Original Research Article

Lipid Profile and Correlation with Blood Pressure among People of Bundelkhand, Madhya Pradesh

Farina Zaidi[1], Abhishek Sharma[2], Khushter Haider[3], Nidhi Sharma[4]

[1]Senior Resident, Department of Gastroenterology, Rajeev Gandhi Superspeciality Hospital, New Delhi, India
[2] Associate Professor, Department of Biochemistry, GMC, Datia, Madhya Pradesh, India
[3]Senior Resident, Department of Dentistry, GMC, Datia, Madhya Pradesh, India
[4]Assistant Professor, Department of Microbiology, GMC, Datia, Madhya Pradesh, India

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Abstract

Introduction: Hypertension is a major health problem worldwide. Uncontrolled hypertension can cause damage to all organs of body. Dyslipidemia and hypertension are the commonest risk factors for coronary artery disease (CAD). There is a strong association between hypertension and dyslipidemia. They increase patient's susceptibility to the development of coronary heart disease. **Aim:** To study the correlation of blood pressure with lipid profile among people of bundelkhand region of Madhya Pradesh. **Materials and Methods**: A case- control study was conducted in a time span of 1 year from January 2019 to January2020. It was carried out in the Department of Medicine and Biochemistry, Govt. Medical College, Datia Madhya Pradesh. Age and sex matched 75 cases and 30controls were included in study. **Results:** Total cholesterol, LDL-C were found to be significantly high in hypertensive patients and HDL-C was found to be decreased in hypertensive patients while triglyceride and VLDL-C levels showed no positive correlation with hypertension. In this study total cholesterol was found to be higher in females (205.3±56.3) as compared to males (178.6±51.8) which was statistically significant (p=0.037), all the other lipid fractions i e TG, LDL-C, HDL-C, VLDL-C, were found to be statistically insignificant in both males and females (p value> 0.005). **Conclusion:** It was concluded that serum lipid profile can serve as an important marker for screening hypertensive patients for cardiovascular diseases, and their early detection can reduce cardiovascular morbidity and mortality.

Keywords: Lipid, Hypertension, Coronary Artery Disease.

Introduction

Hypertension is a major health problem worldwide and it continues to be one of the most common diseases treated by physicians. It is increasingly clear that high blood pressure although an independent risk factor for adverse clinical events frequently exists as a part of a syndrome of cardiovascular, neuroendocrine and metabolic abnormality[1,2].Uncontrolled hypertension can cause damage to all organs of body[3]. Dyslipidemia and hypertension are the commonest risk factors for coronary artery disease (CAD). Persons with combination of risk factors are particularly at high risk of CAD. Hypertensive subjects frequently have higher cholesterol levels than normotensive subjects.It is the most common of the cardiovascular diseases which is the leading cause of morbidity and mortality in the industrial world as well as becoming an increasing common disease in the developing countries.

According to the world health report of 2003 cardiovascular diseases will be the largest cause of deaths and disability by 2020 in India[4]. The blood pressure however, is not the only determinant of cardiovascular damage and the propensity of hypertensive patients to develop target organ damage is markedly influenced by coexisting risk factors such as age, sex, smoking, obesity, diabetes, dyslipidemia and others[5].Among these factors lipoproteins are fundamental to the atherosclerotic process and greatly affect the impact of hypertension on development of target organ damage and therefore on cardiovascular morbidity and mortality[5].Dyslipidemia and hypertension are commonest risk factors for coronary artery disease[6].Persons with combination of these risk factors are particularly at high risk of CAD. Hypertensive persons have usually higher levels of serum lipids than normotensive persons and lipid level increase as BP increases[7-9]. Early detection of risk factors before the catastrophic and life-threatening effect of severe atherosclerosis is a major problem for the general public as well as for the practicing physician. Though no specific pattern of dyslipidemia has been consistently reported among hypertensive individuals, many studies have shown that total cholesterol, triglycerides and virtually all fractions of lipoproteins tend to be more frequently abnormal among hypertensive patients than in the general population. Hypertension has emerged as a leading cause of the global burden of disease in both developed as well as developing countries[9-11]. There is a strong association between hypertension and dyslipidemia. They increase patient's susceptibility to the development of coronary heart disease[12].The purpose of carrying out this study is to evaluate the lipid profile among hypertensives and their correlation in bundelkhand region of Madhya Pradesh where majority of the population is vegetarian due to socioeconomic and religious factors.

