Original Article

Journal of Kathmandu Medical College, Vol. 9, No. 3, Issue 33, Jul.-Sep., 2020

Prevalence and pattern of lipid profile among patients with diabetes mellitus attending a tertiary teaching hospital in Nepal

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Abstract

Background: Dyslipidemia, a well-known major risk factor for coronary heart disease, is commonly associated with macro-vascular complications in patients with diabetes mellitus. Increased level of triglycerides and reduced levels of HDL cholesterol are common lipid abnormalities in diabetes.

Objectives: The aim of the study was to study the prevalence and pattern of lipid abnormalities among diabetic patients attending general practice outpatient department in Kathmandu Medical College Teaching Hospital.

Methodology: This is a descriptive cross-sectional study conducted in the Department of General Practice and Emergency of Kathmandu Medical College Teaching Hospital, Duwakot, Bhaktapur. Convenience sampling technique was used.After obtaining informed consent, 120 diabetic patients from January 2020 to March 2020 were included. The data collected was entered in the Statistical Package for the Social Sciences software and analyzed. Ethical clearance was taken from the Institutional Review Committee of Kathmandu Medical College.

Results: The average TC, HDL, TG and LDL level among the female participants were 186.18 mg/dl, 41.91 mg/dl, 194.63 mg/dl, 111.88 mg/dl respectively and 186.30 mg/dl, 38.80 mg/dl, 205.60 mg/dl, 125.80 mg/dl among the male participants respectively. Eighty-five (71%) patients had a low HDL level. Total cholesterol was found to be high in 38(32%) participants. LDL cholesterol was high in 77(64%) participants. The triglyceride level was high in 85(71%) participants.

Conclusion: This study showed that some diabetic individuals have a lipid abnormality while others did not. This shines light on the importance of regular testing for lipid profile in diabetic individuals because we cannot reasonably predict when a patient will develop dyslipidemia.

Key words: Diabetes mellitus; Dyslipidemia; Prevalence.

Access this article online

Website: www.jkmc.com.np

DOI: https://doi.org/10.3126/jkmc.v9i3.36414

HOW TO CITE

Kafle R, Kadel AR. Prevalence and pattern of lipid profile among patients with diabetes mellitus attending a tertiary teaching hospital in Nepal. J Kathmandu Med Coll. 2020;9(3):150-3.

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ISSN: 2019-1785 (Print), 2091-1793 (Online)

INTRODUCTION

Prevalence of diabetes mellitus (DM) is growing rapidly worldwide. Global prevalence of DM among adults is estimated to be 6.4%, affecting 285 million people in 2010 and is expected to increase to 7.7 % affecting 439 million people by 2030[1]. The prevalence of DM in Nepal is 8.5%[2].

Diabetes mellitus is a common secondary cause of dyslipidemia. The prevalence of dyslipidemia in Diabetes mellitus is 95%[3]. In diabetes mellitus the lipid abnormalities are more prevalent because major key enzymes and lipid metabolism pathways are affected due to deficiency of insulin production and secretion[4]. The dyslipidemia is major risk factor for coronary heart disease (CHD)[5]. Hence, DM is a risk factor for atherosclerosis which can potentially cause dreaded ailments like coronary heart disease and cerebrovascular disease. Micro-vascular complications are related to

poor glycemic control and duration of diabetes, but risk of macro-vascular complications remains to be dyslipidemia, smoking and hypertension[6]. Dyslipidemia in DM usually manifests as an increase in Low Density Lipoprotein (LDL) and triglyceride (TG) concentrations[7]. Studies have shown that dyslipidemia is a significant independent predictor of coronary heart disease in patient with type 2 DM[8]. The cardiovascular disease is the cause of morbidity and mortality in patient with DM because of disturbance in the levels of lipoproteins i.e. serum triglyceride 69%, serum cholesterol 56.6% and LDL 77% [9,10].

In DM, associated hyperglycemia, obesity and insulin changes highly accelerate the progression to atherosclerosis[11, 12]. In this study, we aim to see the association between lipid profile abnormality and a diabetic individual, keeping in mind that early detection and treatment of lipid abnormalities can minimise the risk of atherogenic cardiovascular disorder in type 2 diabetes mellitus.

