

# Study of Association between Dyslipidemia and Hypertension in Tertiary Care Hospital in Bundelkhand Region

Reena Singh<sup>1</sup>, Shubham Mishra<sup>2</sup>, Bhupendra Kumar Singh<sup>3</sup>, Shailendra Yadav<sup>4</sup>, Armanul Haq<sup>5</sup>

## ABSTRACT

**Introduction:** Hypertension and dyslipidemia are important public health problem throughout the world. Therefore aim of present study is to evaluate the lipid profile abnormalities among primary hypertensive patients attending tertiary care hospital in Bundelkhand region of U.P.

**Material and methods:** Present study was conducted in the Department of General Medicine, Government Allopathic Medical College & Associated Hospital, Banda (U.P.) from February 2019 to July 2019. All male and female primary hypertensive patients (cases) within age group of 30-70 years and all male and female non-hypertensive patients of same age group (controls) were included in the study. Patients with secondary hypertension and age <30 years and >70 years were excluded from present study. Total 150 patients were included divided in equally half as cases & controls. General Physical Examination was done and various parameters like blood pressure, heart rates etc were measured. Lipid profile parameters (Total cholesterol, triglycerides, HDL and LDL) were measured. Data was analyzed by using SPSS software trial version 21.

**Results:** Male (53.3%) outnumbered female (46.7%). Majority of participants (34.0%) belonged to the age group 60-70 years followed by age group 50-59 years (30.7%). Mean SBP, mean DBP, mean lipid profile values except HDL were higher in hypertensive patients in comparison of normotensives participants.

**Conclusions:** There was significant statistical association between dyslipidemia and hypertension in present study (p value < 0.05). Life style changes like regular exercise, healthy diet, avoidance of alcohol and smoking etc and Regular screening for lipid profile and blood pressure along with timely treatment can prevent stroke, cardiovascular diseases and other co-morbidities.

**Keywords:** Dyslipidemia, Hypertension, Association, Cardio-Vascular Disease

constitute of metabolic syndrome as per National Cholesterol Education Program (NCEP) Guidelines.<sup>1</sup> Study done by Dalal JJ et al.<sup>4</sup> observed that >80% hypertensive population had at least one additional cardiovascular disease risk factor predominantly atherogenic. Study done by Nickenig G et al.<sup>5</sup> found that timely treatment of dyslipidemia has favorable effects on cerebro-vascular and coronary system. Therefore aim of present study is to evaluate the lipid profile abnormalities among primary hypertensive patients attending tertiary care hospital.

## MATERIAL AND METHODS

Present study was conducted in the Department of General Medicine, Government Allopathic Medical College & Associated Hospital, Banda (U.P.) from February 2019 to July 2019. All male and female primary hypertensive patients (cases) within age group of 30-70 years and all male and female non-hypertensive patients of same age group (controls) were included in the study. Patients with secondary hypertension and age <30 years and >70 years were excluded from present study. Total 150 patients were included divided in equally half as cases & controls.

Demographic information like name, gender, age, address, socio economic status etc. was taken from study subjects. Proper history was taken to find out associated risk factors like smoking, alcohol, DM, heart disease etc. and to rule out causes of secondary hypertension like renal artery stenosis, chronic renal failure, cushing syndrome etc. General Physical Examination was done and various parameters like blood pressure, heart rates etc were measured. Lipid profile parameters (Total cholesterol, triglycerides, HDL and LDL) were measured. Those who had TC  $\geq$  200 mg/dl or LDL  $\geq$  130 mg/dl or HDL < 40 mg/dl or TG  $\geq$  150 mg/dl were labeled as dyslipidemic. Study subjects having systolic blood pressure (SBP)  $\geq$  140mmHg and or diastolic blood pressure (DBP)  $\geq$

## INTRODUCTION

Dyslipidemia is defined as abnormalities in serum lipid and lipoprotein levels. Person having Total Cholesterol level (TC)  $\geq$  200 mg/dl or Low Density Lipoprotein (LDL)  $\geq$  130 mg/dl or High Density Lipoprotein (HDL) < 40 mg/dl or Triglycerides (TG)  $\geq$  150 mg/dl were considered as dyslipidemic.<sup>1</sup> Dyslipidemia is considered as risk factor for essential hypertension and cardiovascular disease (CVD).<sup>2,3</sup> Co-existence of hypertension with dyslipidemia has more adverse impact on the vascular endothelium resulting in higher risk of CVD.