Materials and Methods

Place of study: The proposed study was carried out in the Department of Medicine and Biochemistry, Govt. Medical College,

**Correspondence*
Dr. Nidhi Sharma
Assistant Professor, Department of Microbiology,GMC, Datia, Madhya Pradesh, India
E-mail: drnidz@gmail.com

Datia Madhya Pradesh, on patients who attended the Medicine OPD/IPD of medical college Hospital.

Duration of study: The study was conducted in a time span of 1 year from January 2019 to January 2020.

Study design: It is a case control study.

Sample size: 100 male/Female age and sex matched subjects between 31-60 years were taken. 75 subjects who were hypertensive formed the case group and another 25 healthy subjects formed the control group.

Inclusion criteria: For the selection of cases for the present study were as follows – patient with essential hypertension whether previously diagnosed or recently diagnosed, with or without complication of hypertension were included for study. According to JNC 7 criteria systolic blood pressure ≥ 140mmofHg and diastolic ≥90mmofHg based on average of two readings or one in case of known hypertensive and on antihypertensive medications.

And for serum lipid profile ATP III guidelines were taken which are as under-:

Table 1:For Total Cholesterol-: (in mg/dl)

<200	Desirable
200-240	Borderline High
≥240	High

Table 2:For LDL Cholesterol-: (in mg/dl)

<100	Optimal
100-129	Above optimal
130-149	Borderline High
150-189	High
≥190	Very High

Table 3:For HDL Cholesterol-: (in mg/dl)

<40	Low
>60	High

Table 4:For Triglyceride-: (in mg/dl)

<150	Normal
150-199	Borderline High
200-499	High
≥500	Very High

Table 5:For VLDL Cholesterol-: (in mg/dl)

<5	Low
>35	High

Exclusion criteria:

1. Secondary hypertensive patients were excluded from the study.
2. Patients with Diabetes mellitus, Hypothyroidism, Chronic kidney disease were excluded from the study.
3. Those receiving lipid altering drugs or antihypertensive medications which affect lipid metabolism were excluded.
4. Smokers and Alcoholics.

Control Group

The control group comprised of 25 normotensive healthy subjects male/female. Controls that do not have any of the exclusion criteria and inclusion criteria mentioned for the case group included in the study.All the subjects went under following investigations:

A complete general medical and physical examination. Laboratory investigation which include: Fasting and Post Prandial Blood sugar (to rule out Diabetes), Blood Urea, Serum Creatinine. Lipid profile: (Triglycerides, VLDL-C, LDL-C, HDL-C, Total serum cholesterol), Serum TSH, ECG and Chest X-ray PA VIEW

Methodology:

The present study comprises of 2 groups

Group I- Normotensive (Control) n=25

Group II-Hypertensive (Case) n = 100

Methods of estimation of biochemical parameters

1. Serum cholesterol was estimated by CHOD-POD enzymatic colorimetric method.

Desirable range is <200 mg/dl.

2. High density lipoprotein (HDL) was measured by enzymatic clearance assay using phosphotungstate method for in vitro quantitative determination. Desirable levels: Males >40 mg/dl and Females>50 mg/dl.

3. Triglycerides (TG) was estimated by GPO-PAP method of enzyme colorimetry. Desirable range is <l50 mg/dl.

5. Very low density lipoprotein (VLDL) will be estimated by Friedewald's WT formula= TG/5. Desirable levels are 25-35 mg/dl.

6. Low density lipoprotein (LDL)was estimated by Friedewald's formula as LDL= Total cholesterol –(HDL+LDL) only if the TG value comes less than 200mg/dl, otherwise direct method of LDL estimation was used.

Desirable range is <100 mg/dl.

Blood Glucose will be estimated by GPO-PAP enzymatic colorimetric method both in fasting and post-prandial state.

Statistical Analysis

All the parameters will be analyzed by using software SPSS. Analysis of variance (ANOVA) has been used for comparing all the parameters. Case and control were compared using Chi square test and independent sample t test and p value was calculated. All the results are presented as means± Standard Mean Error (SEM).

