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Original Research Article

An Observational Assessment of the Lipid Profile Abnormalities in Newly Diagnosed Type 2 Diabetics

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Abstract

Aim: To study the lipid profile abnormalities in newly diagnosed type 2 diabetics.

Material & Methods: A cross-sectional study was carried out to determine the lipid profile in newly diagnosed type 2 diabetics in Patna medical College and hospital, Patna, Bihar, India. A total of 120 newly diagnosed type 2 diabetics were enrolled in our study.

Results: According to ATP III classification 51% participants had normal serum triglycerides levels which is <150 mg/dl whereas 49% participants had an abnormal level of serum triglycerides. In our study, among the 120 participants, 65% participants had desirable total Cholesterol levels of <200mg/dl, 25 (51%) had borderline high levels of 200-239mg/dl and 3% had high total cholesterol levels of ≥240mg/dl.

Conclusion: Deranged lipid profiles are quite prevalent in type 2 diabetics with females having higher triglyceride levels. Recognition of such elevated triglyceride levels in even newly diagnosed type 2 diabetics will help in better prevention of associated cardiovascular disease.

Keywords: Cardiovascular disease, Hypertriglyceridemia, Type 2 diabetes, Lipid profile

Introduction

Diabetes (T2DM) and related cardiovascular complications are major public health challenges worldwide. Individuals with T2DM have two- to four-fold increased risk of coronary artery disease (CAD), the leading cause of death among people with T2DM. [1]

Dyslipidemia and hypertension are major modifiable risk factors for T2DM and related CAD, which account for more than 87% of disability in low- and middle-income countries. [2]

Furthermore, prediabetes (an intermediate metabolic state between normoglycemia and T2DM) has also been found to be associated with an increased risk for cardiovascular disease. [3] Lipid abnormalities in patients with diabetes, often termed “diabetic dyslipidemia”, are typically characterized by high total cholesterol (T-Chol), high triglycerides (Tg), low high density lipoprotein cholesterol (HDL-C) and increased levels of small dense LDL particles. Low density lipoprotein cholesterol (LDL-C) levels

may be moderately increased or normal. Lipid abnormalities are common in people with T2DM and prediabetes [4] but the pattern of the different lipids may vary between ethnic groups, economic levels, and access to health care. [5]

Today, however, the World Health Organization (WHO) and International Diabetes Federation (IDF) use the term "Metabolic Syndrome" to describe this clustering of conditions. [6] The term diabetic dyslipidemia comprises a triad of raised triglycerides, reduced high density lipoprotein (HDL) and excess of low density lipoprotein (LDL) particles. The lipid abnormalities are prevalent in diabetes mellitus because insulin resistance or deficiency affects key enzymes and pathways in lipid metabolism. [7] Microvascular and macrovascular complications, including cardiovascular disease (CVD), retinopathy, nephropathy, and neuropathy, occur due to chronic uncontrolled hyperglycemia in diabetics. [8-9] It has been proposed that the composition of lipid particles in diabetic dyslipidemia is more atherogenic than other types of dyslipidemia. [10] 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. [11-12] Hence, we aim to study the lipid profile abnormalities in newly diagnosed type 2 diabetics.

Material & Methods:

A cross-sectional study was carried out to determine the triglyceride levels in newly diagnosed type 2 diabetics in Patna medical College and hospital, Patna, Bihar, India. The Study was carried out during a period of 1 year.

Inclusion criteria:

- All patients who have been diagnosed as having type 2 diabetes mellitus within the last 3 months using the ADA (American Diabetes Association) criteria
- Age of the patient >25 years
- Sex: Both males and females.

Exclusion criteria:

- Patients on steroids
- Type 1 diabetics
- Patients on antipsychotic medications
- Known cases of active hypothyroidism
- Known cases of Cushing's syndrome were excluded from the study.

Methodology

A total of 120 newly diagnosed type 2 diabetics were enrolled in our study. Relevant patient data was collected from the inpatient and outpatient department of Medicine, RMMCH. Fasting lipid profile levels were measured in these patients.