Both hypertension and dyslipidemia are the important

<sup>1</sup>Associate Professor, Department of Medicine, G.S.V.M. Medical College Kanpur, U.P., <sup>2</sup>Senior Resident, Department of Medicine, Government Allopathic Medical College Banda, U.P., <sup>3</sup>Consultant, New Lakhanpur Hospital, Kanpur, U.P., <sup>4</sup>Assistant Professor, Department of Medicine, Government Allopathic Medical College Banda, U.P., <sup>5</sup>Junior Resident, Department of Medicine, Government Allopathic Medical College Banda, U.P., India

**Corresponding author:** Dr. Shubham Mishra, Senior Resident, Department of Medicine, Government Allopathic Medical College, Banda, U.P., India

**How to cite this article:** Singh R, Mishra S, Singh BK, Yadav S, Haq A. Study of association between dyslipidemia and hypertension in tertiary care hospital in bundelkhand region. International Journal of Contemporary Medical Research 2022;9(2):B1-B3.



90mmHg were considered as hypertensive. .

Data was analyzed by using SPSS software trial version 21. Unpaired T test was applied to find out the significance of difference between two means. By use of chi-square test, significance of difference in the percentage of dyslipidemia among each group was analyzed. P value <0.05 was considered as statistically significant.

## RESULTS

In present study, out of 150 participants, 75 were cases (patients with primary hypertension) and 75 were controls (patients without hypertension).

Table 1 shows the demographic profile of study participants. In present study, male (53.3%) outnumbered female (46.7%). About half of participants (34.0%) belonged to the age group 60-70 years followed by age group 50-59 years (30.7%).

Table 2 compares the mean SBP, DBP and mean lipid profile values between case and control groups in present study. In present study, the mean systolic blood pressure (SBP) was higher in cases (154.32±7.42) in comparison of controls (112.47±5.28) and p value was less than 0.05, thus statistically significant. The mean diastolic blood pressure (DBP) was higher in cases (91.39±5.12) in comparison of controls (73.21±6.17). The difference between cases and controls was found to be statistically significant.

Age group in years	Gender		Total
	Male	Female	
30-39 Yrs	13 (16.2%)	9 (12.8%)	22(14.7%)
40-49 Yrs	16 (20.0%)	15 (21.4%)	31(20.7%)
50-59 Yrs	24 (30.0%)	22 (31.4%)	46(30.7%)
60-70 Yrs	27 (33.7%)	24 (34.3%)	51(34.0%)
Total	80 (53.3%)	70 (46.7%)	150(100%)

**Table-1:** Demographic Profile of Study Participants

Above table shows that the mean total cholesterol was higher in cases (205.32±41.18) in comparison of controls (183.29±31.19). The mean triglycerides level was higher in hypertensive patients (163.21±41.39) in comparison of non-hypertensive patients (147.64±38.41). The mean LDL was higher among cases (121.36±35.27) in comparison of controls (113.74±30.12) while mean HDL was low among cases (43.52±5.91) than controls (48.21±4.12). The difference between them was found to be statistically significant (p value=0.002).

Table 3 compares the distorted levels of lipid parameters between cases and controls in present study. Raised levels of various lipid parameters were higher among cases in comparison of controls and this difference was found to be statistically significant ( p value < 0.05).

