ORIGINAL ARTICLE Frequency of Dyslipidemia in Patients with Type-II Diabetes Mellitus

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ABSTRACT

Introduction: Dyslipidemia is one of the major risk factors for cardiovascular disease in diabetes mellitus. Early detection and treatment of dyslipidemia in type-2 diabetes mellitus can prevent risk for atherogenic cardiovascular disorder.

Objective: To determine the frequency of dyslipidemia in patients with type II diabetes mellitus presenting in a tertiary care hospital for routine check-up

Materials and Methods

Study design: Cross sectional study

Setting: Department of Medicine (South Medical Ward), Mayo Hospital, Lahore

Duration: Six months i.e. 1st July 2020 to 31st December 2020.

Data collection procedure: Total 220 patients fulfilling selection criteria were enrolled in the study. Then blood samples were obtained and sent to the pathology laboratory of the hospital for assessment of lipid profile. Reports were assessed and level of cholesterol and triglycerides were noted and dyslipidemia was labeled, if levels were high. All this data was recorded in proforma.

Results: In this study, the mean age of patients in this study was 52.71 ± 7.46 years. There were 104 (47.3%) males and 116 (52.7%) females. There were 92 (41.8%) patients of normal BMI, 72 (32.7%) patients were overweight and 56 (25.5%) patients were obese. The mean duration of diabetes was 18.30 \pm 3.92 months. Dyslipidemia was diagnosed in 97 (44.09%) patients.

Conclusion: Results of this study showed high frequency of dyslipidemia among diabetic patients. **Key words:** Dyslipidemia, Type II, Diabetes mellitus, Lipid profile

INTRODUCTION

Diabetes mellitus type 2 and its consequences are a serious and rising public health concern worldwide, with a particular focus in developing countries.¹ Due to a high degree of genetic predisposition and high susceptibility to environmental insulin, characterized by a high BMI, high upper body adiposity, a high body fat percentage, and a high level of insulin resistance, the prevalence of diabetes mellitus is increasing many folds in the South Asian population. ² Diabetes is linked to a higher prevalence of dyslipidemia, which includes high levels of LDL, cholesterol, and triglycerides.³

Lipoprotein problems are highly frequent in diabetic individuals, and they are the leading cause of morbidity and mortality from cardiovascular illnesses. Diabetic dyslipidemia is characterized as high serum total cholesterol, high serum triglyceride, high LDL-C, and low serum HDL in diabetes mellitus patients, according to ATP III recommendations.⁴

In diabetes mellitus, dyslipidemia is one of the most important risk factors for cardiovascular disease. In diabetes mellitus, early identification and treatment of dyslipidemia can reduce the risk of atherogenic cardiovascular disease.²

Shrestha et al., found that the frequency of dyslipidemia was highly prevalent i.e. 85.3% of diabetic individuals.⁵ Mehmood et al., also found that the frequency of dyslipidemia was 81.5% among diabetic.⁶ Khan et al., found that Diabetic patients in Rawalpindi had an 80% chance of having dyslipidemia.⁷ But Sarfraz et al., found that the frequency of dyslipidemia was only 17% in diabetic patients.⁸

It has been discovered in the literature that people with diabetes mellitus have a very significant risk of dyslipidemia. As a result, we'd want to undertake this research to determine the scope of the problem among the local people. So that early detection and therapy of diabetes mellitus patients with dyslipidemia may be implemented. This will aid in gathering local evidence, allowing us to propose that diabetes mellitus patients' lipid profiles be checked at regular intervals to prevent dyslipidemia, which can decrease patients' quality of life and lead to cardiovascular and cerebrovascular problems.

Objective: To determine the frequency of dyslipidemia in patients with type II diabetes mellitus presenting in a tertiary care hospital for routine check-up

MATERIAL AND METHODS

Study Design: Cross sectional study

Setting: Department of Medicine (South medical ward), Mayo Hospital, Lahore

Study period: 6 months i.e. 1st July 2020 to 31st December 2020

Sample Size: Sample size of 220 patients is calculated with 95% confidence level, 6% margin of error and taking expected percentage of dyslipidemia i.e. 17%⁸ in diabetes mellitus patients

Sampling Technique: Non-probability, consecutive sampling

Sample Selection

Inclusion criteria: Patients aged 40 to 70 years, both genders diagnosed with type II diabetes mellitus were enrolled in the study. Type II diabetes mellitus was defined

as random blood sugar level > 200 mg/dl for >1year and patient is taking anti-glycemic medication.

