Journal of Cardiovascular Disease Research

ISSN: 0975-3583,0976-2833 VOL14, ISSUE 12, 2023

Study of clinical profile of patients with essential hypertension at a tertiary hospital

C. Indumathi[1], Dinesh Kumar S[2]

Assistant Professor, Department of General Medicine, Government Medical College, Omandurar Government estate, India.
[2]Department of Pathology, ESIC Medical College and Hospital, Ashok Pillar road, K. K. Nagar, Chennai-78, India.

Received Date: 19/11/2023 Acceptance Date: 20/12/2023

Abstract

Background: Hypertensive patients have several common and other comorbidities that can affect cardiovascular risk and treatment strategies. Present study was aimed to study clinical profile of patients with essential hypertension at a tertiary hospital. **Material and Methods:** Present study was prospective, comparative study, conducted in cases (patients of age between 18 and 75 years, diagnosed with hypertension) & controls (same age and sex, normotensive subjects). **Results:** In our study, 40 cases & 40 subjects were studied. Age & gender of cases & controls were comparable, no significant difference was noted ($p > 0.05$). In present study, hypertension was more common in BMI ≥ 25 kg/m^2 , patients with Diabetes, family history of hypertension, smoking habit, alcohol use, habits of adding extra salt while eating food, eating foods with high salt content, eating junk food, had nil to moderate Physical activity, had high & very high perceived stress levels and there was significant statistical difference noted (p value < 0.001). There was also a statistically significant difference noted in serum cholesterol (193 ± 14.768 vs 183.15 ± 13.275, p value 0.0024) & average serum sodium (140.43 ± 4.031 vs 138.28 ± 2.837, p value 0.007) among cases & controls. **Conclusion:** Healthy lifestyle choices can prevent or delay the onset of high BP and can reduce cardiovascular risk. Long term reduction in salt intake would significantly reduce the prevalence of hypertension and thereby decrease associated morbidity and mortality due to cardiovascular disease and stroke.

Keywords: hypertension**,** lifestyle choices, cardiovascular risk, essential hypertension

Corresponding Author: Dr. C. Indumathi, Assistant Professor, Department of General Medicine, Government Medical College, Omandurar Government Estate, India.
Address: 169, Wallahjah road, Triplicane, Chennai – 600002, India.
Email: c.indumathi84@gmail.com

Introduction

Hypertension is a multisystem disorder with involvement of cardiovascular, neuroendocrine and renal systems with a strong genetic component. Hypertension is arbitrarily defined as sustained systolic blood pressure of 140 mmHg or greater and a diastolic BP of 90 mmHg or greater or by virtue of the patient taking antihypertensive medications.[1]

.Hypertension (HTN), a known precursor to cardiovascular disease, has emerged as a leading cause of global morbidity and mortality. According to the global burden of disease (GBD) study , high systolic blood pressure (SBP) had claimed over 10.4 million lives and 218 million disability-adjusted life years (DALY). Overall, 9% of the total DALYs were attributable to high SBP.[2] Epidemiological studies have shown that sedentary lifestyle,

ISSN: 0975-3583,0976-2833 VOL14, ISSUE 12, 2023

obesity, excessive salt intake, heavy alcohol intake and stress are significant risk factors for hypertension.[3,4]

Hypertensive patients have several common and other comorbidities that can affect cardiovascular risk and treatment strategies. The number of comorbidities increases with age, with the prevalence of hypertension and other diseases. Common comorbidities include coronary artery disease (CAD), stroke, CKD, HF, and COPD.[5,6] Present study was aimed to study clinical profile of patients with essential hypertension at a tertiary hospital

Material And Methods

Present study was prospective, comparative study, conducted in department of general medicine, at Government Rajaji Hospital, Madurai, Tamilnadu, India. Study duration was of 8 months (April 2012 - November 2012). Study approval was obtained from institutional ethical committee.