Data collection

1. In the study patients were recruited from the medicine outpatient department, medical college Hospital during the period of January 2019 to January 2020.
2. The cases and controls with any exclusion criteria in their clinical history were not invited to participate in the study.
3. Detailed history of both controls were taken regarding any presenting complaint, any addiction, any previous history of hypertension, CAD, DM, T.B or any past surgical history, detailed family history of hypertension, CAD, DM, dyslipidemia.
4. Detailed personal history including dietary habits, occupation, levels of physical activities. A detailed physical examination was done including anthropometric measurements.
5. Height was measured with wall mounted measuring tape to nearest tape to nearest 0.1 cms in standing position without shoes.
6. Weight was measured in kilograms using traditional weighing machine kept on firm horizontal surface without shoes.
7. BMI was calculated by using formula= weight (Kgs)/height (m2).

8. Blood pressure was measured using standard Sphygnomanometer and stethoscope by same observer. A mean of two readings was taken after 15 mins interval as average systolic and diastolic blood pressure.
9. ECG was done in all patients.
10. Laboratory investigations were done at medical college hospital, Datia.

Observations and Results

Study Design: A Case Control study was conducted with 75 patients as cases and 25 patients as control to see the correlation of dyslipidemia in hypertensive patients, which took place at Medical college hospital, Datia.

This study shows that 38% of the cases are in their 5th decade of life that consists of 19% male and 19% female, 23% of cases are in their 4th decade which comprises of 15% male and 8% male and 14% of the cases are in the 3rd decade which has 9% male and 5% female.

This study shows that 9% of the cases are in their 5th decade of life that consists of 8% male and 1% female, 5% of cases are in their 4th decade which comprises of 4% male and 4% female and 8% of the cases are in the 3rd decade which has 3% male and 5% male.

Table 4 interprets:

- BMI (Kg/m^2) value is higher in males as compared to females. The association between males and female was statistically insignificant (p value > 0.05).
- Total Cholesterol (mg/dl) value is higher in females as compared to males. The association between male and female was statistically significant (p value<0.05).
- Triglyceride (md/dl) values is higher in female as compared to male. The association between male and female was statistically insignificant (p value>0.05).
- HDL-Cholesterol (mg/dl) value is higher in male as compared to female. The association between male and female was statistically insignificant (p value>0.05).
- LDL Cholesterol (mg/dl) value is higher in female as compared to male. The association between male and female was statistically insignificant (p value>0.05).

VLDL Cholesterol (mg/dl) is higher in female as compared to male. The association between male and female was statistically insignificant (p value>0.05).

Table 5 interprets:

- BMI (Kg/m^2) value is higher in hypertensive patients as compared to normotensive patients. The association between hypertensive and normotensive was statistically significant (p value < 0.05).
- Total Cholesterol (mg/dl) value is higher in hypertensive patients as compared to normotensive patients. The association between hypertensive and female was statistically significant (p value<0.05).
- Triglyceride (md/dl) values is higher in hypertensive patients as compared to normotensive patients. The association between hypertensive patients and normotensive patients was statistically insignificant (p value>0.05).
- HDL-Cholesterol (mg/dl) value is higher normotensive patients as compared to hypertensive patients. The association between hypertensive patients and normotensive patients was statistically significant (p value<0.05).
- LDL Cholesterol (mg/dl) value is higher in hypertensive patients as compared to normotensive patients. The association between hypertensive patients and normotensive patients was statistically significant (p value<0.05).
- VLDL Cholesterol (mg/dl) is higher in hypertensive patients as compared to normotensive patients. The association between hypertensive patients and normotensive patients was statistically insignificant (p value>0.05).

Table 6 indicates that if BMI (Kg/m^2) is higher than the Mean Blood Pressure will also be on the higher side. The association between BMI and Mean Blood Pressure is statistically significant (p value<0.05).Table 7 indicates that if Mean Blood Pressure is higher than the Total Cholesterol will also be on the higher side. The association between Mean Blood Pressure and Total Cholesterol is statistically significant (p value<0.05).Table 8 indicates that if Mean Blood Pressure is higher than the HDL (mg/dl) will be on the lower side. The association between Mean Blood Pressure and HDL (mg/dl) is statistically significant (p value<0.05).Table 9 indicates that if Mean Blood Pressure is higher than the LDL (mg/dl) will also be on the higher side. The association between Mean Blood Pressure and LDL (mg/dl) is statistically significant (p value<0.05).Table 10 indicates that if Mean Blood Pressure is on the higher side, then also there is no significant change in the values of Triglycerides (mg/dl). There is no positive association between Mean Blood Pressure and Triglyceride (mg/dl). Table 11 indicates that if Mean Blood Pressure is on the higher side, then also there is no significant change in the values of VLDL (mg/dl). There is no positive association between Mean Blood Pressure and VLDL (mg/dl)

