

RESEARCH ARTICLE

A Prospective Study on Incidence of Dyslipidemia in Diabetes Mellitus

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ABSTRACT:

Background: Diabetes Mellitus is a metabolic syndrome characterized by increased blood sugar levels in the body. Dyslipidemia in diabetes is one of the most important reasons for silent heart attacks. The main aim and Objectives of this study are to evaluate the incidence of dyslipidemia after the diagnosis of Diabetes mellitus. **Methodology:** A prospective non interventional single centred study was carried out in a tertiary care hospital. A specially designed proforma was used to collect the data from the case sheets such as patient demographics. Lipid profile values were obtained from the patient after obtaining written consent from each patient and correlated with American Dyslipidemic Associations standard values. The incidence rate was calculated. **Results:** We have included 500 patients in this study. We also observed that there were isolated, combined and mixed patterns of dyslipidemia in Diabetes Mellitus. The incidence rate was found to be 45.60%. Although there was no significant difference between the incidence rate of men and women. **Conclusion:** Dyslipidemia in Diabetes Mellitus possess a major threat of myocardial risk and heart attacks. As HbA_{1c} is monitored every 3 months we recommend the monitoring of lipid profile test also every 3 months. Regular monitoring of Lipid Profile is an important way to prevent silent heart attacks.

KEYWORDS: Incidence, Dyslipidemia, Diabetes Mellitus.

INTRODUCTION:

Diabetes Mellitus is a metabolic syndrome characterized by increased blood sugar levels in the body. It is caused by deficiency of the pancreatic hormone insulin which results in failure to metabolize sugars and starch.¹ Sugar accumulates in the blood and urine and by-products of alternative fat metabolism disturb acid-base balance of the blood causing a risk of convulsions and coma. Defects in insulin action and hyperglycemia could lead to changes in plasma lipoproteins in patients with diabetes.

Alternatively especially in the case of type II diabetes the obesity/ insulin resistant metabolic disarray that is at the root of this form of diabetes could itself, lead to lipid abnormalities exclusive of hyperglycemia.² Early detection of type II diabetes can be justified because diabetes is an important health problem has a relatively long asymptomatic phase, interventions are available that have a proven beneficial effect on clinically meaningful outcomes and screening procedures are safe, acceptable and have a adequate sensitivity and specificity. However it remains controversial because of a lack of an established evidence base that detection earlier in the natural history of diabetes is indeed beneficial to individuals.³ Amit Kumar Dixit et al conducted a study on "The prevalence of dyslipidemia in patients with diabetes mellitus of ayurveda Hospital" in 2014. He concluded that this study showed common lipid abnormalities during diabetes induced dyslipidemia are hypercholesterolemia, hypertriglyceridemia and elevated LDL-C.⁴ Mandal et al conducted a study on

“Prevalence Of Dyslipidemia In Patients With Type 2 Diabetes Mellitus: A Hospital Based Study In Kishanganj, India”. He concluded that plasma glucose levels, obesity indices, cholesterol, triglyceride, VLDL, LDL were significantly higher.⁵ The main aim and Objectives of this study are to evaluate the incidence of dyslipidemia after the diagnosis of Diabetes mellitus and to analyze the changes in the state of LDL, HDL and Triglycerides with respect to the blood sugar levels.

MATERIALS AND METHODS:

A prospective non interventional single centered study was carried out in a tertiary care hospital. 500 patients who were known case of Diabetes Mellitus were selected based on the inclusion and exclusion criteria. A specially designed proforma was used to collect the data from the case sheets such as patient demographics (Age, Sex, Body mass index, past medical history, past medication history, social habits, laboratory values and other diagnostic reports). Lipid profile values were obtained from the patient after obtaining written consent from each patient and correlated with American Dyslipidemic Associations standard values. Lipid profile is a panel of blood tests that serves as an initial broad medical screening tool for abnormalities in lipids, such as cholesterol and triglycerides high density and low density lipoproteins. These values were correlated along with American Dyslipidemic Associations values on standard lipid profile panel. This study has been carried out after the approval from Ethics Committee IEC/2015/DOPV/21

Inclusion Criteria:

1. Patients with Type II Diabetes Mellitus.
2. Patients above 18 years of age.
3. Patients who have undergone Lipid Profile Test.

Exclusion Criteria:

1. Pregnancy and nursing women.
2. Not a known case of Hyperlipidemia/Dyslipidemia before Diabetes Mellitus diagnosis.

Statistical Analysis:

The incidence rate for each pattern of dyslipidemia is statistically correlated between men and women with the help of paired "t" test. All the obtained data were subjected to descriptive statistics using SPSS version 22.

RESULTS:

The following results were obtained in our study.

Table 1: Gender Distribution

Gender	Number of patients (n=500)	Percentage of patients
Male	323	64.60%
Female	177	35.40 %

Table 1 show that there are more male patients than female patients.

