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Prevalence of diabetic dyslipidemia in and around Warangal region

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Abstract
Introduction: Diabetic dyslipidemia is characterized by high triglyceride levels and decreased high-density lipoprotein (HDL) cholesterol, changes observed many years before the onset of clinically relevant hyperglycemia. In the world about 382 million people are the victim of hyperglycemia. According to International Diabetes Federation (IDF) estimates in 2013, 35 countries have about 12% prevalence of diabetes. 10–19% of Asian population is currently affected due to diabetes. The prevalence of dyslipidemia in type 2 diabetes is double with respect to the general population.
Methodology: The present study was done in 300 patients. All the patients were aware of the study protocol and form consent to the study.
Results: Of 300 diabetic patients, 180 were hyperlipidemic. Of 180 Diabetic dyslipidemia patients 92 were male and 88 were female. It was higher in male (51.1%) than female (48.8%).
Conclusion: Majority of type 2 diabetic patients are dyslipidemic. The most prevalent pattern among both male and female diabetic patients was high levels of LDL, Triglycerides and low levels of HDL. Clinical pharmacist plays a vital role in counseling the patients about the disease and life style modifications to be followed.

Keywords: Type 2 diabetic mellitus, hyperlipidemia, LDL, HDL

1. Introduction

Diabetes mellitus is an endocrine disorder which is characterized by metabolic abnormalities with micro and macrovascular complications which cause significant morbidity and mortality. India is one of the rapidly developing country standing in second highest diabetes prevalence in the world which could be due to rapid urbanization that brought along with it a sedentary lifestyle is an important factor inducing diabetes mellitus [1]. Diabetic dyslipidemia is characterized by high triglyceride levels and decreased high-density lipoprotein (HDL) cholesterol, changes observed many years before the onset of clinically relevant hyperglycemia [2]. Dyslipidemia is one of the risk factors for vascular complications in diabetic patients because it lead to increase of free fat flux secondary to insulin resistance and aggravated by increased inflammatory adipokine levels [3]. Many aspects of the pathophysiology and consequences of diabetes dyslipidemia remain unclear, but the mechanism by which hypertriglyceridemia arises is fairly well understood. Insulin deficiency or resistance activates intracellular hormone-sensitive lipase which increases the release of non-esterified fatty acids (NEFA) from triglycerides stored in the more metabolically active centrally distributed adipose tissue. High circulating levels of NEFA increase hepatic triglyceride production. Increased hepatic triglyceride synthesis is associated with increased secretion of apolipoprotein B (apoB). Furthermore, the normal inhibitory effect of insulin on hepatic apoB production and triglyceride secretion in VLDL is lost, and the VLDL secreted is larger and more triglyceride-rich. The tendency to hypertriglyceridemia is further augmented by reduced VLDL catabolism. Lipoprotein lipase located on vascular endothelium largely determines the rate of removal of triglycerides from the circulation. In contrast to intracellular hormone-sensitive lipase this lipoprotein lipase may be down regulated in states of insulin resistance or deficiency. This reduction in lipoprotein lipase activity also contributes to postprandial lipemia [2]. About 382 million people are the victim of hyperglycemia worldwide. The regions of high prevalence are North America and Caribbean about 11%.

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According to International Diabetes Federation (IDF) estimates in 2013, 35 countries out of 219 countries have about 12% prevalence of diabetes. 10–19% of Asian population is currently affected due to diabetes [4]. Huge Life style changes such as westernization of diet, reduced physical activity and long-term sedentary work, all of which are regarded as major risk factors for dyslipidemia [5]. According to a study in 2011, the estimated number of patients with diabetes in India was 62.4 million which is projected to rise to a staggering 101.2 million by 2030. Diabetes mellitus is an important risk factor for cardiovascular disease and atherosclerosis as it is a common secondary cause of hyperlipidemia when the glycemic control is poor. The prevalence of dyslipidemia in type 2 diabetes is double with respect to the general population. Approximately 80% of deaths in patients with diabetes are prone to coronary vascular diseases and the Asian Indians have high risk of coronary heart disease than whites [1].

2. Aim and Objectives
The aim of this study was to detect the lipid abnormality in hyperglycemic patients because in diabetes mellitus early detection and treatment of hyperlipidemia can prevent the progression of lipid abnormalities and minimize the risk for cerebrovascular accident and cardiovascular disorders.

3. Methodology
The present study was a cross sectional study conducted in a diabetic outpatient clinic for a period of 3 months on 300 diabetic patients in which 92 were male and 88 were female. All the patient's data were collected randomly. All the patients were explained about the study and the informed consent was obtained. Age, duration of diabetes, height, weight, and body mass index were recorded in all the patients.

Inclusion criteria: Patients with type 2 diabetes mellitus were included in the study.

