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Lipid Profile Analysis among the Patients with Hypertension in a Tertiary Care Hospital in Bangladesh

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Abstract

Background: Hypertension and dyslipidemia are two common and major risk factors for cardiovascular disease, accounting for the majority of morbidity and mortality among Bangladesh population. In this study, our main goal was to evaluate the lipid profile abnormalities among patients with essential hypertension. **Material and Methods:** This case-control study was conducted at the department of the Cardiology, M. Abdur Rahim Medical College Hospital, Dinajpur, Bangladesh, from March 2021 to February 2022. A total of 500 participants were recruited as the study population. Among them, 250 were primarily hypertensive patients of the age group between 30 to 70 years, as the case group, and 250 non-hypertensive patients of the same age group who attended OPD and indoor department of the hospital for other illnesses were recruited as the control group. **Results:** The majority of the study population (36.4%) was in 60-70 years of age group, followed by 27% in 50-59 years, 21.2% were in 40-49 years and 15.4% were in 30-39 years of age group. In hypertensive group majority (59.2%) of the patients were male and 40.8% were female. Where as in the control group, 50.4% were female, and 49.6% were male. Higher BMI status was seen in cases, 25.53±3.94 and control 24.33±4.09. In hypertensive patients (Cases) mean systolic blood pressure (SBP) was 153.52 ± 24.40 mm Hg and mean diastolic blood pressure (DBP) was 94.56 ± 15.59 mm Hg and Control group had normal blood pressure. Raised levels of total cholesterol, triglycerides, and LDL were noted among hypertensive patients than that of control group and which was found to be statistically significant.

Conclusion: This study shows significant difference in different components of cholesterol levels between hypertensive and normotensive study population suggesting dyslipidemia as a common association in hypertensive patients.

Keywords: Hypertension, Dyslipidemia, Cardiovascular disease, High cholesterol.

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Introduction

Hypertension and dyslipidemia are important risk factors for CVD, accounting for more than 80% of fatalities and disabilities in low and middle-income countries.[1,2] The global prevalence of hypertension is expected to rise, particularly in emerging nations.[2] Rapid urbanization, greater life expectancy, bad nutrition, and lifestyle changes have all contributed to an increase in CVD in Southeast Asia, particularly in Bangladesh, in recent years.[3] It is commonly established that CVD is linked to hypertension and elevated levels of low-density lipoprotein (LDL), total cholesterol (TC), and triglycerides (TG) in the blood. A low amount of high-density lipoprotein (HDL) on the other hand is a risk factor for CVD mortality.[4-5] Epidemiological research has found a substantial link between hypertension and coronary artery disease. The coexistence of these two risk factors has a more than additive negative impact on the vascular endothelium, resulting in increased atherosclerosis and CVD. They are key components of metabolic syndrome (MS), as described by the National Cholesterol Education Program (NCEP) Guidelines (Adult Treatment Panel III).[6] According to the Framingham Heart Study statistics on the hypertensive population, more than 80% had at least one extra cardiovascular disease risk factor, and the majority of these risk factors were atherogenic in origin.[7] Some studies discovered that treating dyslipidemia had a positive effect on both coronary and cerebrovascular events.[8-10] In this study, our main goal is to evaluate the Lipid Profile Abnormalities among Patients with essential Hypertension.

Objective

General objective:

The general objective of the study was to analyze the pattern of lipid profiles among patients with essential hypertension.

Specific objective:

- To assess the lipid profile abnormalities among patients with hypertension.
- To evaluate the associated risk factors for lipid profile abnormalities in patients with hypertension.

