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ANALYZING LIPID PROFILE CORRELATION AMONG DIABETIC PATIENTS: ASSESSING POTENTIAL RISK REDUCTION FOR ATHEROSCLEROTIC CARDIOVASCULAR DISEASE

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Abstract:

Objectives: To determine the dyslipidemia pattern and assess the potential of lipid therapy in mitigating the risk of Atherosclerotic Cardiovascular Disease (ASCVD) among individuals with Diabetes.

Materials and Methods: This retrospective study was conducted at Medical Unit 1, Chandka Medical College Hospital Larkana, Pakistan in the duration from July, 2023 to December, 2023. Data regarding biochemical, clinical, and pharmaceutical profiles were collected of 200 patients. The effectiveness of statin therapy was assessed in accordance with guidelines provided by the American Diabetes Association. Predesign questionere was used for collection of data.

Results: The mean age of total 200 patients was 50.13±11.74 years. Out of total 110 patients were male and the remaining 90 patients were female. The HbA1C level was assessed to be 8.17%, with a standard deviation of 0.96%. The mean LDL cholesterol level was 115.87 mg/dL with a standard deviation of 10.29 mg/dL. The mean HDL cholesterol level was 43.07 mg/dL with a standard deviation of 6.60 mg/dL. The mean triglyceride level was 127.79 mg/dL with a standard deviation of 22.56 mg/dL. LDL cholesterol levels were shown to be correlated with increased HbA1C. The numbers of patients requiring statin treatment, currently using statin medication, those under 40 in need of statin therapy, individuals under 40 receiving prescribed statin medication, and the total number of patients receiving sufficient lipid-lowering treatment were 194, 42, 151, 15, and 36, respectively.

Conclusion: The conclusion drawn from the study indicates that individuals in Pakistan diagnosed with type 2 diabetes frequently exhibit elevated LDL and reduced HDL cholesterol levels, placing many of them at a heightened risk of heart disease. It was further noted that a significant portion of these individuals could potentially improve their cardiovascular health by taking statins. However, the study also revealed that many of them are not currently taking these medications, highlighting a gap in treatment that could be addressed to enhance their overall health outcomes.

Keywords: Atherosclerotic Cardiovascular Disease, Diabetes, HbA1C, LDL, HDL.

INTRODUCTION:

Diabetes Mellitus type 2 (T2DM) is frequently linked with various comorbidities, particularly cardiovascular complications and hyperlipidemia, both of which significantly increase the risk of developing atherosclerotic cardiovascular disease (ASCVD).(1) T2DM is frequently associated with dyslipidemia, a condition marked by alterations in lipid metabolism, including elevated triglycerides, low-density lipoprotein cholesterol (LDL-C), and decreased high-density lipoprotein cholesterol (HDL-C) levels.(3) This dyslipidemia significantly contributes to the development and progression of ASCVD.(4) Numerous studies have demonstrated the dyslipidemic pattern observed in T2DM patients, characterized by elevated levels of triglycerides, LDL-C, and decreased levels of HDL-C.(5, 6) Diabetic patients are at a substantially higher risk of developing ASCVD compared to non-diabetic individuals.(7) The presence of T2DM exacerbates the atherogenic process, leading to the early onset and rapid progression of ASCVD. Recent surveys have highlighted the alarming prevalence of T2DM in Pakistan, with more than 12% of individuals over 25 years of age affected by the disease. This high prevalence underscores the urgent need for comprehensive management strategies to mitigate the risk of ASCVD and other complications associated with diabetes.(8) The prevalent modifiable risk factors included occurrences of ASCVD, smoking, hypertension, type II diabetes, and elevated cholesterol levels.(9) Diabetes is notably prevalent in Pakistan, with research suggesting that over 12% of individuals aged 25 and above in the Pakistani population have been diagnosed with the condition.(10) Statins, which primarily target LDL-C, have demonstrated efficacy in reducing cardiovascular events and mortality in diabetic patients.(11) However, additional therapies targeting triglycerides and HDL-C levels may offer incremental benefits in further reducing ASCVD risk. Lifestyle modifications, including dietary interventions and regular physical activity, also play a crucial role in optimizing lipid profile and mitigating cardiovascular risk in diabetic individuals.(12)

Objective:

To determine the dyslipidemia pattern and assess the potential of lipid therapy in mitigating the risk of Atherosclerotic Cardiovascular Disease (ASCVD) among individuals with Diabetes.

MATERIALS AND METHODS:

Study Design: retrospective study
Study setting: Medical Unit 1, Chandka Medical College Hospital Larkana, Pakistan.
Duration of the study: Duration of the study was 6 month (from July, 2023 to December, 2023).

Inclusion Criteria:

- Patients of either gender suffering from DM.
- Patients of age 25-70 years old.

Exclusion criteria:

- Patients with a history alcohol dependence.
- Patients with a history of chronic liver disease of nonalcoholic or alcoholic etiology.
- Patients who were on dialysis.
- Pregnant and lactating women.

- Patients with hypothyroidism.

