

# A comparative study of lipid profile in IHD patients and healthy controls

Pandit Kishanrao Deshmukh<sup>1</sup>, Manohar Shankarrao Chavan<sup>2\*</sup>

<sup>1</sup>Assistant Professor, <sup>2</sup>Associate Professor, Department of General Medicine, Mahavir Institute of Medical Sciences(MIMS), Shivareddypet(V), Vikarabad, Telangana, INDIA.

Email: [panditkdeshmukh@gmail.com](mailto:panditkdeshmukh@gmail.com)

## Abstract

**Background:** The World Health Organisation (WHO) has drawn attention to the fact that IHD is our modern "epidemic" that affects populations. Hypercholesterolaemia and hypertriglyceridaemia are considered the independent risk factors for Ischemic heart disease. **Aim and objective:** To compare the lipid profile of Ischaemic Heart Disease patients and matched healthy controls **Methodology:** Present study was a case control study carried out in patients diagnosed as Ischaemic Heart Disease patients and healthy controls. Data was collected with pretested questionnaire. Data included demographic characters, clinical history (significant past or family history) of the patients and lipid profile. Fasting and postprandial Blood cholesterol, triglyceride, high density lipoprotein (HDL) cholesterol, low density lipoprotein (LDL) cholesterol, very low density lipoprotein (VLDL) cholesterol were estimated in both cases and controls. **Results:** Fasting levels of triglycerides (170.65 mg/dl), serum VLDL(34.64 mg/dl) and total cholesterol(187.5 mg/dl) in patients of IHD are significantly higher as compared to those in controls (120.42 mg/dl, 23.78 mg/dl,167.54 mg/dl respectively).The triglyceride level raised significantly from fasting to postprandial with a mean difference of 16.92 mg/dl in controls and it raised significantly from fasting to postprandial with a mean difference of 65.1 mg/Dl (P = 0.0001). VLDL levels increased significantly from fasting to postprandial (mean difference: 12.48 mg/dl, P <0.000) in IHD patients and it increased by 2.61 mg/dl in control. The levels of total cholesterol (mean difference 12.27mg/dl), HDL (4.62mg/dl) and LDL (20.41mg/dl) decreased from fasting to postprandial in IHD patients. Similarly it decreased by 2.61mg/dl, 2.11mg/dl and 4.01mg/dl in controls respectively.

**Key Word:** lipid profile in IHD.

## \*Address for Correspondence:

Dr Manohar Shankarrao Chavan, Associate Professor, Department of General Medicine. Mahavir Institute of Medical Sciences (MIMS) Shivareddypet (V) Dist. VIKARABAD (Telangana)

Email: [panditkdeshmukh@gmail.com](mailto:panditkdeshmukh@gmail.com)

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## INTRODUCTION

Ischemic heart disease is a condition in which there is an inadequate supply of blood and oxygen to a portion of the myocardium resulting from imbalance between myocardial oxygen supply and demand.<sup>1</sup> In more than

90% of cases, the cause of myocardial ischemia is reduced blood flow due to obstructive atherosclerotic lesions in the coronary arteries, thus IHD is often termed coronary artery disease (CAD) or Coronary Heart Disease (CHD).<sup>2</sup> Cardiovascular diseases especially coronary heart diseases (CHD) are epidemic in India. The Registrar General of India reported that CHD led to 17% of total deaths and 26% of adult deaths in 2001-2003, which increased to 23% of total and 32% of adult deaths in 2010-2013. <sup>3</sup> The World Health Organization (WHO) and Global Burden of Disease Study also have highlighted increasing trends in years of life lost (YLLs) and disability adjusted life years (DALYs) from CHD in India. <sup>4</sup> Urbanization in countries mainly South Asian countries, especially India and the Middle East, with increasing economies and growing middle class, elements of the energy-rich Western diet are being

adopted. As a result, the prevalence of risk factors for IHD and the prevalence of IHD itself are both increasing rapidly. Risk factors for IHD included non modifiable risk factors like age, gender, family history and modifiable risk factors like Elevated blood cholesterol. High triglyceride (TG) with low HDL, Hypertension, smoking, Diabetes mellitus, unhealthy diet, obesity, physical inactivity, excessive alcohol and stress.<sup>5-11</sup> Diet rich in saturated fats result in increased serum cholesterol. Body accumulates too much of cholesterol it will deposit in the walls of arteries, which become damaged and may become blocked. LDL cholesterol is deposited in the walls of arteries and causes atherosclerosis. Present study was conducted to compare the lipid profile of patients with normal healthy individuals.