Table 2: Age Distribution

Age	Number of patients (n=500)	Percentage of patients
18-35	71	14.20 %
35-50	154	30.80 %
50-65	211	42.20 %
>65	64	12.80 %

Table 2 shows that there are more patients in the age group of 50-65. It can be noticed that even there is higher diabetes percentage in the age group above 35 years.

Table 3: Diabetes Mellitus type

Type	Number of patients (n=500)	Percentage of patients
Type I	44	8.80 %
Type II	456	91.20 %

Table 3 shows that there are more Type II patients than Type I patients.

Table 4: Co morbidities

Co morbidity	Number of patients (n=500)	Percentage of patients
Hypertension	329	65.80%
Bronchial Asthma	66	13.20 %
Acute renal failure	13	02.60 %
Arthritis	02	00.40 %

Table 4 shows that there are more Hypertension patients which is as expected followed by bronchial Asthma.

Table 5: ADA Classification

Parameter	Category	Goal(mg/dl)
LDL-C	With overt CVD	<70
	Without overt CVD	<100
HDL-C	Male	>40
	Female	>50
TG		<150
TC		<240

Table 5 gives the American Dyslipidemic Associations standard values.

Table 6: Characteristics

Group	Number of patients (n=500)
Age (Mean±SEM)	53.6±3.12
Smokers	96 (19.2%)
Alcoholic	152 (30.4%)
Non vegetarian	418 (83.6%)
Vegetarian	82 (16.4%)

Table 6 shows that there are more than 83% non-vegetarians. All values mentioned are n(N%) unless otherwise mentioned.

Table 7 shows the incidence of dyslipidemia among men and women.

After performing the "t" test there are no values that are found to be significantly varying among men and women. All values were found to be p>0.05

Table 7: Patterns of Dyslipidemia

	Male (n=323)	Female (n=177)	Total
MIXED			
High TG, High LDL, Low HDL COMBINED	22	18	40
High TG, High LDL	17	9	24
High LDL, Low HDL	9	11	20
High TG, Low HDL ISOLATED	13	10	23
High TG	32	20	52
High LDL	22	17	39
Low HDL	13	17	30

Overall incidence rate:

$$\text{Incidence rate} = \frac{\text{Number of new cases}}{\text{Number of person at risk}} = \frac{228}{500} = 45.60\%$$

This shows that around 45.60% of people who were diabetic possess higher probability of incidence of dyslipidemia.

Gender wise incidence rate:

$$\text{Incidence rate among male} = \frac{\text{Number of new cases}}{\text{Number of men at risk}} = \frac{128}{323} = 39.62\%$$

This shows that around 39.62% of men who were diabetic possess higher probability of incidence of dyslipidemia.

$$\text{Incidence rate among female} = \frac{\text{Number of new cases}}{\text{Number of women at risk}} = \frac{100}{177} = 56.49\%$$

This shows that around 56.49% of men who were diabetic possess higher probability of incidence of dyslipidemia.

DISCUSSION:

Dyslipidemia is the major contributing factor for the incidence of heart attack with diabetes mellitus. The change in the lipid levels is linked with free fatty acids due to the development of insulin resistance.⁶ This along with hyper glycemia will lead to changes in the cholesterol and lipoproteins. This inturn may lead to further more complications such as pancreatitis as well as many macrovascular complications of the diabetes mellitus. This study showed that there are more men with diabetes mellitus than women, which is similar to the study results of Karet B et al.⁷ But it disagrees with the results of Badawi et al.⁸ We also found that there is more diabetes above the age of 50 years, which is similar to the results of the study conducted by Lim S et al.⁹ Similarly there are more Type II diabetes patients than Type I which is similar to the study published by Harris MI et al.¹⁰ It can also be seen that hypertension is the most common comorbidity along with Diabetes Mellitus which is similar to the results of Elnaggar et al.¹¹ We have used ADA classification as our standard to compare

with the results. We also observed that there were isolated patterns, mixed patterns of dyslipidemia in Diabetes Mellitus. The incidence rate was found to be 45.60% which is not similar to the studies done by Ramavat P et al and Dixit AK et al.^{12,4} Can be clearly seen that women are more prone to the incidence of dyslipidemia among diabetics. Our main recommendation is, although 135mg/dl is the standard cut off value for LDL as a marker for dyslipidemia. We recommend any values of above 100mg/dl are maintained below 100mg/dl with the use of statins. Statins have now become cost efficient and only presents the risk of myalgia. It can be used as a prophylactic measure to prevent the silent heart attacks. Hence dyslipidemia is a condition that goes undetected in Diabetes Mellitus. So we recommend periodic monitoring of lipid profile as a better way to prevent silent heart attacks.

CONCLUSION:

Diabetes Mellitus is most common disease among the population across the world. Dyslipidemia in Diabetes Mellitus possess a major threat of myocardial risk and heart attacks. Regular monitoring of Lipid Profile is an important way to prevent silent heart attacks.

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