The objective of this study was to obtain the fasting blood glucose level and lipid profile of the participants and map out the pattern of lipid profile including total cholesterol (TC), HDL cholesterol, LDL cholesterol and triglyceride among diabetic patients attending general practice outpatient department in Kathmandu Medical College (KMC) Teaching Hospital, Duwakot, Nepal.

METHODOLOGY

This descriptive cross-sectional study was conducted from January 2020 to March 2020, in the General Practice outpatient department of Kathmandu Medical College Teaching Hospital, Duwakot, Bhaktapur.

Sample size of 120 was calculated as $N= Z^2p(1-p) / d^2$.
p was taken as 8.4% from the study "Prevalence of type 2 diabetes in Nepal: a systematic review and meta-analysis from 2000 to 2014"[13], hence sample size calculated was 120.

Adult patients of age 30 years and above were included in the study by purposeful sampling technique and informed consent was obtained. Patients having hypertension, patients on lipid lowering drugs, history of liver, kidney or cardiac failure were excluded.

Detailed history, examination, and anthropometric measurement were recorded in study proforma. Fasting blood sugar and lipid profile was done after a minimum of eight hours of overnight fasting. The National Cholesterol Education Program–Adult Treatment Panel III 2018(NCEPATP III) criteria was followed for diagnosis of lipid abnormality if total cholesterol>200mg/dl, triglyceride >150 mg/dl, LDL>100 mg/dl , HDL<40mg/dl in males and ≤50 mg/dl in females[14].

The data was collected using a semi-structured questionnaire which was entered into and analyzed in Statistical Package for the Social Sciences (SPSS) Statistics for Windows, version 16.0 (SPSS Inc., Chicago, Ill., USA). Descriptive statistics have been presented as frequency, percentage, mean, and standard deviation.

RESULTS

A total of 120 diabetic patients were included, out of which 55 (45.8%) were male and 65(54.2%) were female. Mean age of the patients was 51.8±12.1 years. The mean fasting blood sugar (FBS) was 136±48.2 mg/dl and mean body mass index (BMI) was 25.9±3.5 kg/m^2.

The mean values of the lipid profiles in this study (Table 1) were TC: 186.2 ± 49.1 mg/dl, high density lipoprotein (HDL) cholesterol: 40.5 ± 7.3 mg/dl, triglycerides (TG): 199.7 ± 89.6 mg/dl, low density lipoprotein (LDL) cholesterol: 118.2 ± 40.9 mg/dl.

Regarding gender wise distribution of Lipid profile (Table 2), the average values of TC, HDL, TG and LDL were found to be different when compared between males and females.

Figure1 showed 85 (71%) participants had a low HDL level, 38 (32%) participants had high TC., 77 (64%) of participants had high LDL cholesterol and 85 (71%) participants had high TG.

Table 1: Mean values of lipid profiles in diabetes mellitus

Lipid Parameters	Mean ± SD (mg/dl)
Total Cholesterol (TC)	186.2 ± 49.1
High Density Lipoprotein (HDL) Cholesterol	40.5 ± 7.3
Triglycerides (TG)	199.7 ± 89.6
Low Density Lipoprotein (LDL) Cholesterol	118.2 ± 40.9

Table 2: Gender wise distribution of lipid profiles

Sex	TC (mg/dl)(Mean ± SD)	HDL(mg/dl) (Mean ± SD)	TG(mg/dl) (Mean ± SD)	LDL(mg/dl) (Mean ± SD)
Female	186.18±50.67	41.91±7.69	194.63±97.04	111.88±44.41
Male	186.30±46.78	38.80±6.30	205.60±78.55	125.80±34.41

