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A STUDY ON PREVALENCE OF LIPID AND GLYCAEMIC ABNORMALITIES IN PATIENTS WITH ESSENTIAL HYPERTENSION IN A TERTIARY CARE HOSPITAL

General Medicine

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ABSTRACT

Introduction: Hypertension is a major contributor to cardiovascular diseases, characterized by persistent high blood pressure and is ranked third most important risk factor for attributed burden of disease in South Asia and its prevalence is around 25% in urban and 10% in rural parts of India. Overweight, obesity and dyslipidaemia were very strongly associated with hypertension. **Objectives:** To determine prevalence of lipid and glycaemic abnormalities among essential hypertensive patients. **Methodology:** We adopted a hospital based cross-sectional study and recruited 200 patients diagnosed with essential hypertension and details related to diabetes, hypertension and obesity were collected and the possible association were established by applying appropriate statistical analysis. **Results:** Participants were distributed in all age groups with male predominance. Mean SBP was 159.08 ± 12.35 mmHg and mean DBP was 93.87 ± 6.02 mmHg. 82% of males and all women were obese. 21.50% had elevated FBS, 12% had elevated PPBS and 90% of them had HbA1c more than 6. Dyslipidaemia was seen in 46% of them and 42.50% had metabolic syndrome. **Conclusion:** Only Systolic blood pressure was with elevated PPBS, also blood pressure was significantly associated with glycaemic outcome, but not with dyslipidaemia and metabolic syndrome.

KEYWORDS

Essential hypertension, dyslipidaemia, Metabolic syndrome.

INTRODUCTION

Hypertension is defined as chronic elevation in blood pressure and it is a major contributor to cardiovascular disease and its associated complications.[1] Hypertension is characterized by persistently high blood pressure in the systemic arteries expressed as the ratio of systolic blood pressure and diastolic blood pressure.[2] According to WHO, hypertension is ranked third most important risk factor for attributed burden of disease in South Asia and is one of the most important cause for premature death worldwide with its prevalence being around 25% in urban and 10% in rural in India.[3]

Hypertension is considered a major global public health problem affecting an estimated 1.13 billion people worldwide and among 17 million deaths due to cardiovascular problems, complications of hypertension accounts for 9.4 million deaths every year. Hypertension is an important risk factor for coronary heart disease, congestive heart failure, ischemic and haemorrhagic stroke, renal failure, peripheral arterial disease and contributes to pathogenesis of microvascular complications in diabetes and is for diabetic retinopathy.[4]

Dyslipidaemia among diabetic individuals mediates cardiovascular risk and lipid changes may not only result in diabetes but may also cause disturbance of glucose metabolism.[5] Overweight, obesity and dyslipidaemia are very strongly associated with hypertension, especially weight gain associated with visceral fat gain is the main risk factor for hypertension which accounts for 65 to 75% of the risk of hypertension. Higher BMI, elevated serum cholesterol levels, LDL cholesterol and non-HDL cholesterol are associated with increased risk of hypertension.[6]

In India, one in four adult has hypertension, 7.5% of them have diabetes and the burden differs due to relatively poor control, disparity in health services and case fatality rates.[7] Diabetes mellitus affects around 422 million subjects worldwide and the frequent co-existence of type 2 diabetes and hypertension is not a coincidence, but due to aspects of pathophysiology shared by both conditions, particularly related to obesity and insulin resistance.[8,9]

METHODOLOGY

The patients visiting the Medicine OPD and those admitted in the medicine wards of Navodaya Medical College Hospital and Research Centre, Raichur with diagnosis of essential hypertension were the source of our data and we used a hospital based prospective cross-sectional study design. Our study was carried out from 1st January 2021 to 31st July 2022. Patients aged more than 18 years, diagnosed as primary/essential hypertension were included in our study and those diagnosed as secondary hypertension or with cardiovascular complications (IHD, LVH, etc.), renal complications (AKI, CKD, renal failure), during pregnancy were excluded from our study.