Statistical analysis:

Continuous variables were expressed using mean, standard deviation, range and mean while categorical variables were expressed in terms of percentages. Test of significance wad done using student t test for normally distributed continuous variables. Mann Whitney test was done for not normally distributed continuous variables. P-value less than 0.05 was considered as statistically significant.

Results:

Table 1 shows the age distribution of the participants in the study. The maximum number of patients belonged to the age group of 40-50 years (49.16%) and the least number belonged to the age group 20-30 years (Table 1).

Table 1: Age distribution among the participants (n=120).

Age	No. of participants	%
20-30	3	2.5
30-40	26	21.66
40-50	59	49.16
50-60	33	27.5
Total	120	100

The Table 2 shows the gender distribution of the participants of our study. Among the total participants, 52 (43.3%) were males, and 68 (56.7%) were females (Table 2).

Table 2: Gender distribution among the participants (n=120).

Gender	Male	Female
Number	52	68
Percentage	43.3	56.7

According to ATP III classification 51% participants had normal serum triglycerides levels which is <150 mg/dl whereas 49% participants had an abnormal level of serum triglycerides. Among these 49% participants with abnormal triglycerides, 30% had borderline high levels (150-199mg/dl), 15% had high levels (200-499 mg/dl) and 5% participants had very high triglycerides (≥500 mg/dl) (Figure 1).

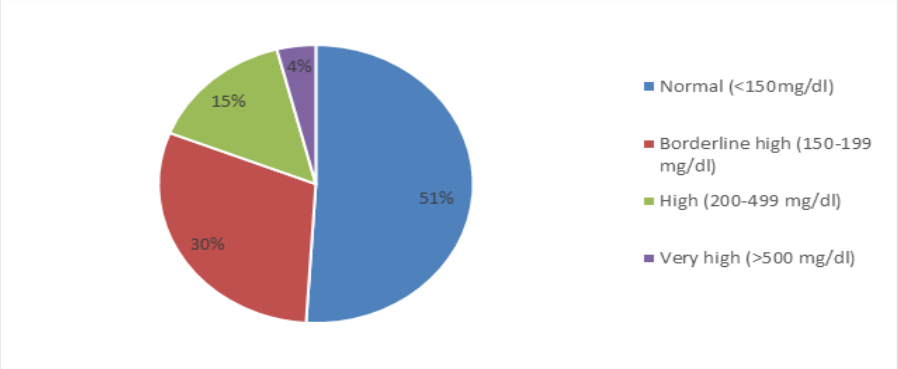

Figure 1: Serum Triglycerides.

According to the NCEP ATP III criteria, HDL levels ≤40 is considered low for males and ≤50 is considered low for females. Based on this criterion, in our study, 59% participants had low HDL and 41% participants had normal HDL. The P value was >0.05 and was not statistically significant (Figure 2).

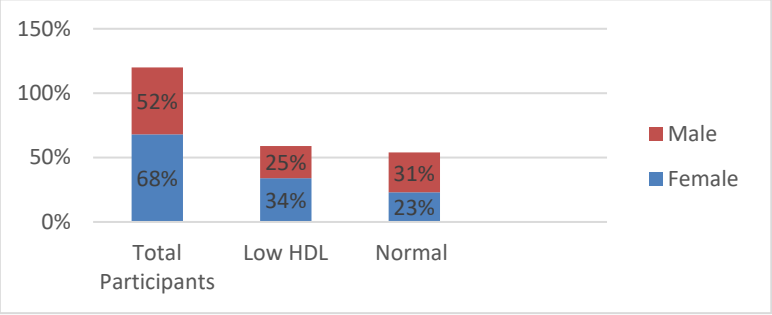

Figure 2: Serum HDL – distribution.

In our study, among the 120 participants, 65% participants had desirable total Cholesterol levels of <200mg/dl, 25 (51%) had borderline high levels of 200-239mg/dl and 3% had high total cholesterol levels of ≥240mg/dl. Among the participants who had elevated cholesterol levels, a female predominance was noted with 36% of participants who had borderline high cholesterol levels being female (Figure 3).