Inclusion criteria

- Cases - Patients of age between 18 and 75 years, diagnosed with hypertension, willing to participate in present study
- Controls - Same age and sex, normotensive (BP lower than 140/90 mmHg) subjects, willing to participate in present study

Exclusion criteria

- Patients with secondary hypertension, on NSAIDs, anti-hypertensives, diuretics.
- Patients with congestive cardiac failure, with malignant hypertension.
- Females on oral contraceptive medications.

We compared two groups – Hypertensives and Normotensives, equal number of age and sex matched controls were taken up for study. An informed written consent was obtained from all the subjects included in the study. Hypertension was defined as per JNC VI report- BP – 140/90 mmHg least at three different occasions after refraining from anti-hypertensives and diuretics for at least three weeks before the study, refraining from eating, smoking or indulging in any stressful activity 30 minutes before recordings.

A detailed medical history was obtained from all the subjects. Family history of hypertension, Diabetes mellitus, cardiovascular disease and renal disease were sought. Duration of hypertension, levels of elevated blood pressure, results and side effects of anti-hypertensive therapy were recorded. History of all the prescribed and over the counter medications, smoking, alcohol use, weight gain and symptoms suggestive of secondary hypertension were obtained.

A complete physical examination was conducted for all the subjects which included pulse and BP measurements, examination for edema, distended veins, thyromegaly, examination of cardiovascular, respiratory, abdominal and central nervous systems, optic fundoscopic examination for any hypertensive changes. Height and weight were measured and Body mass Index was calculated as weight in kg/height in m^2.

Blood pressure was measured on three different occasions with same standard mercury sphygmomanometer in both supine and standing positions. The average of three readings was used in data analysis. All patients underwent investigations such as complete hemogram, Urine analysis, Serum investigations (urea, creatinine, calcium, phosphorus, uric acid, cholesterol, sodium and potassium), Thyroid profile, USG abdomen and pelvis, Chest X ray, Electrocardiogram, Echocardiography.

Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Frequency, percentage, means and standard deviations (SD) was calculated for the continuous variables, while ratios and proportions were calculated for the categorical variables. Difference of proportions between qualitative variables were tested using chi-

ISSN: 0975-3583,0976-2833 VOL14, ISSUE 12, 2023

square test or Fisher exact test as applicable. P value less than 0.05 was considered as statistically significant.

Results

In our study, 40 cases & 40 subjects were studied. Age & gender of cases & controls were comparable, no significant difference was noted ($p > 0.05$). The mean systolic blood pressure among cases was 166.55 ± 10.564 while the mean systolic blood pressure among controls was 115.75 ± 5.995, difference was highly significant (p value < 0.0001). The mean diastolic blood pressure was 98.20 ± 4.525 while the mean diastolic blood pressure was 77.70 ± 4.784, difference was highly significant (p value < 0.0001).

Table 1: General characteristics

	Cases	Controls	P value
Mean age (mean ± SD)	49.73 ± 10.698	47.43 ± 10.406	0.3328
Gender			
Male	22 (55 %)	20 (50 %)	0.8228
Female	18 (45 %)	20 (50 %)	
BMI (kg/m^2)			
< 25	24 (60 %)	31 (77.5 %)	0.096
≥ 25	16 (40 %)	9 (22.5 %)	
Mean BMI (kg/m^2)	24.3 ± 2.445	23.47 ± 1.894	
Blood pressure			
Systolic BP	166.55 ± 10.564	115.75 ± 5.995	<0.0001
Diastolic BP	98.20 ± 4.525	77.70 ± 4.784	<0.0001

In present study, hypertension was more common in BMI ≥ 25 kg/m^2 , patients with diabetes, family history of hypertension, smoking habit, alcohol use, habits of adding extra salt while eating food, eating foods with high salt content, eating junk food, had nil to moderate physical activity, had high & very high perceived stress levels and there was a significant difference noted (p value < 0.001).

