A Study on Variation of Lipid Profile in Hypertensive Patients Compared To Normotensive Patients

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ABSTRACT

Introduction: Hypertension is a major public health problem globally. Hypertension and dyslipidemia, coexisting in 15-31% are the major risk factors for coronary heart disease. Evaluation of Lipid profile among hypertensive patients is extremely important to detect and prevent complication associated with coexisting hypertension and dyslipidemia.

Material & Methods: Present study was a hospital based observational study done at Bidar Medical College Hospital where patients coming to the Out Patient Department were selected. Total duration of the study was for 6 months. Sample size was 80; out of which 40 hypertensive patients were taken and 40 as controls. A pre designed proforma was used to get the demographic clinical data and examination

Results: About three fourth were smokers and half the proportion alcoholics. 60% of hypertensive's had sedentary lifestyle. More than one thirds of the hypertensive's (37.5%) were obese. Mean total cholesterols, triglycerides and low density lipoprotein values were significantly higher in hypertensive compared to normotensive group and it was highly significant statistically ($p<0.001$). High density lipoproteins were lower in hypertensive group which is again statistically significant.

Conclusions: it is imperative to evaluate the lipid profile frequently among the hypertensives so that any abnormality in it can be identified and treated at an early stage. Adequate counseling, dietary modifications and adherence to medications are required specifically for those hypertensive's who already been detected to have lipid abnormalities.

KEY WORDS: lipid profile, hypertensive, normotensive, variation

INTRODUCTION

Hypertension is a major public health problem globally and it is one of the major risk factor for coronary heart disease and other diseases. Hypertension; a condition in which the blood vessels have persistently raised pressure and higher the pressure, the harder the heart has to pump. Majority of people do not show any symptoms and unaware of the condition, it even makes more tough to tackle the issue [1]

According to World Health Organization (WHO), an estimated 1.28 billion adults worldwide have hypertension, of whom majority are living in low and middle income countries. Hypertension shows Iceberg phenomenon and follows Rule of Halves. This is evident from the statistics of WHO, which shows that an estimated 46% of adults are unaware that they have hypertension; less than half (42%) are diagnosed and treated and only 21% have it under control[1]. In India, according to the recent National Family Health Survey (NFHS-5) 2019-21 estimates, the overall prevalence of hypertension among men was 24% and among females 21.3% and the prevalence was more in urban areas compared to rural [2].

On the other aspect, dyslipidemia where there are elevated cholesterols such as triglycerides, low density lipoproteins, total cholesterol and decreased high density lipoproteins. Dyslipidemia is also a major risk factor for coronary heart disease as it increases the risk of atherosclerosis. In India, according to the data from National Health Portal, approximately 25-30% of urban and 15-20% of rural population are suffering from dyslipidemia.[3] Although more common in males, it affects both the genders and 30-40 years age group have high prevalence. In one of the

study on prevalence of dyslipidemia in South Indian adults showed higher percentage of dyslipidemia both in urban and rural population and its significant association with age and body mass index.[4]

Hypertension and dyslipidemia, coexisting in 15-31% are the major risk factors for coronary heart disease. These two risk factors will have a profound effect on vascular endothelium. Once diagnosed as Hypertensive, it is imperative to adhere to the medication, regular & proper follow ups and relevant investigations at periodic intervals to rule out or detect any complications that might happen due to hypertension. If hypertension and dyslipidemia can be controlled, then significant morbidity and mortality due to coronary heart diseases can be prevented[5,6].

In this context, evaluation of Lipid profile among hypertensive patients is extremely important to detect and prevent complication associated with coexisting hypertension and dyslipidemia. Hence the present study has been done with an objective to determine variation of lipid profile in hypertensive patients compared to normotensive patients admitted in a teaching hospital from Karnataka.

MATERIAL & METHODS
Present study was a hospital based observational study done at Bidar Medical College Hospital, Karnataka. The study was conducted in Collaboration with Department of General Medicine where patients coming to the Out Patient Department were selected. Total duration of the study was for 6 months starting from January 2023 to June 2023.