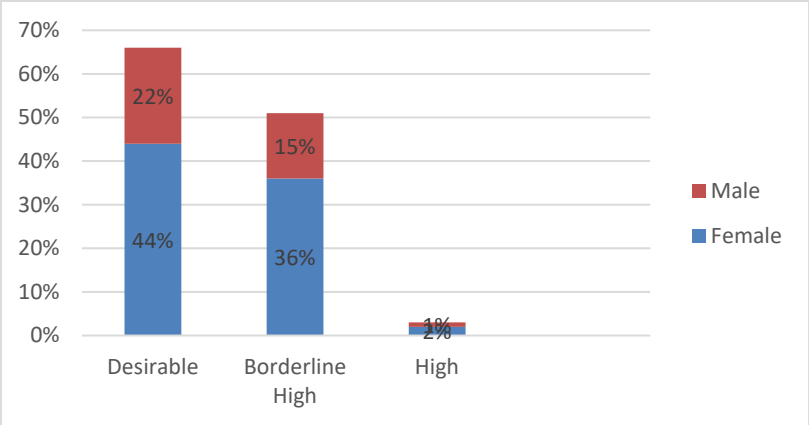

Figure 3: Serum cholesterol levels distribution.

Among the total participants, according to the NCEP-ATP III criteria, 39% participants had an optimal level of LDL. 46% had near optimal levels of LDL. 23% had borderline high levels of LDL. 8% had high levels of LDL. 4% participants had very high levels of LDL. (Figure 4).

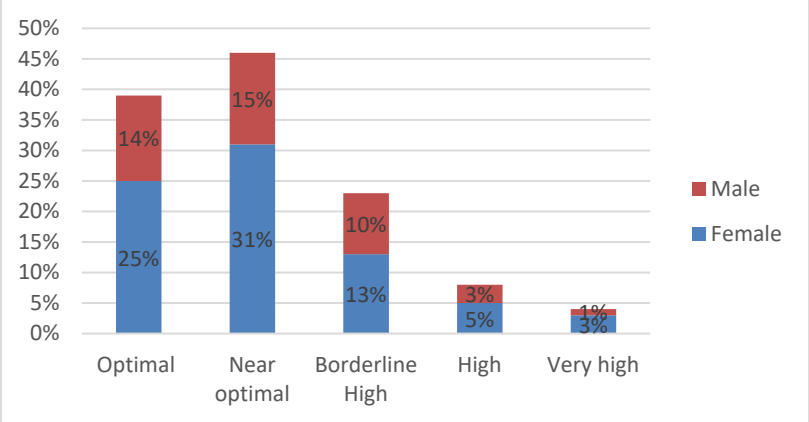

Figure 4: LDL levels- distribution.

Discussion:

A study done in four selected regions of India showed that 29.5% had hypertriglyceridemia with the highest prevalence in Chandigarh and the common risk factors being obesity, diabetes and dysglycemia. [13]

In patients with diabetes, many studies have clearly established that complications are mainly due to chronic hyperglycemia that exerts its injurious to health effects through several mechanisms: dyslipidemia, platelet activation, and altered endothelial metabolism [14-16]. Both lipid profile and diabetes have been shown to be the important predictors for metabolic disturbances including dyslipidaemia, hypertension, and cardiovascular diseases [17].

Lipids play a vital role in the pathogenesis of diabetes mellitus. Dyslipidemia as a metabolic abnormality is frequently associated with diabetes mellitus. Abnormalities in lipid metabolism have been reported in patients with diabetes mellitus accompanied by the risk of cardiovascular arteriosclerosis [18].

A study by Ogbera showed that elevated LDL levels was the most commonly documented lipid abnormality in patients with metabolic syndrome. [19]

In a study down by Karadag et al to assess prevalence of metabolic syndrome in cardiac patients and it was found that the most prevalent paramenter was found to be low HDL (69%). The result quite similar to our study shows that low HDL is one of the important risk factors for cardiovascular diseases. [20,21]

Conclusion:

Deranged lipid profiles are quite prevalent in type 2 diabetics with females having higher triglyceride levels. Recognition of such elevated triglyceride levels in even newly diagnosed type 2 diabetics will help in better prevention of associated cardiovascular disease.