Table 6: Demographic, clinical and Biochemical profile of the hypertensive and normotensive patients

	Hypertensive	Normotensive	p-value
Age (Years)	49.5±7.7	46.8±9.0	P=.150
BMI (Kg/m^2)	26.0±1.73	22.3±1.73	P=.000
SBP (mmHg)	161.3±6.69	119.5±4.01	P=.001
DBP (mmHg)	93.09±7.83	78.08±4.48	P=.001
TC (mg/dl)	189.6±55.0	153.7±34.1	P=.003
HDL (mg/dl)	45.0±6.7	48.0±5.83	P=.000
LDL (mg/dl)	104.8±40.6	91.6±17.1	P=.000
TG (mg/dl)	102.8±43.1	85.9±34.9	P=.080
VLDL (mg/dl)	20.3±8.1	16.5±5.4	P=.029

Table 7: Age & Gender Distribution of the Hypertensive Patients

Age	Female	Male	Total
31-40	5	9	14
41-50	8	15	23
51-60	19	19	38
Total	32 (42.6%)	43 (57.4%)	75 (100%)

Table 8: Age & Gender Distribution of the Normotensive Patients

Age	Female	Male	Total
31-40	5	3	8
41-50	4	4	5
51-60	1	8	9
Total	10 (40%)	15 (60%)	25 (100%)

Table 9: Gender Related Comparison of BMI and Lipid Profile in Hypertensive Patients

Variables	Male (n) = 44	Female (n) = 31	p-value	Result
BMI (Kg/m^2)	26.03±1.8	25.8±1.6	0.63	Not significant
Total Cholesterol (mg/dl)	178.6±51.8	205.3±56.3	0.037	Significant
Triglyceride (mg/dl)	98.6±43.4	108.6±42.6	0.330	Not Significant
HDL- Cholesterol (mg/dl)	45.6±6.6	44.0±6.8	0.316	Not Significant
LDL- Cholesterol (mg/dl)	96.0±36.8	117.4±42.8	0.23	Not Significant
VLDL-Cholesterol(mg/dl)	19.18±7.3	22.0±8.9	0.127	Not Significant

Significant at p<0.05

Table 10: BMI and Lipid profile of Hypertensive and Normotensive Patients

	Hypertensive n=75	Normotensive n=25	p-value	Result
BMI (Kg/m^2)	26.0 ± 1.7	22.3± 1.7	P=.000	Significant
Total cholesterol (mg/dl)	189.6 ± 55.0	153.7 ± 34.1	P= .003	Significant
HDL-cholesterol (mg/dl)	45.0 ± 6.7	48.08 ± 5.83	P=.000	Significant
LDL-cholesterol (mg/dl)	104.8 ± 40.5	91.6 ± 17.1	P=.000	Significant
Triglyceride (mg/dl)	102.8 ± 43.13	85.9 ± 34.9	P=.080	Not significant
VLDL-cholesterol	20.3 ± 8.1	16.5 ± 5.4	P=.029	Not significant

Significant at p<0.05 level

Table 11: Correlation between Mean Blood Pressure and BMI (Kg/m^2)

Correlations		BMI in Kg/m2	MBP
BMI in Kg/m2	Pearson Correlation	1	.605**
	Sig. (2-tailed)		.000
	N	100	100
MBP	Pearson Correlation	.605**	1
	Sig. (2-tailed)	.000	
	N	100	100