Exclusion criteria: Patients with chronic liver disease, renal problems, anemia, thyroid problem, taking statins, Smokers (>5 pack year), morbidly obese (BMI>35kg/m²) were excluded.

Data Collection Procedure: Total 220 patients fulfilled selection criteria were enrolled in the study through OPD. Informed consent was obtained. Demographic information was also noted. Then blood samples were obtained by using 3cc disposable syringe with the help of a staff nurse under aseptic measures. All samples were stored in sterile containers and sent to the pathology laboratory of the hospital for assessment of lipid profile. Reports were assessed and if total cholesterol level was > 200 mg/dl, triglyceride level was > 150 mg/dl, then dyslipidemia was labeled. All this data was recorded on proforma.

Data Analysis: The collected information was entered into SPSS version 21.0 and analyzed through it.

RESULTS

In this study, the mean age of patients in this study was 52.71 ± 7.46 years. There were 90 (40.9%) patients who were aged 40 – 50 years, 91 (51.1%) patients had age range 51 – 60 years and there were 39 (17.7%) of age >60 years. There were 104 (47.3%) males and 116 (52.7%) females. There were 92 (41.8%) patients of normal BMI, 72 (32.7%) patients were overweight and 56 (25.5%) patients were obese. The mean duration of diabetes was 18.30 \pm 3.92 months. There were 80 (36.4%) patients who had diabetes from 12 – 16 months, 68 (30.9%) patients had diabetes from 17-20 months and 68 (30.9%) had diabetes from 21-24 months. Hypertension was positive in 103 (46.8%) patients. The mean total cholesterol level was 29.80 \pm 105.77 mg/dl and mean triglycerides level was 147.56 \pm 51.75 mg/dl. **Table 1**

Dyslipidemia was diagnosed in 97 (44.09%) patients. Fig 1

Data was stratified for different effect modifiers. Patients were distributed in three age groups and it was noted that there were 39 (43.3%) patients of age 40 - 50years had dyslipidemia, in patients age 51 - 60 years, 44 (48.4%) had dyslipidemia and patients of age >65 years, 14 (35.9%) had dyslipidemia. Insignificant difference was seen in different age of patients for dyslipidemia (P-value >0.05). Among males, dyslipidemia was positive in 40 (38.5%) patients while in females, dyslipidemia was positive in 57 (49.1%) patients. Insignificant difference was seen in both gender for dyslipidemia (P-value >0.05). Dyslipidemia was noted in 30 (32.6%) patients of normal BMI, which was significantly less than overweight patients [39 (54.2%)] and obese patients [28 (50.0%)]. Insignificant difference was seen for dyslipidemia among hypertensive and nonhypertensive patients i.e. 43 (41.7%) vs. 54 (46.2%) (Pvalue > 0.05). In patients who had diabetes from 12 - 16months, dyslipidemia was present in 32 (40.0%) patients. In patients who had diabetes from 17 - 20 months, dyslipidemia was present in 34 (50.0%) patients. In patients who had diabetes from 21 - 24 months, dyslipidemia was present in 31 (43.1%) patients. Table 2

Table 1: Baseline investigations of patients

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n	220
Age (years)	52.71 ± 7.46
40 – 50 years	90 (40.9%)
51 – 60 years	91 (41.4%)
> 60 years	39 (17.7%)
Gender	
Male	104 (47.3%)
Female	116 (52.7%)
Body Mass Index	
Normal	92 (41.8%)
Overweight	72 (32.7%)
Obese	56 (25.5%)
Duration of diabetes	18.30 ± 3.92
12 – 16 months	80 (36.4%)
17 – 20 months	68 (30.9%)
21 - 24 months	72 (32.7%)
Hypertension	
Yes	103 (46.8%)
No	117 (53.2%)
Total cholesterol level (mg/dl)	29.80 ± 105.77
Triglyceride level (mg/dl)	147.56 ± 51.75



Fig 1: Dyslipidemia among Type-2 Diabetic Patients

Table-7: Dyslipidemia among	Type-2 Diabetic Patients stratified for
age of patients	

