

# Lipid profile and its association with coronary heart disease

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## Abstract

**Introduction:** In India also the prevalence of coronary heart disease is increasing. It is essential to identify and manage risk factors for coronary heart disease in order to prevent its development in asymptomatic individuals (primary prevention) as well as to avoid its recurrence in patients with established disease (secondary prevention). Abnormalities in plasma lipoproteins and derangement in lipid metabolism rank as the most firmly established and best understood risk factor for CHD. **Aims and Objectives:** To determine the association of abnormal lipid levels with coronary heart disease (CHD) patients. **Materials and Methods:** The present study was conducted at Government Medical College and Hospital, Aurangabad. Lipid profile of 60 Coronary Heart Disease patients admitted with first episode of coronary heart disease in ICCU were compared with 60 healthy apparently normal age, sex matched individuals. **Results:** it was observed that abnormal lipid levels were significantly associated with CHD patients. Except in triglycerides and VLDL levels in male group which were increased but were not statistically significant in CHD patients as compared to control group. **Conclusion:** abnormal lipid levels were significantly associated with coronary heart disease (CHD) patients.

**Keywords:** Lipid, Coronary Heart Disease.

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## INTRODUCTION

Atherosclerosis is the leading cause of death and disability in the world. Despite our familiarity with this disease, some of its fundamental characteristics remain poorly recognized and understood. Although many generalized or systemic risk factors predispose to its development, atherosclerosis affects various regions of the circulation preferentially and yields distinct clinical manifestation depending on the particular circulatory bed affected. Atherosclerosis of coronary arteries commonly

causes myocardial infarction and angina pectoris.<sup>1</sup> In India also the prevalence of coronary heart disease is increasing. The prevalence is higher in men as compared to women in both urban and rural population. Coronary artery disease risk is two to three fold more common among urban subjects compared to rural population in both sexes, which is due to greater sedentary behavior, diabetes mellitus, hypertension, obesity, smoking and hypercholesterolemia.<sup>2</sup> It is essential to identify and manage risk factors for coronary heart disease in order to prevent its development in asymptomatic individuals (primary prevention) as well as to avoid its recurrence in patients with established disease (secondary prevention). Risk factor management should be conceived as prevention of coronary atherosclerosis itself and as such, should be included as an integral part of any management plan for the many acute and chronic manifestation of this disease.<sup>3</sup> Abnormalities in plasma lipoproteins and derangement in lipid metabolism rank as the most firmly established and best understood risk factor for atherosclerosis.<sup>17</sup> Abnormal lipid levels contribute significantly to the risk of CHD which is increased further

in the presence of other risk factors such as hypercholesterolemia, hypertension, male gender, diabetes mellitus, family history of premature coronary artery disease, cigarette smoking, post menopausal state, hyperfibrinogemia, hyperhomocysteinemia, physical activity and obesity.<sup>1</sup>

### AIMS AND OBJECTIVE

To determine the association of abnormal lipid levels with coronary heart disease (CHD) patients.

### MATERIALS AND METHODS

#### Study design

The present study was conducted at Government Medical College and Hospital, Aurangabad among the subjects those who were diagnosed of Coronary Heart Disease and admitted with either myocardial infarction or angina pectoris or ischemic Heart Disease in ICCU.

#### Methodology

The present cross sectional study was conducted by selecting 60 patients with Coronary Heart Disease admitted to ICCU during January 2005 to January 2006. Following inclusion and exclusion criteria was used to select the cases.

#### Inclusion criteria

- Hospitalization with first time chest pain and fresh ECG showing sign of Ischemic changes.
- Patient between age group of 45-65 years.

#### Exclusion criteria

- Smoking
- Diabetes Mellitus
- Lipid lowering Drugs

These 60 cases were compared with 60 Age and sex matched healthy individuals. Detail history of cases and controls was entered on proforma. Fasting blood sample were collected and analyzed for lipid profile of both the groups. The arithmetic mean (x), standard deviation (S.D) were calculated for case and control group separately and compared by using unpaired t test.