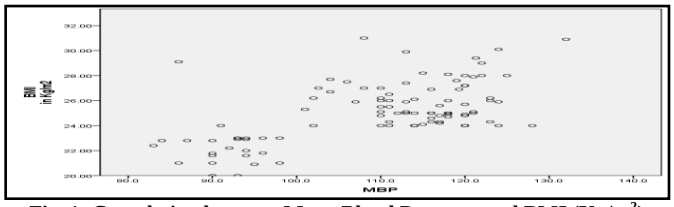

Fig 1: Correlation between Mean Blood Pressure and BMI (Kg/m^2)

Table 12: Correlation between Mean Blood Pressure and Total Cholesterol (mg/dl)

Correlations		MBP	TC
MBP	Pearson Correlation	1	.254*
	Sig. (2-tailed)		.011
	N	100	100
TC	Pearson Correlation	.254*	1
	Sig. (2-tailed)	.011	
	N	100	100

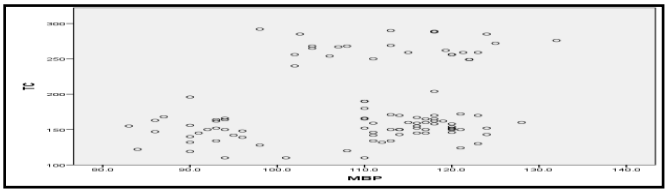

Fig 2: Correlation between Mean Blood Pressure and Total Cholesterol (mg/dl)

Table 13: Correlation between Mean Blood Pressure and High Density Lipoprotein (mg/dl)

Correlations		MBP	HDL
MBP	Pearson Correlation	1	-.780**
	Sig. (2-tailed)		.000
	N	100	100
HDL	Pearson Correlation	-.780**	1
	Sig. (2-tailed)	.000	
	N	100	100
**. Correlation is significant at the 0.01 level (2-tailed).			

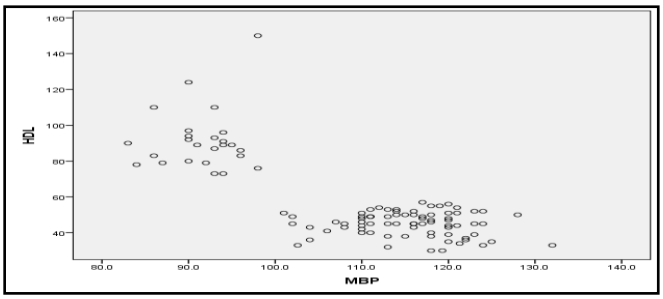

Fig 3: Correlation between Mean Blood Pressure and High Density Lipoprotein (mg/dl)

Table 14: Correlation between Mean Blood Pressure and Low Density Lipoprotein (mg/dl)

Correlations		MBP	LDL
MBP	Pearson Correlation	1	.521**
	Sig. (2-tailed)		.000
	N	100	100
LDL	Pearson Correlation	.521**	1
	Sig. (2-tailed)	.000	
	N	100	100
**. Correlation is significant at the 0.01 level (2-tailed).			

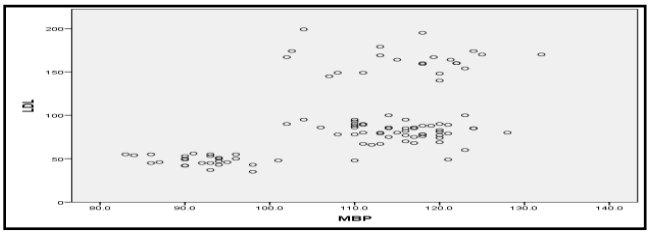

Fig 4: Correlation between Mean Blood Pressure and Low Density Lipoprotein (mg/dl)

Table 15: Correlation between Mean Blood Pressure and Triglycerides (mg/dl)

Correlations		MBP	TG
MBP	Pearson Correlation	1	.261**
	Sig. (2-tailed)		.009
	N	100	99
TG	Pearson Correlation	.261**	1
	Sig. (2-tailed)	.009	
	N	99	99
**. Correlation is significant at the 0.01 level (2-tailed).			

