Research Article

COMPARATIVE STUDY OF LIPID PROFILE OF DIFFERENT AGE GROUP AND GENDER IN NORTH INDIAN POPULATION

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Abstract :
Dyslipidemia is one of the major causal risk factor for atherosclerosis leading to coronary artery disease (CAD) and cerebro vascular accidents (CVA). Present study was aimed to find out the lipid profile of non-diabetic adult north Indian population (n = 300; M: 150 and F: 150; Mean age: 45.8±3.76 years). The mean ± SD (mg/dl) level of TC, HDL, LDL TG and VLDL were 175.72 ± 40.69, 45.60 ± 9.54, 102.22 ± 28.82, 177.3 ± 86.57, 35.48 ± 17.39 in male & 175.72 ± 40.69, 45.60 ± 9.54, 102.22 ± 28.82, $177.3 \pm 86.57..35.48 \pm 17.39$ in female respectively. The TC, TG and HDL level was highest among 41 to 60 years age group and the difference was statistically significant when compared with younger age group.The desirable level of TC (<200 mg/dl) was found in nearly 78 percent of the population; however, almost 5 percent had high TC (>240 mg/dl).Normal TG (<150 mg/dl)& LDL (<129mg/dl) level was found in 59.5%& 75% respectively. High TC(>240 mg/dl) and very high TG (>500mg/dl) and LDL (>190 mg/dl) were found in 5%, 3% and 5.5% ofparticipants, respectively. Nearly two-third (60.0%) of the total population had, higher HDL level (>40 mg/dl). Percentage prevalence of normal lipid profile or desirable lipid levels (TC<200mg/dl, TG<150 mg/dl, LDL<129 mg/dl and HDL" 40mg/dl) in the whole study population was calculated in the present study. The overall mean cholesterol level was within normal limit. MeanLDL level showed increasing trend with age.
Keywords:Dyslipidemia, CVA, CAD, non-diabetic, North Indian

INTRODUCTION

Dyslipidemia is one of the major causal risk factor for atherosclerosis leading to coronary artery disease (CAD) and cerebro vascular accidents (CVA).[1,2] It acts independently for the progression of coronary artery disease. Raised serum cholesterol (TC), triglyceride (TG), low density lipoprotein (LDL) level and decreased high density lipoprotein (HDL) are associated major risk factors for cardiovascular disease[3]. High cholesterol levels are found to cause 56% of global ischemic heart diseas[4].

Worldwide, there is a wide variation in mean population cholesterol levels. Steady increase of cholesterol levels was noted in Asian countries in the last decades and the trend was

increasing fasterin urban areas than in rural areas.[5]The positive correlation between the increase of older population in the regions of developing economy and the prevalence of dyslipidemia, is the major concern for the prevention of coronary artery disease. It has been observed that the populations with high total cholesterol and LDL level are at the higher the risk of heart disease;on the contrary, the populations with the lower LDL cholesterol level are at the lower risk.

Great variations have been observed in plasma lipid levels amongst different populations and the factors like age; sex, food habits, life style, socio-economic status, races, heredity etc. have impact on this variation.In addition, variation caused by different methodologies adopted for the determination of lipids and lipoproteins could not be ignored. In clinical chemistry, reference values, we use, are usuallystandardised for the Western population and hence, these values may not match with the Indian population as observed in case of lipid profile. A reference value may be defined as a value obtained by observation or measurement of a particular type of quantity on a reference individual. As reference values play important role in interpretation of the results of diagnostic analysis, it should represent the variation range for the population to which the patient under consideration belongs. Present study, therefore, was aimed to report the prevalence and distribution of lipid profile in non-diabetic adult North Indian population. Also, the study was designed to find out the prevalence of desirable target lipid levels in the population under consideration.

MATERIALS AND METHODS:

This retrospective study was carried out at the OPD of, SGT Medical College,Hospital& Research Institute, Gurgaon,Haryana.The study was conducted on a total of 300 individuals, inclusive of 150 male and 150 female patients

The patients having past history of diabetes mellitus or recently diagnosed with the same (fasting glucose 126 mg/dl) were put in the exclusion criteria. Also,the patients with acute illness at the time of the study were excluded.