### RESULTS

**Table 1:** Age and sex wise distribution of CHD patients and normal control subjects.

Variable	CHD Patients (n=60)	Controls (n=60)
Male	39	42
Female	21	18
Age(yrs)	59.92 ± 5.40	55.18 ± 5.23

The study included a total number of sixty (60) coronary heart disease patients admitted in Medicine ICCU. Same number (60) age and sex matched apparently healthy normal subjects were studied as controls. It was observed there were 39 male and 21 female with an average age of

59.92 yrs suffering from CHD and control group of 42 male and 18 female with an average age of 55.18 yrs.

**Table 2:** Comparison cholesterol level in CHD cases and control subjects

Group	Cases Mean ± S.D	Controls Mean ± S.D	Unpaired t test	P value
Male	210.13 ± 37.55	198.14 ± 17.29	11.85	< 0.05
Female	208.28 ± 23.12	194.11 ± 16.39	2.22	< 0.05
<b>Total</b>	<b>209.46 ± 33.02</b>	<b>196.94 ± 17.39</b>	<b>2.59</b>	<b>&lt; 0.01</b>

It was observed that serum cholesterol level in CHD patients was significantly increased as compared to control group. Similar findings were observed when male CHD group was compared with male control group. And female CHD group was compared with female control group. There were 39 male and 21 female with an average age of 59.92 yrs suffering from CHD and control group of 42 male and 18 female with an average age of 55.18 yrs.

**Table 3:** Comparison triglycerides level in CHD cases and control subjects

Group	Cases Mean ± S.D	Controls Mean ± S.D	Unpaired t test	P value
Male	145.61 ± 17.31	139.24 ± 20.30	1.54	NS
Female	153.09 ± 16.99	132.22 ± 18.05	3.69	< 0.001
<b>Total</b>	<b>148.24 ± 17.86</b>	<b>137.13 ± 20.18</b>	<b>3.19</b>	<b>&lt; 0.001</b>

Serum Triglyceride showed very highly significant increase in CHD patients as compared to normal healthy group (148.24 ± 17.86 vs 137.13 ± 20.18 mg/dl, p<0.001). Female CHD group also showed significant difference in serum triglyceride levels. Male CHD patients also showed increase in sr. triglyceride levels as compared to control group, but the increase was not found to be statistically significant.

**Table 4:** Comparison HDL level in CHD cases and control subjects

Group	Cases (n=60) Mean ± S.D	Controls (n=60) Mean ± S.D	Unpaired t test	P value
Male	38.77 ± 2.59	40.40 ± 4.08	2.16	< 0.05
Female	39.28 ± 2.95	41.55 ± 3.10	2.33	< 0.05
<b>Total</b>	<b>38.95 ± 2.77</b>	<b>40.75 ± 3.886</b>	<b>2.92</b>	<b>&lt; 0.01</b>

It was observed that serum HDL levels were decreased in total CHD patients and also in males and females patients with statistical significant difference.

**Table 5:** Comparison VLDL level in CHD cases and control subjects

Group	Cases Mean ± S.D	Controls Mean ± S.D	Unpaired t test	P value
Male	29.18 ± 3.59	27.78 ± 4.04	1.65	NS
Female	30.71 ± 3.44	26.5 ± 3.51	3.76	< 0.001
<b>Total</b>	<b>29.717 ± 3.68</b>	<b>27.4 ± 3.988</b>	<b>3.31</b>	<b>&lt; 0.001</b>

Serum VLDL levels showed significant increase in CHD patients as compared to control group. Similar findings were observed in female group also. Increases in VLDL levels were also observed in male CHD group but the difference was not statistically significant.

**Table 6:** Comparison LDL level in CHD cases and control subjects

Group	Cases Mean $\pm$ S.D	Controls Mean $\pm$ S.D	Unpaired t test	P value
Male	142.18 $\pm$ 32.42	129.95 $\pm$ 17.48	2.09	< 0.05
Female	138.28 $\pm$ 20.45	125.05 $\pm$ 17.92	2.15	< 0.05
<b>Total</b>	<b>140.8 <math>\pm</math> 29.59</b>	<b>128.78 <math>\pm</math> 18.01</b>	<b>2.68</b>	<b>&lt; 0.01</b>

LDL in our study was found to be significantly increased in all the groups.