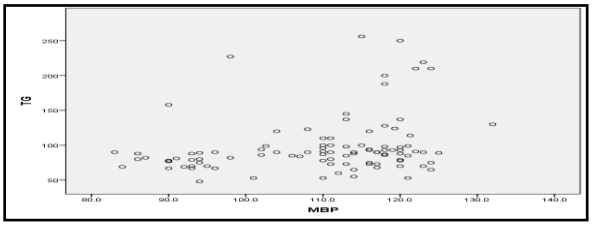

Fig 5: Correlation between Mean Blood Pressure and Triglycerides (mg/dl)

Table 16: Correlation between Mean Blood Pressure and Very Low Density Lipoprotein (mg/dl)

Correlations		MBP	VLDL
MBP	**Pearson Correlation**	1	.280**
	Sig. (2-tailed)		.005
	N	100	100
VLDL	**Pearson Correlation**	.280**	1
	Sig. (2-tailed)	.005	
	N	100	100
**. Correlation is significant at the 0.01 level (2-tailed).			

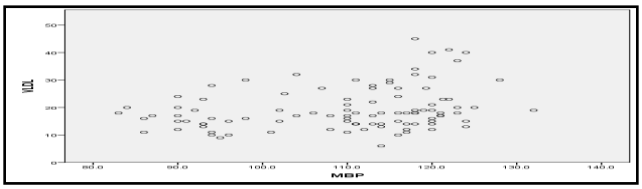

Fig 6: Correlation between Mean Blood Pressure and Very Low Density Lipoproteins(mg/dl)

Table 17: Prevalence of various serum lipid abnormalities among hypertensive patients

Lipid abnormality	Hypertensive patients n=75 (%)
Elevated TC (mg/dl)	26.7
Elevated LDL (mg/dl)	21.3
Elevated TG (mg/dl)	4.8
Low HDL-C (mg/dl)	16.2
No lipid abnormality	51
Lipid abnormality	24

Discussion

The increasing burden of cardiovascular disease (CVD) is a major concern and problem in developing countries like India. It is well-established that hypertension and dyslipidemia are the two major contributing risk factors for CVD[13].Various epidemiological studies have shown the prevalence of the co-existence of hypertension and dyslipidemia, in the range of15 to 31%. The co-existence of the two risk factors has more than an additive adverse impact on the vascular endothelium, which results in enhanced atherosclerosis, leading to CVD, and is associated with adverse outcomes[14].The present study was conducted to determinethe abnormality of lipid profile (TC, TG, HDL, LDL, VLDL) in hypertensive patients and healthy subjects. The finding of our study revealed a significant increase in BMI in cases (26.0±1.73) as compared to controls (22.3±1.73), it was significant at (p = .000). Our finding corroborates with a study conducted by Charles U. Osuji, Emeka G. Omejua et al, who analysed cross sectional data and concluded that hypertensive subjects were significantly heavier than the normotensive subjects, with significantly higher lipid profile[15].Raksha Goyal, Nandini Sarwate, also analysed a cross sectional data and concluded that hypertensive patients had BMI higher than normotensive patients with significantly deranged lipid profile[16].Umar G Adamu, George A Okku et al also concluded the same in their study.Positive relation was seen for Total cholesterol between hypertensive and normotensive subjects. Total cholesterol was higher among hypertensive subjects (189.6±55) than normotensive subjects (153.7± 34 .1), it was significant at (p=.003). The results of our study were in concordance with the study conducted by Srinivas Pai K, Sanjay Bhagoji et al which showed positive relation of hypertension with total cholesterol. They demonstrated that total cholesterol levels were higher in hypertensive patients than those in the healthy adults. Gulab Kanwar, Neelam Jain et al also concluded that there is a positive correlation of hypertension with total cholesterol. Arindam sur, Trikey BN et al, Umar G Adamu, George A Okku et al also concluded the same in their study.In this study, we also compared LDL-C levels with mean blood pressure. When LDL-C level of hypertensive (104.8±40.5) patients was compared with normotensive (91.6±17.1) patients, there was a positive relation between the LDL cholesterol and hypertension. The result was similar to study conducted by Golnoosh Ghooshchi, Mahdi Masoomian et al which showed increased levels of LDL-C in hypertensive subjects compared to normotensive subjects[19].M S Saha, N K Sana et al also concluded that there is a positive correlation between hypertension and LDL cholesterol.[20] Arindam sur, Trikey BN et al[11],N. Brixi Gormat,F. Benmaansour et al, also concluded the same from their studies.In our study there was a significant correlation between mean blood pressure and HDL cholesterol levels. When HDL levels of hypertensive (45.0±6.7) patients were compared with HDL levels of normotensive (48.08±5.83) patients there was significant fall in HDL levels of hypertensive patients as compared to normotensive patients. The study was similar to the study done by GulabKanwar, Neelam Jain et al which concluded that HDL-C levels were decreased in patients with hypertension compared to control[12].Jamshed J. Dalal, T. N. C. Padmanabhan et al also concluded the same in their study and established a positive correlation between hypertension and HDL-C level.Arindam sur, Trikey BN et al, N. Brixi Gormat, F. Benmaansour et al, Umar G Adamu, George A Okku et al concluded the same from their studies. In this study, we also compared triglyceride levels with mean blood pressure. When triglyceride level of hypertensive patients was compared with normotensive patients, there was a negative relation between the triglyceride level and hypertension, and it was found to be insignificant (p>0.05). Umar G Adamu, George A Okku et al concluded the same from their studies. It was unlike other studies conducted by Raksha Goyal, Nandini Sarwat and M S Saha, N K Sana et al in which it was found to be significant.VLDL-C levels were also compared with mean blood pressure and was found to be insignificant (p>0.05) unlike other study conducted by Gulab Kanwar, Neelam Jain et al and Bini N.E, Adu E.M et al in which it was found to be significant.Thus, our study showed that Total cholesterol, LDL-C were found to be significantly high in hypertensive patients and HDL-C was found to be decreased in hypertensive patients while triglyceride and VLDL-C levels showed no positive correlation with hypertension.In the present study it was found that the frequency of hypertension increases with increasing of age in all groups which are in accordance with the former studies of M.S. Saha, N.K. Sana et al[20] maximum number of patients of both sexes were between 50-60 years of age and the percentage had declined sharply below these ages. N. Brixi Gormat, F. Benmaansour et al also concluded the same from their study.In this study total cholesterol was found to be higher in females (205.3 ±56.3) as compared to males (178.6±51.8) which was statistically significant (p=0.037). This was found to be in accordance with the study conducted by Ali Akbar Tavasoli, Masoumeh Sadeghi et al in which total cholesterol was found to be higher in females than in males and was statistically significant.In this study, all the other lipid fractions ie TG, LDL-C, HDL-C, VLDL-C, were found to be statistically insignificant in both males and females (p value> 0.005) as seen in the study conducted by Srinivas Pai K, Sanjay B Bhagoji et al, in which they also concluded that no significant difference was found between males and females. This finding is contrary to the findings of study conducted by Ali Akbar Tavasoli, Masoumeh Sadeghi et al, in which it was found to be significant.In this study, BMI was found to be statistically insignificant in both males and females (p=>0.005).Therefore, this study has shown a significant relationship between the mean blood pressure and total cholesterol,

