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Research Article

**AN AUDIT OF DYSLIPIDEMIA IN CASES OF TYPE II
DIABETES MELLITUS**¹Dr. Adil Abdul Haye, ²Dr. Abdul Nafay¹Central Park Medical College, Lahore²Medical Officer, Qilla Abdullah, Balochistan**Article Received:** June 2020**Accepted:** July 2020**Published:** August 2020**Abstract:*****Objective:** To assess the dyslipidemia in cases of type-II diabetes mellitus.****Material and methods:** This cross-sectional study was conducted at Department of Medicine, Central Park Medical College Lahore from July 2019 to December 2019. Total 100 known cases of type-II diabetes mellitus having age >30 years either male or female and having history of diabetes mellitus for more than 4 years were selected. Dyslipidemia was assessed in selected patients.****Results:** In present study mean age of the patients was 46.3 ± 5.3 years. Out of 100 patients with type-II diabetes mellitus, dyslipidemia was found in 87 (87%) patients. Dyslipidemia was found in 22 (66.67%) male patients and 65 (97.01%) female patients. Statistically significantly association of dyslipidemia with gender was observed with p value 0.0001. Out of 59 (59%) obese patients, dyslipidemia was seen in 56 (94.92%) patients. Among the 41 (41%) non-obese patients, dyslipidemia was found in 31 (75.61%) patients. Statistically significant association between dyslipidemia and obesity was seen with p value 0.0065.***Corresponding author:****Dr. Adil Abdul Haye,**

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INTRODUCTION:

Diabetes mellitus (DM) has become a major public health problem in developing countries and the frequency of diabetes mellitus is increasing many folds in South Asian population due to the 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.¹ It is a metabolic disorder caused by impaired insulin secretion, peripheral insulin resistance or both.² It is characterized by raised blood glucose with diminished uptake and metabolism of cellular glucose as well as altered lipid and protein metabolism.³ Diabetes is not only increasing morbidity and mortality but also decreases the quality of life.⁴

Persistent hyperglycaemia of diabetes is associated with micro as well as macro vascular complications like coronary heart disease, stroke, diabetic renal disease, diabetic retinopathy and neuropathy etc. Altered lipid metabolism and altered lipid levels are major contributors to macrovascular complications.⁵ "Dyslipidemia" is the term used widely to describe the abnormal lipid profile. Dyslipidemia contribute to considerable increased risk of atherosclerosis and consequent mortality in diabetic patients.⁶ It often precedes onset of diabetes particularly type 2 DM and may persist inspite of adequate control of blood sugar.⁷ The typical diabetic dyslipidemia is characterized by elevations of triglycerides (TG), low density lipoproteins (LDL) and decreased high density lipoproteins values.⁶

In type 2 diabetics, insulin resistance causes unrestricted lipolysis leading to increased fatty acid flux in liver and ends in higher hepatic triglyceride synthesis. Also, the activity of endothelial insulin dependent lipoprotein lipase is less resulting in decreased triglyceride clearance. Other processes involving apoprotein production and action of cholesteryl ester also get affected.⁸

Patients having diabetic dyslipidemia have lipid particles that are more atherogenic than in non-diabetic people. Because of this additive cardiovascular risk of hyperglycemia and hyperlipidemia, it is needed to detect and treat the lipid abnormalities at the earlier. In view of this present study was conducted with objective to study frequency of dyslipidemia in type 2 diabetes mellitus patients attending tertiary care hospital. Findings of this study may help us to early manage the dyslipidemia to decrease the mortality and morbidity.

Operational definition:**Dyslipidemia:**

For serum lipid reference level national cholesterol education programme (NCEP) adult treatment panel III (ATP III) guidelines were referred. Dyslipidemia was defined as one or more from the following criteria: as diagnosed previously by physician, elevated LDL-C (> 100 mg/dl), or TG (>150 mg/dl); a low HDL-C (< 40 mg/dl); or a combination of these abnormalities and for patients who reported being prescribed for lipid lowering drugs.

Type-II Diabetes mellitus:

Type 2 diabetes mellitus was diagnosed as per criteria of American diabetics association:

1. Fasting plasma glucose level higher than 126 mg/dl or
2. Plasma Glucose level exceeding 200 mg/dl at 2 hours in the 75 g oral glucose tolerance test or
3. Symptoms of Diabetes and Random Plasma Glucose > 200 mg/dl or
4. HbA1C $> 6.5\%$.

MATERIAL AND METHODS:

This cross sectional study was conducted at Department of Medicine, Central Park Medical College Lahore from July 2019 to December 2019. Total 100 known cases of type-II diabetes mellitus having age >30 years either male or female and having history of diabetes mellitus for more than 4 years were selected. Before collecting any data, an ethical clearance was obtained from the ethical review board of Institution.