Material and Methods

This case-control study was conducted at the Department of Cardiology, M. Abdur Rahim Medical College Hospital, Dinajpur, Bangladesh, from March 2021 to February 2022. 500 participants were recruited as the study population. Among them, 250 were primarily hypertensive patients of the age group between 30 to 70 years, as the case group, and 250 non-hypertensive patients of the same age group who attended OPD and indoor department of the hospital for other illnesses were recruited as the control group of the study. History about associated risk factors like diabetes mellitus, smoking, alcohol, heart diseases, stroke, etc. Were taken and history regarding causes of secondary hypertension like chronic renal failure, renal artery stenosis, hyperaldosteronism, pheochromocytoma, thyroid disease, Cushing syndrome, coarctation of the aorta, etc. were ruled out. General physical examination and anthropometric measurements like height and weight were measured; blood pressure and heart rate were recorded. Investigations like Total cholesterol (TC), High-density lipoprotein cholesterol (HDL) levels, Low-density lipoprotein cholesterol (LDL) levels, and triglycerides (TG) were estimated. Those who had TC $\geq$ 200 mg/dl or TG $\geq$150 mg/dl or LDL $\geq$130 mg/dl or HDL<40 mg/dl for men and <50 mg/dl for women were considered dyslipidemic.[5] Hypertension is defined as Systolic blood pressure (SBP) $\geq$ 140mmHg and or Diastolic blood pressure (DBP) $\geq$ 90mmHg. Data were enteredin an MS excel sheet and analyzed by using SPSS software version 23.0.Qualitative data were represented as proportions/percentages and quantitative data was represented as Means &

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standard deviations. An unpaired T-test was used to find out the significance of the difference between the two means. The significance of the difference in the percentage of dyslipidemia among each group was analyzed using the chi-square test. P value<0.05 was considered statistically significant.

Results

In table-1 showed the age distribution of the study population where the majority belonged 60-70 years age group, 36.4%. Followed by 27% belong to the 50-59 years age group, 21.2% belong to the 40-49 years age group and 15.4% belong to the 30-39 years, age group. The following table has given below in detail:

Table 1: Participants distribution based on age group (N=500)

Age group (in years)	Male	Female	Total	P-value
30-39 yrs.	48 (17.6%)	29 (12.7%)	77 (15.4%)	0.381
40-49 yrs.	54 (19.9%)	52 (22.8%)	106 (21.2%)	
50-59 yrs.	73 (26.8%)	62 (27.2%)	135 (27.0%)	
60-70 yrs.	97 (35.7%)	85 (37.3%)	182 (36.4%)	
Total	272 (100%)	228 (100%)	500 (100%)	

