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**Research Article**

# Frequency of Dyslipidemia in Patients with Type II Diabetes Mellitus

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## ABSTRACT

**Objective:** To find out the frequency of dyslipidemia in cases of type-II diabetes mellitus in patients presenting at Civil Hospital, Bahawalpur.

**Material and methods:** This cross sectional study was conducted at Department of Medicine Civil Hospital, Bahawalpur from October 2017 to April 2018 over the period of six months. Total 250 known cases of type-II diabetes mellitus having age 15-65 years either male or female were selected for this study. Lipid profile of the selected patients was assessed in present study.

**Results:** Mean age of the diabetics was 39.92 ± 13.878 years, mean BMI was 26.8 ± 5.48, mean HDL, LDL, TC and TG was 40.10 ± 3.070 md/dl, 138.06 ± 9.732 md/dl, 204.41 ± 24.104 md/dl and 199.09 ± 71.763 md/dl respectively. Out of 250 type-II diabetics, dyslipidemia was found in 210 (84%) patients. Dyslipidemia was found in 99 (81.15%) patient and 111 (86.72%) patients respectively in age group 15-40 years and age group 41-65 years. But insignificant association between age group and dyslipidemia was seen with p value 0.3005.

**Conclusion:** Results of present study showed a very high percentage of dyslipidemia in cases of type-II diabetes mellitus. No association of dyslipidemia with age, gender and obesity was found. But statistically significant association between area of residence and dyslipidemia was noted

## INTRODUCTION

Diabetes mellitus (DM) is a chronic metabolic disorder which is characterized by hyperglycemia in context of insulin resistance and relative lack of insulin.[1]The total number of individuals with DM is projected to rise from 171 million individuals in 2000 to 366 million individuals in 2030.[2] DM has become a very important public health problem in Pakistan with 7.1 million individuals with DM in 2010 expected to rise to 13.8 million in 2030 when the country will be ranked 4th in terms of number of individuals aged 20 years to 79 years with DM.[3]

Research finding shows that it is the body composition components, mainly body fat and lipid profiles that are responsible for increase prevalence of this disease.[4]The term "dyslipidemia" is increasingly popular to describe abnormal changes in lipid profile, replacing the old term "hyperlipidemia". Dyslipidemia encompasses changes in High density lipoprotein cholesterol (HDL-C), the size and density of Low

density lipoprotein cholesterol (LDL-C), very low density lipoprotein cholesterol (VLDL-C) and triglyceride level.[5] The term diabetic dyslipidemia comprises a triad of raised triglycerides, reduced HDLC and excess of small, dense LDL particles.[6] The lipid abnormalities are prevalent in diabetes mellitus because insulin resistance or deficiency affects key enzymes and pathways in lipid metabolism.[7] In particular, the following processes are affected: apoprotein production, regulation of lipoprotein lipase, action of cholesteryl ester, transfer proteins and hepatic and peripheral actions of insulin.[8] Even more, it has been proposed that the composition of lipid particles in diabetic dyslipidemia is more atherogenic than other types of dyslipidemia.[9] This means that even normal lipid concentrations might be more atherogenic in diabetic than in nondiabetic people. The causal association between atherosclerosis and dyslipidemia is well established. In diabetes the associated hyperglycemia, obesity and insulin changes highly accelerate the progression to atherosclerosis.[10-11]

The objective of this study is to findout the frequency of dyslipidemia in type-II diabetics. By early screening of type-II diabetics, we may be able to early manage the lipids and to decrease the morbidity and mortality related to it.

## OPERATIONAL DEFINITION

**Dyslipedemia:**

Presence of any one of following was labeled as dyslipidemia; When fasting lipid profile (after an overnight fast of 12 hours) is outside the range proposed by ATP (III)

| | |
|---|---|
| Triglycerides | >150 mg/dl |
| HDL | <40 mg/dl |
| LDL | >100 mg/dl |
| Total Cholesterol | >200 mg/dl |

**Type-II Diabetes mellitus:**

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

Fasting plasma glucose level higher than 126mg/dl or plasma Glucose level exceeding 200 mg/dl at 2hours in the 75 g oral glucose tolerance test or symptoms of Diabetes and Random PlasmaGlucose > 200mg/dl orHbA1C > 6.5%.

## MATERIAL AND METHODS

This cross sectional study was conducted at Department of Medicine Civil Hospital, Bahawalpur from October 2017 to April 2018 over the period of six months. Total 250 known cases of type-II diabetes mellitus having age 15-65 years either male or female were selected for this study.