Exclusion criteria: The patients with type 2 diabetes mellitus with conditions altering the lipid levels and the patients suffering from coronary artery disease (CAD), cerebrovascular accident (CVA), having past history of CAD or CVA been excluded from the study.
The blood glucose estimation was done by GOD-POD method. To evaluate the dyslipidemia the serum total cholesterol, triglycerides and HDL levels were measured using CHODPOD method, GOD-Pod method, CHODPOD methods respectively. LDL was calculated by total cholesterol-HDL-serum triglyceride/5 and VLDL cholesterol was calculated by plasma triglycerides by 5 [1].

4. Results
Of 300 diabetic patients in the study, 180 were hyperlipidemic. Of 180 diabetic dyslipidemia patients, 92 were male (51.1%) and 88 were female (48.8%). Prevalence was higher in the eldest age group i.e., 51- 60 years (36.1%) followed by 61-70 years (35%), 40-50 years (16.6%) and >70 years (12.2%). Around 60.5% had <25 kg/m2 and remaining patients were either overweight or obese. The age group which was most affected with diabetic dyslipidemia among male and female patients were 51-60 and 61- 70 years.

Hypertriglyceridemia was found in around 57.7% (58.6% in male, 56.8%in female), high levels of LDL is observed in 56.1% (57.6% in male, 54.5% in female), Total Cholesterol is high i.e., 56.1% (56.5% in male, 55.6% in female). The main Characteristic of Dyslipidemia is Low HDL levels (59.4%), the proportion is higher in male (59.7%) than female (59.0%).

Table 1: Age wise distribution

Age groups	Male	Female	Total (n=180)
40-50 years	13	17	30 (16.6%)
51-60 years	38	22	65 (36.1%)
61-70 years	33	30	63 (35%)
>71 years	10	12	22 (12.2%)

Table 2: Lipid Profile of the patients included in the study

Variables	Sex Male	Female	Total
TC			
< 200 mg/dL	52 (56.5%)	49 (55.6%)	101 (56.1%)
>200 mg/dL	40 (43.4%)	39 (44.3%)	79 (43.8%)
HDL			
Low	55 (59.7%)	52 (59.09%)	107 (59.4%)
Normal	37 (40.2%)	36 (40.9%)	73 (40.5%)
LDL			
>100 mg/dL	53 (57.6%)	48 (54.5%)	101 (56.1%)
<100 mg/dL	39 (42.3%)	40 (45.04%)	79 (43.8%)
TG			
<150 mg/dL	38 (41.3%)	38 (43.1%)	76 (42.2%)
>150 mg/dL	54 (58.6%)	50 (56.8%)	104 (57.7%)

5. Discussion
In this study, we are aimed to determine the prevalence of dyslipidemia in diabetic patients visiting hospital. In the present study, most of the patients are with more than one lipid abnormality. The prevalence of dyslipidemia in diabetic patients was found as 60%. The study conducted by Hetal Pandya et. al. [6] the prevalence of dyslipidemia was 82.5%. In our study we found the prevalence of dyslipidemia in Type 2 Diabetic patients was 60%.
According to the study conducted by Das H et al., [7] concluded that the prevalence of dyslipidemia was high in male (73%) than in female (71%). In our study we observed the prevalence of dyslipidemia was high in male (51.1%) than in female (48.8%).
One study conducted by Md N. Karim et al., [8] concluded that the prevalence of dyslipidemia was more than two third of the patients were of age between 40 and 59 years. In our study we concluded that the prevalence of dyslipidemia was more between the age group of 51-60 years.
In a study conducted by Eda Dayakar et al., [1] concluded that out of 46 diabetic patients, 27 (58.6%) were having hypercholesterolemia, 17(36.9%) patients are having hypertriglyceridemia, 30 (65.2%) patients were having increased levels, and 43 (93.4%) patients were having reduced HDL levels. Our study supports the authors conclusion that hypertriglyceridemia was found in around 57.7% (58.6% in male, 56.8%in female), high levels of LDL is seen in 56.1% (57.6% in male, 54.5% in female), Total Cholesterol is high i.e., 56.1% (56.5% in male, 55.6% in female). The main Characteristic of dyslipidemia is Low HDL levels (59.4%), the proportion is higher in male (59.7%) than female (59.0%).

6. Conclusion

Majority of type 2 diabetic patients are dyslipidemic. The most prevalent pattern among both male and female diabetic patients was high levels of LDL, Triglycerides and low levels of HDL. The prevalence of dyslipidemia in Warangal region is high, which designate the importance of life style changes in order to prevent and manage the health problem and risk factor. Specific efforts should be taken to educate patients and increase the awareness regarding the importance of life style changes and regular intake medication would be a positive step toward decreasing dyslipidemia. Clinical Pharmacist plays a vital role in counseling the patients about the disease and life style modifications to be followed.

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