

A cross-sectional study of lipid profile and coronary heart disease risk assessment in males

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Abstract: The current study has been performed to evaluate the relationship of dyslipidemia in coronary heart diseases on 113 males above age of twenty from Karachi Institute of Heart Diseases. Lipid profile is a traditional biomarker for CHD. The mean \pm SD (mg/dl) levels of total cholesterol (TC), triglyceride (TGs) and low density lipoprotein cholesterol (LDL-C) were found high while low level of high density lipoprotein cholesterol (HDL-C) were observed. The analysis of data provides an opportunity to study the lipid profile and their association in developing cardio vascular diseases. High concentration of cholesterol, LDL-C, TGs and low concentration of HDL-C indicate strong indication of CHD in individual in future life.

Keywords. Total cholesterol (TC), triglyceride (TGs), low density lipoprotein cholesterol (LDL-C), high density lipoprotein cholesterol (HDL-C), cardio vascular disease (CVD), coronary heart disease (CHD), dyslipidemia

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INTRODUCTION

Cardiovascular complication is the major agent of morbidity and mortality in industrialized countries¹. Numerous researchers reported that disturbances in lipid profile is major cause which contribute in developing atherogenic sclerosis²⁻⁴. Dyslipidemia is characterized by high concentration of triglycerides (TGs), low-density lipoprotein cholesterol (LDL-C) and total cholesterol (TC) while low concentration of high-density lipoprotein cholesterol (HDL-C)⁵. Pakistani population at risk of cardio vascular complications due to consumption of saturated fat in their diet⁶ or might be due to mutation in gene code for hepatic uptake of LDL-C and degradation of LDL-C receptor⁷. Cardio vascular disturbances increase continuously as serum cholesterol increase⁸⁻⁹. Several prospective, observational and case control research study demonstrate that decrease level of high density lipoprotein-cholesterol is an independent risk factor component for heart diseases, while high level of HDL-C is linked with longevity and are protective against the development of atherosclerotic disease. When high density lipoprotein-cholesterol level below than 40 mg/dl, risk for cardiac diseases sharply increases¹⁰. The object of this cross sectional survey is to study the lipid profile levels and their influence on CHD risk in future in individuals. Many experimental, genetic and epidemiological study demonstrated that increase concentration of fat rich lipoprotein, high level of triglycerides and cholesterol remnant in serum are major causes in heart disease. Dislipidemia management can help to protect the population to CVD³¹.

MATERIALS AND METHODS

The current study has been conducted for a period from December 2012 to April 2013. The samples were 113 males of ≥ 20 years of age selected from OPD of Karachi Institute of Heart Diseases. Patients were classified into four groups according to age. They were advised to attend fasting condition at least 12 hours prior to blood sampling. SPSS version 20 was used to analyze the data of 113 male individuals. Data was analyzed by using auto analyzer in Karachi Institute of Heart Diseases hospital laboratory.

RESULTS

The patient were classified in four groups between 21-40 (A), 41-60(B), 61-80(C), <80(D) and total of all. Lipid profile included TC, LDL-C, HDL-C and TGs. The table 1 shows mean and standard deviation (SD \pm) of all groups including total of all groups. Table 2 shows the category distribution of different concentration of total cholesterol, triglycerides, total high density lipoprotein & low density lipoprotein in all age group. National Cholesterol Education Programme (NCEP) defined criteria for dyslipidemia was used to compare our results³².

Table 1: Lipid parameters (Mean \pm SD) (mg/dl) among different age's groups.

Groups	AGE (Years)	TC	TGs	LDL-C	HDL-C
A	21-40 (n=30)	Desirable	High risk	Near optimal	High risk
B	41-60 (n=47)	Desirable	High risk	Near optimal	High risk
C	61-80 (n=18)	Borderline	High risk	Near optimal	High risk
D	>80 (n=18)	Borderline	High risk	Optimal	High risk

Table 2: Category distributions of different levels of TC, TGS, LDL-C and HDL-C (mg/dl) in all age's groups.