## MATERIAL AND METHODS

Present study was a case control study carried out in department of Medicine at a tertiary health care centre. Study population was patients diagnosed as Ischaemic Heart Disease patients and healthy controls. Inclusion criteria: 1. Patients diagnosed with IHD based on history, physical examination and investigations 2. Patients above 30 years 3. Healthy controls matched with cases

**Exclusion criteria:** 1. Patients below 30 years 2. Unstable IHD patients with deranged vital parameters like altered sensorium, fever, tachycardia or bradycardia, hypotension. 3. Hemodynamically unstable patients 4. Patients with cardiomyopathies, rheumatic heart disease and congenital heart disease The study was approved by the ethical committee of the institute. A valid written consent was taken from patients and controls after explaining study to them. Study was carried out in two groups. First group consisted of 100 healthy individuals without IHD and risk factors for IHD and were considered as controls, second group consisted of 150 patients diagnosed as having IHD. Both the groups are matched with various variables like age, sex. Data was collected with pretested questionnaire. Data included demographic characters, clinical history (significant past or family history) of the patients. A thorough clinical examination was done for all patients. for confirmation of diagnosis of ischaemic heart disease all patients underwent ECG and 2 D echo of selected patients. For assessment of lipid profile, blood samples were taken from all patients. Venous blood sample was collected after an overnight fast of 8-12 hours. Postprandial sample was collected 2 hours after meal. Blood cholesterol, triglyceride, high density lipoprotein (HDL) cholesterol, low density lipoprotein (LDL) cholesterol, very low density lipoprotein (VLDL) cholesterol were estimated in both cases and controls. cases and controls were also

evaluated with routine haemogram and biochemical studies like random blood sugar level, liver function test and kidney function test. Data was analysed with software IBM SPSS version 21.0 and MS Excel sheet and by using percentage, chi square, and Student's t test for proportion. P value < 0.05 was considered as significant.

Given Study is ethical approved by ethical committee of Institution.

## RESULTS

Out of 100 patients 59 were males and 41 were females in each group. In our study IHD was found more in males.

Table 1 showed age wise distribution of controls and IHD patients. Majority of the patients and controls were from age group of 51-60 years (33.5%) followed by 61-70 years (27.5%). Patients and controls in the age group of 41-50 years contributed 22.5% of all study population. 10.5% study population was above 70 years and 6% was below 40 years.

Among the IHD patients 50% were diagnosed with stable angina and 48% were diagnosed to have myocardial infarction. Only 2 patients had unstable angina. Table 3 shows comparison of lipid profile in controls and cases. In our study mean value of TC in healthy controls was 167.54 mg/dl in fasting state, 164.93 mg/dl in postprandial state and in IHD cases was 187.50 mg/dl in fasting state, 175.23mg/dl in postprandial state. Mean for TG in healthy controls was 120.42 mg/dl in fasting state, 137.34 mg/dl in postprandial state and in IHD cases was 170.65 mg/dl in fasting state, 235.75 mg/dl in postprandial state. Mean for HDL in healthy controls was 41.65 mg/dl in fasting state, 39.54 mg/dl in postprandial state and in IHD cases was 42.41 mg/dl in fasting state, 37.78 mg/dl in postprandial state. Mean for LDL in healthy controls was 104.30 mg/dl in fasting state, 100.29 mg/dl in postprandial state and in IHD cases was 113.47 mg/dl in fasting state, 93.07 mg/dl in postprandial state. Mean for VLDL in healthy controls was 23.78 mg/dl 1 in fasting state, 27.23 mg/dl in postprandial state and in IHD cases was 34.64 mg/dl in fasting state, 47.12 mg/dl in postprandial state. In our study Fasting levels of triglycerides (170.65 mg/dl), serum VLDL(34.64 mg/dl) and total cholesterol(187.5 mg/dl) in patients of IHD are significantly higher as compared to those in controls (120.42 mg/dl, 23.78 mg/dl, 167.54 mg/dl respectively) difference between them is statistically significant (p < 0.001). Fasting serum HDL in IHD patients(42.41mg/dl) is slightly more as compared to that in controls(41.65 mg/dl) but statistically not significant. Serum LDL is increased significantly in IHD patients (113.47 mg/dl) as compared to controls 104.30 mg/dl) in fasting state. The triglyceride level raised significantly from fasting to postprandial with a mean difference of

16.92 mg/dl in controls and it raised significantly from fasting to postprandial with a mean difference of 65.1 mg/Dl (P = 0.0001). VLDL levels increased significantly from fasting to postprandial (mean difference: 12.48 mg/dl, P <0.000) in IHD patients and it increased by 2.61 mg/dl in control. The levels of total cholesterol (mean difference 12.27mg/dl), HDL (4.62mg/dl) and LDL (20.41mg/dl) decreased from fasting to postprandial in

IHD patients. Similarly it decreased by 2.61mg/dl, 2.11mg/dl and 4.01mg/dl in controls respectively. (table4 and 5) Postprandially, TG levels in IHD patients are found to be raised significantly as compared to controls (p < 0.05) and fasting state (p < 0.001). Total cholesterol is high postprandially as compared to controls (p < 0.001) but decreased as compared to fasting in both controls (p > 0.05) and study group (p < 0.001).