Table 2: Prevalence of HTN according to the studied risk factors

Variable	Cases (n=40)	Controls (n=40)	P value
BMI (kg/m^2)			
< 25	24 (60 %)	31 (77.5 %)	0.096
≥ 25	16 (40 %)	9 (22.5 %)	
Mean BMI (kg/m^2)	24.3 ± 2.445	23.47 ± 1.894	
Other			
Diabetes	7 (17.5 %)	2 (5 %)	<0.001
Family history of hypertension	16 (40 %)	3 (7.5 %)	<0.001
Smoking	5 (12.5 %)	1 (2.5 %)	<0.001
Smokeless tobacco use	3 (7.5 %)	0	--
Alcohol use	8 (20 %)	3 (7.5 %)	<0.001
Adding extra salt while eating food	11 (27.5 %)	3 (7.5 %)	<0.001
Eating foods with high salt content	12 (30 %)	4 (10 %)	<0.001
Eating junk food	9 (22.5 %)	3 (7.5 %)	<0.001
Eating fruits <7 servings/week	6 (15 %)	13 (32.5 %)	<0.001
Moderate Physical activity			
Nil	9 (22.5 %)	4 (10 %)	<0.001

ISSN: 0975-3583,0976-2833 VOL14, ISSUE 12, 2023

≤2 hrs	14 (35 %)	8 (20 %)	
2.1–4 hrs	12 (30 %)	13 (32.5 %)	
>4 hrs	5 (12.5 %)	15 (37.5 %)	
Perceived stress level			<0.001
Low	4 (10 %)	12 (30 %)	
Average	7 (17.5 %)	14 (35 %)	
High	15 (37.5 %)	9 (22.5 %)	
Very high	14 (35 %)	5 (12.5 %)	

The average cholesterol in the hypertensive group was 193 ± 14.768 whereas the average cholesterol in the normotensive group was 183.15 ± 13.275, there was significant difference in the cholesterol levels (p value 0.0024).

The average serum sodium in the hypertensive group was 140.43 ± 4.031 whereas the average serum sodium in the normotensive group was 138.28 ± 2.837, there was significant difference noted (p value 0.007). The average serum potassium in the hypertensive group was 3.90 ± 0.387 while in the normotensive group it was 3.79 ± 0.287, no significant difference was noted (p > 0.126).

The mean serum calcium in the hypertensive group was 9.590 ± 0.534 while the mean serum calcium in the normotensive group was 9.440 ± 0.605, no significant difference was noted (p > 0.2433). The mean serum phosphorus in the hypertensive group was 3.755 ± 0.295 while the mean serum phosphorus in the normotensive group was 3.680 ± 0.272, no significant difference was noted (p > 0.2409)

Table 3: Serum cholesterol & serum electrolytes

	Cases	**Controls**	**P value**
Serum cholesterol	193 ± 14.768	183.15 ± 13.275	0.0024
Electrolytes			
Serum Na	140.43 ±` 4.031	138.28 ± 2.837	0.007
Serum K	3.90 ± 0.387	3.79 ± 0.287	0.127
Serum calcium	9.590 ± 0.534	9.440 ± 0.605	0.2433
Serum phosphorus	3.755 ± 0.295	3.680 ± 0.272	0.2409

The mean blood sugar was 103.90 ± 9.9403 among cases and 102.45 ± 6.2468 in controls, difference was not significant (p value 0.4371). The mean serum uric acid was 5.958 ± 0.5514 in the hypertensive group and 5.775 ± 0.7027 in the normotensive group, difference was not significant (p value 0.2001).

