



## COMPARISON OF LIPID PROFILE IN DIABETIC AND NON-DIABETIC PATIENTS WITH ISCHEMIC HEART DISEASE

Ayesha Anwer<sup>a\*</sup>, Majid kaleem<sup>a</sup>, Hassan Abbas<sup>a</sup>, Saba Pervez<sup>a</sup>, Asif Hanif<sup>a</sup>

### ABSTRACT

**BACKGROUND:** Ischemic heart disease is a worldwide health problem. Diabetes is one of the leading cause of dyslipidemia in coronary artery disease patients.

**OBJECTIVE:** Our objective was to investigate the comparison of dyslipidemia in diabetic and non-diabetic patients with ischemic heart disease.

**METHODOLOGY:** A cross-sectional study was done on 130 patients; samples were taken from cardiology department of Gulab Devi Hospital, Lahore. A questionnaire was designed to collect the information from the patients regarding their clinical findings and lab results. Blood sample was taken from these patients after overnight fasting for lipid profile and serum was separated from the whole blood by centrifugation. The lipid profile was performed using lipid profile kit. The data was analyzed by using SPSS version 16.

**RESULT:** There were 66.42% male and 33.58% female patients. The mean age was  $58.71 \pm 11.628$ . 59(45.38%) patients were diabetic and 71(54.62%) patients were non diabetic. 8% patients were underweight, 57% were healthy, 29% were overweight, 6% were obese. There were 75.18% were hypertensive and 24.82% were non hypertensive. Hypercholesteremia in diabetics and non-diabetics was  $175.86 \pm 41.410$  mg/dl and  $156.64 \pm 25.756$  mg/dl respectively. Hypertriglyceridemia in diabetics and non-diabetics was  $159.14 \pm 56.139$  mg/dl and  $124.43 \pm 50.341$  mg/dl respectively. LDL was higher in diabetics with IHD with mean  $103.31 \pm 37.397$  mg/dl and with non-diabetics  $85.84 \pm 28.344$  mg/dl and HDL in diabetics and non-diabetics with IHD  $43.17 \pm 14.042$  mg/dl,  $45.98 \pm 16.142$  mg/dl respectively.

**CONCLUSION:** Dyslipidemia was higher in those patients who were diabetic and degree of dyslipidemia increases with increase in age in both genders. Females are more prone to diabetes and dyslipidemia.

**KEY WORDS:** Diabetes, ischemic heart disease, dyslipidemia

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### INTRODUCTION:

Ischemia is caused by lack of oxygen due to inadequate perfusion of myocardium, which disturbs a balance between oxygen supply and demand<sup>1</sup>. In atherosclerosis or in heart attack, fatty streaks occur at sites of altered arterial shear stress such as bifurcations and are associated with abnormal endothelial function. They develop when inflammatory cells, predominantly monocytes, bind to receptors expressed by endothelial cells, migrate into the intima, take up oxidized low density lipoprotein (LDL) from the plasma and form lipid laden foam cells or macrophages<sup>2</sup>.

Diabetes is one of the risk factor for ischemic heart disease. Diabetes impairs the cellular utilization of lipids and lipoproteins which results in development of diabetic atherogenic dyslipidemia<sup>3</sup>.

Ischemic heart disease is classified as a chronic

stable angina (CSA) and acute coronary syndrome (ACS), but it varies in location and nature of lesion<sup>4</sup>. Frequency of dyslipidemia frequently observed in patients with diabetes with raised triglycerides, decreased high density lipoprotein cholesterol (HDL-C) and slightly raised or normal plasma concentrations of low density lipoprotein cholesterol(LDL-C), with LDL-C, not being significantly different from that in non-diabetic individuals<sup>5</sup>.

The prevalence of diabetes mellitus in heart failure populations is close to 20% compared with 4 to 6% in control populations. Epidemiological studies have demonstrated an increased risk of heart failure in diabetics; moreover, in diabetic population, poor glycemic control has been associated with an increased risk of heart failure<sup>6</sup>.

Low-density lipoprotein-cholesterol (LDL-C) and lowered high-density lipoprotein cholesterol (HDL-C) are probably conventional risk factors for myocardial infarction and the major cause of atherosclerosis. Low-density lipoprotein cholesterol (LDL-C) is the main therapeutic target in the prevention of CAD. The TG/HDL-C ratio is also used

<sup>a</sup>Gulab Devi Chest Hospital, Lahore.

\* Corresponding author:  
Email: ayesharana1001@gmail.com

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to evaluate the lipid atherogenesis <sup>7</sup>.

The aim of this study was to see comparison of lipid profile in diabetic and non-diabetic patients with ischemic heart disease.

### MATERIAL AND METHODS:

This cross-sectional study was conducted at cardiology department of Gulab Devi chest Hospital, Lahore. The target population was diabetic patients with ischemic heart disease. Study was completed in 2 months from December 2016 to January 2016. We used non-probability (purposive) sampling. Sample size of this research was 130. Patients of both gender with age range 30 to 90 years, Smoking, Hypertension and Family history were other major risk factors noted. IHD patients, who were admitted in cardiology department with and without diabetes at Gulab Devi Hospital, Lahore were included. Patients with any thyroid disease, stress and anemia were excluded. Blood sample was taken from these patients after overnight fasting for lipid profile and serum was separated from the whole blood by centrifugation. A questionnaire was designed to record the clinical findings and the laboratory results. Lipid profile was performed and recorded carefully. The data was analyzed by using SPSS version 16. The qualitative data were presented in the form of tables along with its percentage. The quantitative data were presented in the form of mean, range and standard deviation by simple descriptive analysis. Independent-sample t-test was applied for comparing results with significant p value i.e. ( $p < 0.05$ ).