Methods: This study was conducted at Medical Unit 1, Chandka Medical College Hospital Larkana, Pakistan from July, 2023 to December, 2023, after obtaining the ethical approval from the hospital's ethical committee.
In this retrospective study, 200 patients were enrolled after utilizing hospital records to gather biochemical, clinical, and medication profiles of patients. Clinical details, diagnoses, therapies, and laboratory findings related to lipid profiles and diabetes were noted from these records. Prevalence rates were determined for both individuals previously diagnosed with hyperlipidemia and those diagnosed recently. We also recorded the count of participants in the study who received prescriptions for statin medications. Furthermore, we identified the number of patients meeting the criteria for initiating statin therapy as per the recommendations of the American Diabetes Association. A predesign questionere was used to collect data. For statistical analysis SPSS version 25 were used.

RESULTS:
Total of 200 patients were enrolled with mean age of 50.13±11.74 years. Out of total 110 patients were male and the remaining 90 patients were female. The mean duration of diabetes among the patients was 7.87 years, with a standard deviation of 2.54 years. Patients had a mean BMI of 24.70 kg/m², with a standard deviation of 4.74 kg/m². The HbA1C level was measured at 8.17%, with a standard deviation of 0.96%. Hemoglobin levels observed in patients mean at 13.18 g/dL, with a standard deviation of 1.20 g/dL, while the mean ESR was 13.28 mm/hr, with a standard deviation of 1.58 mm/hr. The mean LDL cholesterol level was 115.87 mg/dL with a standard deviation of 10.29 mg/dL. The mean HDL cholesterol level was 43.07 mg/dL with a standard deviation of 6.60 mg/dL. The mean triglyceride level was 127.79 mg/dL with a standard deviation of 22.56 mg/dL. The mean ALT level was 40.91 IU/mL with a standard deviation of 11.47 IU/mL. The mean AST level was 32.61 IU/mL with a standard deviation of 5.96 IU/mL. The mean TSH level was 1.91 mIU/mL with a standard deviation of 1.31 mIU/mL. The mean Serum Cr level was 0.96 mg/dL with a standard deviation of 0.67 mg/dL. The mean eGFR was 80.79 mL/min/1.73m² with a standard deviation of 12.73 mL/min/1.73m². The mean serum uric acid level was 5.81 mg/dL with a standard deviation of 1.22 mg/dL (table 1). Frequency of Baseline Characteristics were shown in fig 1. In Table 3 frequency of patients needed Statin therapy and sufficient rates of statin prescription were shown. The counts for patients needing statin treatment, currently on statin medication, those under 40 requiring statin therapy, patients under 40 receiving statin medication as required, and the total number of patients receiving adequate lipid-lowering treatment were 194, 42, 151, 15, and 36, respectively.

Table 1: Mean age and Duration of DM of all enrolled Patient *(n=99)*

Variables	Minimum	Maximum	Mean±SD
Age (Years)	26.00	70.00	50.13±11.74
Duration of DM (years)	3.00	20.00	7.87±2.54
BMI (kg/m2)	18.00	35.00	24.70±4.74
Hemoglobin (g/dL)	11.00	16.00	13.18±1.20
ESR (mm/hour)	9.00	17.00	13.28±1.58
LDL cholesterol (mg/dL)			115.87±10.29
HDL cholesterol (mg/dL)			43.07±6.60
Triglycerides (mg/dL)			127.79±22.56
ALT (IU/mL)			40.91±11.47
AST (IU/mL)			32.61±5.96
TSH, mIU/mL			1.91±1.31
Serum Cr (mg/dL)			0.96±0.67
eGFR, mL/min/1.73 (m2			80.79±12.73