Inclusion criteria:
- Already known hypertensive patients and newly diagnosed cases were included in the study. Similar age controlled normotensive patients were taken as controls.
- Aged 18 to 60 years who have given informed consent for the study.

Sample size was estimated using the formula $4pq/l^2$. Where p is prevalence of hypertension, it is taken as 28.3% from the data on Hypertension prevalence from urban area of Karnataka as per National Family Health Survey 5[7]. $N=4pq/l^2$ where p=28.3%, q=100-p (71.1) and l taken as Absolute error of 10%. Hence, the final sample size was 80; out of which 40 hypertensive patients were taken and 40 as controls.

A pre designed proforma was used to get the demographic clinical data and examination including measurement of Blood pressure, height, weight was done using standard guidelines. Serum lipid profile test was done to assess Total cholesterols (TC), Low Density Lipoproteins (LDL), Triglycerides (TG) and High Density Lipoproteins (HDL) in both hypertensive and normotensive participants. Blood pressure measurement was done using standard protocol where two measurements were taken with a 5 minute gap and average of two readings was taken into consideration. Hypertension was defined based on Joint National Committee (JNC-7) on Prevention, Detection, Evaluation and Treatment of Hypertension where systolic blood pressure ≥140 mm Hg and diastolic blood pressure ≥90 mm Hg were considered [8].

Criteria for defining Dyslipidemia was taken from National Cholesterol Education Program-Adult Treatment Panel III (NCEP ATP III) where Borderline high levels are defined as TC >200 mg/dL, LDL-C >130 mg/dL, TG >150 mg/dL, and low HDL-C <40 mg/dL in men and <50 mg/dL in women. Very high levels are defined as TC >240 mg/dL, TG >500 mg/dL, LDL-C >170 mg/dL, and combined atherogenic dyslipidemia as high TG and low HDL-C [9].

Study was approved by the Institutional Ethical Committee. Purpose of the study was explained to the study participants and informed consent was taken prior to the start of the study. Confidentiality over the identity and data was ensured.

Data entry was done using Microsoft Excel 2015 version and analysis using EPI INFO version 3.5.3. Categorical data was presented in percentages and proportion and numerical data using mean and standard deviation. Association between variables was assessed using chi square test and 't' test with p value less than 0.05 considered to be statistically significant.

RESULTS:
A total of 80 study participants were included in the study; of which 40 were hypertensive and 40 normotensive patients. The mean age among hypertensive and normotensive groups was 38.52 and 39.16 years respectively. Since they were age controlled, there was no statistically significant difference among two groups and majority in both

groups belonged to 31-40 years age group. With regards to gender distribution, a slight male preponderance (62.5%) was observed among hypertensive group compared to normotensive group (57.5%) which again was not significant statistically. Hence there were no differences with regards to age and gender in both the groups.

Majority in both the groups hypertensive and normotensive groups were literates (62.5% & 55% respectively) and employed (70% & 65% respectively). With regards to addictions such as Smoking and Alcohol, majority of hypertensive group were smokers and alcoholics comparatively. Among hypertensive, about three fourth (72.5%) were smokers and half the proportion (55%) alcoholics compared to normotensives in whom 35% were smokers and 50% alcoholics.

60% of hypertensive and 55% of normotensives had sedentary lifestyle. More than one thirds of the hypertensives (37.5%) were obese compared to 27.5% in normotensive [Table 1].

Table 1: Socio demographic characteristics of study population

Variable	Hypertensive group	Normotensive group
Mean Age (years)	38.52	39.16
Gender Male Female	25 (62.5%) 15 (37.5%)	23 (57.5%) 17 (42.5%)
Education Illiterate Literate	15 (37.5%) 25 (62.5%)	18 (45%) 22 (55%)
Occupation Employed Unemployed	28 (70%) 12 (30%)	26 (65%) 14 (35%)
Smoking Yes No	29 (72.5%) 11 (27.5%)	14 (35%) 26 (65%)
Alcohol consumption Yes No	22 (55%) 18 (45%)	20 (50%) 20 (50%)
Physical activity Yes No	16 (40%) 24 (60%)	18 (45%) 22 (55%)
Obesity Yes No	15 (37.5%) 25 (62.5%)	11 (27.5%) 29 (72.5%)