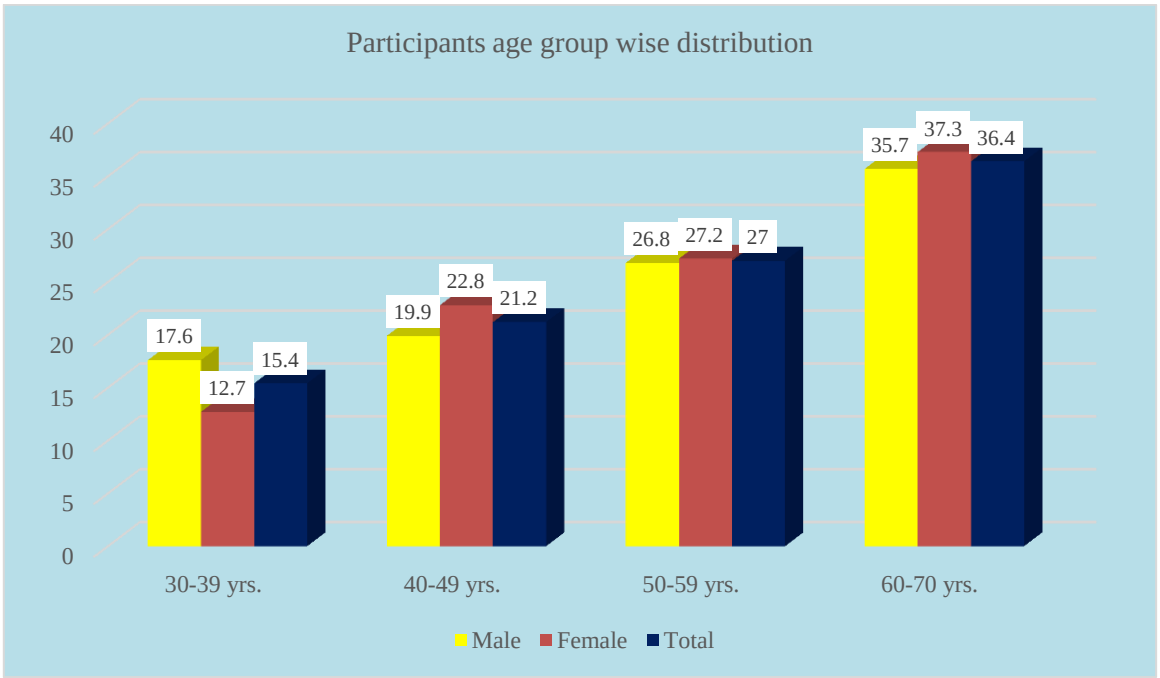

Figure 1: Participants Age Group Wise Distribution

In table-2 showed gender distribution in the hypertensive case group males were higher at 59.2% than females at 40.8%. Whereas in the control group, 50.4% were female, and 49.6% were male. The following table is given below in detail:

Table 2: Gender distribution between case and controls (N=500)

Gender	**Case**	**Control**	**Total**	**P-value**
Male	148 (59.2%)	124 (49.6%)	272 (54.4%)	0.031
Female	102 (40.8%)	126 (50.4%)	228 (45.6%)	
Total	250 (100%)	250 (100%)	500 (100%)	

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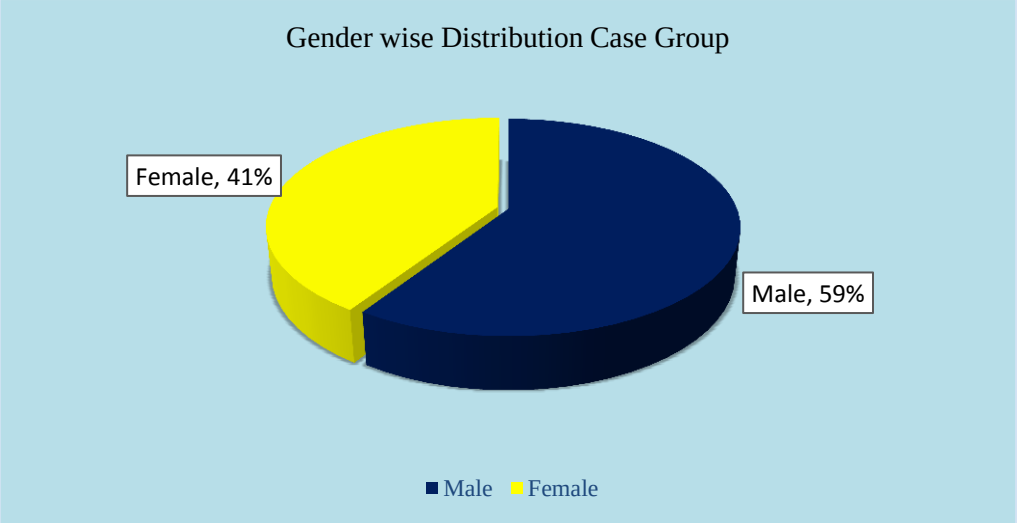