Known cases of type 1 DM, patients with acute cerebrovascular and cardiovascular disease, patients with history of malignancy, active liver disease, chronic kidney disease, initiation of hormone replacement therapy, pregnant or breast-feeding women and patients taking lipid lowering drugs were excluded from the study.

Total 5ml fasting blood sample was taken from every patient for total cholesterol, LDL, HDL & Triglycerides analysis. The entire test was run on fully automated chemistry analyzer selectra E and all levels were measured in mg/dl. Findings were entered on pre-designed proforma along with demographic profile of the patients.

All the collected data was entered in SPSS version 17 and analyzed. Mean and SD was calculated for age and frequencies and percentages were calculated for dyslipidemia, gender and obesity. Stratification was done for age, gender duration of disease and obesity. After stratification chi-square test was applied to see the effect of these on outcome variable i.e. dyslipidemia. P value ≤ 0.05 was considered as significant.

RESULTS:

In present study mean age of the patients was 46.3 ± 5.3 years. Out of 100 patients with type-II diabetes mellitus, dyslipidemia was found in 87 (87%) patients. (Fig. 1). Minimum age of the patients was 30 years and maximum age was 60 years. Patients were divided into two age groups i.e. age group 30-45 years and age group 46-60 years. Total 38 (38%) patients belonged to age group 30-45 years and dyslipidemia was noted in 29 (30.85%) patients. Total 62 (62%) patients belonged to age group 46-60 years and dyslipidemia was found in 58 (93.55%) patients. Significantly ($P = 0.0284$) higher rate of dyslipidemia was noted in age group 46-60 as compared to age group 30-45 years. (Table 1) Male patients were 33 (33%) and female patients were 67 (67%). Dyslipidemia was found in 22 (66.67%) male patients and 65 (97.01%) female patients.

Statistically significantly association of dyslipidemia with gender was observed with p value 0.0001. (Table 2)

Patients were divided into two groups according to duration of diabetes i.e. 1-2 years group and 3-4 years group. Total 36 (36%) patients belonged to 1-2 years group and 64 (64%) patients belonged to 3-4 years group. Higher rate dyslipidemia was observed in 3-4 years group as compared to 1-2 years group with p value 0.0017. (Table 3) Out of 59 (59%) obese patients, dyslipidemia was seen in 56 (94.92%) patients. Among the 41 (41%) non-obese patients, dyslipidemia was found in 31 (75.61%) patients. Statistically significant association between dyslipidemia and obesity was seen with p value 0.0065. (Table 4)

Fig. 1: Frequency of dyslipidemia

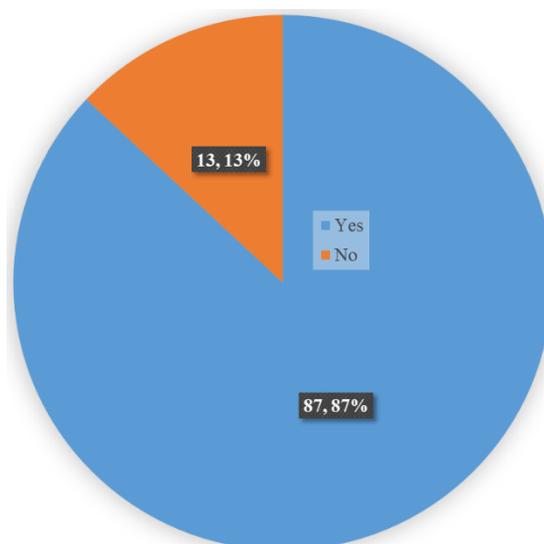


Table 1: Association of dyslipidemia with age

Age Group	Dyslipidemia		Total	P value
	Yes	No		
30-45	29 (76.32)	9 (23.68)	38 (38)	0.0284
46-60	58 (93.55)	4 (6.45)	62 (62)	
Total	87 (87)	13 (13)	100	

Table 2: Association of dyslipidemia with gender

Gender	Dyslipidemia		Total	P value
	Yes	No		
Male	22 (66.67)	11 (33.33)	33 (33)	0.0001
Female	65 (97.01)	2 (2.99)	67 (67)	
Total	87 (87)	13 (13)	100	

Table 3: Association of dyslipidemia with diabetes mellitus

Duration of diabetes mellitus	Dyslipidemia		Total	P value
	Yes	No		
1-2 years	26 (72.22)	10 (27.78)	36 (36)	0.0017
3-4 years	61 (95.31)	3 (4.69)	64 (64)	
Total	87 (87)	13 (13)	100	

