under the age of 31-40 (2.1%).

Table 1: Distribution according to age-wise

Age in years	No of patients	Percentage of Patients
31-40	3	2.1%
41-50	13	9.3%
51-60	39	27.7%
61-70	38	26.9%
71-80	36	25.5%
81-90	12	8.5%
Total	**141**	**100%**
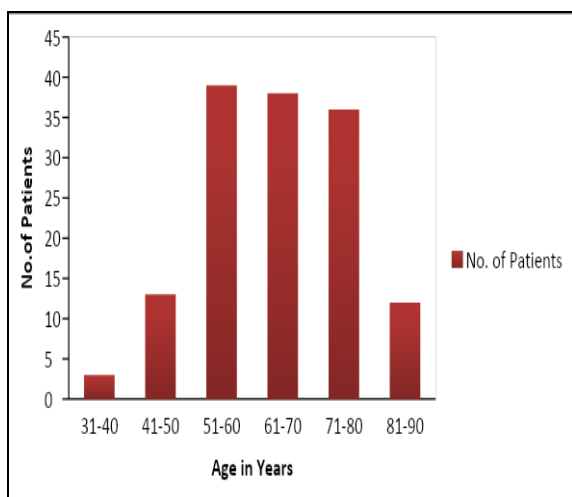
Figure1: Age wise distribution

Table 2: Distribution according to sex wise

Sex Wise Distribution		
Sex	No of Patients	Percentage of Patients
Male	75	53.2%
Female	66	46.8%
Total	**141**	**100%**

Out of 141 subjects 75(53.2%) subjects were males and 66 (46.8%) subjects were females

Table 3: Distribution of Body Mass Index

BMI(kg/m²)	Males	Females	Total
• Normal(Less than 25)	42	44	86
• Overweight(25-30)	21	15	36
• Obesity(Greater than 30)	12	7	19
Total	**75**	**66**	**141**

As in Table 3, out of 141 subjects 86 subjects had normal BMI, 36 subjects were overweight and19 subjects were obese.

According to the study, out of 141 subjects risk factors of age 100(70.9%), diabetes mellitus 69(48.9%), obesity 19 (13.5%), family history 42(29.7%) and alcohol consumption 51 (36.17%)

Table 4: Distribution of Risk factors

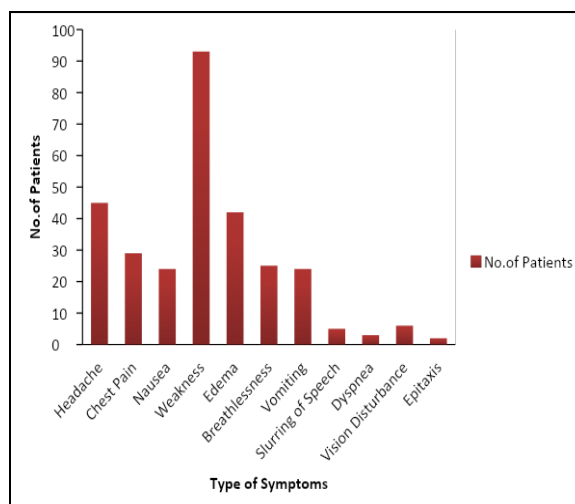| Risk Factors	No. of Patients (n=141)	Percentage of Patients
Age	100	70.9%
DM	85	60.2%
Physical Inactivity	69	48.9%
Obesity	19	13.5%
Family History	42	29.7%
Estimated GFR	44	31.2%
Alcohol	51	36.17%
Cigaratte smoking	38	26.2%
More than 1 Risk Factor	141	100%

Figure 2: Distribution of risk factors

Table No.5: Distribution according to Complaint wise

Complaints	No of patients	Percentage of Patients
Headache	45	31.9%
Chest pain	29	20.6%
Nausea	24	17.1%
Weakness	93	65.9%
Edema	42	29.8%
Breathlessness	25	17.7%
Vomiting	24	17.2%
Slurring of speech	5	3.5%
Dyspnea	3	2.1%
Vision disturbance	6	4.3%
Epistaxis	2	1.4%

Among 141 subjects, symptoms of headache 45(31.9%), chest pain 29(20.6%), nausea24 (17.1%), weakness 93(65.9%), edema 42 (29.8%), breathlessness 25(17.7%), vomiting 24(17.2%), slurring of speech 5(3.5%), dyspnea 3(2.1%), vision disturbance 6(4.3%) and epistaxis 2(1.4%)

7. Distribution of Blood pressure

According to JNC VIII classification it divided BP into four subgroup population >60 years,<60 years, all ages DM present without CKD and all ages CKD present with or without DM.