HDL-C, LDL-C, but no significant relationship was seen between triglycerides and VLDL-C. As per the study conducted by Gulab Kanwar, Neelam Jain et al, Arindam sur, Trikey BN et al, N. Brixi Gormat, F. Benmaansour et al total cholesterol, LDL-C were raised in patients with hypertension in comparison to normotensive patients. HDL-C levels were decreased in hypertensive patients as compared to normotensive patients.

In this study no significant correlation was found between triglyceride levels of hypertensive patients and normotensive patients, which is in accordance with the study conducted by Umar G Adamu, George A Okku et al but wasunlike other studies conducted by Raksha Goyal, Nandini Sarwate et al, which concluded triglyceride level was found significantly higher in hypertensive patients as compared to normotensive patients.In the present study no significant correlation was found between VLDL-C and mean blood pressure, contrary to the study conducted by Gulab Kanwar, Neelam Jain et al, which showed that VLDL-C level was significantly higher in hypertensive patients as compared to normotensive patients.Thus, our study shows that dyslipidemia is more common among hypertensive patients, and among the parameters, total cholesterol, HDL-C, LDL-C were found to be abnormal compared to triglycerides and VLDL-C.

Conclusion

Thus, it was concluded that serum lipid profile can serve as an important marker for screening hypertensive patients for cardiovascular diseases, and their early detection can reduce cardiovascular morbidity and mortality. More so in my study, total cholesterol, HDL-C, LDL-C and BMI were found to be abnormal in hypertensive patients, but triglycerides and VLDL-C did not show any significant variation with hypertension.

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