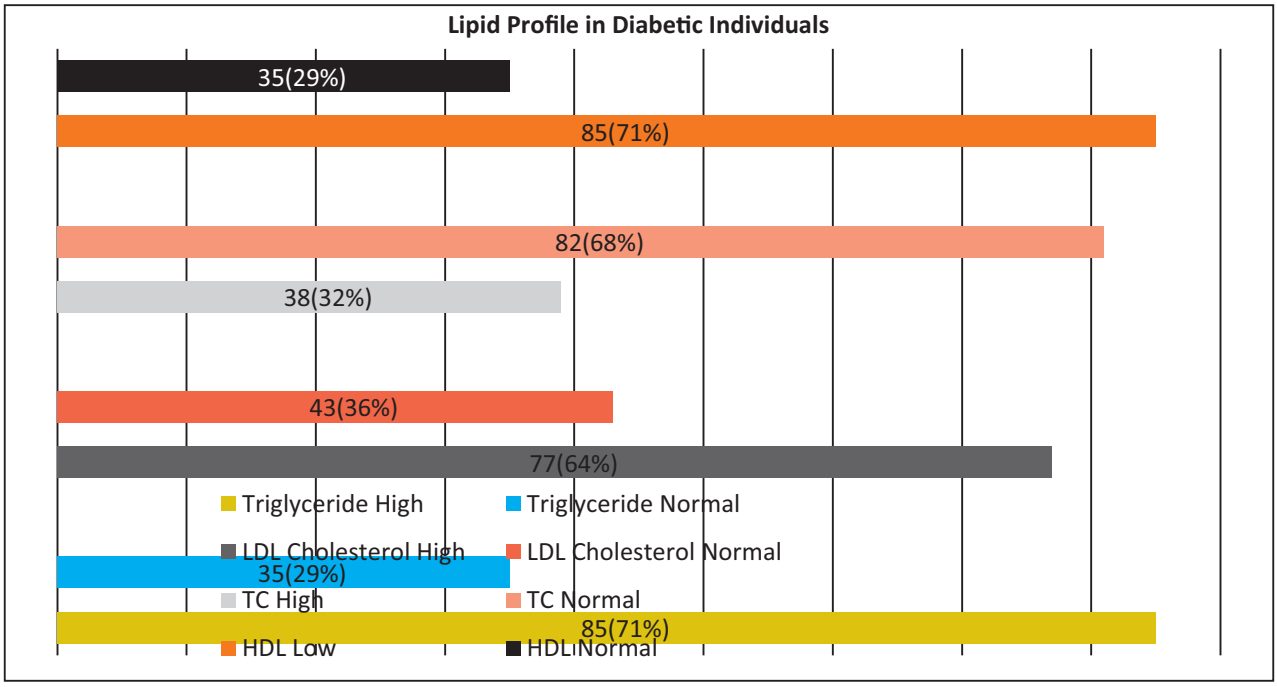

Figure 1: Pattern of Dyslipidemia in patients with Diabetes Mellitus

DISCUSSION

Dyslipidemia is a modifiable risk factor which should be identified and treated to decrease the mortality and morbidity from cardiovascular and cerebrovascular diseases.

In this study, 71% patients have high TG, 71% have low HDL, 64% have high LDL and 32% have high TC. Similar findings were seen in study done by Ullasini et al.[15] which showed 78% have high TG and 85% have low HDL. Another study conducted by Sehran et al.[16] showed more than 50% of diabetes patients have raised TG, 54% have elevated LDL and 73% have decreased HDL. In this study, there were more females than male participants. This study showed that the mean TG was higher in male than female. However, the mean HDL was lower in male than female. This trend of dyslipidemia can be due to consumption of food rich in carbohydrates, fat and lack of physical activity.

Although diabetes and obesity commonly coexist, mean BMI in this study was 25.9, which falls in overweight range. As the patients included in this study were diabetic for long time, this BMI finding can be assumed due to improvement in diet and physical activity over a long period of time.

Our study revealed high TG, low HDL, and high LDL in patient with Diabetes Mellitus type-2. Monitoring the lipid profile in regular basis might play a role to detect and treat the lipid abnormalities in patient with diabetes mellitus. Dyslipidemia management in patient with type II DM should be started with life style changes, comprising of increased physical activity, dietary modifications and weight control strategies. Tight glycemic control with use of antidiabetic agents and insulin is shown to be beneficial in correcting dyslipidemia[17, 18].

As the study was carried out among patients attending OPD only, results can't be generalized to general population. Also factors like pattern of glycemic control, duration of disease were not considered so further studies are required in this issue.

CONCLUSION

The most common lipid abnormality in DM is high triglyceride and low HDL. But this study showed that some diabetic individuals have a lipid abnormality while others do not. This shines light on the importance of regular testing for lipid profile in diabetic individual because we cannot reasonably predict when a patient will develop dyslipidemia. Thus, regular testing of lipid profile in diabetic individuals can detect dyslipidemia early. The optimal care for a patient with diabetes mellitus should include routine monitoring of blood sugar and serum lipid profile.

Conflict of interest: None
Source(s) of support: None

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