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The Pattern of lipid abnormalities in Type-2 Diabetes Mellitus Patients Attending a private medical college hospital

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Abstract

Background: *Diabetes mellitus (DM) is a group of metabolic disorders characterised by hyperglycemia resulting from a defect in insulin secretion, insulin action, or both. It is associated with chronic hyperglycemia and carbohydrate, lipid, and protein metabolism disturbances.* ***Objectives:*** *We aimed to research the association between serum lipid profile and blood glucose so that early detection and treatment of lipid abnormalities can minimise the risk for atherogenic cardiovascular disorder and cerebrovascular accident in patients with type 2 diabetes mellitus.* ***Materials and Methods:*** *This is a cross-sectional study carried out to diagnose dyslipidemia among patients with DM at Ad-din Akij Medical College Hospital over a period of 6 months study among 110 diabetic patients selected by nonrandom purposive sampling after fulfilling inclusion and exclusion criteria.* ***Result:*** *In this study, among 110 study subjects with type 2 DM, the prevalence of dyslipidemia was 72.7%, and among those, 30% had abnormalities in a single parameter, and 70% had abnormalities in multiple parameters. Hypertriglyceridemia (70.8%) was the most prevalent among patients with abnormalities in a single parameter. Among patients with abnormalities in multiple parameters, high TG & low HDL-C dyslipidemia (39.2%) was most prevalent. A total of 26.7% of patients were found to have abnormalities in all the parameters of the lipid profile.* ***Conclusion:*** *Dyslipidemia is high in number in type 2 diabetic patients and is also a significant risk factor for cerebrovascular and cardiovascular disease. To reduce this risk, healthcare professionals should provide regular follow-up and proper advice and ensure primary prevention of vascular complications.*

Keywords: *Diabetes Mellitus, various types of lipid abnormalities*

Introduction

Diabetes mellitus is a long-term health condition that affects how our body metabolises glucose and other energy sources, the later development of blood vessels, and neurological complications (1). Symptoms may include polydipsia, polyuria, polyphagia, weight loss, fatigue, and blurred vision. Those with diabetes are more likely to develop atherosclerosis in the vessels, increasing the risks for cardiovascular, cerebrovascular, and peripheral vascular diseases. Numerous causes play a part in diabetes' origin, from autoimmune destruction of the pancreas's beta cells resulting in insulin deficiency. It is an extensive problem affecting global health; it is estimated that around 200 million people worldwide have diabetes (over 5% of the adult population (2, 3). Various factors affect type 2 diabetes's pathogenesis, including lifestyle choices and environmental concerns.

The atherogenicity is associated with small and dense LDL cholesterol particles (4). A diet rich in saturated fats, smoking, lifestyle, and increased visceral fat raises LDL cholesterol levels (5). The lowering of LDL cholesterol levels leads to reducing the risk of coronary heart disease. The increase in serum cholesterol levels (HDL) raises the risk of incidence of coronary heart disease (5). Low HDL cholesterol also increases the risk of cardiovascular disease (6).

Materials and Methods

This was a cross-sectional study, the sampling technique was convenient and carried out in the Medicine OPD, Ad-din Akij Medical College Hospital, and Khulna from January 2022 to June 2022. We included those who reported having diabetes for 6 months or more regardless of taking oral hypoglycemic agents or insulin. Patients were diagnosed as type 2 diabetic by their primary physicians. We excluded subjects with other chronic illnesses like hypertension, chronic kidney and liver disease, those who were pregnant, and anyone taking lipid-lowering drugs. In this way, a total number of 220 patients were enrolled at first. After fulfilling inclusion and exclusion criteria finally, 110 patients aged 30 years or above were taken as the study population. Blood samples were collected and the serum lipid profile was estimated by Autoanalyzer. SPSS, Microsoft Excel, and Microsoft Word were used in this study.

Both male and female patients aged over 30 years and have a diagnosis of type 2 DM were included in the study. A written consent was obtained from each patient, using an informed consent form. The research was conducted in full compliance with ethical principles.

Results

In this study among 110 individuals, the prevalence of dyslipidemia (at least one abnormal lipid fraction) was 80 (72.7%) (Figure 1). 24 (30%) individuals with dyslipidemia had abnormalities in single lipid parameters and 56 (70%) had multiple abnormal lipid parameters (Table 1). Hypertriglyceridemia was observed in 70.8% of cases among individuals with single lipid parameter abnormality. Combined high TG & low HDL-C level was found in 39.2% of cases in individuals with multiple abnormal lipid parameters. 26.7% of individuals were identified to have abnormalities in all the lipid parameters.