Table No.7 (a): Distribution of Blood Pressure

SUBGROUP	Male (n=75)	Female(n=66)
• (>60 years):		
Systolic blood pressure	184.09± 21.30	186± 25.57
Diastolic blood pressure	104.54 ± 14.38	97.33 ± 36.35
• (<60 years):		
Systolic blood pressure	173.38 ±21.42	184.88 ± 23.66
Diastolic blood pressure	98.46 ± 12.81	114.22± 22.37
Mean SBP	180.11± 21.67	179.75± 36.35
Mean DBP	102.28 ± 13.95	104.5 ± 19.49
Total mean blood pressure (SBP/DBP)	(179/103)	

Table No.7 (b): Distribution of Blood Pressure in all ages DM present No CKD

SUBGROUP	Male	Female
• All ages DM present No CKD		
Systolic Blood Pressure	182.57 ± 23.59	179.44 ± 27.11
Diastolic Blood Pressure	100.47± 14.65	101.66 ± 22.29

Table No.7(c): Distribution of Blood Pressure in all ages CKD present with or without DM

SUBGROUP	Male
• (>18 years + CKD, with or without DM)	
Systolic Blood Pressure	165 ± 22.03
Diastolic Blood Pressure	97.5± 16.69

8. Biochemical Investigations

Table 4:Biochemical Investigations

Variables	No of subjects	Percentage of subjects
FBS(mmol/L)		
FBS (70-100)	66	46.8%
FBS >110	75	53.1%
Serum Creatinine(mg/dl)		
S.Creatinine (0.6-1.4)	81	57.4%
S.Creatinine >1.4	60	42.6%
Total Bilirubin((mg/dl)		
Total Bilirubin (0.3-1)	111	78.7%
Total Bilirubin >1	30	21.3%
Serum Sodium(mmol/L)		
Serum Sodium < 137	49	34.8%
Serum Sodium (137-145)	32	22.6%
Serum Sodium>145	60	42.6%
Serum Potassium(mmol/L)		
Serum Potassium <3.6	53	37.6%
Serum Potassium (3.6-5.4)	41	29.1%
Serum Potassium >4.5	47	33.3%

Table no 8: Distribution of ECG findings

ECG Findings	No of Patients	Percentage of Patients
Sinus Tachycardia	55	39%
T- wave changes	31	21.9%
LVH strain	35	24.8%
ST-T changes	36	25.5%
Sinus Rhythm	43	37.5%
Others	13	9.2%

Out of 141 subjects, ECG findings were found to be sinus tachycardia 55(39%) subjects, T-wave changes 31(21.9%), LVH strain (24.8%), ST-T changes36 (25.5%), Sinus rhythm 43(37.5%) and others 13(9.2%).

DISCUSSION

Hypertension varies among countries and apparently prevalent in developed countries and urban populations due to the lifestyle changes. According to the World Health Organization report of 2009, the worldwide prevalence of hypertension in adults aged 25 years and above was 40%, highest in Africa 46% and lowest in America (35%). It's a risk factor for the development of cardiovascular disease and stroke.