Table 4: Association of dyslipidemia with obesity

Obesity	Dyslipidemia		Total	P value
	Yes	No		
Obess	56 (94.92)	3 (5.08)	59 (59)	0.0065
Non-obese	31 (75.61)	10 (24.39)	41 (41)	
Total	87 (87)	13 (13)	100	

DISCUSSION:

Patients with T2DM have a higher mortality rate than the general population attributed mainly to cardiovascular disease (CVD) caused by dyslipidemia.⁹ Dyslipidemia is elevation of TC, TG, or both, or a low HDL and diagnosed by measuring plasma levels of TC, TG, and lipoproteins.¹⁰ Type 2 diabetes mellitus accounts for more than 90% of cases of diabetes mellitus, leading to major public health burden in community. Patients with T2DM have a higher mortality rate than the general population attributed mainly to cardiovascular disease (CVD) caused by dyslipidemia. Dyslipidemia is elevation of TC, TG, or both, or a low HDL and diagnosed by measuring plasma levels of TC, TG, and lipoproteins.¹¹

The relation between diabetes mellitus and serum lipid profile had been much discussed during the past decades.¹²⁻¹³ Both lipid profile and diabetes have been shown to be the important predictors for

metabolic disturbances including dyslipidaemia, hypertension, cardiovascular diseases, hyperinsulinemia, etc.¹⁴ Dyslipidemia as a metabolic abnormality is frequently associated with diabetes mellitus. Its prevalence is variable, depending on the type and severity of diabetes, glycaemic control, nutritional status, age and other factors. Earlier studies also indicated a strong clustering risk factor for coronary artery disease in diabetic subjects.¹⁵ Over 70% of patients with type 2 diabetes mellitus had one or more types of dyslipidemia.¹⁵

The objective of the present study was to find out the frequency of dyslipidemia in cases of type-II diabetes mellitus. Out of 100 patients with type-II diabetes mellitus, dyslipidemia was found in 87 (87%) patients. In one study by Borle *et al*,¹⁶ dyslipidemia was observed in 86% patients which is an agreement with our findings. In another study by Agrawal *et al*,¹⁷ frequency of dyslipidemia was 89%

in cases of type-II diabetes mellitus. Titty et al¹⁸ and Ogbera et al¹⁹ reported frequency of dyslipidemia as 89.1% and 90.3% respectively. Prevalence of dyslipidemia was 82.5% in a study by Pandya et al conducted in India.²⁰

In present study, male patients were 33 (33%) and female patients were 67 (67%). Dyslipidemia was found in 22 (66.67%) male patients and 65 (97.01%) female patients. Statistically significantly association of dyslipidemia with gender was observed with p value 0.0001. In one study by Jayarama et al,²¹ A total of 820 type 2 DM patients (533 males and 287 females) were studied. Prevalence of dyslipidemia among diabetic males was 95.4 % and 86.75% in females. In another study by Pandya et al,²⁰ out of 171 diabetic patients, 100 were male and 71 were female patients.

Dixit et al²² reported that out of 100 diabetic patients, 72 (72%) were males and 28 (28%) were females. In another study Daya et al,²³ total 200 type 2 DM patients studied, 86 (43%) were male and 114 (57%) female.

In our study, out of 59 (59%) obese patients, dyslipidemia was seen in 56 (94.92%) patients. Among the 41 (41%) non-obese patients, dyslipidemia was found in 31 (75.61%) patients. Statistically significant association between dyslipidemia and obesity was seen with p value 0.0065.

In one study by Samantaray et al,²⁴ out of 403 type 2 diabetic patients, 362(89.93%) were males and 41(10.17%) were females. Majority of patients were obese (47.7%) or overweight (36.5%) and the mean BMI was 27.74±4.73 kg/m². Findings of this study were also in agreement with our study.

CONCLUSION:

Results of this study showed higher rate of dyslipidemia among type-II diabetics. Increasing trend of dyslipidemia was observed with advancing age. Results of present also showed that female diabetics are more victim of dyslipidemia as compared to male diabetics. Significant association of dyslipidemia with duration of diabetes and obesity was observed.

REFERENCES:

1. Hu FB. Globalization of Diabetes. *Diabetes Care*. 2011 Jun;34(6):1249–57.
2. Diagnosis and Classification of Diabetes Mellitus. *Diabetes Care*. 2009 Jan;32(Suppl 1):S62–7.
3. Herman MA, Kahn BB. Glucose transport and sensing in the maintenance of glucose homeostasis and metabolic harmony. *J Clin Invest*. 2006 Jul 3;116(7):1767–75.