The mean serum urea in the hypertensive group was 36.20 ± 6.603 while the mean serum urea in the normotensive group was 34.48 ± 7.463, difference was not significant (p value 0.2769). The mean serum creatinine in the hypertensive group was 0.98 ± 0.281 while the mean serum creatinine in the normotensive group was 0.92 ± 0.267, difference was not significant (p value 0.292)

Table 4: Blood Sugar & Renal function test

	Cases	**Controls**	**P value**
Blood Sugar	103.90 ± 9.9403	102.45 ± 6.2468	0.4371
Renal function test			
Serum Uric acid	5.958 ± 0.5514	5.775 ± 0.7027	0.2001
Serum Urea	36.20 ± 6.603	34.48 ± 7.463	0.2769
Serum Creatinine	0.98 ± 0.281	0.92 ± 0.267	0.2920

ISSN: 0975-3583,0976-2833 VOL14, ISSUE 12, 2023

Discussion

This rising trend in hypertension is found to be closely related to rise in obesity, sedentary lifestyle, insulin resistance and metabolic syndrome, which has led to a steep rise in the pre-clinical cardiovascular risk factors in hypertensive patients.[7] The endothelial dysfunction in hypertension leads to remodeling of the small and large arteries leading to a failure in the dilation of the high resistance vasculature that may further lead to reduced coronary reserve, plaque formation and stenoses and aneurysms, especially in the aorta, diagnosed by measuring the intima-media wall thickness in the carotid artery.[8]

More than 50% of hypertensive patients have additional cardiovascular risk factors. The most common additional risk factors are diabetes (15%–20%), lipid disorders (elevated low-density lipoprotein- cholesterol [LDL-C] and triglycerides [30%]), overweight-obesity (40%), hyperuricemia (25%) and metabolic syndrome (40%), as well as unhealthy lifestyle habits (eg, smoking, high alcohol intake, sedentary lifestyle).[9,10]

The presence of one or more additional cardiovascular risk factors proportionally increases the risk of coronary, cerebrovascular, and renal diseases in hypertensive patients.[11] In a study by Chataut J et al.,[12] age, gender, marital status, overweight (BMI ≥25), smoking, alcohol consumption, having diabetes, and family history of -hypertension were found to have significant association with hypertension in univariate analysis. The multivariate logistic regression analysis revealed that gender, having diabetes and physical activity had independent and significant association with hypertension.

Blood pressure is influenced by a number of environmental, genetic and lifestyle factors. Genetic factors play a role in the behavioural pattern of individuals which elevates blood pressure.Aging has significant effect on cardiovascular and renal functions which leads to hypertension. In adult women, blood pressure is lower than in men of comparable age. But the rise in blood pressure is more steep thereafter and around middle age , blood pressure is about the same in both men & women.Modifiable lifestyle factors such as obesity, excessive salt intake,heavy alcohol intake,smoking, physical inactivity and high stress levels play a major role in the development of hypertension. In our study we have found a very strong association between these variable risk factors and hypertension.

Hypertension is a silent killer, because people who have it are often symptom free or unaware of the disease. There is a need for strengthening and adoption of certain interventional measures in lifestyle such as reducing salt intake and weight reduction. Promoting physical activity among this vulnerable group should be encouraged. Once identified, elevated BP should be monitored at regular intervals because it is a lifelong disease.

Healthy lifestyle choices can prevent or delay the onset of high BP and can reduce cardiovascular risk.[16] Lifestyle modification is also the first line of antihypertensive treatment. Modifications in lifestyle can also enhance the effects of antihypertensive treatment. Lifestyle modifications should include Salt reduction, healthy diet, healthy drinks, moderation of alcohol consumption, avoid binge drinking, weight reduction, smoking cessation, regular physical activity and reduction of stress.

Conclusion

Healthy lifestyle choices can prevent or delay the onset of high BP and can reduce cardiovascular risk. Long term reduction in salt intake would significantly reduce the prevalence of hypertension and thereby decrease associated morbidity and mortality due to cardiovascular disease and stroke.