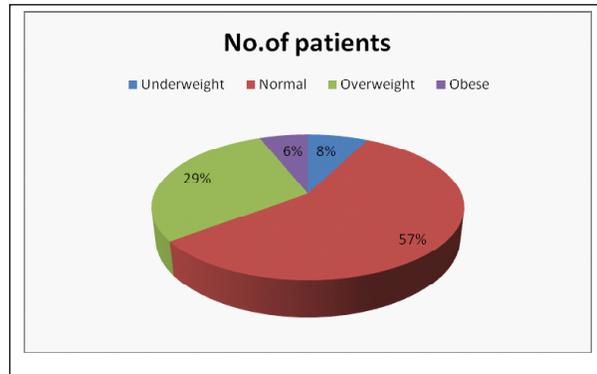
### RESULTS:

The present study included 130 patients of ischemic heart disease with diabetes and without diabetes. The mean age of the study population was  $58.63 \pm 11.613$ . There 45 (34.62%) females and 85(65.38%) were males. 59 (45.38%) patients were diabetic and 71(54.62%) were non diabetic. Regarding associated factors 76.15% were hypertensive, 39.23% had family history of IHD and 48.46% were smoker as shown (Table-1). Regarding BMI status 8% patients were underweight, 57% were healthy, 29% were overweight, 6% were obese (Fig-1). Regarding lipid profile Hypercholesteremia with diabetics and non-diabetics  $175.86 \pm 41.410$  mg/dl,  $156.64 \pm 25.756$  mg/dl and hypertriglyceridemia in diabetics and non-diabetics was  $159.14 \pm 56.139$  mg/dl,  $124.43 \pm 50.341$  mg/dl respectively. LDL was higher in diabetics with IHD with mean  $103.31 \pm 37.397$  mg/dl and with non-diabetics  $85.84 \pm 28.344$  mg/dl and HDL in diabetics and non-diabetics with IHD  $43.17 \pm 14.042$

**Table-1: Demographic variables and risk factors of IHD in study population**

Sex	Male n=85(65.38%)	Female n=45(34.62%)	Total n=130
<b>Risk Factors</b>	<b>No of Patients(%)</b>		
Diabetes Mellitus	59(45.38)		
Smoking	63(48.46)		
Family History of IHD	51(39.23)		
Hypertension	99(76.15)		
Obesity/Overweight	45(35)		

**Fig-1: BMI of the study population**



**Table-2: group statistics of IHD with diabetes and without diabetes**

	IHD with diabetes and without diabetes	N	Mean	Std. Deviation	p-value
<b>Cholesterol of patients</b>	GroupA IHD with diabetes	59	175.86	41.410	0.0002 (Sig)
	GroupB IHD without diabetes	71	156.64	25.756	
<b>Triglycerides of patients</b>	GroupA IHD with diabetes	59	159.14	56.139	0.000 (Sig)
	GroupB IHD without diabetes	71	124.43	50.341	
<b>LDL of patients</b>	GroupA IHD with diabetes	59	103.31	37.397	0.004 (Sig)
	GroupB IHD without diabetes	71	85.84	28.344	
<b>HDL of patients</b>	GroupA IHD with diabetes	59	43.17	14.042	0.0290 (Sig)
	GroupB IHD without diabetes	71	45.98	16.142	

mg/dl,  $45.98 \pm 16.142$  mg/dl respectively (Table-2). The results showed significantly higher lipid profile in IHD patients with diabetes as compared to non diabetics.

### DISCUSSION:

The relationship between diabetes and serum lipid profile is much discussed and showed that both have been the important predictor of metabolic disturbance including dyslipidemia, hypertension, hyperinsulenemia and cardiovascular events. Dyslipidemia is mostly associated with diabetes.<sup>8</sup>

In this study, out of total, hypercholesteremia was found in 50 (38.46%) patients, hypertriglyceridemia was found in 68 (52.30%). LDL was found higher in 46 (35.38%) patients HDL was found in 61 (46.92%) individuals. Another study showed



similar results as; hypercholesterolemia was found in 79 (52.6%) individuals. Similarly, hypertriglyceridemia was found in 95 (63.3%) individuals, and increased LDL-C was found in 108 (72.6%) individuals<sup>9</sup>.

A research showed the most common pattern of dyslipidemia in diabetics is elevated triglyceride (TG), low high density lipoprotein cholesterol (HDL), and predominance of small dense particle low density lipoprotein. The same pattern we found in our study<sup>10</sup>.

Packard et al. reported that low HDL level is power full predictor of premature coronary heart

disease<sup>11</sup>. Goldberg reported that hyperglycemia increases the transfer of cholesterol ester from HDL to VLDL particles progressively, hence that large population of LDL further diminish the HDL<sup>8, 11</sup>. Several studies showed that insulin affects the liver apolipoprotein production and regulates the enzymatic activity of lipoprotein lipase and cholesterol ester transport protein, which causes dyslipidemia in diabetes mellitus<sup>12, 13</sup>.

### CONCLUSION:

Dyslipidemia was higher in diabetics than in non-diabetics. Dyslipidemia increases with increasing age in both genders. Females are more prone to diabetic dyslipidemia.

## Author's Contribution

A.A. Introduction, sampling and discussion. M.K. Discussion and proof reading. H.A. Study design and literature review. S.P. Sampling and literature review. A.H. Analysis

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