



LIPID PROFILE AND HYPERTENSION

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ABSTRACT **Background:** Hypertension and dyslipidemia are major risk factors for cardiovascular disease, causing highest morbidity and mortality. The objective of this study was to determine the association between serum lipid profiles in hypertensive patients **Methods:** Patients: This study was conducted at tertiary care hospital. 50 patients with hypertension and 25 normotensive patients as control were selected for the study. All the patients were above 40 years of age at the time of study. Data were collected on sociodemographic factors, anthropometric measurements, blood pressure, and lipid profile including total cholesterol (TC), triglyceride (TG), low density lipoprotein (LDL), and high density lipoprotein (HDL). Statistical methods All continuous variables were reported as mean with their standard deviation and percentages or proportions was used for categorical data. t test for continuous data and the chi-square test is for categorical data was used as test for significance. **Results:** The mean (\pm standard deviation) age was 45.43 year \pm 4.973 and there were more males than females ($P > 0.05$). The serum levels of TC, TG, and LDL were higher while HDL levels were lower in hypertensive subjects compared to normotensives, and difference was statistically significant ($P < 0.01$). Waist circumference, and body mass index showed significant association with hypertensive patients ($P < 0.01$). The logistic regression analysis showed that hypertensive patients had 1.1 times higher TC, 1.2 times higher with LDL and TG and for HDL it was 0.8 that indicates a protective effect and 20 % reduced risk of having hypertension which was statistically significant **Conclusion:** In hypertensive patients there is association with dyslipidemia and so there is need of measurement of blood pressure and lipid profile at regular intervals to prevent cardiovascular disease, stroke, and other comorbidities.

KEYWORDS : lipid profile, cardiovascular diseases, dyslipidemia, blood pressure

INTRODUCTION

It is known that CVD is associated with hypertension and increased blood levels of low-density lipoprotein (LDL), total cholesterol (TC), and triglycerides (TG) and low level of high density lipoprotein (HDL) is a risk factor for mortality from CVD cause 80% of deaths and disability in low- and middle-income countries.^{1,2} Patterns of lipid abnormalities among Asians and their relative impact on cardiovascular risk have not been well characterized. Low HDL is increasingly recognized as an independent risk factor for adverse CVD related outcomes, irrespective of levels of LDL.^{3,4,5,6}

The purpose of the study was to compare the blood lipid levels in hypertensive patients with normotensive control.

Methods

Patients: This study was conducted at tertiary care hospital in 50 hypertensives and 25 controls. Study period – January 2023 to March 2023. Patients with hypertension on treatment or newly diagnosed hypertensives above 40 years and both gender were selected for the study. Patients with systolic blood pressure more than 140 mm Hg and diastolic pressure above 90 mm Hg were selected based on JNC IX criteria and with complications such as cerebro vascular disease and cardiovascular disease were also selected while Patients with Diabetes mellitus, with secondary hypertension and those on lipid lowering drugs were excluded. The control population consists of 25 patients without hypertension or its complications were selected

Measurements

All anthropometric measurements were collected by the same individual. BP was measured using standard BP measurement protocol after the patient had rested for 10 minutes.

SAMPLE PREPARATION.

After obtaining written informed consent, data was collected, The selected patients were instructed to have a fat free meal the day before obtaining the sample. Following an overnight fasting for 12 hours, samples were obtained the next day morning. Blood was drawn from ante-cubital vein after cleaning and 10 ml of blood was drawn in a sterile syringe and transferred to the laboratory in sterile, dry glass tubes. Blood samples were centrifuged for 10 minutes at 5000 rpm. and serum were separated Hemolysed samples were not taken for the study.

Biochemical analysis

The clear supernatant serum was removed using dry pipettes and were analysed on machine Erba XL-640 fully automated analyser. All tests

were carried out at the laboratory. Lipid parameters (TC, TG, and HDL) were estimated by enzymatic colorimetric methods.

TG by enzymatic method (Glycerol-3 phosphate oxidase GPO). Total cholesterol by enzymatic method (cholesterol oxidase CHOD-PAP). HDL-cholesterol by direct method (cholesterol oxidase). LDL-cholesterol calculated by Friedwald formula: LDL cholesterol (mg/dl) = Total cholesterol (mg/dl) - HDL cholesterol (mg/dl) - TG/5 (mg/dl) Dyslipidemia was defined according to the Evaluation and Treatment of High Blood Cholesterol in Adults.

Data analysis

All the data was entered in Microsoft excel and coded and analyzed with SPSS version 25 All continuous variables were reported as mean with their standard deviation. t test for continuous data and the chi-square test statistical analysis for categorical data was done.. P value less than 0.05 was taken as significant.

Binary logistic regression analysis was performed to measure the relationship of lipid profile among the hypertensive and normotensive patients after adjusting for age, BMI, sex, and BP.

