ORIGINAL ARTICLE

LIPID PROFILE IN NON-OBESE PATIENTS OF ESSENTIAL HYPERTENSION IN RELATION TO AGE AND SEX IN SOUTHERN PUNJAB, PAKISTAN

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Background: Lipid profile has been one of the parameters under investigation for diagnosis of essential hypertension. This study was carried out to investigate the role of lipid profile in non-obese essential hypertensives. **Methods:** One thousand age- and sex-matched subjects (500 normotensives, and 500 essential hypertensives) were selected on standard cross-sectional design, excluding secondary hypertensives. Lipid profile in essential hypertensives was compared to that in age and sex matched normotensives. Moreover, the parameters, i.e., total cholesterol, Low density lipoprotein, high density lipoprotein, Triglycerides, and LDL/HDL ratio in women were compared to age matched hypertensive men in Southern Punjab, Pakistan. **Results:** Significantly higher values of lipid profile were found in essential hypertensives compared to normotensives. The lipid profile values were also significantly higher in women compared to age-matched men. **Conclusion:** Raised lipid profile does have a role in pathogenesis of essential hypertension.

Keywords: Lipid profile, hypertension, essential hypertensives, normotensives

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INTRODUCTION

Lipid profile refers to the levels of fats found in blood. These include total cholesterol (TC), high density lipoprotein cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C) and triglycerides. These levels can be measured by simple laboratory tests. The lipid profile shows whether there is difficulty in metabolising lipids or there is consumption of high fat or cholesterol diet.[1,2] Lipid profile helps in management of patients with cardiovascular disease. It has been important predictor for metabolic disturbances like dyslipidaemias, hypertension, atherosclerosis, cardiovascular disease, and diabetes mellitus.[3]

An abnormal lipid profile is said to be associated with cardiovascular dysfunction and atherosclerosis and has a profound effect on endothelial dysfunction. There is a significantly raised lipid profile in hypertensives as compared to normotensives.[4] Statistically significant higher values of total cholesterol, LDL-C, HDL-C and triglycerides in hypertensive subjects than in normotensives have been reported. However, mean HDL-C was found lower in hypertensives than in normotensives.[5]

A study revealed that serum TC, TG, LDL-C and HDL-C levels were not statistically significant between age and sex matched essential hypertensives and normotensives.[6] However, dyslipidemia may be a contributing factor to increased risk of cardiovascular disease like atherosclerosis in hypertensive patients.[6] Hypercholesterolaemia, hyperglyceridaemia and low density lipoprotein are the major lipid abnormalities contributing to hypertension.[7]

This study was carried out to assess the role of serum lipid profile in non-obese hypertensives in different age groups.

MATERIAL AND METHODS

This cross-sectional observational study was carried out at Nishtar Hospital, Multan, and Sheikh Zayed Hospital Rahim Yar Khan from Jan 2011 to Dec 2012. The study was conducted on non-obese population of Southern Punjab, Pakistan. One thousand age- and sex-matched cases (500 essential hypertensives and 500 normotensives) aged 10–60 years were included in the study. They were further divided into subgroups aged <20 years, 21–40 years, and 41–60 years. Subjects were known hypertensives for the last one year or more. Secondary hypertensives were excluded from the study.

Serum lipid profile of the patients was tested after 9 hour fasting. Fasting blood sample (5 cc) was taken for lipid profile analysis, i.e., TC, LDL-C, HDL-C and TG. Serum was collected after clotting of blood and was centrifuged. The parameters were assessed by enzymatic end point method using 'Human Kit'. Blood pressure was recorded in sitting position with aneroid sphygmomanometer after the participant emptied his/her bladder and sat quietly for 5 minutes.[8]

RESULTS

Table-1 asserts that among 500 normotensives who had TC 148–180 mg/dl, 165 (33.0%) were 10–20 year old, 165 (33.0%) were 21–40 year old and 170 (34.0%) were 41–60 year old (*p*=0.00). Among 385 (77.0%) normotensives who had TG 50–100 mg/dl, 130 (26.0%) were 10–20 year old, 125 (25.0%) were 21–40 year old and 130 (26.0%) were 41–60 year old. Among 115 (23.0%) normotensives who had TG 101–170 mg/dl, 35 (7.0%) were 10–20 year old, 40 (8.0%) were 21–40 years old and 40 (8.0%) were 41–60 years old (p=0.00).

Table-2 elucidates that among 230 (46.0%) normotensives who had LDL-C 19–75 mg/dl, 70 (14.0%) were 10–20 year old, 75 (15.0%) were 21–40 year old and 85 (17.0%) were 41–60 year old. Likewise among 270 (54.0%) normotensives who had LDL-C 76–133 mg/dl, 95 (19.0%) were 10–20 year old, 90 (18.0%) were 21–40 year old and 85 (17.0%) were 41–60 years old (p=0.00). Among 500 (100.0%) normotensives who had HDL-C 38–55 mg/dl, 165 (33.0%) were 10–20 year old, 165 (33.0%) were 21–40 year old and 170 (34.0%) were 41–60 year old (p=0.00).

