

## Lipid Profile of Patients with *Diabetes mellitus* (A Multidisciplinary Study)

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**Abstract:** The present study was carried out to determine the frequency and pattern of hyperlipidemia in patients with *diabetes mellitus*. This multidisciplinary study was conducted at combined military hospital and Liaquat University Hospital, Pakistan. All known cases of *diabetes mellitus* (type 1 and type 2), of = 1 year duration and of either gender were evaluated for their lipid profile. During six month study period, total 100 patients with *diabetes mellitus* were evaluated for lipid profile. Out of 100, diabetic patients 72 (72%) were males and 28 (28%) were females. 88 patients had type 2 *diabetes mellitus* and 12 patients had type 1 *diabetes mellitus*. The mean  $\pm$  SD for age of patients with type 2 and type 1 *diabetes mellitus* was  $53.73 \pm 7.88$  and  $20.53 \pm 1.58$ . 07 (58%) patients of type 1 *diabetes mellitus* and 65 (74%) patients of type 2 *diabetes mellitus* were found to be hyperlipidemic. The pattern of lipid abnormalities observed was high triglyceride in 22 (31%) patients, high LDL in 14 (19%), low HDL in 08 (11%), high cholesterol in 10 (14%) and combined hyperlipidemia in 18 (25%) diabetic patients. The diabetic patients are more prone to develop hyperlipidemia.

**Key words:** Diabetes mellitus • Hyperlipidemia • Lipid profile

### INTRODUCTION

*Diabetes mellitus* (DM) is a group of metabolic diseases characterized by increase blood glucose level resulting from defects in insulin secretion, insulin action, or both [1]. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction and failure of various organs, especially the eyes, kidneys, nerves, heart and blood vessels. The cross sectional survey conducted earlier in rural and urban areas of Pakistan upon 5433 individual which show 19% prevalence of *diabetes mellitus* [2].

Patients with type-2 diabetes have increased risk of cardiovascular disease associated with atherogenic dyslipidaemia. Coronary artery disease, especially myocardial infarction is the leading cause of morbidity and mortality worldwide [3]. Hyperglycaemia and atherosclerosis are related in type-2 diabetes [4]. Persistent hyperglycaemia causes glycosylation of all proteins, especially collagen cross linking and matrix proteins of arterial wall. This eventually causes

endothelial cell dysfunction, contributing further to atherosclerosis. The prevalence of dyslipidemia in diabetes mellitus is 95% [5]. The dyslipidemia is a major risk factor for coronary heart disease (CHD) [6]. The cardiovascular disease is a cause of morbidity and mortality in patients with *diabetes mellitus* because of disturbance in lipoproteins i. e. serum triglycerides (TC) 69%, serum cholesterol 56. 6%, low-density lipoprotein cholesterol (LDL) 77% and high density lipoprotein cholesterol (HDL) 71% [7. 8]. The rationale of this study was to detect the lipid abnormality in diabetic patients. Early detection and treatment of hyperlipidemia in *diabetes mellitus* can prevent the progression of lipid abnormalities and minimize the risk for atherogenic cardiovascular disorder and cerebrovascular accident.

### MATERIALS AND METHODS

Patients of known or newly diagnosed cases of *diabetes mellitus* (type 1 and 2) for = 1 year duration who came through outdoor patient department (OPD) or indoor

patient or causality outdoor department (COD) of combined military hospital and Liaquat University Hospital were evaluated and those patients who meet the inclusion criteria were enrolled in the study. The patients were taken randomly. The detail history was taken; relevant clinical examination and all routine investigations were performed. An informed consent was taken from every patient after full explanation of procedure. Every patient was advise for at least 12-14 hours overnight fasting and the 5ml venous blood sample were collected in a disposable syringe on next morning (before breakfast) for the serum lipid profile and fasting blood sugar (for the assessment of blood glucose level). The lipid profile were evaluated by National Cholesterol Education Programme (NCEP) Adult Treatment Panel III (ATP III) classification of lipid profile. The known cases of type 2 *diabetes mellitus* will also be evaluated for their blood sugar (control or un-control) by advising the HbA1C level. The data was collected on predesign proforma and then entered, saved and analyzed in SPSS version 10. 00. The frequency of dyslipidemia was evaluated while the pattern were determine by serum level for cholesterol, high density lipoprotein HDL-C, low density lipoprotein LDL-C and triglyceride.

