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Frequency of Dyslipidemia In Type 2 Diabetic Patients In Karachi

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ABSTRACT:

Objective: To find out the frequency of dyslipidemias in type 2 diabetic patients.

Study Design and Setting: This was cross-sectional study and conducted in a different clinics in Karachi during 3 months period.

Methodology: Those patients who fulfilled the inclusion criteria and attended the OPD were selected. Patient were advised to bring their lipid profile report in next visit if not already done. The total dyslipidemias were presented by their frequencies and percentages with 95% confidence interval.

Results: Out of 383 patients with diabetes mellitus 210 (55 %) had dyslipidemia. Among which 76% had elevated low-density lipoprotein (LDL), 66.6 % had elevated serum cholesterol, 57% patient had elevated triglyceride. p- value of 0.05 was taken as statistically significant.

Conclusion: It was concluded that increased frequency of dyslipidemias, with elevated low-density lipoprotein, cholesterol and triglycerides levels seen in diabetic patients.

Keyword: coronary heart disease, Diabetes mellitus, dyslipidemia, HbA1C.

INTRODUCTION:

Diabetes is one of those disease that is of high concerns because of its increasing number of cases. It is expected that number of diabetics will increase from 382 million in 2013 to 592 million by 2035[1]. According to International Diabetes Federation estimates in 2013,35 countries out of 219 have about 12% prevalence of diabetes. Among the Asian population 20% is currently affected due to the disease. In our country 7 million people suffer from hyperglycemia. The prevalence of the disease in our country is 18-46%. The occurrence of diabetes with metabolic syndrome is 46-75% in Pakistan.[2] It is one of the chronic metabolic diseases which is characterized by hyperglycemia, occurring due to defects in either insulin secretion, action, or both.[3,4] Poorly controlled diabetes can result in many long-term complications which can lead to damage and dysfunction or failure of many vital organs, especially the eyes, kidneys, nerves, heart, brain, blood vessels which are more affected along with increased risk of local and systemic infections in these patients.[4] Because of developing these complications, the patients are also at a high risk of disability and premature death.[4] Among these complications, Cardiovascular disease is of high concern in type 2 diabetics, as more than 60-70% die from coronary heart disease.[5,6] According to American Heart Association, at 70%of the people with diabetes aged 65 or older die of diseases due to atherosclerotic changes in arteries supply heart and CNS.[7] Diabetic patients have four times more chances to have coronary heart disease than non- diabetes. Thus diabetes is considered as equivalent to coronary artery disease.[8]

Dyslipidemia is common in diabetics.[6,7,8] In diabetic dyslipidemia there are lipid and lipoprotein abnormalities. It is characterized by elevated fasting and non-fasting triglycerides (TG) and TG-rich lipoproteins, e.g., chylomicrons and very-low-density lipoprotein (VLDL), low high-density lipoprotein cholesterol (HDL-C) and often also elevated low-density lipoprotein cholesterol (LDL-C) concentrations, increased small dense LDL particles.[8,9] The pathophysiology behind these abnormalities is that they occur due to impaired VLDL secretion and there is decreased hepatic uptake of chylomicrons and their remnants also.[8,9,10] Furthermore, lipolysis in these patients is also suppressed due to the presence of insulin resistance in adipose tissue which further contributes to diabetic dyslipidemia. So, there are number of factors which can contribute to deranged lipid markers from normal value in human body in diabetics, apart from insulin resistance, there is also deficiency of adipocytokines, which are also considered as the contributing factors in causing the alteration in lipid metabolism.[8] The exact pathophysiology is still poorly understood, but it is seen that because of insulin resistance there is activation of

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intracellular lipases which in turn increase the release of no esterified fatty acids (NEFA) from the stored triglycerides in the adipose tissue and increases the hepatic triglyceride production which also causes increase in apolipoprotein B production.[10,11] So, the normal inhibitory effect of insulin on hepatic apolipoprotein B production and triglyceride secretion in VLDL is lost, and the VLDL that is secreted is larger and more triglyceride-rich. There is also reduced VLDL catabolism which also increases the triglyceride levels.[9,10] Lipoprotein lipase which is an enzyme located on vascular endothelium is responsible for the rate of removal of triglycerides from the circulation, but it is downregulated in diabetics due to insulin resistance or deficiency.[10] This reduction in lipoprotein lipase activity further also contributes to deranged lipid markers from normal value in human body.