Among 70 (14.0%) normotensives who had LDL/HDL ratio <3.0, 20 (4.0%) were 10–20 year old, 35 (7.0%) were 21–40 year old and 15 (3.0%) were 41–60 years old. Among 335 (67.0%) normotensives who had LDL/HDL ratio 3.0–4.0, 115 (23.0%) were 10–20 year old, 105 (21.0%) were 21–40 year old and 115 (23.0%) were 41–60 year old. Among 90 (18.0%) normotensives who had LDL/HDL ratio 4.1–5.0, 30 (6.0%) were 10–20 year old, 25 (5.0%) were 21–40 year old and 35 (18.0%) were 41–60 year old. All 5 (1.0%) normotensives who had LDL/HDL ratio >5.0 were 41–60 year old (p=0.00).

Table-1: Comparison of total cholesterol and triglycerides between normotensives and essential hypertensives [n(%)]

Lipid Profile	Normotensives				Essential Hypertensives			
	10–20 yr	**21–40 yr**	**41–60 yr**	**Total**	**10–20 yr**	**21–40 yr**	**41–60 yr**	**Total**
Total Cholesterol (TC) (mg/dl)								
<148	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
148–180	165 (33)	165 (33)	170 (34)	500 (100)	75 (15)	45 (9)	45 (9)	165 (33)
181–209	0 (0)	0 (0)	0 (0)	0 (0)	90 (18)	120 (24)	125 (25)	335 (67)
>209	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Total	165 (33)	165 (33)	170 (34)	500 (100)	165 (33)	165 (33)	170 (34)	500 (100)
Triglycerides (TG) (mg/dl)								
<50	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
50–100	130 (26)	125 (25)	130 (26)	385 (77)	0 (0)	0 (0)	0 (0)	0 (0)
101–170	35 (7)	40 (8)	40 (8)	115 (23)	165 (33)	165 (33)	170 (34)	500 (100)
>170	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Total	165 (33)	165 (33)	170 (34)	500 (100)	165 (33)	165 (33)	170 (34)	500 (100)

Table-2: Comparison of LDL-cholesterol and HDL-Cholesterol between normotensives and essential hypertensives [n(%)]

Lipid Profile	Normotensives				Essential Hypertensives			
	10–20 yr	**21–40 yr**	**41–60 yr**	**Total**	**10–20 yr**	**21–40 yr**	**41–60 yr**	**Total**
LDL-C (mg/dl)								
<19	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
19–75	70 (14)	75 (15)	85 (17)	230 (46)	0 (0)	0 (0)	0 (0)	0 (0)
76–133	95 (19)	90 (18)	85 (17)	270 (54)	165 (33)	165 (33)	170 (34)	500 (100)
>133	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Total	165 (33)	165 (33)	170 (34)	500 (100)	165 (33)	165 (33)	170 (34)	500 (100)
HDL-C (mg/dl)								
<38	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
38–55	165 (33)	165 (33)	170 (34)	500 (100)	0 (0)	0 (0)	0 (0)	0 (0)
56–72	0 (0)	0 (0)	0 (0)	0 (0)	165 (33)	165 (33)	170 (34)	500 (100)
>72	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Total	165 (33)	165 (33)	170 (34)	500 (100)	165 (33)	165 (33)	170 (34)	500 (100)
LDL/HDL ratio								
<3.0	20 (4)	35 (7)	15 (3)	70 (14)	0 (0)	5 (1)	0 (0)	5 (1)
3.0–4.0	115 (23)	105 (21)	115 (23)	335 (67)	60 (12)	55 (11)	75 (15)	190 (38)
4.1–5.0	30 (6)	25 (5)	35 (7)	90 (18)	100 (20)	105 (21)	95 (19)	300 (60)
>5.0	0 (0)	0 (0)	5 (1)	5 (1)	5 (1)	0 (0)	0 (0)	5 (1)
Total	165 (33)	165 (33)	170 (34)	500 (100)	165 (33)	165 (33)	170 (34)	500 (100)

DISCUSSION

This study showed that in hypertensives and normotensives, the values of lipid profile, i.e., TC, TG, HDL-C,LDL-C were within normal limits yet, these values were statistically significant in essential hypertensives than in normotensives. Lakshmana *et al*[9] also showed the raised values of lipid profile in essential hypertensives as compared to the findings in normotensives. Goyal *et al*[3] in their studies also confirmed that all parameters of lipid profile were significantly higher in essential hypertensives compared to age- and sex-matched normotensives. Our study also revealed that lipid profile was significantly higher in females compared to age-matched hypertensive males. Other studies have also reported that in women the values of lipid profile were significantly higher compared to the values in men of the same age group.[3,9]

CONCLUSION

Higher lipid profile in essential hypertensives compared to normotensives indicates lipids as contributing factor in pathogenesis of cardiovascular diseases including essential hypertension. It requires further investigation into the potential role of raised lipid profile in causation of essential hypertension.

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