The ethical clearance was taken for the study from the Ethical Committee of the Institute. The informed consent of the subjects was obtained for the study. Participants were advised to attend fasting at least for 12 hours prior to the blood sampling venous blood samples were collected irrespective of seasonal variations throughout the year. Analysis was done within 4 hrs of collection on fully automated autoanalyzer EM-200 (Transasia). Serum level of Total Cholesterol was estimated by Cholesterol Oxidase Method whereas estimation of Triacylglycerol (TAG) was done by Lipase/ G-ol dehydrogenase Method. Direct: non immunological method was used for determination of High Density Lipoprotein Cholesterol (HDL-C). Low Density Lipoprotein Cholesterol (LDL-C) was estimated directly by an assay based on a modified polyvinyl sulfonic acid (PVS) and polyethylene glycolmethyl ether (PEGME) coupled classic precipitation method

STATISTICAL ANALYSIS:

The statistical software SPSS (version 17) was used for data analysis. The mean values of all the parameters of lipid profile tests were analyzed. Data were expressed as mean ± SD. Unpaired student's t-test was used for group wise comparisons and p-value of <0.001 was considered statistically significant.

RESULT:

300 participants (1:1 male/female) who fulfilled the criteria of the study were included in the study. The age of the participants ranged from 21 to 92 years with a mean of 49.68 ± 14.63 years for male and 48.34 ± 12.88 for female participants.The mean ± SD (mg/dl) level of TC, HDL, LDL TG and VLDL were calculated for both the sex and the results are listed in table 1 and table 2. The mean ± SD (mg/dl) level of TC, HDL, LDL TG and VLDL were 175.72 ± 40.69, 45.60 ± 9.54, 102.22 ± 28.82, 177.3 ± 86.57, 35.48±17.39 in male & 175.72 ± 40.69, 45.60 ± 9.54,102.22 ± 28.82, 177.3 ± 86.57..35.48 ± 17.39 in female respectively. It was observed that the TC, TG and HDL level was highest among 41 to 60 years age group and the difference was statistically significant when compared with younger age group.

TABLE-1:Lipid levels (mean ± SD) (mg/dl) among different age groups of female

Age (years)	TC	HDL	LDL	TG	VLDL
21-40	166.36±30.91	44.51±8.76	96.69±23	158.44±55.44	31.69±11.12
41-60	183.47±41.25	47.44±11.94	105.16±31.35	177.86±78.62	34.7±15.64
>60	157.23±30.46	41.1±8.84	92.38±30.84	152.05±42.91	30.43±8.64
Total	175.72±36.64	45.04±10.10	99.35±28.54	165.24±52.23	32.68±12.37

TABLE-2:Lipid levels (mean ± SD) (mg/dl) among different age groups of male

Age (years)	TC	HDL	LDL	TG	VLDL
21-40	175.07+34.29	45.03+8.43	101.69+23.72	166.46+89.37	37.31+17.97
41-60	179.7+36.56	47.58+11.42	103.5+28.23	175.9+66.41	35.25+13.33
>60	163.04+41.26	42.82+7.95	95.61+30.24	129.82+57.35	25.89+11.44
Total	175.72±40.69	45.60±9.54	102.22±28.82	177.3±86.57	35.48±17.39

The results indicate that the mean TC, HDL level was comparable in both male and female participants, whereas the mean LDL, TG and VLDL levels were comparatively higher in the males.