Figure 2: Gender wise Distribution Case Group

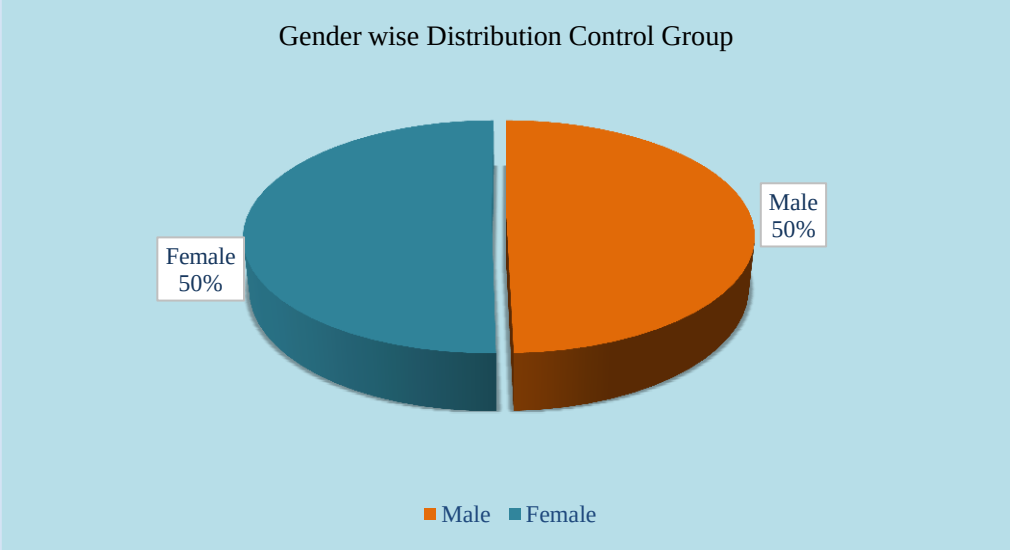

Figure 2: Gender wise Distribution Control Group

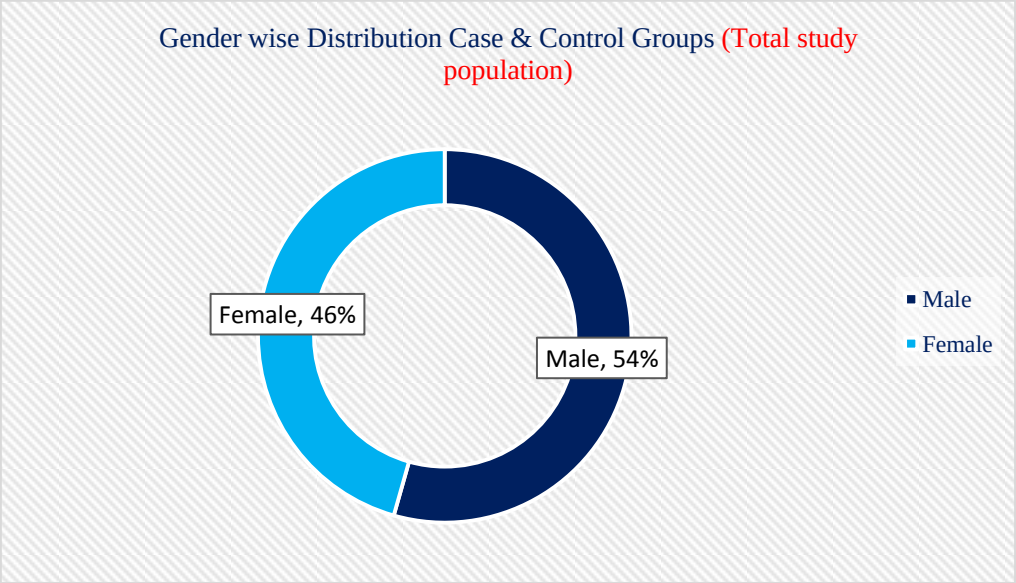

Figure 3: Gender wise Distribution of Case &Control Groups

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In table-3 showed the comparison of mean SBP, DBP, and BMI where higher BMI status was seen in cases, 25.53±3.94 and control 24.33±4.09. However, in the case group elevated levels of SBP, 153.52±24.40, and DBP, 94.56±15.59 were noticed more than in the control group. In fact, a significant association was also noted. The following table has given below in detail:

Table 3: Comparison of mean SBP, DBP, and BMI between case and control group (N=500)

Parameter	Case Mean ± SD	Control Mean ± SD	P-value
SBP	153.52±24.40	116.92±13.50	0.001
DBP	94.56±15.59	76.44±8.47	0.001
BMI	25.53±3.94	24.33±4.09	0.001
Waist Circumference	95.97±9.33	91.98±9.08	0.001

