

**A COMPARATIVE STUDY OF FASTING AND POSTPRANDIAL LIPID PROFILE
AMONG PATIENTS WITH AND WITHOUT DIABETES MELLITUS IN A TERTIARY
CARE HOSPITAL**

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Abstract

Introduction: The growing incidence of Type 2 diabetes mellitus (T2DM) is a major problem in the modern world. DM is a group of metabolic diseases, which is characterized by chronic hyperglycemia, which results from the defects in the insulin secretion, insulin action, or both. Diabetic dyslipidemia contributes to the excess morbidity and mortality in T2DM.

Materials and Methods: Assessment of fasting and postprandial lipid abnormalities in type 2 diabetes mellitus was done. A case control study was conducted in Department of General Medicine, ESIMC & PGIMSR, KK Nagar, Chennai. The study was conducted from January 2021 to December 2021. This study was carried out on 200 known cases of type-2 Diabetes Mellitus visiting at ESIMC & PGIMSR, OPD on regular basis were included as cases; based on non-probability purposive sampling technique and 100 healthy participant who were not known cases of type-2 Diabetes Mellitus were included in the study as controls. The sample size for the study was calculated 200.

Results: A total of 100 controls and 100 cases were included in the final analysis. Table I shows the baseline characteristics of patients with type 2 diabetes mellitus. Diabetic subjects were middle aged (mean age 43.2 ± 7.48 years), with a mean body mass index (BMI) of 25.9 ± 5.46 kg/sq m. Diabetic subjects were matched for age, BMI with controls, Family history of diabetes. Fasting lipid parameters higher among diabetics as compare to control. Parameters was higher in diabetic group TC (211.76 ± 49.65), TG (160.26 ± 55.28), LDL (127.86 ± 33.20) and VLDL (36.72 ± 7.24) compare to control group TC (161.40 ± 20.76), TG (117.65 ± 29.32), LDL (24.80 ± 6.74) and VLDL (24.83 ± 6.70). Only HDL was higher in control group. A statistically significant difference was observed between control and diabetic groups. (P value < 0.0001).

Conclusion: Both fasting and post prandial lipid abnormalities seen in type 2 diabetes but the post- prandial lipid profile was altered when compare to fasting lipid levels. Lifestyle

modifications along with diet and proper lipid lowering drugs are helpful in diabetic individuals with lipid abnormalities.

Key Words: Type 2 diabetes mellitus, HDL, LDL, TG, BMI.

INTRODUCTION

The growing incidence of Type 2 diabetes mellitus (T2DM) is a major problem in the modern world. DM is a group of metabolic diseases, which is characterized by chronic hyperglycemia, which results from the defects in the insulin secretion, insulin action, or both. Diabetic dyslipidemia contributes to the excess morbidity and mortality in T2DM.¹

India is one of the rapidly developing countries standing in second highest diabetes prevalence in the world which could be due to rapid urbanization that brought along with it a sedentary lifestyle is an important factor inducing diabetes mellitus.² According to a study in 2011, the estimated number of patients with diabetes in India was 62.4 million which is projected to rise to a staggering 101.2 million by 2030.³ Diabetes mellitus is an important risk factor for cardiovascular disease and atherosclerosis as it is a common secondary cause of hyperlipidaemia when the glycaemic control is poor.⁴ The prevalence of dyslipidaemia in type 2 diabetes is double with respect to the general population. Approximately 80 % of deaths in patients with diabetes are prone to coronary vascular diseases and the Asian Indians have high risk of coronary heart disease than whites.⁵

MATERIALS AND METHODS

Assessment of fasting and postprandial lipid abnormalities in type 2 diabetes mellitus was done. A case control study was conducted in Department of General Medicine, ESIMC & PGIMSR, KK Nagar, Chennai. The study was conducted from January 2021 to December 2021.

This study was carried out on 200 known cases of type-2 Diabetes Mellitus visiting at OPD on regular basis were included as cases; based on non-probability purposive sampling technique and 100 healthy participant who were not known cases of type-2 Diabetes Mellitus were included in the study as controls. The sample size for the study was calculated 200.

Study participants included who were on oral hypoglycemic drugs, duration of diabetes of more than five years and were in the age group of 35-65 years and who had given consent for inclusion in the study. Those who declined to participate, did not give written consent to be included in the study and were <35 and >65 years age study participant were not included in the study.

Data collection

A pre-tested, semi-structured questionnaire was used for data collection that was build based on literature review and was reviewed and validated by 5 arbitrators and modified accordingly. The

questionnaire had 2 parts: Part I - questions about the participants' socio-demographic characteristics such as age, gender and socioeconomic status. Part II – question body weight, BMI, WHR waist circumference, diet, daily exercise, biochemical parameters and diabetes medications.

Informed consent: We explained our purpose of study to all individual participants in local language and then written and informed consent was obtained from each participant for being included in the study before starting interview.

Statistical analysis: The data was expressed as means \pm (SD) values. The data was recorded in Microsoft excel and analyzed using SPSS software (version 15). The significance of the difference between the groups was assessed by Student's t-test, between cases and controls.

RESULTS

A total of 100 controls and 100 cases were included in the final analysis. Table I shows the baseline characteristics of patients with type 2 diabetes mellitus. Diabetic subjects were middle aged (mean age 43.2 \pm 7.48years), with a mean body mass index (BMI) of 25.9 \pm 5.46kg/sq m. Diabetic subjects were matched for age, BMI with controls, Family history of diabetes.