Results

The mean (\pm standard deviation) age was 45.43 years \pm 4.973 and there were more males than females ($P > 0.05$). The serum levels of TC, TG, and LDL-cholesterol were higher while HDL-cholesterol levels were lower in hypertensive subjects compared to normotensives, which was statistically significant ($P < 0.01$). Waist circumference, and body mass index showed significant association with hypertensive patients ($P < 0.001$) but not with normotensives. The logistic regression analysis showed that hypertensive patients had 1.1 times higher TC, 1.2 times higher with LDL-cholesterol and TG and for HDL-cholesterol it was 0.8 that indicates a protective effect and 20 % statistically significant reduced risk of having hypertension ($P < 0.01$).

Table 1 characteristics of the respondents

Variables	Group	N Sample size	Mean	Std. Deviation	p value
Age	1	50	45.36	4.852	0.871
	2	25	45.56	5.308	
Total cholesterol	1	50	230.18	7.735	<0.01
	2	25	137.00	6.338	
Low density lipoprotein	1	50	139.80	4.101	<0.01
	2	25	64.00	.000	

High density lipoprotein	1	50	32.96	2.176	<0.01
	2	25	49.68	2.868	
Triglyceride	1	50	195.68	4.128	<0.01
	2	25	125.76	1.332	
Body mass index	1	50	25.52	2.830	<0.01
	2	25	27.32	1.626	
waist circumference	1	50	100.76	5.968	<0.01
	2	25	93.40	9.700	

Group 1 cases (hypertensives)

Group 2 controls (normotensives)

Table 2 Analysis for hypertensive and normotensive participant

Variables	Group 1	Group 2	P value
Addiction			<0.01
No	3	22	
Yes	47	3	
CVA			<0.01
No	11	25	
Yes	39	0	
IHD			0.102
No	5	25	
Yes	45	0	
Gender			0.803
Female	21	9	
Male	29	16	

DISCUSSION

In this study the mean values of serum TC, TG, and LDL were significantly higher and statistically significant among the hypertensives compared to normotensives. The mean HDL level was lower in the hypertensives when compared to normotensives and was statistically significant. In our study age, gender and addiction was not associated with hypertension.

In Choudhury KN, study mean age \pm SD of 44.7 ± 5.7 years and mean BMI of 25.2 ± 3.8 kg/m². TC, HDL, and LDL were higher for males compared to females, and difference was statistically significant ($P < 0.05$). In our study mean waist circumference was higher in males than females and was statistically significant. In Choudhury KN, study the mean WC was higher in males, which was not statistically significant.⁷ In Mohammad Akram Shaikh where out of 100 cases 56 (56%) were males and 44 (44%) were females.⁸

In Choudhury KN, study serum levels of TC, TG, and LDL were 238.3 ± 3.4 , 178.3 ± 6.3 , and 151.3 ± 7.8 mg/dl, respectively, in hypertensive subjects while in normotensive subjects, they were 187 ± 6.2 , 141.5 ± 11.2 , and 110.3 ± 6.3 mg/dL, respectively, and the difference seen was statistically significant. The serum HDL was significantly lower ($P < 0.001$) in hypertensive patients (41.2 ± 3.2 mg/dl) than in normotensive subjects (44.3 ± 5.6 mg/dl). WC, and BMI showed significant association with hypertensive patients ($P < 0.001$) but not with normotensive subjects.⁷

Teo K in a prospective study revealed that serum total cholesterol, triglyceride and LDL-cholesterol were significantly raised ($p > 0.001$) whereas the level of HDL-cholesterol was significantly lower ($p > 0.001$) in hypertensive patients as compared to control subjects. No significant changes of serum lipid profile were found between male and female hypertensive patients, but in control subjects, markedly higher levels of serum lipid profile was observed in male compared to that of female. It was concluded that hypercholesterolaemia, hypertriglyceridaemia and low density lipoprotein are the main lipid abnormalities.⁹ Our findings of increased levels of TC in hypertensive patients are similar to the findings of some other studies. In Saha study.⁶ In Sarkar study findings similar to our study was seen.¹⁰

Analysis from the INTERHEART study shows that among both cases and controls, mean LDL levels were about 10 mg/dl lower in Asians compared with non-Asians who require further study and targeted intervention. Several studies have shown that most of the hypertensive patients undergo inconsistent treatment, and there was significant changes seen in serum for TC, TG, HDL, and LDL levels in hypertensive patients.¹¹

A wide range of risk factors for CVD has been studied in Bangladesh, but few studies have measured the association of CVD risk with

hypertension and lipid profile.

CONCLUSIONS

This study demonstrate that patients with hypertension are more likely than normotensive patients to exhibit dyslipidemia, including elevated TC, LDL, TG, and reduced HDL cholesterol levels. Therefore, the findings from investigations of these parameters may reinforce routine monitoring of hypertensive patients in daily clinical practice to prevent CVD and other harmful consequences of hypertension.

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