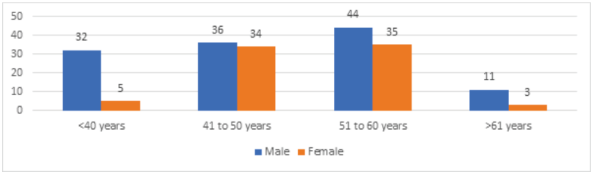
The sample size was calculated based on the formula used for sample size calculation for cross-sectional studies, $n = z^2 p q / d^2$ where, $z = 1.96$ (confidence limit at 95%), p = prevalence (31% - Prevalence of lipid abnormalities among patients with essential hypertension[10]), $q = 100 - p$ (100 – 31 = 69), d = allowable error (absolute error of 7). By substituting the values in the above formula, the sample size was calculated to be 167.70. (Considering the non-response rate the sample size was rounded off to 200) So, finally the sample size was estimated to be 200 and were selected based on simple random sampling technique.

Patients fulfilling the inclusion and exclusion criteria were selected after obtaining an informed written consent and once recruited, the patients or their attenders were explained in details about our study. A detailed history related to their co-morbidities like diabetes, hypertension, dyslipidaemia was collected. The necessary investigations included Complete Blood Count (CBC), Random blood sugar (RBS), Glycosylated Haemoglobin (HbA1c), Fasting Lipid Profile, Serum creatinine, Blood urea and Complete urine routine.

RESULTS

Out of the 200 subjects, 61.50% were males and 38.50% were females and mean age of the participants was 48.79 ± 8.09 years (Graph 1). The mean systolic blood pressure (SBP) was 159.08 ± 12.35 mmHg with 33% participants having SBP more than 161 mmHg and mean diastolic blood pressure was 93.87 ± 6.02 mmHg with 4% having DBP more than 101 mmHg. Mean waist circumference among males was 94.93 ± 4.72 centimetres and among females it was 92.09 ± 2.69 centimetres. Mean FBS was 101.63 ± 27.01 mg/dl, mean PPBS was 148.37 ± 39.69 mg/dl and mean HbA1c was 7.86 ± 2.16%. Lipid profile of the patients also showed deranged values with 28% reported elevated cholesterol, 19% had elevated triglycerides, 12.50% had elevated LDL and 30% had deranged HDL levels. The glycaemic outcome showed that 30.50% had impaired glucose tolerance, 2.50% had impaired fasting glucose, 9.50% were diabetic and rest 57.50% had normal glycaemic outcome. 46% of the participants had dyslipidaemia and 42.50% had metabolic syndrome. The association between blood pressure and waist circumference did not show statistically significant association, similarly association between FBS and blood pressure was not significant, but association between PPBS and blood pressure was

significant (Table 1). Similarly, association between blood pressure and lipid profile failed to show any statistical significance even though SBP and DBP was seen elevated among participants with deranged lipid profile. Very significant association was established between elevated blood pressure and glycaemic outcome (Table 2).



Graph 1: Age And Gender Wise Distribution Of Participants

Table 1: Association Between Blood Pressure And Glycaemic Parameters

Sl. No	Glycaemic parameters		SBP (Mean ± SD)	DBP (Mean ± SD)
01	FBS	>126 mg/dl (n=43)	156.93 ± 13.30	94.42 ± 5.91
		<125 mg/dl (n=157)	159.67 ± 12.01	93.71 ± 6.05
t test value (p value)			1.295 (0.1969) NS	-0.685 (0.4940) NS
02	PPBS	>200 mg/dl (n=24)	153.08 ± 11.93	92.25 ± 4.05
		<200 mg/dl (n=176)	159.89 ± 12.18	94.09 ± 6.21
t test value (p value)			2.576 (0.0107) *	1.410 (0.1602) NS

(T test: NS – Not significant, * - significant, at p value <0.05)