No	AGE (Years)	TC Desirable range (<200mg/dl)	TGs Optimal range (150mg/dl)	LDL-C Optimal (<100mg/dl)	HDL-C Normal (>40mg/dl)
A	21-40 (n=30)	195.86±41.90	226.33±77.36	115.58±33.86	39.23±6.32
B	41-60 (n=47)	191.44±71.46	212.23±64.51	105.55±32.94	38.02±8.17
C	61-80 (n=18)	216.66±43.46	241.66±43.46	102.5±25.93	39.9±8.06
D	>80 (n=18)	205.33±50.76	205.33±50.70	90.81±36.33	30.77±5.35
Total	113	202.07±51	221±59.01	103±28.63	36.98±6.97

DISCUSSION

Asian population has one of the highest ratio of heart diseases as compare to other population¹¹⁻¹². *Statistical* analysis in year 2002 demonstrates that 100,000 patient were reported with coronary heart diseases complications. Lipid profile have direct correlation with coronary heart disease risk¹³.

Our present results of cholesterol show desirable range (<200mg/dl) in group A & B while C & D at border line (200-239 mg/dl). Other biomarker is LDL-C which related with concentration of cholesterol in serum because LDL-C is major transporter of cholesterol, carry cholesterol in periphery tissue. In present study LDL-C mean in group A, B & C show range in near optimal region (100-129mg/dl) while group D were found in (<100mg/dl) optimal region. LDL-C cholesterol is directly related to pathogenesis of atherosclerosis and can be used as a therapeutic target to deprecate the risk of cardiovascular event¹⁴. A 10-mg/dl increases in LDL-C cholesterol level was associated with a 12% increase in CHD risk¹⁵.

Hypercholesterolemia might be due to genetic disorder which in turn cause defect in hepatic uptake and lysosomal degradation of cholesterol¹⁶. Pekka and coworker¹⁷ reported that a 10 % decline in serum cholesterol level, reduce 20% mortality in cardiac heart disease and risk of coronary heart complication increase as level of cholesterol elevated. TG and HDL-C are use as lipid biomarker to investigate coronary heart disease. Every 10% decline in HDL-C, risk for CHD elevate 13%¹⁸. HDL-C exert athero-protective functions by promoting anti-oxidant¹⁹, anti-infectious anti-

apoptotic and anti-thrombotic and anti-inflammatory properties¹⁹⁻²⁰. Kontush and coworker²¹ demonstrate that dysfunctional HDL lose its normal function and acquire pathological functions and develop CHD. 50% people who get heart attacks have healthy cholesterol levels but decrease concentration of high density lipoprotein-cholesterol (HDL). Usually collaborated with high concentration of TGs.

Present cross sectional study result show that TG level mean of A, B, C & D at high risk (200-499 mg/dl) as well as HDL-C level in all mean group A, B, C & D also below (<40mg/dl). Low concentration of high density lipoprotein-cholesterol describe as heart disease risk biomarker³³.

Increase concentration of triglycerides and decrease concentration of HDL-cholesterol are the most prominent lipid deformity in Pakistani cardiac patients²². Several researcher suggest that low concentration of high density lipoprotein-cholesterol and high level of triglycerides in serum also confer residual risk for coronary heart complications²³⁻²⁴.

Present survey shows all age groups have triglyceride levels above 200mg/dl, indicates that all individuals are at very high chance of occurrences in upcoming. Large observational study confirms that both TGs²⁵⁻²⁶ and HDL-C²⁷⁻²⁸ concentrations are associated with increased CHD risk. High concentration of TGs might be due to increase production and decrease catabolism of TGs. Prospective studies of TGs demonstrate that high TGs is strongly correlated to CHD risk in people with decrease concentration of HDL-C and increase concentration level of LDL-C in serum²⁹⁻³⁰.

CONCLUSION

Present cross sectional study shows the high concentration of triglyceride and low density lipoprotein cholesterol while, low level of high density lipoprotein cholesterol in all groups. Statistical data indicates that adult's male patient at highest risk of heart diseases in future. Healthy heart must keep lipid profile in normal range. Therefore earlier investigation and medication are required to prevent and cure the dyslipidemia and their related disorder. A plan is required for decreasing hypertriglyceridemia and increasing

HDL-cholesterol levels in CHD patients. Dietary lipid abnormalities can be reversed by exercise, weight control, reduced intake of saturated fats and use of drugs but Genetic abnormalities are not possible to restore. It can be control by proper clinical care.

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