Known cases of type-1 DM, hypothyroidism, chronic renal failure, nephrotic syndrome, cholestatic jaundice, patients already on lipid lowering drugs, hypertensive using beta blockers or thiazide diuretics, having BMI more than 30 and patients using alcohol were excluded from the study.

An approval was taken from ethical committee of the hospital and written informed consent was taken from every patient.

Total 5ml fasting blood sample was taken from every patients 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 noted on pre-designed performa in term of dyslipidemia (Yes/No). Demographic profile of all the patients was also noted on pre-designed performa.

All the collected data was entered in SPSS version 17 and analyzed. Mean and SD was calculated for numerical data i.e. age, BMI, total cholesterol, LDL, HDL & Triglycerides. Categorical data was presented as frequency and percentage like gender, obesity, rural/urban and dyslipidemia. Stratification was done for age, BMI, gender, area of residence (rural/urban). Post stratification chi-square test was applied to see the effect of these on outcome variable i.e. dyslipidemia. P value $\leq$ 0.05 was considered as statistically significant.

## RESULTS

Mean age of the diabetics was 39.92 ± 13.878 years, mean BMI was 26.8 ± 5.48, mean HDL,

LDL, TC and TG was 40.10 ± 3.070 md/dl, 138.06 ± 9.732 md/dl, 204.41 ± 24.104 md/dl and 199.09 ± 71.763 md/dl respectively. (Table 1) Out of 250 type-II diabetics, dyslipidemia was found in 210 (84%) patients. (Fig. 1) Selected patients were divided into two age groups, age group 15-40 years and age group 41-65 years. Total 122 (48.8%) patients belonged to age group 15-40 years and 128 (51.2%) patients belonged to age group 41-65 years. Dyslipidemia was found in 99 (81.15%) patient and 111 (86.72%) patients respectively in age group 15-40 years and age group 41-65 years. But insignificant association between age group and dyslipidemia was seen with p value 0.3005. (Table 2)

Male diabetics were 153 (61.2%) and female diabetics were 97 (38.8%). Elevated lipids were seen in 129 (84.31%) male patients and in 81 (83.51%) female patients. No association was observed between gender and dyslipidemia with p value 0.8614. (Table 3) Out of 160 (64%) obese patients, dyslipidemia was found in 132 (82.5%) patients. Among the 90 (36%) non-obese patients, dyslipidemia was observed in 78 (86.87%) patients. Dyslipidemia was insignificantly (P = 0.4734) associated with obesity. (Table 4)

Total 180 (72%) patients were belonged to rural area and 70 (28%) patients belonged to urban area of Bahawalpur. Altered lipids were seen in 144 (80%) patients of rural area and in 66 (94.29%) patients of urban area. Statistically significant association between area of residence and dyslipidemia was noted with p value 0.0064. (Table 5).

**Table No. 1:** Mean and standard deviation of lipid profile

| Lipid Profile | Mean | SD |
|---|---|---|
| **HDL** | 40.10 | 3.070 |
| **LDL** | 138.06 | 9.732 |
| **TC** | 204.41 | 24.104 |
| **TG** | 199.09 | 71.763 |

**Fig. 1:** Frequency of dyslipidemia

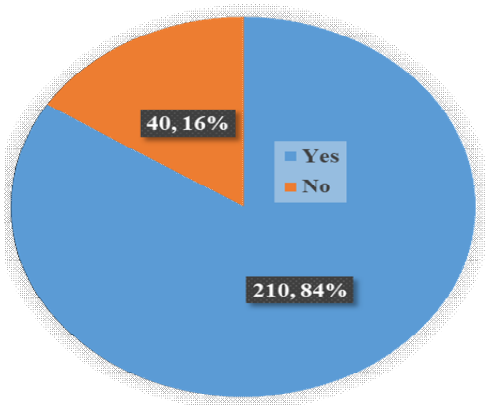


**Table No.2:** Association of dyslipidemia with age

| Age Group | Dyslipidemia | | Total (%) | P. value |
|---|---|---|---|---|
| | Yes (%) | No (%) | | |
| 15-40 | 99 (81.15) | 23 (18.185) | 122 (48.8) | 0.3005 |
| 41-65 | 111 (86.72) | 17 (13.28) | 128 (51.2) | |
| **Total** | 210 (84) | 40 (16) | 250 | |

**Table No.3:** Association of dyslipidemia with gender

| Gender | Dyslipidemia | | Total (%) | P. value |
|---|---|---|---|---|
| | Yes (%) | No (%) | | |
| Male | 129 (84.31) | 24 (15.69) | 153 (61.2) | 0.8614 |
| Female | 81 (83.51) | 16 (16.49) | 97 (38.8) | |
| **Total** | 210 (84) | 40 (16) | 250 | |