Table 2: Association Between Blood Pressure And Glycaemic Outcome

Sl. No	Glycemic outcome	SBP (Mean ± SD)	DBP (Mean ± SD)
01	Impaired glucose tolerance (n=61)	165.28 ± 16.37	96.46 ± 8.24
02	Impaired fasting glucose (n=5)	150 ± 0	100 ± 0
03	Diabetic (n=19)	153.37 ± 10.13	92.84 ± 4.49
04	Normal (n=115)	157.13 ± 8.78	92.39 ± 4.14
ANOVA f value (p value)		9.328 (<0.00001) *	8.878 (0.000015) *

(ANOVA test: NS – Not significant, * - significant, at p value <0.05)

DISCUSSION

Tang N, et al, reported in their study the mean age to be 66.50 ± 10.50 years and 80% were aged more than 45 years with only 28.20% being males, whose results were not similar to that of ours.[6] Similarly, higher age distribution was seen in Zhu B, et al, where mean age was 60.89 years and 33.90% were males.[11] As reported by Gebrie A, et al, mean age noted was 51.21 ± 12.30 years.[10] Sarno F, et al, reported that mean age was 57.80 ± 11.90 years with 92% aged more than 40 years.[12] According to a study by Mahto SK, et al, 60% were males and mean age was 43.06 ± 10.68 years, which was closer to our findings.[13] Cheng W, et al, reported mean age of the hypertensive patients to be 53 years and 67% were males.[14] Mean age of the patients was 40.60 ± 4.95 years and 44% were males, as reported by Nayak P, et al, which was quite lower than that of ours.[15]

Kang NL reported that maximum SBP recorded was 159 mmHg and maximum DBP recorded was 101 mmHg, which was quite similar to our findings.[16] Mean SBP as reported by Zhu B, et al, was 149mmHg and mean DBP was 85 mmHg, which was slightly lower compared to our study.[11] Mean systolic blood pressure as per Mahto SK, et al, was 160.68 ± 19.75 mmHg and mean diastolic blood pressure was 84.44 ± 4.32 mmHg and their findings were partly similar to our findings.[13] Mean SBP was 162 ± 2.68 mmHg and mean DBP was 95 ± 4.6 mmHg as per findings by Nayak P, et al, which almost similar to our findings.[15] Gebrie A, et al, reported that among men mean WC was 91.05 ± 8.88 centimetres with 65.45% having WC more than cut-off and among women, 91.11% had WC more than cut-off value and mean WC was 98.67 ± 14.16 centimetres, whose findings varied slightly from that of ours.[10]

Mean FBS was 88.10 ± 5.38 mg/dl as per Nayak P, et al which was very low compared to our findings.[15] In our study, 28% had elevated total cholesterol levels with mean being 184.21 ± 39.93 mg/dl, 24.50% had elevated triglyceride levels with mean TGL 157.05 ± 47.59 mg/dl, 28% had elevated LDL with mean LDL 110.62 ± 33.21 and 30% had deranged HDL levels and mean HDL was 44.16 ± 5.89 mg/dl. Mahto SK, et al, reported in their study that mean total cholesterol was 213.72 ± 43.32 mg/dl, mean LDL was 138.08 ± 40.64 mg/dl, mean triglycerides was 183.26 ± 55.59 mg/dl and mean HDL was 34.38 ± 5.98 mg/dl and it was evident that their findings were quite higher compared to that of ours.[13] Cheng W, et al, reported mean total cholesterol to be 191.75 mg/dl, mean triglycerides was 97.46 mg/dl, mean LDL was 110.95 mg/dl and mean HDL was 51.45 mg/dl and this findings were not similar compared to our findings.[14]

CONCLUSION

Increase in blood pressure was not significantly associated with waist circumference, but blood pressure was significantly higher among subjects with impaired glucose tolerance and among diabetic individuals. Though blood pressure was elevated among individuals with high lipid profile, the difference was not statistically significant.

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