In table-4 shows a comparison of mean lipid values between case and controls. In the case of the group, triglyceride level was mildly higher, 192.62±107.81 than control group, 149.70±69.99. Besides that, in both groups elevated level of LDL was noticed, 125.82±44.17 and 119.15±40.20. Where total cholesterol was slightly higher in the case group 204.82±52.59 than in the control 191.95±45.89. The following table is given below in detail:

Table 4: Comparison of mean lipid values between case and controls (N=500)

Parameter	Cases Mean ± SD	Controls Mean ± SD	P-value
Total Cholesterol	204.82±52.59	191.95±45.89	0.004
Triglycerides	192.62±107.81	149.70±69.99	0.001
HDL	40.84±8.83	42.94±9.46	0.011
LDL	125.82±44.17	119.15±40.20	0.078

In table-5 showed a comparison of dyslipidemia between cases and controls. Raised levels of total cholesterol, triglycerides, and LDL were higher among hypertensive patients than controls and this difference was found to be statistically significant. The following table is given below in detail:

Table 5: Comparison of dyslipidemia between case and controls (N=500)

Lipid parameter	Sub-category	Cases	Controls	Total	P-value
Cholesterol	Dyslipidemia	124 (49.6%)	111 (44.4%)	235 (47.0%)	0.245
	Normal	126 (50.4%)	139 (55.6%)	265 (53.0%)	
Triglycerides	Dyslipidemia	127 (50.8%)	107 (42.8%)	234 (46.8%)	0.073
	Normal	123 (49.2%)	143 (57.2%)	266 (53.2%)	
HDL	Dyslipidemia	85 (34.0%)	85 (34.0%)	170 (34.0%)	1.000
	Normal	165 (66.0%)	165 (66.0%)	330 (66.0%)	
LDL	Dyslipidemia	117 (46.8%)	104 (41.6%)	221 (44.2%)	0.243
	Normal	113 (53.2%)	146 (58.4%)	279 (55.8%)	

Discussion

In our study, in hypertensive group majority (59.2%) of the patients were male and 40.8% were female. Whereas in the control group, 50.4% were female, and 49.6% were male.

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Which was similar to another study where the majority was male in both the hypertensive group and the control group? In fact, according to their study, hypertension increases as age increases. A similar type of results we have also found in our study where the majority belonged 60-70 years age group, 36.4%. Followed by 27% belonging to the 50-59 years age group, 21.2% belonging to the 40-49 years age group, and 15.4% belonging to the 30-39 years age group.[11] In one report it was found that, a mean age ± SD of 44.7±5.7 years and BMI of 25.2±3.8 kg/m^2. The mean SBP and DBP were 137.9±9.6 mmHg and 94.4±8.8 mmHg, respectively. The mean BMI, TC, HDL, and LDL were higher for males compared to females, which was statistically significant ($P<0.05$).[12] Whereas in our study, higher BMI status was seen in both cases, 25.53±3.94 and control 24.33±4.09. However, in the hypertensive group elevated levels of SBP, 153.52±24.40, and DBP, 94.56±15.59 were noticed more than in the control group. In fact, a significant association was also noted. 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.[13-14] A study in rural areas of Bangladesh reported that the prevalence of "high" TC concentration (>240 mg/dL or >6.2 mmol/L) in Bangladesh is about 17%, "high" LDL (≥160 mg/dL or ≥4.2 mmol/L) is about 2%, and "low" HDL (<40 mg/dL or <1.04 mmol/L) is about 67%.[15] Whereas our study found that the mean ±SD of the total cholesterol, LDL, and triglycerides were significantly higher in hypertensive patients compared to the control group. The mean HDL was lower among cases than in controls.

Conclusion

In this study, it has been shown that there is statistically significant difference in mean total cholesterol, LDL cholesterol, triglycerides, and HDL cholesterol levels between hypertensive and normotensive individuals. According to the findings of this study, it may be concluded that hypertensive persons in Dinajpur region of Bangladesh commonly suffer from dyslipidemia. A large multi centered study is needed to get a precise picture of association of lipid abnormalities in hypertensive people throughout the country.

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