## DISCUSSION

In present study, out of 150 participants, 75 were cases (patients with primary hypertension) and 75 were controls (patients without hypertension). In this study, male (53.3%) outnumbered female (46.7%) in both cases and control groups. Similar findings were observed by the study done by Kishore J et al<sup>6</sup> and Mahapatro AK et al.<sup>7</sup> Both these studies found that majority of patients in both groups were male.

In our study, about half of participants (34.0%) belonged to the age group 60-70 years followed by age group 50-59 years (30.7%). It shows that people with higher age groups are more prone to develop hypertension. Reason for this may be that vascular system changes with increasing age and with increasing age, elastic tissue reduces in blood vessels. Blood vessels become stiffer and less compliant causing hypertension. Similar results were observed by the studies done by Pyadala N et al<sup>8</sup> and Murali Krishna TV et al.<sup>9</sup> Study done by Vasana RS et al<sup>10</sup> also found significant

S.No.	Parameters	Cases (Mean±SD)	Control (Mean±SD)	P value
1	Mean Blood Pressure (MBP)			
	Systolic BP (SBP)	154.32±7.42	112.47±5.28	P=0.001
	Diastolic BP (DBP)	91.39±5.12	73.21±6.17	P=0.001
2	Mean Lipid Value (MLV)			
	Total Cholesterol	205.32±41.18	183.29±31.19	P=0.003
	Triglycerides	163.21±41.39	147.64±38.41	P=0.004
	High density lipoprotein (HDL)	43.52±5.91	48.21±4.12	P=0.002
	Low density lipoprotein (HDL)	121.36±35.27	113.74±30.12	P=0.029

**Table-2:** Comparison of mean SBP, DBP and mean lipid profile values

Parameters	Subcategory	Cases	Control	Total	P value
Total cholesterol	Normal	39 (44.82%)	48(55.17%)	87	0.049
	Dyslipidemia	36(57.14%)	27(42.85%)	63	
Triglycerides	Normal	37(43.02%)	49(56.97%)	86	0.038
	Dyslipidemia	38(59.37%)	26(40.62%)	64	
Low density lipoprotein	Normal	43(44.32%)	54(55.67%)	97	0.048
	Dyslipidemia	32(60.37%)	21(39.62%)	53	
High density lipoprotein	Normal	64(48.85%)	67(51.14%)	131	0.019
	Dyslipidemia	11(57.89%)	8(42.10%)	19	

**Table-3:** Comparison of dyslipidemia in present study

association of age with hypertension among 1298 patients while Idemudia J et al.<sup>11</sup> found that majority (63%) of the participants belonged to age group 30-39 years which is different from results of present study

In present study, the mean systolic blood pressure (SBP) was higher in cases (154.32±7.42) in comparison of controls (112.47±5.28) and p value was less than 0.05, thus statistically significant association was present. The mean diastolic blood pressure (DBP) was higher in cases (91.39±5.12) in comparison of controls (73.21±6.17). The difference between cases and controls was found to be statistically significant. Similar results were also observed in the studies done by Pyadala N et al.<sup>8</sup> and Bargaonkar K et al.<sup>12</sup>

Mean total cholesterol was higher in cases (205.32±41.18) in comparison of controls (183.29±31.19). The mean triglycerides level was higher in hypertensive patients (163.21±41.39) in comparison of non-hypertensive patients (147.64±38.41). The mean LDL was higher among cases (121.36±35.27) in comparison of controls (113.74±30.12) while mean HDL was low among cases (43.52±5.91) than controls (48.21±4.12). The difference between them was found to be statistically significant (p value=0.002). Table 3 compares the distorted levels of lipid parameters between cases and controls in present study. Raised levels of various lipid parameters were higher among cases in comparison of controls and this difference was found to be statistically significant (p value < 0.05). Similar results were also observed in the studies done by Osuji CU et al.<sup>13</sup> and Mahapatro AK et al.<sup>7</sup> There is a multidimensional clinical implication of presence of hypertension with dyslipidemia. In cases where both conditions are present, risk of cardiovascular disease is higher. Therefore timely management of both conditions (hypertension and dyslipidemia) is the need of the hour.