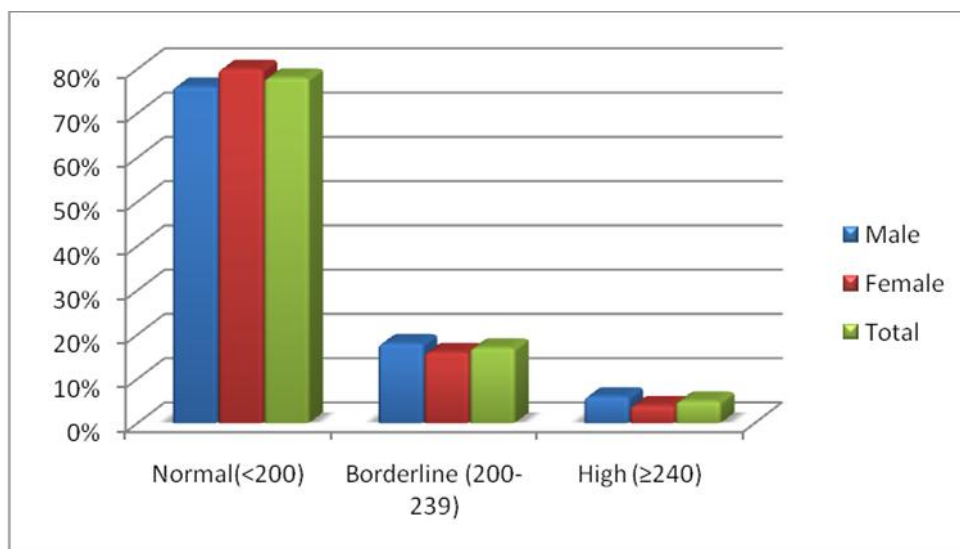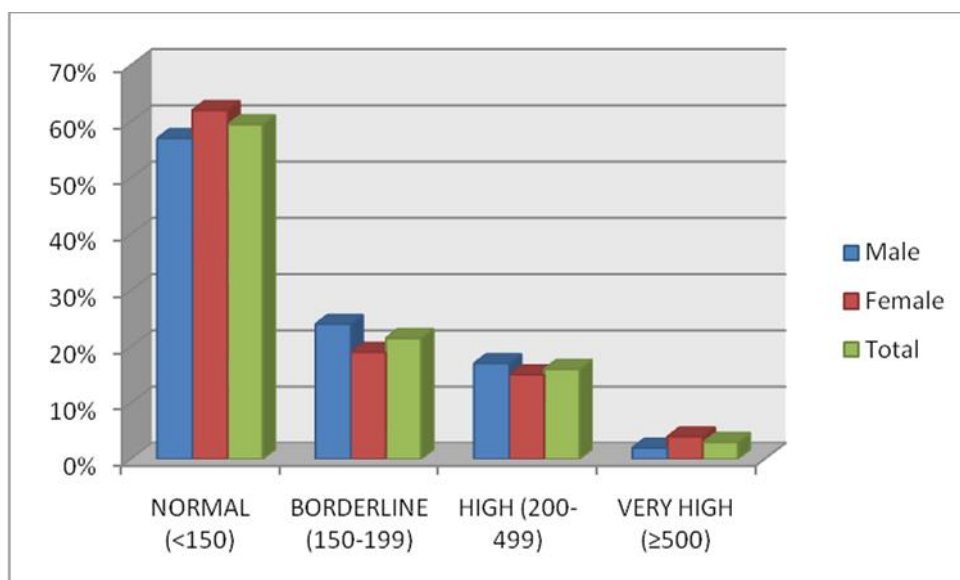**Figure-1: Percentage distribution of different levels of TC (mg/dl)**
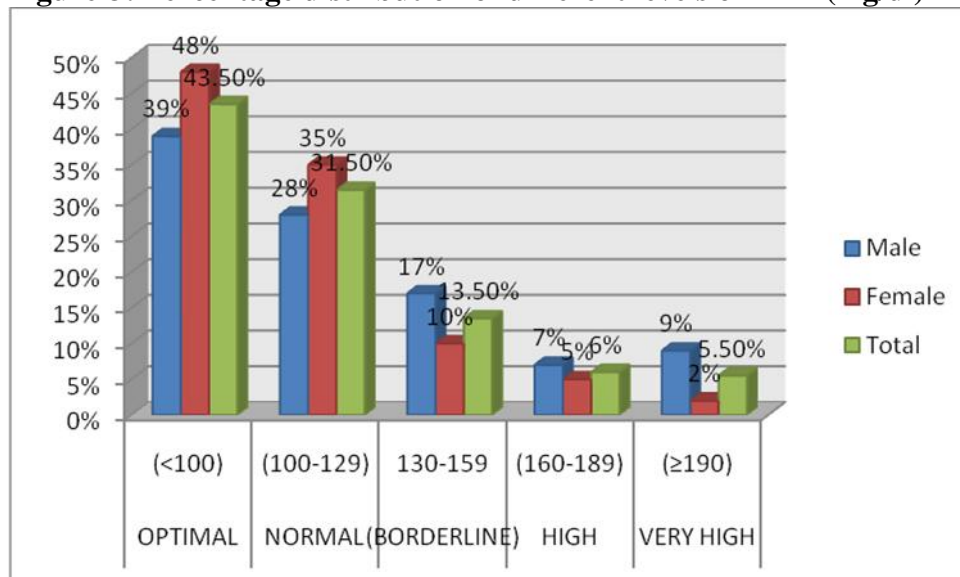

