



## Role of Hdl in Coronary Artery Disease

### KEYWORDS

HDL, Coronary Artery Disease, Hypertension

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**ABSTRACT** *The high-density lipoproteins (HDLs) protect against the development of cardiovascular disease (CVD) is based on a number of robust and consistent observations. Human population studies have shown consistently that plasma concentrations of both HDL cholesterol (HDL-C) and the major HDL apolipoprotein (apo), apoA-I, are statistically independent, inverse predictors of the risk of having a CVD event in multivariate models that adjust for established risk factor covariates. HDLs possess several properties with the potential to protect against CVD.*

**RESULTS** *Out of 22 patients who had pre-existing hypertension 59.09% of them had HDL Cholesterol less than 40 mg/dl while out of 28 patients who were non-hypertensive 28.57% had HDL Cholesterol less than 40 mg/dl. The study showed a definite male preponderance. Male constituted 70% while female constituted 30% of total cases studied Incidence increased in females in post-menopausal age group compared to the pre-menopausal age group.*

### INTRODUCTION

For four decades it has been recognized that elevated serum levels of high-density lipoprotein cholesterol (HDL-C) are associated with reduced risk of cardiovascular disease (CVD) and its sequelae. Many prospective observational studies performed around the world have confirmed an inverse relationship between HDL-C and cardiovascular risk in people irrespective of sex, race, or ethnicity. Consequently, it was assumed that, by extension, raising HDL-C through lifestyle modification and pharmacologic intervention would reduce risk of CVD. Lipid treatment guidelines around the world promoted the recognition of HDL-C as a therapeutic target, especially in high-risk patients. Some randomized controlled trials also suggest that raising HDL-C beneficially affects the risk of CVD. On the basis of an enormous amount of basic scientific and clinical investigation, a considerable number of reasons support the need to continue to investigate the therapeutic effect of modulating HDL structure and function.<sup>3</sup>

### AIMS AND OBJECTIVES

- To determine the role of HDL in Coronary Artery Disease
- To test the relation of HDL/LDL ratio with CAD.
- To test the relation of role of HDL in smoking and hypertension in coronary artery disease patients.
- To test the relation of serum HDL in males and females of CAD.

### MATERIALS AND METHODS

- Data collection was done from case record form of duration 1st July 2012 to 1st March 2014 from medicine department, G.G. Hospital, Jamnagar.
- Data was collected sixty days of discharge/follow up/ drug prescription/procedure whichever is later.
- Data was collected in the form of clinical examination/ notes of clinician/age and sex of patients/procedure / drug prescription and treatment made by clinicians.
- Mention investigation, drugs procedures that are mentioned in the case record form are available in medicine department, G.G. Hospital, Jamnagar.
- Sample size: 50 cases of Coronary Artery Diseases in-

cluding Unstable Angina, ST Elevation and Non ST Elevation Myocardial Infarctions.

### SELECTION OF CASES

#### Inclusion Criteria:

- Subjects should be between 25 to 70 years of age.
- Should be a patient of Coronary Artery Disease

#### Exclusion Criteria:

- Patients with Diabetes Mellitus.
- Patients with Acute and chronic renal failure,
- Patients with chronic liver disease will be excluded from the study.
- Pregnant women
- Patients on lipid lowering drugs/drugs affecting lipid levels of plasma

### Methodology of the study

Patients irrespective of gender who attend the Clinics of Medicine department, Government Hospital will be screened and studied. The history of the participant and information regarding general profile, lifestyle variables and dietary habits was noted. Anthropometric measurements will be noted to calculate BMI.

### OBSERVATIONS AND RESULTS

Table 1: Age Distribution

AGE	No.	%
<40 years	6	12
40 – 50 years	9	18
51 – 60 years	18	36
61 – 70 years	8	16
More than 70	9	18
TOTAL	50	100

From the above table it can be seen that

Highest number of patients (36%) were observed in the 6<sup>th</sup> decade (i.e. 51 – 60 years)

Only 6% of patients with CAD were < 40 years of age.

### Sex Distribution

Coronary Artery Disease is more prevalent in males (70%) as compared to females (30%)

**Table 2: Age Distribution in Various Sex Groups**

AGE GROUP	Male		Female		Total	
	No.	%	No.	%	No.	%
Less than 40	6	17.14	0	0	6	12
40 – 50	9	25.71	0	0	9	18
51 – 60	9	25.71	9	60	18	36
61 – 70	5	14.30	3	20	8	16
More than 70	6	17.14	3	20	9	18
TOTAL	35	100	15	100	50	100

### From the above we observe that:

Before 50 years of age (i.e. mean age of menopause) all patients were males.

It is also revealed that after the age of 50 years (i.e. after the mean age of menopause) incidence in females increased and almost equaled that of males.

**TABLE 3: HDL Cholesterol and its Correlation with BMI**

PATIENTS	HDL more than or equal to 40 mg/dl		HDL less than 40 mg/dl		Total
	No.	%	No.	%	
BMI > 25kg/m <sup>2</sup>	10	41.67	14	58.33	24
BMI < 25kg/m <sup>2</sup>	19	73.07	07	26.93	26

Out of 50 patients, 24 patients had BMI values more than 25 kg/m<sup>2</sup>. From the above observation it is clearly seen that out of 24 patients with high BMI, 58.33% patients had HDL cholesterol less than 40 mg/dl while out of 26 patients with normal BMI only 26.93% had HDL cholesterol less than 40 mg/dl.

### Presenting Symptoms in CAD Patients

Gabhraman/ Perspiration was the most common presenting symptom found in 33(66%) cases closely followed by Chest Pain and Nausea/Vomiting with 29(58%) and 27(54%) cases respectively. 4(8%) patients presented with syncope.