## CONCLUSION

Present study found that dyslipidemia was more common in hypertensive patients in comparison of control cases. It also observed that statistically significant difference was found in mean lipid profile values (total cholesterol, triglycerides, HDL and LDL) between hypertensive and normotensives patients. Life style changes like regular exercise, healthy diet, avoidance of alcohol and smoking etc are helpful in the prevention of both hypertension and dyslipidemia. Regular screening for lipid profile and blood pressure along with timely treatment can prevent stroke, cardiovascular diseases and other co-morbidities. Present study was a hospital based study and had small sample size. Therefore there is need for further studies to find out the association of dyslipidemia with hypertension.

## REFERENCES

1. Bethesda: National Heart, Lung, and Blood Institute; 2001. May, Third Report of the National Cholesterol Education Program (NCEP) Expert Panel. Detection, evaluation and treatment of high blood cholesterol in adults (Adult Treatment Panel III) NIH Publication No. 01-3670.

2. Kannel WB, Castelli WP, Gordon T, McNamara PM. Serum cholesterol, lipoproteins, and the risk of coronary heart disease. The Framingham study. *Annals of Internal Medicine* 1971; 74:1–12.
3. Halperin RO, Sesso HD et al. Dyslipidemia and the risk of incident hypertension in men. *Hypertension* 2006; 47:45–50.
4. Dalal JJ, Padmanabhan TN, Jain P, Patil S, Vasawala H, Gulati A. LIPITENSION: Interplay between dyslipidemia and hypertension. *Indian J Endocrinol Metab.* 2012;16:240–245.
5. Nickenig G, Baumer AT, Temur Y, Kebben D, Jockenhovel F, Bohm M. Statin-sensitive dysregulated AT1 receptor function and density in hypercholesterolemic men. *Circulation*, 1999; 100: 2131–4.
6. Kishore J, Gupta N, Kohli C, Kumar N. Prevalence of Hypertension and Determination of Its Risk Factors in Rural Delhi. *International Journal of Hypertension.* 2016;5:1-6.
7. Mahapatro AK, Chandrika S, Chepuru R. A study of lipid profile abnormalities among patients with essential hypertension attending tertiary care centre. *International Journal of Contemporary Medical Research* 2020;7(1):A1-A4.
8. Pyadala N, Bobbiti RR, Borugadda R, Bitinti S, Maity SN, Mallepaddi PC, Polavarapu R. Assessment of lipid profile among hypertensive patients attending to a rural teaching hospital, Sangareddy. *Int J Med Sci Public Health.* 2017;6:71-74
9. Murali Krishna TV, Vasa VK, Ponnuru VAD. The study of correlation between dyslipidemia and hypertension and its complications in 30-70 years age group. *IAIM*, 2016;3: 84-90.
10. Vasan RS, Beiser A, Seshadri S. Residual lifetime risk for developing hypertension in middle-aged women and men: the Framingham Heart Study. *The Journal of the American Medical Association.* 2002;287:1003–10.
11. Idemudia J, Ugwuja E. Plasma Lipid Profiles in Hypertensive Nigerians. *The Internet Journal of Cardiovascular Research.* 2008;6:1-6.
12. Bargaonkar K, Patil R, Ben P. Lipid profile in hypertension: A Meta-analysis using western countries data. *MedPulse – International Medical Journal* 2016;3: 967-973.
13. Osuji CU, Omejua EG, Onwubuya EI, Ahaneku GI. Serum Lipid Profile of Newly Diagnosed Hypertensive Patients in Nnewi, South-East Nigeria. *International Journal of Hypertension* 2012;6:1-7.

**Source of Support:** Nil; **Conflict of Interest:** None

**Submitted:** 08-08-2021; **Accepted:** 13-09-2021; **Published:** 28-02-2022