**Table 1:** Distribution of controls and cases according to age group

Sr no	Age group (years)	Control group	Cases	Total
1	31-40	07	05	12(6%)
2	41-50	22	23	45(22.5%)
3	51-60	35	32	67(33.5%)
4	61-70	26	29	55(27.5%)
5	>70	10	11	21(10.5%)
<b>Total</b>		<b>100</b>	<b>100</b>	<b>200(100%)</b>

**Table 2:** Distribution of cases according to type of IHD

Sr no	Type of IHD	No of patients	Percentage
1	Stable angina	50	50%
2	Unstable angina	02	2%
3	Myocardial infraction	48	48%
<b>Total</b>		<b>100</b>	<b>100%</b>

**Table 3:** comparison of lipid profile in controls and IHD patients

	TC		TG		HDL		LDL		VLDL	
	Controls	IHD	Controls	IHD	Controls	IHD	Controls	IHD	Controls	IHD
F(mean)mg/dl	167.54	187.50	120.42	170.65	41.65	42.41	104.30	113.47	23.78	34.64
PP(meas)mg/dl	164.93	175.23	137.34	235.75	39.54	37.78	100.29	93.07	27.23	47.12

**Table 4:** Fasting and post prandial lipid profile in controls

Lipid profile	Fasting	Postprandial	Mean difference	P value
TC	167.54	164.93	2.61	<0.05
TG	120.42	137.34	-16.92	<0.05
HDL	41.65	39.54	2.11	<0.05
LDL	104.30	100.29	4.01	<0.05
VLDL	23.78	27.23	-3.45	<0.05

**Table 5:** Fasting and post prandial lipid profile in IHD cases

Lipid profile	Fasting	Postprandial	Mean difference	P value
TC	187.5	175.23	12.27	<0.0001
TG	170.65	235.75	-65.1	<0.0001
HDL	42.41	37.79	4.62	<0.0001
LDL	113.47	93.06	20.41	<0.0001
VLDL	34.64	47.12	-12.48	<0.0001

## DISCUSSION

Out of 100 patients 59 were males and 41 were females in each group. In our study IHD was found more in males. These findings were consistent with the study done by Vakil *et al.*, of the 5615 cases of ischemic heart disease, 78.8% were male and 21.2% female, the sex ratio being 3.7 to 1 for the entire series.<sup>12</sup> Similar findings were observed in a study by Haque *et al.* in Malaysia. The prevalence of male CHD patient was twice as high as women, 110(69%) and 50(31%) respectively in this

study.<sup>13</sup> It was similar to the observation of Ferduos *et al.*, where in cases 31 were males and 19 were females and in controls 28 were males and 22 were females.<sup>14</sup> In our study, majority of the patients and controls were from age group of 51-60 years (33.5%) followed by 61-70 years (27.5%). Similar to our study, a study by Vakil *et al.* found that the average age was 46.6 yrs. 54.9% cases were between the ages of 41-60 yrs.<sup>12</sup> Similar findings were seen in Mahalle N *et al.* where Mean age was 60.9 ± 12.4 years, and range was 25-92 years.<sup>15</sup> In contrast to our study Haque *et al.* found that majority of patients (35%)

belonged to 60-69 yrs age group followed by 70-79 yrs age group (34.2%).<sup>13</sup> In our study, The triglyceride level raised significantly from fasting to postprandial with a mean difference of 16.92 mg/dl in controls and it raised significantly from fasting to postprandial with a mean difference of 65.1 mg/Dl (P = 0.0001). VLDL levels increased significantly from fasting to postprandial (mean difference: 12.48 mg/dl, P <0.000) in IHD patients and it increased by 2.61 mg/dl in control. The levels of total cholesterol (mean difference 12.27mg/dl), HDL (4.62mg/dl) and LDL (20.41mg/dl) decreased from fasting to postprandial in IHD patients. Similarly it decreased by 2.61mg/dl, 2.11mg/dl and 4.01mg/dl in controls respectively. Similar results were observed in Samson *et al.*, the triglyceride level showed a significant rise from fasting to 2 hours after breakfast with a mean difference of 23.86 mg/dl (P =0.012). VLDL levels showed a similar pattern. Levels increased significantly from fasting to 2h after breakfast (mean difference: 4.49mg/dl, P = 0.007).<sup>16</sup> In our study Fasting levels of triglycerides (170.65 mg/dl), serum VLDL(34.64 mg/dl) and total cholesterol(187.5 mg/dl) in patients of IHD are significantly higher as compared to those in controls (120.42 mg/dl, 23.78 mg/dl,167.54 mg/dl respectively) difference between them is statistically significant (p < 0.001). Similar findings were observed in Shankar *et al.* where Fasting serum triglycerides, serum VLDL, serum LDL and total cholesterol were increased as compared to controls. And in contrast to our study serum HDL level was decreased in cases.<sup>17</sup> Similarly Ferduos *et al.* showed that mean (±SD) of TC, TG, LDL-C were significantly higher in cases than that of controls and mean (±SD) HDL-C was significantly lower in cases than that of controls.<sup>14</sup>

## CONCLUSION

The patients with ischemic heart disease are associated with significantly higher levels of serum TC, TG and LDL-C. Postprandial hypertriglyceridemia may be an independent risk factor for atherosclerosis in ischemic heart disease patients.

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