Table 2: Comparison of Lipid profile among Hypertensive and Normotensive group

Variable	Hypertensive group (n=40) Mean±SD	Normotensive group (n=40) Mean±SD	p value
Total Cholesterol	245.63±4.14	195.62±3.56	0.001*
Triglycerides	182.25±4.80	136.78±2.35	0.00002*
Low Density Lipoproteins	148.46±5.32	108.83±6.08	0.001*
High Density Lipoproteins	45.25±2.81	58.57±1.72	0.002*

*'t' test applied $p < 0.05$ (statistically significant)

Evaluation of lipid profile was done among hypertensive and normotensive group including total cholesterol, triglycerides, low density lipoproteins and high density lipoproteins. Study found that mean total cholesterols, triglycerides and low density lipoprotein values were significantly higher in hypertensive compared to normotensive group and it was highly significant statistically ($p < 0.001$). The Good or the protective high density lipoproteins were lower in hypertensive group which is again statistically significant [Table 2].

DISCUSSION:

Cardiovascular diseases are the leading causes of mortality globally and in that regards, hypertension and dyslipidemia are the major preventable risk factors to reduce its burden. The co-existence of these conditions makes it more difficult to manage and prevent the complications. In this regards, the present hospital based observational study which was done to determine with an objective to determine variation of lipid profile in hypertensive patients compared to normotensive patients found that statistically significant differences in the levels of lipids among hypertensive group compared to normotensive group. About three fourth were smokers and half the proportion alcoholics. 60% of hypertensive had sedentary lifestyle. More than one thirds of the hypertensives (37.5%) were obese. Total cholesterols, triglycerides and low density lipoprotein values were higher and High Density Lipoproteins were lower among hypertensive group comparatively.

These findings were in concurrence with findings from Pyadala et al (2017[10] study which was also done in a teaching hospital. In their study, the mean values of total cholesterol, triglycerides, LDL, VLDL and HDL among hypertensive was 253.71, 178.87, 177.6, 36.54 and 39.96 respectively which was significantly higher than controls. Similar findings were also observed in study by Choudhury et al (2014)[11] from Bangladesh where the serum levels of total cholesterol, triglycerides and LDL were higher while HDL levels were lower in hypertensive group compared to normotensives. Their study also found that age, waist circumference and body mass index showed statistically significant association with hypertensive but not with normotensives. In present study, no association between variables and hypertension was assessed.

A laboratory based cross sectional study on evaluation of lipid profiles and hematological parameters in hypertensive patients from Ethiopia observed that 54%, 52%, 35% and 11% of hypertensive patients had abnormal low density lipoproteins, total cholesterol, triglycerides and HDL levels respectively [12].

A correlation between serum lipid profile and blood pressure by Anika et al (2015) [13] found that there was a significant correlation between systolic blood pressure with triglycerides and diastolic blood pressure with triglycerides. But with other variables and blood pressure did not show any statistically significant association.
Distribution of Lipids and Prevalence of Dyslipidemia among Indian Expatriates in Qatar by R. Nirwan D. Singh observed a gender variation in levels of lipids with greater prevalence of lipids among men than women, however women had higher levels of mean HDL vales [14].

LIMITATIONS OF THE STUDY:
Since study findings are from one hospital, findings may not be generalizable and study design being observational; we can only determine the association between hypertension and dyslipidemia but cannot prove the causation. Similar extensive studies from different geographical area or community based studies are required to gain extensive in depth understanding.

CONCLUSION:
Existing literature and studies mentions that there is definite lipid abnormality among hypertensive and the present study reiterates the same. Study concludes that on evaluation of lipid profile, the values of lipids were significantly higher among hypertensive group compared to normotensive. Hence it is imperative to evaluate the lipid profile frequently among the hypertensive so that any abnormality in it can be identified and treated at an early stage. Adequate counseling, dietary modifications and adherence to medications are required specifically for those hypertensive who already been detected to have lipid abnormalities. The patients in the present study among whom abnormal levels of lipids were seen, they were counseled and managed accordingly.

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