Parameters	Control (100)	Diabetes patients (100)	P-Value
Age (years)	45.6 \pm 6.10	45.1 \pm 7.10	0.558
BMI (kg/sqm)	25.80 \pm 4.50	25.70 \pm 5.02	0.292

Table 1: Patient Demographics

Lipid profile	Control (100)	Diabetes patients (100)	P-Value
TC(mg/dl)	161.40 \pm 20.76	211.76 \pm 49.65	0.001
HDL(mg/dl)	49.72 \pm 6.10	43.52 \pm 8.10	0.001
TG (mg/dl)	117.65 \pm 29.32	160.26 \pm 55.28	0.001
LDL (mg/dl)	24.80 \pm 6.74	127.86 \pm 33.20	0.001
VLDL (mg/dl)	24.83 \pm 6.70	36.70 \pm 7.20	0.001

Table 2: Comparison of fasting lipid profile among the subjects

According to result fasting lipid parameters higher among diabetics as compare to control. Parameters was higher in diabetic group TC (211.76 \pm 49.65), TG (160.26 \pm 55.28), LDL (127.86 \pm 33.20) and VLDL (36.72 \pm 7.24) compare to control group TC (161.40 \pm 20.76), TG (117.65 \pm 29.32), LDL (24.80 \pm 6.74) and VLDL (24.83 \pm 6.70). Only HDL was higher in control group. A statistically significant difference was observed between control and diabetic groups. (p.value<0.0001*).

Lipid profile	Control (100)	Diabetes patients (100)	P-Value
TC(mg/dl)	177.40±31.24	248.76±54.12	0.001
HDL(mg/dl)	46.30±7.21	35.64±8.52	0.001
TG (mg/dl)	138.80±37	200.08±64.63	0.001
LDL (mg/dl)	112.85±29.45	154.12±33.43	0.001
VLDL (mg/dl)	26.80±5.7	39.70±7.20	0.001

Table 3: Post prandial lipid profile of the subjects.

Lipid profile	Fasting	Post Prandial	P Value
TC(mg/dl)	218.12±42.17	250.72±52.12	0.001
HDL(mg/dl)	44.13±8.14	36.62±8.50	0.001
TG (mg/dl)	160.12±54.15	199.7±64.65	0.001
LDL (mg/dl)	124.86±35.10	153.52±41.80	0.001
VLDL (mg/dl)	37.42±8.10	39.18±9.46	0.001

Table 4: Comparison of fasting and post prandial lipid profile of type 2 diabetes mellitus (100)

Post prandial lipids parameters was higher compare to fasting lipids among diabetic. In diabetics post prandial lipids Parameters was higher TC (250.72±52.12), TG (199.7±64.65), LDL (153.52±41.80) and VLDL (39.18±9.46) compare to fasting lipids TC (218.12±42.17), TG (160.12±54.15), LDL (124.86±35.10) and VLDL (37.42±8.10). Only HDL was higher in fasting lipids. A statistically significant difference was observed between fasting lipid profile and post prandial lipid profile among type 2 diabetes mellitus. (P value <0.0001*).

DISCUSSION

Dyslipidemia as a metabolic abnormality is frequently associated with diabetes mellitus. We know that lipid profile and diabetes together are related to be a important predictors for metabolic syndrome. The lipid profile (both fasting and post prandial) was altered in individuals with type 2 diabetes when compared with controls.⁶

In the present study, the fasting and postprandial lipid parameters i.e., TC, TG, LDL and VLDL were increased and the fasting and postprandial HDL level was decreased in the type 2 DM subjects as compared to controls (Table 2 and 3] and the postprandial lipid parameters i.e., TC, TG, LDL and VLDL were increased in the type 2 DM subjects as compared to the fasting lipid parameters (Table 4).⁷

Abnormalities in lipid metabolism have been reported in patients with diabetes mellitus accompanied by the risk of cardiovascular arteriosclerosis. Heavy meals also precipitate

atherosclerosis thus Myocardial Infarction. There are few studies that have reported that postprandial dyslipidaemia is more important in the pathogenesis of the vascular changes and atherosclerosis and it increases the risk of the cardiovascular events.⁸ Postprandial hypertriglyceridaemia has been linked to macrovascular diseases in both normo and hypertriglyceridaemic subjects in type 2 DM. The increased risk of atherosclerosis among them, may therefore, be related to the higher postprandial lipaemia in them.⁹

The postprandial dysmetabolism and the associated oxidative stress may have a link with insulin resistance and type 2 DM, thereby increasing the incidence of cardiovascular disease disproportionately. Another study has proposed cardiovascular disease morbidity and mortality associated with type 2 DM showed prolonged and exaggerated postprandial state.¹⁰

CONCLUSION

Both fasting and post prandial lipid abnormalities seen in type 2 diabetes but the post-prandial lipid profile was significantly altered when compare to fasting lipid levels. Lifestyle modifications along with diet and proper lipid lowering drugs are helpful in diabetic individuals with lipid abnormalities. Health education should be provided at community level lipid abnormalities. India has low rate of awareness about lipid abnormalities so, it is important to include postprandial lipid profile, in addition to the fasting lipid profile, which helps in better cardiovascular risk assessment in type 2 diabetes mellitus.

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