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Original Research Article

Prevalence of Dyslipidemia in Type II Diabetes: A Cross Sectional Study from Raichur, Karnataka

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Abstract:

Background: The lipid parameters serum Cholesterol, serum Triglyceride, serum Low Density Lipoprotein (LDL), serum High Density Lipoprotein (HDL) are correlated with blood sugar levels in this study.

Objective: To study the lipid profile in type II diabetes patients.

Materials and Methods: This is cross sectional observational study conducted amongst diagnosed cases of diabetes mellitus department of Medicine at Navodaya Medical College and Hospital, Raichur involving 50 cases of type II diabetes.

Results: Majority of the patients were from 41-50 years age group i.e. 36%. 54% were males and 46% were females. Elevated HBA1c was found in 76% cases in our study. Prevalence of hypercholesterolemia in our study was 44%. Prevalence of hypertriglyceridemia in our study was 44%. Prevalence of elevated LDL and VLDL in our study was 34% and 44% respectively. Prevalence of reduced HDL in our study was 54%.

Conclusion: Prevalence of hypercholesterolemia in our study was 44%. Prevalence of hypertriglyceridemia in our study was 44%. Prevalence of elevated LDL and VLDL in our study was 34% and 44% respectively. Prevalence of reduced HDL in our study was 54%.

Keywords: Prevalence, dyslipidemia, type II DM.

Introduction

Diabetes mellitus is a collection of common metabolic disorder mainly considered by hyperglycaemia which results commencing from defective insulin secretion or insulin action or together. [1] It is a diverse group of diseases with different group of etiology such as social, environmental and genetic factors which acting concurrently or mutually. [2] Insulin is a hormone which controls the body metabolism of carbohydrates, proteins and lipids at different level. Chronic poor glycaemic control will cause disorder like dyslipidemia, hypo thyroidism, cardiac disease, central nerve system problems and also poor control of infections. [3]

In India, Type 2 DM is an epidemic disorder due to social influence and changes in life style. As per WHO estimation, the universal prevalence of Diabetes mellitus was 170 million (2.8%) in 2002, this number expected to grow up to 366 million (4.4%) or more in 2030. [4-6]

Diabetes is more prevalent in developing countries and India is becoming the diabetic capital in the world with prevalence range next to China. India has around 69.1 million people with diabetes. The increased prevalence is attributed to ageing of the population and obesity. Type 2 diabetes being a chronic disease is characterized by hyperglycemia and dyslipidemia due to underlying insulin re-sistance. As the disease progresses it leads to micro vascular and macro vascular complications. [7]

The lipid parameters serum Cholesterol, serum Triglyceride, serum Low Density Lipoprotein (LDL), serum High Density Lipoprotein (HDL) are correlated with blood sugar levels in this study. An understanding of the complex interplay of how treating dyslipidaemia reduces the risk for CVD events in patients with type 2 diabetes mellitus and an ability to assess at-risk patients is necessary to ensure the most appropriate treatment strategies are implemented. [8,9,10]

Glycated haemoglobin (HbA1c) is a routinely used marker for long-term glycemic control. HB A1c predicts risk for development for diabetic compli-cation. Lifestyle changes such as nutrition therapy,

weight loss, regular physical exercise, and appropriate education and self-management strategies are vital to improve outcomes. [11] So, the present study was planned with the objective to study the lipid profile in type II diabetes patients approaching to OPD at Navodaya Medical College and Hospital, Raichur

Objective: To study the lipid profile in type II diabetes patients

Materials and Methods: This is cross sectional observational study conducted amongst diagnosed cases of diabetes mellitus department of Medicine at Navodaya Medical College and Hospital, Raichur

1) Place of study: department of Medicine at Navodaya Medical College and Hospital, Raichur

2) Duration of study: January 2024 to November 2024

3) Sample size: 50

4) Inclusion criteria:

a. Patients who have given written and informed consent
b. Age between 25 to 60 years age group.
c. Patient with clinically diagnosed case of diabetes mellitus.

5) Exclusion criteria:

a. Peoples who received previous lipid lowering agent therapy e.g. statins.
b. Patients not willing to give written informed consent.

Methods of data collection:

Details of all the participants like age, name, gender, history of diabetes, treatment details were recorded.