4. Trikkalinou A, Papazafiropoulou AK, Melidonis A. Type 2 diabetes and quality of life. *World J Diabetes*. 2017 Apr 15;8(4):120–9.
5. Cade WT. Diabetes-Related Microvascular and Macrovascular Diseases in the Physical Therapy Setting. *Phys Ther*. 2008 Nov;88(11):1322–35.
6. Borle A, Chhari N, Gupta G, Bathma V. Study of prevalence and pattern of dyslipidaemia in type 2 diabetes mellitus patients attending rural health training centre of medical college in Bhopal, Madhya Pradesh, India. *International Journal of Community Medicine and Public Health*. 2016;140–4.
7. Sheshiah V, Balaji V. A handbook on Diabetes Mellitus. 6th ed. New Delhi: all india publishers & distributors. 2013:29-54.
8. Sears B, Perry M. The role of fatty acids in insulin resistance. *Lipids Health Dis [Internet]*. 2015 Sep 29 [cited 2018 Sep 29];14. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4587882/>
9. Leon BM, Maddox TM. Diabetes and cardiovascular disease: Epidemiology, biological mechanisms, treatment recommendations and future research. *World J Diabetes*. 2015 Oct 10;6(13):1246–58.
10. Mandal M, Kumari R, Mukherjee A. Prevalence of dyslipidemia in patients with type 2 diabetes mellitus: a hospital based study in Kishanganj, India. *International Journal of Research in Medical Sciences*. 2015;3691–7.
11. Wu Y, Ding Y, Tanaka Y, Zhang W. Risk factors contributing to type 2 diabetes and recent advances in the treatment and prevention. *International journal of medical sciences*. 2014;11(11):1185.
12. Mooradian AD. Dyslipidemia in type 2 diabetes mellitus. *Nature Reviews Endocrinology*. 2009 Mar;5(3):150.
13. Peters AL. Clinical relevance of non-HDL cholesterol in patients with diabetes. *Clinical Diabetes*. 2008 Jan 1;26(1):3-7.
14. Goldberg IJ. Diabetic dyslipidemia: causes and consequences. *The Journal of Clinical Endocrinology & Metabolism*. 2001 Mar 1;86(3):965-71.
15. Regmi P, Gyawali P, Shrestha R, Sigdel M, Mehta KD, Majhi S. Pattern of dyslipidemia in type-2 diabetic subjects in Eastern Nepal. *J Nepal Assoc Med Lab Sci*. 2009;10(1):11-3.
16. Borle A, Chhari N, Gupta G, Bathma V. Study of prevalence and pattern of dyslipidaemia in type 2 diabetes mellitus patients attending rural health training centre of medical college in Bhopal, Madhya Pradesh, India. *International Journal of Community Medicine and Public Health*. 2016;140–4.

17. Agrawal Y, Goyal V, Chugh K, Shanker V, Singh A. Types of Dyslipidemia in Type 2 Diabetic Patients of Haryana Region. *Sch. J. App. Med. Sci.* 2014;2(4D):1385-92.
18. Titty FK. Glycaemic control, dyslipidaemia and metabolic syndrome among recently diagnosed diabetes mellitus patients in Tamale Teaching Hospital, Ghana. *West Afr J Med.* 2010 Feb;29(1):8–11.
19. Ogbera AO, Fasanmade OA, Chinenye S, Akinlade A. Characterization of lipid parameters in diabetes mellitus--a Nigerian report. *Int Arch Med.* 2009 Jul 20;2(1):19.
20. Pandya H, Lakhani JD, Dadhania J, Trivedi A. The Prevalence and Pattern of Dyslipidemia among Type 2 Diabetic Patients at Rural Based Hospital in Gujarat, India. *Indian Journal of Clinical Practice* 2012;22(12):36-44.
21. Jayarama N, Reddy M, Lakshmaiah V. Prevalence and pattern of dyslipidemia in type 2 diabetes mellitus patients in a rural tertiary care centre, southern India. *Global Journal of Medicine and Public Health.* 2012;1(3):24-8.
22. Dixit AK, Dey R, Suresh A, Chaudhuri S, Panda AK, Mitra A. The prevalence of dyslipidemia in patients with diabetes mellitus of ayurveda Hospital. *Journal of Diabetes & Metabolic Disorders.* 2014;13:58.
23. Daya R, Bayat Z, Raal F. Prevalence and pattern of dyslipidaemia in type 2 diabetes mellitus patients at a tertiary care hospital. *Journal of Endocrinology, Metabolism and Diabetes of South Africa.* 2017 Sep 27;22(3):31–5.
24. Samantaray R, Kumar Bal A, Das D. Pattern of Dyslipidemia in Type 2 Diabetic Patients in Southern Odisha. Vol. 5. 2017. 4397 p.