References:

1. Aronson, D.; Edelman, E.R. Coronary artery disease and diabetes mellitus. Cardiol. Clin. 2014, 32, 439–455.
2. Yusuf, S., Rangarajan S., Teo K., Islam S., Li W., Liu L., Bo J., Lou Q., Lu F., Liu T., et al. Cardiovascular risk and events in 17 low-, middle and high-income countries. N. Engl. J. Med. 2014, 371, 818–827.
3. Huang, Y., Cai X., Mai W., Li M., Hu Y., Association between prediabetes and risk of cardiovascular disease and all cause mortality: Systemic review and meta-analysis. BMJ 2016, 355, i5953.
4. Santos-Gallego, C.G.; Rosenson, R.S. Role of HDL in those with diabetes. Curr. Cardiol. Rep. 2014, 16, 512.
5. Gerber P.A., Spirk D., Brandle M., Thoenes M., Lehmann R., Keller U., Regional differences of glycaemic control in patients with type 2 diabetes mellitus in Switzerland: A national cross-sectional survey. Swiss Med. Wkly. 2011, 141, w13218.
6. Zimmet P, Alberti G, Shaw J: A new IDF worldwide definition of the metabolic syndrome: the rationale and the results. Diabetes Voice 2005, 50(3):31–33.
7. Taskinen MR: Diabetic dyslipidemia. Atheroscler Suppl 2002,3 (1):47–51.
8. FolliF, Corradi D, Fanti P, Davalli A, Paez A, Giaccari A, Perego C, Muscogiuri G: The role of oxidative stress in the pathogenesis of type2 diabetes mellitus micro-and macrovascular complications: avenues for amechanistic-based therapeutic approach. Curr Diabetes Rev2011, 7(5):313–324.
9. Maritim AC, Sanders RA, Watkins JB: Diabetes, oxidative stress and antioxidants: a review. J Biochem Mol Toxicol 2003,17(1):24–38.
10. Mahato RV, Gyawali P, Raut PP, Regmi P, Khelanand PS, Dipendra RP, GyawaliP: Association between glycaemic control and serum lipidprofile in type 2 diabetic patients: glycated haemoglobin as a dual biomarker. Biomed Res 2011,22(3):375–380.
11. Wexler DJ, Grant RW, Meigs JB, Nathan DM, Cagliero E: Sex disparities in treatment of cardiac risk factors in patients with type 2 diabetes. Diabetes Care 2005,28(3):514–520.
12. Regmi P, Gyawali P, Shrestha R, Sigdel M, Mehta KD, Majhi S: Pattern of dyslipidemiaintype-2 diabetic subjects in Eastern Nepal. J Nepal Assoc Med Lab Sci 2009,10(1):11–13.
13. Joshi SR, Anjana RM, Deepa M, Pradeepa R, Bhansali A, DHandania VK. Prevalence of dyslipidemia in urban and rural India. The ICMR-

INDIAB Study. PLoS ONE. 2014; 9(5):e96808.
14. Brownlee M: Biochemistry and molecular cell biology of diabetic complications. Nature 2001, 414 (6865): 813–820.
15. Jokl R, Colwell JA: Arterial thrombosis and atherosclerosis in diabetes. Diabetes Metab Rev 1997, 5:1–15.
16. Taskinen MR: Diabetic dyslipidaemia: from basic research to clinical practice. Diabetologia 2003, 46(6):733–749.
17. Goldberg IJ: Diabetic dyslipidemia: causes and consequences. J Clin Endocr Metab 2001, 8(3):965–971.
18. Hays, P. Evidence Basis for Pharmacogenetic Testing in Psychiatry. Journal of Medical Research and Health Sciences, 2022:5(3), 1838–1859.
19. Krauss RM: Lipids and lipoproteins in patients with type 2 diabetes. Diabetes Care 2004, 27(6):1496–1504.
20. Ogbera AO. Prevalence and gender distribution of the metabolic syndrome. Diabetol Metab Syndr. 2010;2 (1):1.
21. Karadag MK, Akbulut M. Low HDL levels as the most common metabolic syndrome risk factor in heart failure. Int Heart J. 2009 Sep;50(5):571-80.