Anthropometric details were weight, height, BMI, waist circumference, WHR were recorded. Blood samples were collected for BSL fasting and postprandial, HBA1c and lipid profile.

Laboratory investigations:

Blood Glucose Level: Under aseptic precautions 5ml of venous blood in a fasting state after a fast of at least 8hrs was collected.

The fasting blood glucose as well as post prandial blood glucose was calculated using Glucose oxidase Peroxidase method (GOD POD method) using invitro diagnostic kit. The intensity of the compound is directly proportional to the glucose concentration and is measured at 505nm.

HBA1C: The glycosylated haemoglobin, was estimated by fluorescence immunoassay (FIA) for the quantitative determination of HBA1C (Haemoglobin A1C) in human whole blood, in vitro diagnostic use.

The test uses a sandwich immunodetection method; the detector antibody in buffer binds to antigen in sample, forming antigen antibody complexes, and migrates onto nitrocellulose matrix to be captured by the immobilized antibody on test strip.

The test displays the content of glycated haemoglobin in terms of percent of the total haemoglobin in blood.

Reference values: [12]

Types of diabetes	Normal glucose tolerance	Pre-diabetes IFG/IGT	Diabetes Mellitus
Fasting plasma glucose	<5.6 mmol/l (100 mg/dl)	5.6-6.9 mmol/l (100-125 mg/dl)	>/ 7mmol/l (126mg/dl)
2h-plasma glucose	<7.8mmol/l (140mg/dl)	7.8-11 mmol/l (140-199)	>/ 11.1 mmol/l (200mg/dl)
A1C	<5.6%	5.7-6.4%	>/ 6.5%

National Cholesterol Education Programme (NCEP) [13] guidelines were used for definition of dyslipidemia as follows:

- Hypercholesterolemia- serum cholesterol levels ≥ 200mg/dl (≥5.2mmol/l).
- Hypertriglyceridemia- serum triglyceride levels ≥150 mg/ dl (≥1.7 mmol/l).
- Low HDL cholesterol- HDL cholesterol levels ≤40 mg/dl (≤1.04 mmol/l).
- High LDL cholesterol- LDL cholesterol levels ≥130 mg/dl (≥3.4 mmol/l) calculated using the Friedewald equation.

Statistical analysis and methods: Data will be collected by using a structure proforma. Data entered in MS excel sheet and analyzed by using SPSS IBM USA. Qualitative data will be expressed in terms of proportions. Quantitative data will be expressed in terms of Mean and Standard deviation.

Results

Table 1: Distribution according to age group

		Frequency	Percent
Age group in years	< 40	8	16.0
	41-50	18	36.0
	51-60	12	24.0

	>60	12	24.0
	Total	50	100.0
Gender	Male	27	54.0
	Female	23	46.0
	Total	50	100.0

We included total 50 cases of type II DM in our study. Majority of the patients were from 41-50 years age group i.e. 36% followed by 24% each from 51-60 and above 60 years age group. 54% were males and 46% were females.

Table 2: Distribution according to FBS and PPBS values

		Frequency	Percent
FBS	Normal	17	34.0
	Elevated	33	66.0
	Total	50	100.0
PPBS	Normal	20	40.0
	Elevated	30	60.0
	Total	50	100.0

Fasting BSL was elevated in 66% cases whereas post prandial BSL was elevated in 60% cases.

