

## Study of Serum lipid profiles associated with hypertensive patients

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**Abstract**

**Background:** High blood pressure is associated with elevated atherogenic blood lipid fractions. A better understanding of the relation between blood pressure and blood lipids may provide insight into the mechanisms of hypertension associated with increased risk of coronary heart disease. **Methods:** the serum lipid profile of 50 hypertensive patients were studied and compared with healthy controls. The serum lipid profile was studied concerning various clinical profiles like age, gender, incidence, etc. **Result:** higher number of patients with hypertension were above 40 years of age group. The serum value of total cholesterol (TC), very low-density lipoprotein (VLDL), Low-density lipoprotein (LDL), Total cholesterol (TC)/High-density lipoprotein (HDL), triglycerides (TGL), Low-density lipoprotein LDH/high-density lipoprotein LDH were significant elevated in the hypertensive group as compared to healthy controls. The incidence of hyperlipidemia was more in male patients. **Conclusion:** there was a significant alteration observed of lipid profiles in hypertensive patients as compared to controls.

**Keywords:** Lipoprotein, Atherosclerosis, lipid, obesity.

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**Introduction**

Hypertension and dyslipidemia are prime fear for cardiovascular disease (CVD) and account for more than 80% of mortality and disabilities in low- and middle-income countries [1-2]. It is widely recognized that CVD is concerned with hypertension and increased blood levels of low-density lipoprotein (LDL), total cholesterol (TC), and triglycerides (TG). In contrast, a low level of high-density lipoprotein (HDL) is a risk factor for mortality from CVD [3]. The prevalence of hypertension is estimated to increase globally, especially in developing countries, and epidemiological studies have shown a strong association between hypertension and coronary artery disease [4]. Many studies have shown that triglycerides (TG), total cholesterol (TC), and practically all fractions of lipoproteins tend to be abnormal among hypertensive patients than in the healthy population. In general, black Africans have been reported to have lower serum total cholesterol and higher high-density lipoprotein cholesterol (HDL-C) than whites and other blacks in industrialized countries; however, as in Westernized countries, age, sex, socioeconomic status, and diet also significantly affect lipid levels in healthy Africans [5-8]. Hypertension is associated with alterations in lipid metabolism, which gives rise to abnormalities in serum lipid and lipoprotein levels. It has also been documented that the presence of hyperlipidemia substantially worsens the prognosis in hypertensive patients. The consistent clustering of hypertension, lipid abnormalities, and other metabolic abnormalities in an individual has been clearly proven to be synergistic in accelerating atherosclerosis and CVD development [9-10].

**Material and methods**

Our cross-sectional study was carried out in Gajra Raja Medical College and Jaya Arogya Hospital Gwalior Madhya Pradesh, India, during the period between September 2008 to October 2009. Ethical clearance was taken by the institutional Ethics Committee and obtained informed consent from adult research participants. A total of 50 patients with essential hypertension attending the hospital and 50

healthy control subjects were included in the study. The patients were in the age group of 30-80 years. Both known hypertensive patients who were on treatment for a varying time and newly diagnosed hypertensive patients were included in the study. Inclusion Criteria patients who have essential hypertension without the complication of hypertension and on medication were included in the study. Diastolic pressure should be > 90 mmHg, and Systolic Blood pressure should be > 140 mmHg based on the average of two readings are considered. Exclusion Criteria Secondary hypertensive subjects were excluded from the study. After selecting cases for the study, each patient was subjected to the following as per format. A detailed history, Careful physical examination, Laboratory investigations which includes complete blood count, Urine-albumin, sugar, microscopy, Fasting blood sugar, post-prandial blood sugar, Electrocardiograph, Lipid profile (Total cholesterol, HDL cholesterol, LDL cholesterol, VLDL, Triglycerides), chest X-ray were done in relevant cases. Microsoft excel analyzed the Parameters.

**Results****Table 1: Distribution of hypertensive patients group (n=50).**

S.NO.	Group	No. of patient (n=50).
1	Male	29
	Female	21
2	Below 40yr	16
	Above 40yr	34
3	Tobacco addict	19
	Tobacco non addict	31
4	Alcohol addict	06
	Alcohol non addict	44

In the present study, male hypertensive patients were 29, and female hypertensive patients were 21. Patients Below 40 years of age 16 and above 40 years of age group patients were 34. Tobacco addict patients were 19, and tobacco nonaddict patients were 31. Alcohol addict hypertensive patients were 06, and alcohol nonaddict patients were 44 [Table 1].