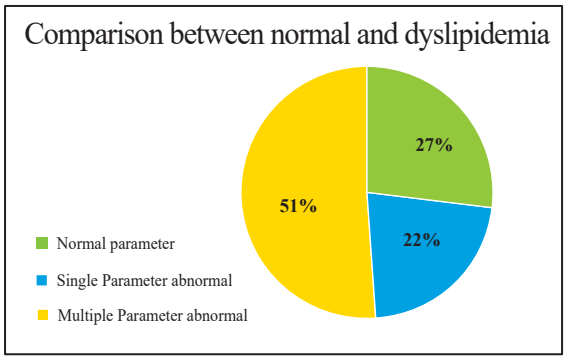

Fig 1. Lipid status among type 2 Diabetes mellitus patients

Table 1: Distribution of individuals with a single abnormal lipid parameter (n=24)

Lipid Index	Number	Percentages
High TG	17	70.8
Low HDL- C	7	29.1
Total	24	100

Table 2: Distribution of individuals with a single abnormal lipid parameter (n=80)

Lipid Index	Number	Percentages
High TG &low HDL -C	22	39.2
High TG, high TC & high LDL-C	19	33.9
High TG, high TC, high LDL-C & low HDL-C	15	26.7
Total	56	100

Table 3: Distribution of respondents according to social background

Social background	Number	Percentage
Urban	42	38.1
Rural	68	61.8
Total	110	100

Table 3, shows the distribution of respondents according to social background. In our study, 38.1% of respondents were urban, and 61.8% of respondents were rural residents.

Discussion

Dyslipidemia is a serious contributor to cardiovascular disease, stroke, and type 2 diabetes, so it's important to be aware of its potential impact (6). Although it's dangerous, it is a risk factor that can be modified through lifestyle changes and medications. This disorder is characterized by an irregular lipid profile, which may include higher levels of plasma cholesterol, triglycerides, or both, or a decrease in high-density lipoprotein cholesterol (HDL-C) (7). The American Heart Association advises that a blood cholesterol level of 200 mg/dl, Triglycerides over 150 mg/dl, High-Density Lipoprotein Cholesterol (HDL-C) under 40 mg/dl, and Low-Density Lipoprotein Cholesterol (LDL-C) over 130 mg/dl are all considered signs of dyslipidemia (7) . In our study, 38.1% of respondents were urban and 61.8% of respondents were rural residents. Most of the patients coming to this medical college hail from rural and low social economic conditions because of the philanthropic nature of this institution. Also, the geographic location of these institutions attracts patients from rural areas. So, several rural respondents were more in our study.

In our study, we found that the prevalence of dyslipidemia in type 2 diabetic patients is very high (72.7%). This was similar to another study done in South Africa where they found the prevalence of dyslipidemia was 90.3 % (8). This result is consistent with another study in Nigeria (9) .In a Bangladeshi study showed that dyslipidemia was found to be very highly prevalent (94%) (9). Among individuals who have dyslipidemia with a single lipid profile parameter, serum TG was the most prevalent

(70.8%) whereas among individuals with abnormalities in multiple lipid profile parameters, combined High TG & low HDL-C was observed at the highest frequency (39.2%). Sultana MS et.al also found hypertriglyceridemia combined with low HDL-C is the most common form of multiple dyslipidemias. But in a Pakistani study, the researcher found the highest number of dyslipidemias was LDL-C (8). Age, duration of diabetes, HbAlc, and drug compliance may all affect variables such as lipid profile. It appears that the food we eat can have an effect on our lipid profile especially food with a high glycemic index may also affect lipid abnormalities (10).

Conclusion

Despite some limitations such as the purposefully chosen institution and relatively small sample size, this study has given us a foundational understanding that dyslipidemia is widespread among individuals with type 2 diabetes. The most common abnormality of dyslipidemia was found to be serum triglycerides, and the most frequent form of dyslipidemia with multiple abnormal parameters had abnormal serum triglycerides and serum high-density lipoprotein cholesterol (HDL-C) levels. This highlights the importance for medical professionals to pay attention to dyslipidemia when caring for diabetic patients.

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Conflict of Interest: Nil

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