In the present study, 141 cases study was conducted on cross-sectional study during 6 months. Prevalence were calculated as a known case of hypertension by total cases admitted in the wards. In this 141 were known case and total case admitted in the wards of tertiary care hospital were 2251. The prevalence were found to be 6.26%. A similar study was conducted by Belachew A *et al.,* shows that the prevalence of hypertension in this study was 27.3%.[1]

According to the study the various risk factors like Age 100(70.9%), Diabetes mellitus 85(60.2%), physical inactivity 69(48.9%), obesity, family history 42(29.7%), Estimated glomerular filtration rate 44(31.2%), Alcohol 51(36.17%), cigarette smoking 38(26.2%) and all the patients have more than one risk factors. Similarly, a study conducted by J Tripathy *et al.,* shows that age was the predominant risk factor for hypertension.[3]

In the present study, out of 141 cases, 75(53.2%) were males and 66(46.8%) were females. In this study, males were more prone to hypertension than females. Similarly study conducted by Singh S *et al.,* shows that males were having higher odds of having hypertension than females. The symptoms of HTN are headache 45(31.9%), chest pain 29(20.6%), nausea 24(17.1%), weakness 93(65.9%), Edema 42(29.8%), Breathlessness 25(17.7%), Vomiting 24(17.2%), Slurring of speech 5(3.5%), Dyspnea 3(2.1%), Vision disturbance 6 (4.3%) and epistaxis 2(1.4%),

this mean SBP in males were180.11± 21.67 and mean DBP were 102.28 ± 13.95. The mean SBP in females were 179.75±36.35 and mean DBP were 104.5±19.49. The total mean BP is 179/103 mmHg. In 75 males, 42 were found to be normal weight, 21 were over-weight and 12 were obese. In 66 female's subjects, 44 were normal, 15 were over-weight and 7 were obese. In this study, male subjects are more obesity than females. [8]

In the present study, Serum creatinine level greater than 1.4mg/dL for 60(42.6%). The similar study done by Pooja *et al.*, concluded that the serum creatinine levels in hypertensive subjects were higher and statistically significant (p < 0.000).[9] In the present study of 141 subjects total bilirubin level were found to be greater than 1mg/dL for 30(21.3%). The similar study done by Rao K S P *et al.*, shows that total bilirubin levels have a negative correlation with systolic and diastolic BP.[85] In the current study 141 subjects, Serum Sodium level were found to be greater than 145mmol/L for 60(42.6%). Out of 141 subjects, Serum Potassium level were found to be less than 3.6mmol/L for53 (37.6%), greater. A similar study was conducted by Kumar A *et al*., shows that Serum sodium was higher and serum potassium was lower in cases than control group.[42]

In this study,141 subjects ECG findings were found to be sinus tachycardia 55(39%) subjects, T-wave changes 31(21.9%), LVH strain(24.8%), ST-T changes 36(25.5%), Sinus rhythm 43(37.5%) and others 13(9.2%), a similar study was conducted by Hetal C *et al.,* showed that sinus tachycardia was most observed finding.[53]

CONCLUSION

According to the analysed results and from view of literature, the conclusions made

- The prevalence was found to be 6.26%. In this males are 53.2% and females are 46.8%. The males are more prone to hypertension than females.

- The major risk factor is age and least risk factor is obesity. The risk factors are Age 100(70.9%), DM 85(60.2%), Physical inactivity 69(48.9%), Obesity 19(13.5%), Family history 42(29.7%), Estimated GFR 44(31.2%), Alcohol 51(36.17%), Cigarette smoking 38(26.2%) and all the patients have more than one risk factors.
- In the study, maximum subjects were having normal body mass index.
- The commonest symptoms were found to be weakness.
- The laboratory parameters we were found that
  → Serum creatinine was higher in 42.6% of the subjects.
  → FBS is higher in 53.1% of subjects.
  → Total bilirubin is greater in 21.3% of subjects.
  → Serum Sodium higher in 42.6% of subjects.
  → Serum Potassium lower in 37.6% of subjects.
- ECG finding were found to be most of them have Sinus tachycardia and ST-T changes.

Abbreviation
OBG: Obstetrics and Gynecology
HTN: Hypertension
LVH: Left Ventricular Hypertrophy

BMI: Body Mass Index
JNC: Joint National Committee
CKD: Chronic Kidney Disease
ECG: Electrocardiographic
BP: Blood Pressure
SBP: Systolic Blood Pressure
DBP: Diastolic Blood Pressure
DM: Diabetes mellitus

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