## DISCUSSION

In the present study we compared lipid profile of 60 Coronary Heart Disease patients admitted with first episode of coronary heart disease in ICCU of Government Medical College, Aurangabad with 60 healthy apparently normal age, sex matched individuals. In our study we observed that serum Total Cholesterol levels were significantly increased in CHD patients as compared to normal controls (209.42  $\pm$  33.02 vs 196.94  $\pm$  17.39 mg/dl,  $p < 0.01$ ). Serum Cholesterol levels were also found to be significantly increased in male CHD patients and female CHD patients when compared to their normal counterparts (males 210.13  $\pm$  37.55 vs 198.14  $\pm$  17.29 mg/dl,  $p < 0.05$  and females 208.28  $\pm$  23.12 vs 194.11  $\pm$  16.39 mg/dl,  $p < 0.05$ ). The relationship between cholesterol and atherosclerosis enjoys a wide acceptance. The emergence of data from cohort studies, such as that began in Framingham in 1950s, bolstered the relationship between cholesterol and CHD. This study, as well as others performed in different population around the world, established more firmly the concept of cholesterol as a culprit in coronary heart disease.<sup>4</sup> Similar findings were also reported in Multiple Risk Factor Intervention (MRFIT) Trial (1986)<sup>5</sup>, the Prospective Cardiovascular Munster (PROCAM) cohort (1992)<sup>6</sup>, and recently, the Atherosclerosis Risk In Communities (ARIC) study (2001)<sup>7</sup>. Serum Triglyceride showed very highly significant increase in CHD patients as compared to normal healthy group. Female CHD patients also had very high significant increase in serum triglyceride levels. Male CHD patients also showed increase in sr. triglyceride levels as compared to control group, but the increase was not found to be statistically significant. Thus in contrast to the compelling evidence favoring a causal role for cholesterol in atherogenesis, the role of

triglycerides still engenders controversy. Avins A.L. *et al* (2000)<sup>8</sup> concluded that in men, measurement of serum triglyceride levels does not provide clinically meaningful information about CHD risk. Austin M.A. *et al* (1989)<sup>9</sup> stated that from a statistical point of view, triglyceride often is not a significant predictor of coronary heart disease in multivariate statistical models because of the large variation in triglyceride measurements and the strong inverse relation between HDL cholesterol and triglyceride. Our finding of triglycerides correlate with Michael F Reardon *et al* (1985)<sup>10</sup> who found in their study that in men, the score for severity of atherosclerosis was strongly related to LDL and apo B concentration, whereas in women it was related to the triglyceride concentration in plasma. It was observed that HDL cholesterol was decreased in total CHD patients and also in males and females patients. HDL also shows significant decrease in both male and female patients. Our findings were similar with the finding of Gordon *et al* (1977)<sup>11</sup>, John Albers *et al* (1978)<sup>12</sup>, Lynn Rosenberg *et al* (1983)<sup>13</sup>, Gred Assmann *et al* (1992)<sup>14</sup>, Korhonen T. *et al* (1996)<sup>15</sup>. All of them found significant decrease in HDL cholesterol in CHD irrespective of sex and age. Table 5 showed very highly significant increase in VLDL in cases as compared to controls (29.71  $\pm$  3.68 vs 27.4  $\pm$  3.98 mg/dl,  $p < 0.001$ ). In males VLDL was increased in cases as compared to controls but the increase was not statistically significant (29.18  $\pm$  3.59 vs 27.78  $\pm$  4.04 mg/dl) while very highly significant increase was also found in female CHD patients with 30.71  $\pm$  3.44 mg/dl as compared to 26.5  $\pm$  3.51 mg/dl in control females. Our findings were in accordance with Michael Reardon *et al* (1985)<sup>31</sup> and Singh R.B. *et al* (1997)<sup>16</sup>. LDL in our study was found to be significantly increased in all the groups. The overall concentration of LDL in population was 140.8  $\pm$  29.59 mg/dl in CHD patients against 128.78  $\pm$  18.01 mg/dl in controls with  $p < 0.01$ . LDL values in our study were calculated using Friedewald formula. Our finding correlates with Reardon *et al* (1985)<sup>10</sup>, Cambien *et al* (1987)<sup>17</sup>, Korhonen *et al* (1996)<sup>15</sup>.

## CONCLUSION

Thus in the end we can conclude that abnormal lipid levels were significantly associated with coronary heart disease (CHD) patients.

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