## RESULTS

During six month study period, total 100 patients with *diabetes mellitus* were evaluated for lipid profile. Out of 100, diabetic patients 72 (72%) were males and 28 (28%) were females. 88 patients had type 2 *diabetes mellitus* and 12 patients had type 1 *diabetes mellitus*. The mean  $\pm$  SD for age of patients with type 2 and type 1 *diabetes mellitus* was  $53.73 \pm 7.88$  and  $20.53 \pm 1.58$ . The lipid profile of patients with type 1 and 2 are shown in table 1 whereas the frequency of dyslipidemia in patients with diabetes mellitus (type 1 and 2) as far as gender is concerned is shown in tables 2 and 3. The pattern of disturbance in lipid profile of diabetic patients is shown in table 4. Majority of hyperlipidemic diabetic patients 58/72(81%) had uncontrolled diabetes i. e. raised fasting blood sugar level and HbA1C.

Table 1: frequency of hyperlipidemia in patients with *diabetes mellitus*

Hyperlipidemia	Diabetes Mellitus		
	Type 1	Type 2	Total
Yes	07 (58%)	65 (74%)	72 (72%)
No	05 (42%)	23 (26%)	28 (28%)
Total	12 (100%)	88 (100%)	100(100%)

Table 2: hyperlipidemia in type 2 *diabetes mellitus*

Gender	Diabetes Mellitus type 2		
	Hyperlipidemia		
	Yes	No	Total
Male	52 (76%)	10 (50%)	62 (70%)
Female	16 (24%)	10 (50%)	26 (30%)
Total	68 (100%)	20 (100%)	88 (100%)

Table 3: hyperlipidemia in type 1 *diabetes mellitus*

Gender	Diabetes Mellitus type 2		
	Hyperlipidemia		
	Yes	No	Total
Male	03 (75%)	07 (88%)	10 (83%)
Female	01 (25%)	01 (12%)	02 (17%)
Total	04 (100%)	08 (100%)	12 (100%)

Table 4: pattern of hyperlipidemia in patients with *diabetes mellitus*

Lipid profile	n = 72	%
High triglyceride	22	31
High LDL	14	19
Low HDL	8	11
High cholesterol	10	14
Combined hyperlipidemia	18	25

## DISCUSSION

Lipid abnormalities are common in diabetics and frequently seen in type-2 diabetics. Dyslipidaemias make diabetics prone to develop CHD and other complications of atherosclerosis. There were 100 patients in this study out of which 72% of the patients were male and rest were female. 72% of total patients had dyslipidemia. According to the CDC, 97% of adults with diabetes have one or more lipid abnormalities while the prevalence of diabetic dyslipidemia varies from 25% to 60% in other studies [9]. This variation in prevalence may be due to differences in BMI and possibly genetic variation. A study conducted in Nishtar Hospital, Multan by Ahmad et al showed that 21% patients with type-2 diabetes had raised serum cholesterol (>200mg/dl) and 34. 2% patients have raised triglycerides in serum (>150mg/dl) [10]. Whereas, in our study serum cholesterol level >200mg/dl was found in 14% patients with type-2 diabetes and serum TG was raised in 31% diabetics. The values of serum TG in our study are consistent with above mentioned study. The reason for difference in serum cholesterol values may be due to difference in the dietary habits of the people at Multan and Lahore. Another study conducted at Hazara division Pakistan on "Frequency of dyslipidaemia in type 2 *diabetes mellitus* in patients of hazara division" showed

that serum triglyceride was raised in 59% [11]. The most probable reason behind is people are now more aware of their physical well-being and changing their dietary habits. Increasing use of cooking oils in place of vanaspati ghee has also contributed to the change in lipid profile. Another reason is increasing literacy rate and life style modification by most of the people.

In our study, serum TG levels were found to be much raised among diabetic females as compared to males whereas serum cholesterol and LDL-C levels were higher among male diabetics. Our results are partly consistent with a study by Firdous *et al*, who reported that adverse effects of diabetes mellitus on dyslipidaemias are more marked in women than men [12]. This explains why, diabetes eliminates or attenuates a woman's protection against IHD.

In our study, males had higher levels of LDL-C as compared to females. 19% diabetic males had LDL-C >160mg/dl. This finding was consistent with that by Ahmad *et al*. [13]. In present study, 14% diabetics had HDL-C <35mg/dl. Low HDL-C was a common associated finding with raised serum TG, serum cholesterol and LDL-C. The findings of Kannel, *et al*. [14] Jarrett *et al*. [15] and Barette *et al*. [16] were also consistent with our study.

## CONCLUSION

In conclusion, hyperlipidemia is the commonest complication of diabetes mellitus and it predisposes them to premature atherosclerosis and macrovascular complications. Common lipid abnormalities in diabetes are raised triglycerides, LDL-C serum cholesterol and low HDL-C. Therefore good glycaemic control can prevent development and progression of lipid-abnormalities among patients with diabetes mellitus.

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