### HDL Cholesterol and Its Correlation with Life Style

Out of 50 patients, 24 had sedentary life style.

Out of 24 patients who had sedentary life style 54.17% had HDL Cholesterol levels less than 40 mg/dl while out of 26 patients who had active life style 69.23% had HDL Cholesterol values higher than or equal to 40mg/dl.

### Correlation of HDL Cholesterol With Smoking

Out of 50 patients 24 patients had habit of chronic smoking of either a bidi or a cigarette while 26 patients had no history of smoking.

Out of 24 patients who had habit of smoking, 62.5% has HDL Cholesterol values less than 40 mg/dl while out of 26 patients who did not have habit of smoking 26.93% had HDL Cholesterol values less than 40 mg/dl.

### The Distribution of Serum HDL Level In CAD Patients

Among 50 study subjects, the mean HDL level was found to be 37.3 mg/dl. Among the 15 females, mean HDL level was 37.8 mg/dl while among the 35 males, mean HDL was 37.2 mg/dl. Thus, HDL levels less than 40 mg/dl were as-

sociated with a higher risk of CAD.

### The Distribution of Serum HDL/LDL Level Ratio among Study Participants

Among 50 study subjects, the mean HDL/LDL ratio was found to be 0.37. Among the 15 females, mean HDL/LDL ratio was 0.36 while among the 35 males, mean HDL was 0.37. Thus, HDL/LDL ratio more than 0.09 were associated with a higher risk of CAD.

### HDL Cholesterol In Preexisting Hypertension

Out of 50 patients studied, 22 patients had a history of pre-existing hypertension while other 28 had no such history.

Thus it is evident that out of 22 patients who had pre-existing hypertension 59.09% of them had HDL Cholesterol less than 40 mg/dl while out of 28 patients who were non-hypertensive 28.57% had HDL Cholesterol less than 40 mg/dl.

### Correlation Of HDL Cholesterol Values with LV Dysfunction

Out of 50 patients studied 36 patients had LVEF > 40% while 14 patients had LVEF < 40%. Out of the 36 patients whose LVEF were > 40%, only 8.33% had HDL cholesterol levels more than or equal to 40 mg/dl. On the other hand out of 14 patients who had LVEF < 40%, 71.43% had HDL cholesterol less than 40 mg/dl and 28.57% had HDL cholesterol levels more than or equal to 40 mg/dl.

### Correlation of HDL Cholesterol With Complications

Out of 50 patients, 22 patients had some or other complication such as heart failure, cardiogenic shock or cardiac arrhythmias during their respective hospital stay while 28 patients did not experience any complications.

### DISCUSSION

Prevalence study was done in males and females of 50 patients of hypertensive, out of which 35 males (70%) and 15 females (30%). Similarly prevalence study of Lp-a level in hypertensive patients done by B.A.Bhavani, T. Padma, B.K.S. Sastry, N. K. Reddy study 2003 in Department of Genetics, Osmania University, Hyderabad published in journal of Human Genetic, July-Dec., 2003<sup>1</sup>, showing 73% of males and 27% of females in study group.

### Study of risk factors

Study of role of Lipid profile in CAD (IHD) patients carried out in North India Population by Fauzia Ashfaq, P. K. Goel et al. in Sultan Qaboos University, published in Med. J., November 2012<sup>2</sup> showing following results regarding age, sex and BMI, which were comparable.

**TABLE - 4 : LIPID LEVEL**

Variables	This study (mean)	FauziaAshfaq, P. K. Goel et al. in Sultan Qaboos University, 2012
T.chol. (mg/dl)	180.76	150.8
HDL-c (mg/dl)	38.2	30.9
LDL-c (mg/dl)	107.42	83
TG (mg/dl)	127.16	182.8

After comparing the mean distribution of Lipids and HDL, their values were comparable amongst the IHD patients, as shown in table. So they have significant role in IHD.

**SUMMARY**

- The present cross sectional study was carried out to correlate the levels of HDL cholesterol with Coronary Artery Disease.
- The study was also designed to find out the relationship of HDL cholesterol with traditional risk factors and complications.
- The age group in the study varied from 25 to 70 years. Highest number of patients (36%) were observed in the 6<sup>th</sup> decade (i.e. 51 – 60 years). It was observed in the study that risk of CAD increased with age.
- The study showed a definite male preponderance. Male constituted 70% while female constituted 30% of total cases studied.
- Incidence increased in females in post-menopausal age group compared to the pre-menopausal age group.
- Gabhraman/Perspiration (66%) was the main presentation followed closely by chest pain (58%).
- Out of 24 patients who had habit of smoking, 62.5% has HDL Cholesterol values less than 40 mg/dl while out of 26 patients who did not have habit of smoking 26.93% had HDL Cholesterol values less than 40 mg/dl . Thus, patients with habit of smoking had lower HDL cholesterol levels.
- Out of 22 patients who had pre-existing hypertension 59.09% of them had HDL Cholesterol less than 40 mg/dl while out of 28 patients who were non-hypertensive 28.57% had HDL Cholesterol less than 40 mg/dl.
- Those patients who had complications during hospital stay were found to have HDL cholesterol levels less than 40 mg/dl(63.64%)
- Heart Failure was the commonest complication.
- Those patients with poor EF values had low HDL cholesterol levels.
- Mortality rates were significantly higher in patients with HDL Cholesterol levels less than 40 mg/dl.

**CONCLUSION**

- Low levels of HDL Cholesterol are associated with a greater risk of Coronary Artery Disease(CAD).
- Complications of CAD such as heart failure, cardiogenic shock and arrhythmias are more in patients with lower HDL levels.
- Low HDL cholesterol levels are also associated with greater mortality.
- Higher levels of HDL Cholesterol have a protective effect with fewer risk of complications and mortality associated with CAD.

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