Figure-2: Percentage distribution of different levels of TG (mg/dl)

Figure-3: Percentage distribution of different levels of LDL (mg/dl)

The desirable level of TC was found in nearly 78 percent of the population; however, almost 5 percent had high TC (>240 mg/dl) (Fig. 1). Higher level of TC was observed among males than in females. Similarly, Normal TG level was found in 59.5% of participants and it was found very high (>500 mg/dl) in 3% of the total population (Fig. 2). 4%female and 3% male had very high TG level. Normal or near optimal level of LDL (<129 mg/dl) was found in 75% of the total population and LDL was found very high (>190 mg/dl) in 6.5 percent of the total population (Fig. 3). Nearly 9% male had very high LDL level, while it was observed in only two percent of females.Nearly two-third (60%) of the total population had, higher HDL level (>40 mg/dl).

DISCUSSION:

Heart disease and stroke are usually associated with the atherosclerosis of large and medium sized arteries. Hypercholesterolemia is the most important factor in the pathogenesis of atherosclerosis. Hypertension, smoking, diabetes, obesity, physical inactivity, and atherogenic diets have all been identified as modifiable risk factors for heart disease. Age, male gender, and a family history of premature coronary heart disease (CHD) have been identified as non-modifiable risk factors.The study population of present study mainly comprised of the rural population of Gurgaon. This study, therefore, documents the lipid profile of mainly adult non-diabetic rural population. Significantly higher mean TG level observed in the 41to 60 age group as compared to other age groups needs to further investigated. The comparative analysis of our data with the recent studies on the other regions of India revealed that the variation was not much significant on the studied parameters in Indian populations.[6,7]Present study showed the mean TC level is 175.72 mg/dl in male and 175.72 mg/dl in female which is comparable previous reports. [9,10]All lipid levels including HDL were found highest among middle age group. The reason for high level of TC, TG and HDL in middle age group needs to be elucidated.The recent health consciousness and public

awareness regarding the role of dietary habit and lifestyle on the occurrence of heart disease, a uniform pattern of living quality and healthy food habit has put the population of different regions of India on a similar plateau.

The increase in mean cholesterol level can be justified with the changing life style of the people during recent years associated with rapid urbanization and globalization. Steady increase of cholesterol levels has also been reported in other Asian countries during the last decade of the 20th century. Considerable increase in hypercholesterolemia, hypertriglyceridemia and abnormally low HDL in all age groups of professional population since past 20 years has recently been reported from China.[11]Epidemiological surveys in an urban Indian population [12] has also demonstrated the increased adverse lipid profile in both men and women. Unhealthy life style is the main cause of adverse lipid profile in these regions, on the contrary with appropriate life style change and the use of lipid lowering medication, mean TC and LDL level has noted decreased since past 20 years in the region of established market economy .[13]