Conflict of Interest: None to declare
Source of funding: Nil

ISSN: 0975-3583,0976-2833 VOL14, ISSUE 12, 2023

References

1. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure:The JNC 7 report. Chobanian AV, Bakrie GL, Black HR et al. s.l. : JAMA, 2003, Vols. 289: 2560 - 72.
2. Stanaway JD, Afshin A, Gakidou E, et al. Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks for 195 countries and territories, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet. 2018 Nov 10;392:1923e1994.
3. Mittal BV, Singh AK. Hypertension in the Developing World: Challenges and Opportunities. American Journal of Kidney Diseases. 2010;55(3):590-98.
4. Bhadoria AS, Kasar PK, Toppo NA, Bhadoria P, Pradhan S, Kabirpanthi V. Prevalence of hypertension and associated cardiovascular risk factors in Central India. J Fam Community Med. 2014;21:29-38.
5. Anchala R, Kannuri NK, Pant H, Khan H, Franco OH, Di Angelantonio E, Prabhakaran D. Hypertension in India: a systematic review and metaanalysis of prevalence, awareness, and control of hypertension. J Hypertens. 2014;32:1170–1177.
6. Wang Z, Chen Z, Zhang L, Wang X, Hao G, Zhang Z, Shao L, Tian Y, Dong Y, Zheng C, Wang J, Zhu M, Weintraub WS, Gao R, China Hypertension Survey Investigators. Status of hypertension in China: results from the China Hypertension Survey, 2012–2015. Circulation. 2018;137:2344–2356.
7. Ford ES. Risks for all-cause mortality, cardiovascular disease, and diabetes associated with the metabolic syndrome: a summary of the evidence. Diabetes Care 2005; 28: 1769-1778.
8. Naseh G, Fard MM, Kazemi T, Mirgholami A, Hashemi N, Saburi A. Comparison of Carotid Intima-media Thickness in Hypertensive Patients and Control Group. J Cardiovasc Echogr. 2016 Apr-Jun;26(2):48-51.
9. Asayama K, Thijs L, Li Y, Gu YM, Hara A, Liu YP, Zhang Z, Wei FF, Lujambio I, Mena LJ, et al; International Database on Ambulatory Blood Pressure in Relation to Cardiovascular Outcomes (IDACO) Investigators. Setting thresholds to varying blood pressure monitoring intervals differentially affects risk estimates associated with white-coat and masked hypertension in the population. Hypertension. 2014;64:935–942
10. Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJ. Global and regional burden of disease and risk factors, 2001: systematic analysis of population health data. Lancet. 2006;367:1747–1757.
11. Williams B, Mancia G, Spiering W, Agabiti Rosei E, Azizi M, Burnier M, Clement DL, Coca A, de Simone G, et al. 2018 ESC/ESH Guidelines for the management of arterial hypertension: The Task Force for the Management Of Arterial Hypertension of the European Society of Cardiology and the European Society of Hypertension. J Hypertens. 2018;36:1953–2041.
12. Chataut J, Dahal S, Shrestha A, Bhandari MS. Prevalence of Hypertension and associated risk factors among bank workers in Kathmandu. J Kathmandu Med Coll. 2020;9(2):107-13.
13. Age is a determinant of renal sodium conservation in man. H., Muray E .Norman. s.l. : J Lab Clin Inv, 1975.
14. Abnormalities of water metabolism in the elderly. AI, Ayus JC & Arieff. s.l. : Semin Nephrol, Vols. 16, 277-288.
15. Electrolyte and salt disturbances in older people: causes, management and implications. Soiza RL, Graeme E & Chua M. s.l. : Rev Clin Gerontol, 2008, Vols. 18, 143 - 158.

ISSN: 0975-3583,0976-2833 VOL14, ISSUE 12, 2023

16. Piepoli MF, Hoes AW, Agewall S, Albus C, Brotons C, Catapano AL, Cooney MT, Corra U, Cosyns B, Deaton C, et al. 2016 European Guidelines on cardiovascular disease prevention in clinical practice: The Sixth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representatives of 10 societies and by invited experts) Developed with the special contribution of the European Association for Cardiovascular Prevention & Rehabilitation (EACPR). Eur Heart J. 2016;37:2315–2381.
17. He FJ, Li J, Macgregor GA. Effect of longer term modest salt reduction on blood pressure: Cochrane systematic review and meta-analysis of randomized trials. BMJ. 2013;346:f1325.