

Assessment of Lipid Profile Levels in Type – II Diabetes and Non Diabetic Subjects: Attended at Specialized Diabetic Hospital in Karachi

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ABSTRACT

Objective: The aim of our study was to assess prevalence and pattern of dyslipidemia in Diabetes and to compare Lipid profile levels between Diabetics and Non-diabetic subjects.

Study Design: Prospective study.

Place and Duration of Study: This study was conducted at the National Institute of Diabetology and Endocrinology (NIDE), Dow University of Health Sciences (DUHS), Karachi, Pakistan from Feb. 2019 to June 2019.

Materials and Methods: The study included a total of Eighty (80) Type II Diabetes and 80 Non-diabetic subjects with 40 pts. were males and 40 patients were females in both groups. Blood samples were drawn from cases of Diabetes Mellitus (DM) and Non-diabetic controls. All Biophysical parameters and Biochemical tests were done using standard procedures. Values were tabulated for cases and control separately for statistical evaluation.

Results: The total cholesterol (TC), Triglycerides (TG), Very Low Density Lipoprotein (VLDL) and Low Density Lipoprotein cholesterol (LDL) were significantly raised in Diabetics as compared to Non-diabetic subjects; whereas the level of High Density Lipoprotein (HDL) was significantly lower in Diabetic subjects as compared to Non-diabetics.

Conclusion: It was concluded that diabetic patients have high level of Cholesterol, Triglyceride and LDL-C as compared to non-diabetic subjects, whereas the level of HDL-C was significantly low in diabetic patients compared to non-diabetic subjects, thus indicating that diabetic patients were more prone for dyslipidemia, which could cause cardiovascular disorders (CVD) and its complications.

Key Words: Lipid profile, Diabetes, Dyslipidemia, Cholesterol, Coronary Heart Disease (CHD).

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INTRODUCTION

Diabetes Mellitus (DM) is considered a syndrome because of many symptoms the individuals present,

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resulting from interaction of numerous genetic and environmental factors¹. A predisposition to the disease is probably inherited as an autosomal recessive trait. Lack of insulin or relatively low insulin levels affects the metabolism of Carbohydrates, Protein, Lipids, Water & Electrolytes balance resulting in Diabetes^{2,3,16}. Peripheral Insulin Resistance (IR) and impaired insulin secretion is the main cause of Type-2 DM accounting for approximately 90% of all affected individuals. Abnormal lipid metabolism is one of the important finding of Type-2 DM which leads to increase serum Free Fatty Acid (FFA)⁴. Enzymes of lipid metabolism are greatly affected due to hormonal abnormality leading to excess circulation of Free Fatty Acid, which is the main cause of Insulin resistance⁵. Decrease clearance of Triglycerides, VLDL and Chylomicrons due to decrease activity of Lipoprotein Lipase greatly contribute to hypertriglyceridemia in Type-2 DM^{6,7}. As compared to Non-diabetic subjects, people with Type-II DM have a higher cardiovascular morbidity and mortality^{7,17}. Diabetic vascular disease is responsible

For 2-4 fold rise in the occurrence of Coronary Artery Disease (CAD) and stroke. The aim or target of this study was to compare Lipid levels between Diabetics and Non-diabetic subjects.

MATERIALS AND METHODS

This study was conducted at the National Institute of Diabetology and Endocrinology (NIDE), Dow University of Health Sciences (DUHS), Karachi, Pakistan from Feb. 2019 to June 2019. We randomly selected eighty (80) Diabetics and eighty (80) Non-diabetics as control with 40 patients were males and 40 were females in both groups. Subjects were age and sex matched and was between 35-60 years. The nature of the study was thoroughly explained and the informed consent was obtained. The diagnosis of Diabetes is based on Diagnostic Criteria for DM of American Diabetic Association (ADA) 2011.

Inclusion criteria included patients with Type-2 Diabetes of more than 35 years of age with duration of Diabetes more than 5 years. The control group consists of Non-diabetics, who are normotensive and do not have concomitant diseases. Exclusion criteria included patients with concomitant diseases or condition affecting the lipid level and age <40 years.

RESULTS

A case control study consisting of 80 subjects Type-2 DM patients and 80 Non-diabetics as control was under taken to compare the lipid profile and blood glucose level concentrations in Diabetics and Non-diabetics subjects. To perform this, a comparison analysis was done to see if there is any difference between controls and patients the mean age was 54±11.52 years. When compared to control significant increase in body weight and body mass index (BMI) (p<0.001) were found in diabetes. There was also significant in waist circumference (WC) (p<0.012) in Type-2 diabetes as shown in Table-1.

The mean value of Triglyceride (TG) in Diabetic patients was significantly higher than the mean value of Non-diabetic subjects (p=<0.001). The total Cholesterol (TC) mean value in Diabetic patients was significantly higher than the mean value of Non-diabetic subjects (p=<0.001). All diabetic patients have significantly higher level of VLDL-C and LDL-C (p=V0.001) and significantly lower HDL-C as compared to Non-diabetic subjects as shown in Table-2 and Figure 1. The mean Fasting Blood Glucose (FBS) and Post prandial Blood Glucose (PPBG) level of Diabetic patients were significantly (p=0.001) higher than that of Non-diabetic subjects as shown in Table-2. In Type-2 DM patients, both the sexes have shown higher value, both in Female diabetics the Cholesterol (TC), Triglyceride (TG), LDL-C and VLDL-C and HDL-C were higher as compared to male diabetic as shown in Table-3.