**Table No.4:** Association of dyslipidemia with obesity

| Obesity | Dyslipidemia | | Total (%) | P. value |
|---|---|---|---|---|
| | Yes (%) | No (%) | | |
| Obese | 132 (82.5) | 28 (17.5) | 160 (64) | 0.4734 |
| Non-obese | 78 (86.87) | 12 (13.33) | 90 (36) | |
| **Total** | 210 (84) | 40 (16) | 250 | |

**Table No.5: Association of dyslipidemia with area of residence**

| Area of residence | Dyslipidemia | | Total (%) | P. value |
|---|---|---|---|---|
| | Yes (%) | No (%) | | |
| Rural | 144 (80) | 36 (20) | 180 (72) | 0.0064 |
| Urban | 66 (94.29) | 4 (5.71) | 70 (28) | |
| **Total** | 210 (84) | 40 (16) | 250 | |

## DISCUSSION

Patients with diabetes mellitus have a 2 to 4 fold increased risk of cardiovascular, peripheral vascular and cerebrovascular disease, which are the leading causes of morbidity and mortality in this population.[12] Diabetes is considered a coronary heart disease (CHD) - risk equivalent and it is frequently associated with various other cardiovascular (CV) risk factors.[13] It is well-established that dyslipidemia is a major risk factor for macrovascular complications in patients with type-2 diabetes mellitus and affects 10%-73% of this population. Approximately 80% of deaths in patients with diabetes are attributable to cardiovascular disease (CVD).[14]

The objective of present study was to evaluate the dyslipidemia in cases of type-II diabetes mellitus.

Mean age of the diabetics was 39.92 ± 13.878 years, mean BMI was 26.8 ± 5.48, mean HDL, LDL, TC and TG was 40.10 ± 3.070 md/dl, 138.06 ± 9.732 md/dl, 204.41 ± 24.104 md/dl and 199.09 ± 71.763 md/dl respectively. Dyslipidemia was found in 84% diabetics. In one study by Khan et al,[15] dyslipidemia was found in 80% diabetics which is similar with our study. Ahmed et al did a comparative cross sectional study on 50 type 1 and 50 type 2 diabetics and found a high frequency of dyslipidemias in both groups. Some local studies have also reported that dyslipidemias are very common in diabetic population.[16-18]

International studies done show that among the diabetic dyslipidemias, hypertriglyceridemia is the commonest. Mathura et al found that the most common lipid abnormality found in diabetics is increased serum triglyceride levels around 73.3%. The next common abnormality is decreased serum HDL-Cholesterol levels and increased serum LDL-Cholesterol levels, both seen in 66.7% patients respectively. A high total serum cholesterol level is seen in 46.7% patients.[16,19]In one study conducted in Jordan by Abdel-Aal et al,[20] reported frequency of dyslipidemia was 91.5% patients with diabetics.

In another study, out of 189 patients, 123 were males and 66 females with age range of 35-80 years (Means 57.61 years ±10.25 SD). Over all frequency of dyslipidemia in newly-detected type-2 diabetics (T2DM) were observed in 71.4%.[15]In present study Male diabetics were 153 (61.2%) and female diabetics were 97 (38.8%). Elevated lipids were seen in 129 (84.31%) male patients and in 81 (83.51%) female patients. No association was observed between gender and dyslipidemia with p value 0.8614.

In a study by Gilani et al,[21] there were 80 (53.33%) male and 70 (46.7%) female patients. Mean BMI was 28.45±3.30 Kg/m2. Mean serum cholesterol level was 3.9±1.31 mmol/L, triglyceride level was 2.98±1.14 mmol/L, LDL level was 3.28±0.85 mmol/L and HDL was 0.95±0.02 mmol/L. Women were more frequent to have low level HDL as compare to men ($p$<0.05), while no significant difference was found regarding serum cholesterol, serum triglyceride and serum LDL ($p$>0.05). In our study Mean age of the diabetics was 39.92 ± 13.878 years, mean

BMI was 26.8 ± 5.48, mean HDL, LDL, TC and TG was 40.10 ± 3.070 md/dl, 138.06 ± 9.732 md/dl, 204.41 ± 24.104 md/dl and 199.09 ± 71.763 md/dl respectively.In one study by Sarfraz et al[22] prevalence of dyslipidemia among diabetic males was 97.18% while for females 87.15%.

## CONCLUSION

Results of present study showed a very high percentage of dyslipidemia in cases of type-II diabetes mellitus. No association of dyslipidemia with age, gender and obesity was found. But statistically significant association between area of residence and dyslipidemia was noted

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