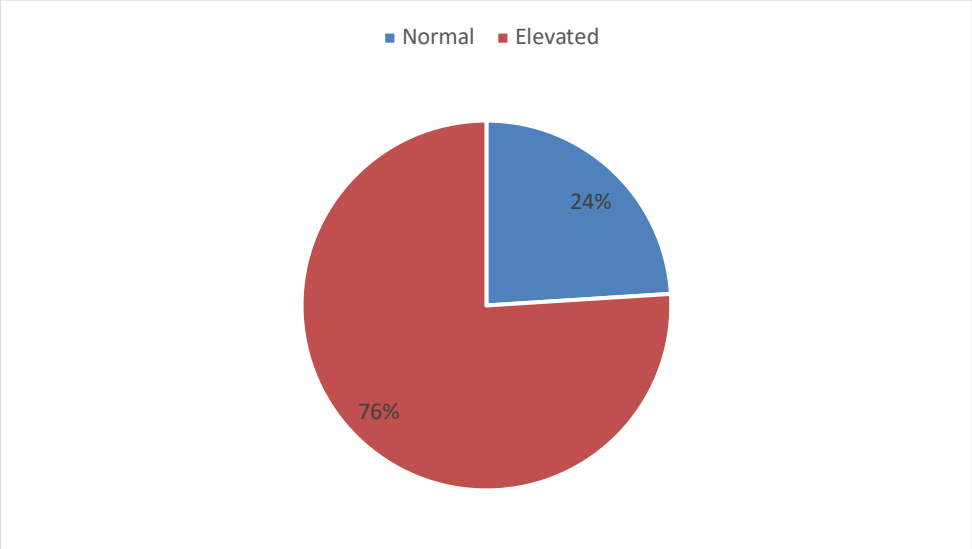

Figure 1: Distribution according to HBA1c value

Elevated HBA1c was found in 76% cases in our study

Table 4: Prevalence of dyslipidemia

		Frequency	Percent
Total cholesterol	Normal	28	56.0
	Elevated	22	44.0
Triglycerides	Normal	28	56.0
	Elevated	22	44.0
HDL	Reduced	27	54.0
	Normal	23	46.0
LDL	Normal	33	66.0
	Elevated	17	34.0
VLDL	Normal	28	56.0
	Elevated	22	44.0
	Total	50	100.0

Prevalence of hypercholesterolemia in our study was 44%. Prevalence of hypertriglyceridemia in our study was 44%. Prevalence of elevated LDL and VLDL in our study was 34% and 44% respectively. Prevalence of reduced HDL in our study was 54%.

Discussion

We included total 50 cases of type II DM in our study. Majority of the patients were from 41-50 years age group i.e. 36% followed by 24% each from 51-60 and above 60 years age group. 54% were males and 46% were females. Madhu SV et al [14] in 2005 conducted the study with the objective to study the postprandial lipid abnormalities in patients with type 2 diabetes mellitus and included 20 male type 2 diabetic subjects (age 49.75 ± 4.82years). Sujaya Raghavendra et al [15] in his study included 200 subjects and divided them into two groups, 100 controls (non-diabetic) and 100 cases (type 2 DM) with the age range of 30 – 60 years. Out of 100 non-diabetic controls, 58 were males and 42 females, and in 100 diabetic cases, 52 were males and 48 women.

In our study, prevalence of hypercholesterolemia in our study was 44%. Prevalence of hypertriglyceridemia in our study was 44%. Prevalence of elevated LDL and VLDL in our study was 34% and 44% respectively. Prevalence of reduced HDL in our study was 54%.

Lipid profile and diabetes together are related to be the important predictors or metabolic disturbances such as dyslipidaemia, metabolic syndrome, hypertension, and cardiovascular diseases. Dyslipidemia as a metabolic abnormality is commonly associated with DM. In the study by Wali et al the postprandial lipid parameters i.e. TC, TG, LDL and VLDL were significantly increased in the type 2 DM subjects as compared to the fasting lipid parameters and the postprandial HDL level was significantly decreased as compared to the fasting HDL level ($P<0.01$) [16] Dyslipidemia as a metabolic abnormality is frequently associated with diabetes mellitus. Abnormalities in lipid metabolism have been reported in patients with diabetes mellitus accompanied by the risk of cardiovascular arteriosclerosis.

Lipid abnormalities in patients with diabetes, often termed “diabetic dyslipidemia”, are typically characterized by high total cholesterol (T-Chol), high triglycerides (Tg), low high density lipoprotein cholesterol (HDL-C) and increased levels of small dense LDL particles. Low density lipoprotein cholesterol (LDL-C) levels may be moderately increased or normal. Lipid abnormalities are common in people with T2DM and prediabetes but the pattern of the different lipids may vary between ethnic groups, economic levels, and access to health care. [17,18]

Conclusion

Prevalence of hypercholesterolemia in our study was 44%. Prevalence of hypertriglyceridemia in our study was 44%. Prevalence of elevated LDL and VLDL in our study was 34% and 44% respectively. Prevalence of reduced HDL in our study was 54%.

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