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E-mail: [meenaanil10@gmail.com](mailto:meenaanil10@gmail.com)**Table 2: Mean of serum total cholesterol, serum triglyceride, serum high density lipoprotein cholesterol, low density lipoprotein in control and in hypertensive patients (n=50).**

	No. of cases	Mean TC mg/dl (S D)	Mean TG mg/dl (S D)	Mean HDL-C mg/dl (S D)	Mean LDL-C mg/dl (S D)
control	50	160.16 ±26.93	107.30 ±25.53	46.06 ±5.37	94.04 ±20.76

Hypertensives	50	187.42 ±25.38	131.08 ±25.6	41.04 ±4.36	105.12 ±22.92
P		<0.05	<0.05	<0.05	<0.05
T		5.21	4.64	5.13	2.60
Significance		Highly significant	Highly significant	Highly significant	significant

[TG = Triglyceride, TC = Total Cholesterol, HDL-C = High Density Lipoprotein Cholesterol, LDL-C= Low Density Lipoprotein Cholesterol]

Table 2 shows high serum total cholesterol, high serum triglyceride, high serum low-density lipoprotein cholesterol in hypertensive patients than the control group and low level of high-density lipoprotein cholesterol in hypertensive patients than in the control group. The result of the patients was highly significant statically. In this study, average serum total cholesterol, serum triglyceride serum high-density lipoprotein cholesterol, and low-density lipoprotein cholesterol estimated in hypertensive patients were 187.42±25.38 mg/dl, 131.08±25.06mg/dl, 41.04±4.36mg/dl and 105.12±22.92mg/dl respectively[Table 2]. In the control group, average serum total cholesterol, serum triglyceride serum high-density lipoprotein cholesterol, and low-density lipoprotein cholesterol were 160.16±2 6.29 mg/dl, 107.30±25.53mg/dl, 46.06±5.73mg/dl, and 94.04± 20.76mg/dl, respectively on comparing serum lipid levels of hypertensive patients with controls significantly high level of total serum cholesterol (p<0.05), high level of serum triglyceride (p<0.05), high level of low-density lipoprotein (p<0.05) and low level of high-density lipoprotein cholesterol (p<0.05) were found [Table2].

#### Discussion

In the present study, 50 hypertensive patients and 50 healthy control subjects were included. Hypertension is considered systolic blood pressure must be ≥ 140 mmHg, and diastolic blood pressure must be ≥ 90 mmHg. Blood sample draws for lipid profiles.

In our study, 50 hypertensive patients were included, in which 71% had hyperlipidemia; male hypertensive patients were 29 male, and female hypertensive patients were 21. Hakim et al.[11] in his study found that in hypertensive subjects, dyslipidemia was present 40% of patients, and the male-female ratio was 3:1. Assmann et al. [12], in the PROCAM study, found that most lipid abnormality prevalence correlates very well to our study. The present study has shown that the lipid fractions, TGL, LDL-C, VLDL, TC/HDL-C, and LDL/HDL-C ratio were greater in the hypertensive than those in healthy controls. In the results present study, all the lipid fractions were increased except HDL-C, which was reduced. The change in TC, TGL, HDL-C, LDL-C, VLDL-C, TC/HDL-C, LDL-C/HDL-C was statistically significantly more significant in hypertensive subjects than healthy controls. The Study of Sarkar et al., Chen YD et al., and R Pramila Devi et al.[13-15] supported that hypertensive patients are found dyslipidemia and elevated total cholesterol, low-density lipoprotein cholesterol, total cholesterol/high-density lipoprotein cholesterol. The authors in their study results were well correlated with the present study. Akiyama SA et al. [16] studied and correlated serum total cholesterol in hypertensive Northern Nigerians. In their study, serum total cholesterol concentrations are significantly high in hypertensive patients than in normotensive patients. In the present study, serum TC concentrations are significantly elevated in hypertensive patients than in healthy controls. These results of the study were consistent with earlier observations in parts of the world and other parts of Nigeria [17,18]. High concentrations of serum cholesterol increase the risk of developing macrovascular complications such as coronary heart disease and stroke [19].

#### Conclusion

There was a significant alteration of lipid profile in hypertensive patients as compared to controls. Hypertension was more common in middle-aged and elderly subjects, and males were more commonly affected than females. Total cholesterol TC, LDL cholesterol, triglycerides, VLDL, TC/HDL, and LDL/HDL ratios were significantly elevated in patients with hypertension. HDL was significantly reduced in hypertensive subjects. LDL/HDL ratio was raised in men when compared with women, which was statistically significant. The mean values of TC, LDL, TC/HDL, LDL/HDL were higher in obese when compared with non-obese hypertensive patients, which was statistically significant.

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