	Dyslipidemia		n value
	Yes	No	p-value
Age 40-50 years	39 (43.3%)	51 (56.7%)	
Age 51-60 years	44 (48.4%)	47 (51.6%)	0.416
Age >65 years	14 (35.9%)	25 (64.1%)	
Gender			
Male	40 (38.5%)	64 (61.5%)	0.111
Female	57 (49.1%)	59 (50.9%0	
BMI			
Normal	30 (32.6%)	62 (67.4%)	0.012
Overweight	39 (54.2%)	33 (45.8%)	0.013
Obese	28 (50.0%)	28 (50.0%)	
Hypertension			
Yes	43 (41.7%)	60 (58.3%)	0.511
No	54 (46.2%)	63 (53.8%)	
Duration of diabetes			
12-16 months	32 (40.0%)	48 (60.0%)	0.464
17-20 months	34 (50.0%)	34 (50.0%)	0.404
21-24 months	31 (43.1%)	41 (56.9%)	

DISCUSSION

Diabetes mellitus is commonly linked with dyslipidemia, a metabolic disorder. Its incidence varies according to diabetes type and severity, glycemic management, nutritional condition, age, and other variables. In diabetic individuals, previous research revealed a significant clustering risk factor for coronary artery disease.^{9, 10} In our study, dyslipidemia was diagnosed in 97 (44.09%) patients. Frequency of dyslipidemia was higher in age group 51 - 60 years (48.4%) as well as among female patients (49.1%). Overweight patients and patients with normal BMI had the highest frequency of dyslipidemia (54.2% and 50% respectively).

Shrestha et al., found that the frequency of dyslipidemia was highly prevalent i.e. 85.3% of diabetic individuals.⁵ Mehmood et al., also found that the frequency of dyslipidemia was 81.5% among diabetic.⁶ Khan et al., found that Diabetic patients in Rawalpindi had an 80% chance of having dyslipidemia.⁷ But Sarfraz et al., found that the frequency of dyslipidemia was only 17% in diabetic patients.⁸

In this study frequency of dyslipidemia was quite lower when compared with above mentioned local study. This difference may be due to difference in sample size or other methodological considerations.

One cross-sectional study, conducted by Wang et al., among Chinese people aged 45 to 89 years found that women had a greater risk of dyslipidemia (odds ratio: 1.51; 95 percent Cl: 1.25–1.83) than males.¹¹ The similar pattern was observed in this investigation, with diabetic female patients having a greater prevalence of dyslipidemia. Previous research has found that males had greater provenance than women, which contradicts the conclusions of this study.^{12, 13}

In hyperglycemic individuals, research in India have found a greater prevalence of dyslipidemia (89-92.4 percent).^{14, 15}

Because of the connection between glucose and lipid metabolism, several variables in diabetes can impact blood lipid levels. As a result, any problem with glucose metabolism causes problems with lipid metabolism, and vice versa.¹⁶ Insulin resistance is a common complication in people with type 2 diabetes. Insulin resistance combined with hyperinsulinemia has a significant predictive value for type-2 diabetes development in non-diabetic persons.¹⁷

Insulin influences hepatic apolipoprotein synthesis and controls the enzymatic activity of lipoprotein lipase and cholesterol ester transport protein, resulting in dyslipidemia in diabetes mellitus, according to several studies. Insulin insufficiency also decreases hepatic lipase activity as well as many stages in the generation of physiologically active lipoprotein lipase. ^{9, 18, 19}

Management of dyslipidemia in persons with diabetes mellitus, as in anybody else, begins with a comprehensive examination aimed at identifying secondary factors that may contribute to the aberrant lipid profile.²⁰ The pillars of management are lifestyle changes, such as increased physical activity and nutritional adjustments. For diabetics with poor glycaemic control, the most important goal should be to attain near-normal blood glucose levels, with the hope that this will also improve dyslipidemia.²¹

CONCLUSION

Results of this study showed high frequency of dyslipidemia among type 2 diabetic patients. Type 2 diabetes is very much common in our population so there is a need to design screening programs in which blood lipid levels screening should be monitored on regular intervals to rule out dyslipidemia timely and for effective and proper management with statin therapy.

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