Table No.1: Demographic Characteristics of Non-Diabetic Subjects and Diabetic Patients

Characteristics	Non-Diabetic Subject	Diabetic Patients	P-Value
	N = 80	N = 80	
Age	47±7.1	54±11.52	P<0.05
Body Weight (KG)	52 ±7.2	58±9.8	P<0.01
Height (M)	0.99±2.3	1.12±3.0	P<0.02
BMI (KG/M2)	21±2.0	28±2.5	P<0.01
WC (CM)	69.4±2.3	75.4±3.4	P<0.05

Kg = kilogram; m = metre; BMI = Body Mass Index; Kg/m²= kilogram/ metre² WC= waist circumference; Cm = centimetre

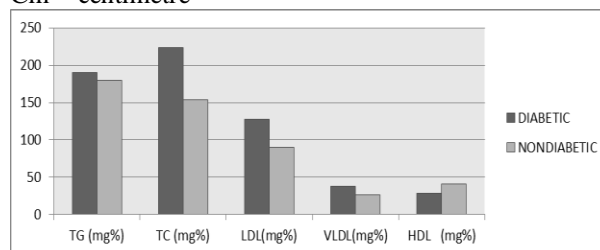


Figure No.1 Comparison of Lipid Parameters in Non-Diabetic and Diabetic Patients Studied

Table No.2: Comparison of Various Parameters between Non-Diabetic and Diabetic Groups

Parameters	Non-Diabetic	Diabetic	P-Value
	n = 80 (Mean ± Se)	n = 80 (Mean ± Se)	
TG (mg %)	180.72 ± 36	189.82 ± 58	<0.001
TC (mg %)	154.74 ± 71	224.61 ± 10	<0.001
LDL-C (mg %)	89.8 ± 24	128.24 ± 09	<0.001
VLDL-C (mg %)	26.32 ± 72	38 ± 7.21	<0.01
HDL-C (mg %)	41.10 ± 6.23	29.2 ± 25	<0.001
FBS (mg %)	98 ± 13	185 ± 37	<0.001
PPBS (mg %)	134 ± 20	325 ± 40	<0.001

Table No.3: Gender Wise Lipid Parameters among the Type-II Diabetic, Males and Females

Gender	TC	TG	LDL	VLDL	HDL
	(Mean±Sd) (Mg %)				
Diabetic Male	252 ± 12.2	188 ± 12.5	148 ± 15.2	42.2 ± 4.2	36.88 ± 7.7
Diabetic Female	271 ± 14.4	190 ± 13.4	172 ± 12.3	69 ± 6.7	39.03 ± 6.3
p-Value	<0.05	<0.05	<0.05	<0.05	<0.05

DISCUSSION

Lipid abnormalities are common in Diabetes which is associated with a marked increased risk of Cardiovascular Disease (CVD). Individuals with diabetes have an absolute risk of major coronary events⁸. Furthermore, diabetic subjects develop congestive cardiac failure (CCF) more frequently than

non-diabetic individuals.⁹ LDL-C was found to be significantly higher in Type-II DM than non-diabetics in our study, similar results were reported by other researchers in their studies, indicating that LDL-C was the strongest independent predictor of Coronary heart disease (CHD) followed by HDL Cholesterol.^{10,15} The atherogenesis begins as an endothelial cell dysfunction due to complex combination of traditional and non-traditional risk factors that induces the evolution of atherosclerosis leading to increase incidence of CVD in Type-2 Diabetes^{16,17}.

We also found in our study that total cholesterol (TC), Triglyceride (TG), VLDL-C were comparatively higher in Type-II DM and HDL-C was lower than in non-diabetic subjects. Several workers have reported the same in their studies^{9, 11}. We also observed in higher age groups a high level of TC and TG, whereas in adolescent group LDL-C level was found to be higher whereas HDL-C level was found to be low^{10,18}.

Women with diabetes are more susceptible to increased cardiac vascular mortality. Our finding correlates similar to other study^{12,18}. We observed the lipid profile, especially TC, TG and LDL of females to be considerably higher than that of males, which is in accordance with previous reports⁵.

This study also shows that significant increasing level of TC, TG, LDL-C and VLDL-C and significant decrease in level of HDL-C has strong association with increase severity of Diabetes which is in accordance with similar results observed by other workers^{4,13}. Low HDL concentrations are often accompanied by elevated TG levels as seen in this study and others¹¹, and this combination has been strongly associated with increased risk of Coronary Heart Disease (CHD)^{14, 15}.

CONCLUSION

From our study we have come to the conclusion that lipid metabolism is adversely affected in Diabetes mellitus. This was proven by the fact that all the lipid factors were elevated in Diabetes when compare to Non-diabetic subjects. The most common abnormality diabetic patients tend to have is Hypertriglyceridemia as diabetes are more prone to Hyperlipidemia. High levels of Total Cholesterol (TC), Triglyceride (TG), Very Low Density Lipoprotein (VLDL) and Low Density Lipoprotein (LDL) and low level of High Density Lipoprotein (HDL) are the important characteristics of Type-2 DM as observed in our study. Similar findings were reported by other workers as well giving strength to ideas that due to prevailing Hyperlipidemia, Diabetes are highly susceptible to develop premature atherosclerosis and macro vascular complications as compared to Non-diabetics.

Author's Contribution:

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Conflict of Interest: The study has no conflict of interest to declare by any author.

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