The similar pattern of lipid profiles was observed in some studied world populations.[8]The mean levels of TC, TG, LDL and HDL found in this study was comparable with the previous report from the Brazil.[14] Higher TG level in the age group of 45 to 59 years and over 60 years has been reported in one Chinese study.[15]. Present study showed the desirable TC level in 78%, normal TG in 59.5% and normal LDL (<129 mg/dl) in 75% of the total population. The results of present survey on the prevalence of dyslipidemia were comparable with one of the recent report from Iraqi.[16] High and very high levels of TC, TG and LDL was noted respectively in 5%, 3% and 5.5% of the total study population. Significantly higher percentage of males had very high LDL level, while it was comparable in high and very high TC and TG levels. This correlates well with high incidence of coronary heart disease. Higher percentage of female than male had HDL>40 mg/dl, however, almost 35% population had HDL<40 mg/dl. The prevalence of low LDL level observed in this study was comparable to one of the report from India.[17] but higher than the finding of one of the Brazilian study.[14] Percentage prevalence of normal lipid profile or desirable lipid levels (TC<200mg/dl, TG<150 mg/dl, LDL<129 mg/dl and HDL> 40mg/dl) in the whole study population was calculated in the present study.

REFERENCES:

1. Yusuf S, Hawken S, Ounpuu S *et al*. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. *Lancet* 2004; 364: 937-52.
2. Grundy SM. Primary prevention of coronary heart disease, integrating risk assessment with intervention. *Circulation* 1999; 100: 988-98.
3. Wilson PDF, D Agostino RB, Levy D, Belanger AM, Silbershatz H, Kannel WB. Prediction of coronary artery disease using risk factor categories. *Circulation* 1998; 97:1837-47.
   4. WHO. World Health Report: Reducing risks, promoting healthy life. Geneva 2002.
5. Khoo KL, Tan H, Liew YM *et al*. Lipids and coronary artery disease in Asia. *Atherosclerosis* 2003; 169: 1-10.
6. Goswami K, Bandyopadhyay A. Lipid profile in middle class Bengali people of Kolkata. Ind J ClinBiochem 2003; 18 (2): 127-30.
7. Gupta R, Prakash H, Kaul V. Cholesterol lipoproteins,Triglyceride, Rural-Urban Deferences and prevalence of dyslipidemia among males in Rajasthan.J
8. Yano K. Distribution and correlates of lipids and lipoproteins in elderly JapanesesAssoc Physicians Ind1997; 45:273-9.

9.   Nakanishi M, Rai SK, Hirai K *et al*. Serum lipid profile inadult Nepalese of different ethnic groups. *J Inst Med* 1997;19: 98-104.

10.   Karki DB, Neupane A, Pradhan B, Magar A. Lipid levels in Nepalese population. *Kathmandu Univ Med J* 2004; 2: 349-53.

11.   Li ZY, Yang RF, Xu GB, Xia TA. Serum lipid concentrations and prevalence of dyslipidemia in a large professional population in Beijing. *ClinChem*2005; 51: 144-50

12.   Gupta R, Gupta VP, Sarna M, Prakash H, Rastogis S, Gupta KD. Serial epidemiological surveys in an urban Indian population demonstrate increasing coronary risk factors among the power socioeconomic strata. *J Assoc Physicians India* 2003; 51: 470-7.

13.   Caroll MD, Lachev DA, Sorlie PD *et al*. Trends in serum lipids and lipoproteins of adults, 1960-2002. *J Amer Med Assoc*2005; 294: 1773-81.

14.   de Souza LJ, SoutoFillo JT, de Souza TF *et al*. Prevalence of dyslipidemia and risk factors in Campos dos Goytacazes in Brazilian state of Rio de Janeiro. *Arq Bras Cardiol*2003; 81:249-64.

15.   Zhang J, Mann QQ, Wang CR *et al*. The plasma lipid level in adults among different areas in China. *ZhongHua Yu Fang Yi XueZaZhi (in Chinese)* 2005; 5: 302-5.

16.   Mula-Abed WS, Chilmeran SK. Prevalence of dyslipidemia in the Iraqi adult population. *Saudi Med J* 2007; 12: 1868- 74.

17.   Gupta R, Gupta VP, Sarna M, Prakash H, Rastogis S, Gupta KD. Serial epidemiological surveys in an urban Indian population demonstrate increasing coronary risk factors among the power socioeconomic strata. *J Assoc Physicians India* 2003; 51: 470-7.