HbA1C (%)			8.17±0.96
Serum uric acid (mg/dL)			5.81±1.22

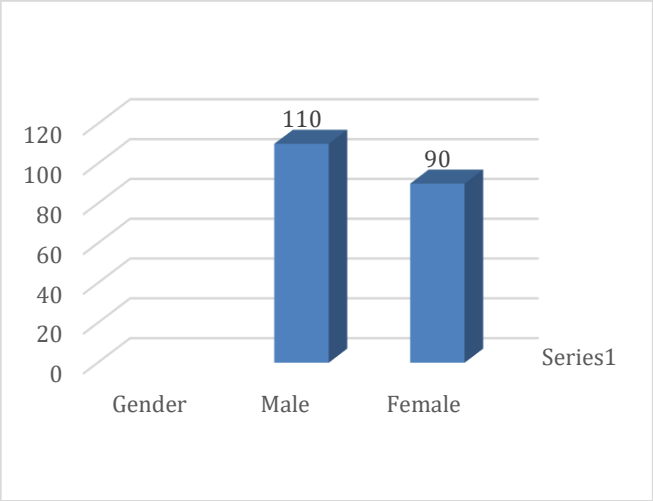

Fig 1: Frequency of gender

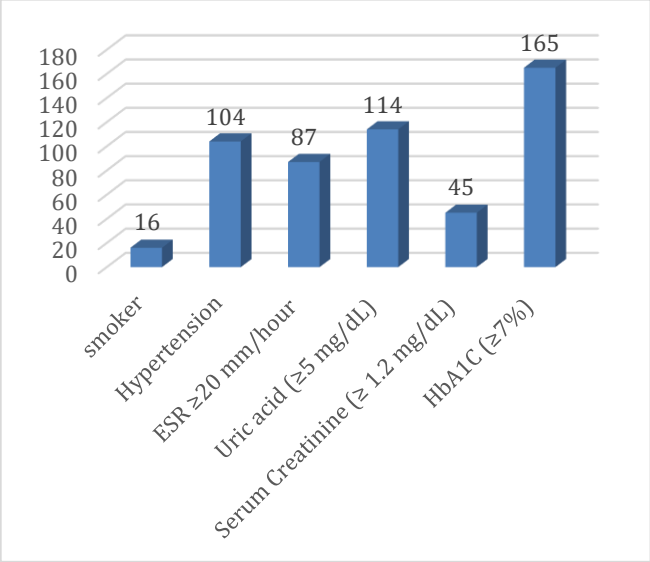

Fig 1: Frequency of Baseline Characteristics

Table 3: Frequency of patients Needing Statin Therapy and Sufficient Rates of Statin Prescription

	Frequency	**Percentage**
Patients that require statin treatment	194	96.5
Patients undergoing statin medication	42	21.0
Patients under 40 who require statin therapy	151	75.5
Patients who required statin medication and were receiving it were under 40 years old	15	7.5
Total number of patients getting enough lipid lowering treatment	36	18.0

Discussion: Diabetes is indeed a significant risk factor for atherosclerotic cardiovascular disease (ASCVD).(13) Evaluating the effectiveness of lipid therapy, particularly in individuals with diabetes, holds great importance in enhancing their cardiovascular health. The main aim of the present study was to determine the dyslipidemia pattern and assess the potential of lipid therapy in mitigating the

risk of Atherosclerotic Cardiovascular Disease (ASCVD) among individuals with Diabetes. According to the American Diabetes Association's Standards for Diabetes Care in 2019, low levels of LDL cholesterol below 100 mg/dL are considered a risk factor for atherosclerotic cardiovascular disease (ASCVD), and for individuals with diabetes, it is recommended to maintain LDL levels below 70 mg/dL due to their increased susceptibility to ASCVD. (15) This recommendation is particularly important as individuals with diabetes are either already diagnosed with ASCVD or are at a heightened risk of developing it. In our study, we found that the average LDL cholesterol levels were 115.87 mg/dL with a standard deviation of 10.29 mg/dL, indicating that, on average, the LDL levels were above the recommended targets for individuals with diabetes. Additionally, the average triglyceride levels were 1127.79 mg/dL with a standard deviation of 22.56 mg/dL. These findings suggest that there may be a need for interventions to lower LDL cholesterol levels and triglycerides among individuals with diabetes to reduce their risk of ASCVD. Similar results were observed in a study conducted in India, emphasizing the importance of addressing dyslipidemia in individuals with diabetes to mitigate their cardiovascular risk.(16) Another Pakistani study conducted by Khalid, M. R. et al. also supported our study.(17)

There exist numerous recommendations for primary prevention of atherosclerotic cardiovascular disease (ASCVD) through the use of statins. However, relatively few guidelines have specifically focused on addressing disease-specific conditions that elevate the risk of ASCVD. In order to foster a healthy aging population, particularly in response to increasing life expectancies, it becomes imperative to establish clear guidelines regarding the judicious use of statin medications aimed at preventing the occurrence of a first, potentially fatal ASCVD event. Among the 200 patients included in this study, it was observed that only 7.5% of patients under the age of 40 were utilizing statin therapy. This finding underscores a potential gap in the implementation of preventive measures, suggesting a need for heightened awareness and adherence to guidelines regarding the utilization of statins, especially among younger individuals at risk of developing ASCVD. A Pakistani study conducted by Khalid, M. R. et al. supported our study.(17). In this study, only 10.8% of patients Out of 367 patients, used statins < 40 years of age. Another study (18) conducted in Pakistan demonstrated that the utilization of statins was associated with a low occurrence of prescription of potentially inappropriate medications (PIMs), with only 9% of prescriptions falling into this category. In the present study, it was found that only 16 percent of the participants, including those who were prescribed statins, received sufficient lipid-lowering treatment.

This study suggests a responsible and cautious approach to the prescription of statins, highlighting the importance of appropriate medication selection and management in optimizing patient care and minimizing potential risks associated with medication use.

Conclusion: The present study concluded that individuals diagnosed with type 2 diabetes in Pakistan often have elevated LDL and decreased HDL cholesterol levels, increasing their susceptibility to heart disease. Additionally, a notable proportion of these individuals could potentially enhance their cardiovascular health by using statins. However, the study also uncovered that many of them are currently not utilizing these medications, underscoring a treatment gap that, if addressed, could lead to improved overall health outcomes.

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