Recent studies suggest that low HDL cholesterol is also an independent factor not only for causing cardiovascular disease but also for the development of diabetes itself.[12,13,14,15] In diabetic patients, improvement in the glycemic control not only cause reduction in cholesterol and triglyceride levels but also increases the catabolism of LDL through the upregulation of its receptors and reduced glycation.[14,16] The rationale of our study was to find out the frequency of deranged lipid markers from normal value in patients with diabetes as earlier diagnosis of such abnormalities in diabetics can minimize and prevent the mortality due to coronary artery disease. Also, both of these diseases are commonly prevalent in our society and their mortality increase many times when they occur simultaneously.

METHODOLOGY:

The study was conducted in a private clinic in Karachi for a period of three months. All diagnosed cases of diabetes mellitus for more than 3 years with Hb A1C of 7 % or more, irrespective of age, gender were included and the patients suffering from cancer, chronic liver disease, hypothyroidism, patients on lipid lowering drugs and chronic renal disease were excluded from the study. The ethical approval was taken from the ethical review committee. Consent was taken before collection of data and also explaining the significance of this study and its procedure. Those patients who were selected after inclusion criteria and attending the OPD were selected. Patients were advised to bring their lipid profile report in next visit if not already done. The total deranged lipid markers from normal value in human body were presented in the form of frequencies and percentages with 95% confidence interval and compared with standard NCEP chart given below. For data analysis SPSS version 20 were used. Different variables were calculated through frequency and percentage.

RESULTS:

In our study a total of 383 cases were selected among which 210 were found to have deranged lipid markers from normal value in human body(table1). The minimal age is 30 years and maximum age is 70 years. Most of the selected patients were in the age group of 46-55yrs (65%) followed by 56-70yrs age group (53%) as shown in graph 2. There were 200 females and 183 male patients included in our study, among which 110 females (55%) and 100 males (55%) were found to have deranged lipid markers from normal value in human body graph 2.

DISCUSSION:

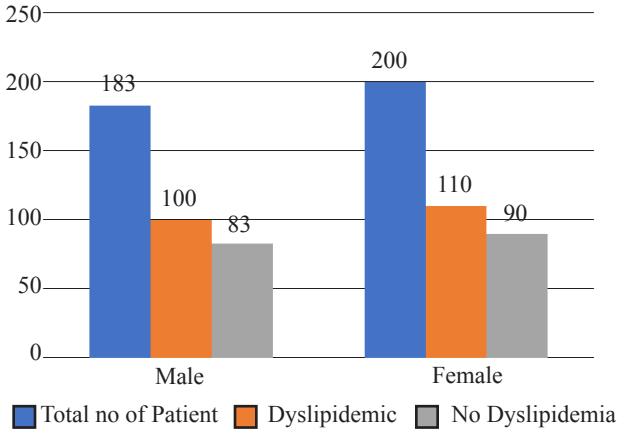
This study has been conducted to see the association of deranged lipid profile in patients with diabetes mellitus. In our study it is observed that out of total 383 patients with diabetes mellitus, 210 (55%) were found to have deranged lipid markers from normal value in human body. The results showed in our study that in diabetic patients the levels of different lipid markers were above the normal required range seen in human body and the outcome was also consistent with previous studies.[17] In our study there were slightly more females 200, among which 55% had deranged lipid markers from normal value in human body, as far as in males out of total 183 patients, 55 % had deranged lipid markers from normal value in human body (graph1). The frequency of deranged lipid markers from normal value in human body was 55% in diabetic patients in our study is consistent with two different previous studies which also shows the presence of deranged lipid markers from normal value in human body in diabetic patients.[18,19] Sedentary life style, increasing shift

Deranged lipid markers from normal value in human body	Frequency	Percentage
YES	210	55%
NO	173	45%

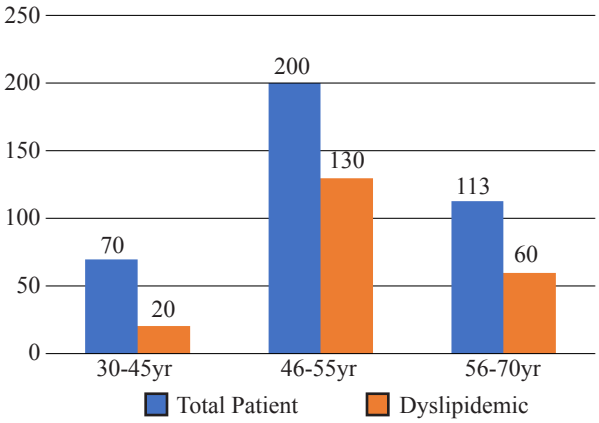
Table:1 frequency & percentage of have deranged lipid markers from normal value

Classification of lipids	Total cholesterol mg %	LDL-C mg%	HDL -C mg %	TG mg%
Desirable	< 200	< 100	>60	< 150
Near optimal	-	100- 129	Higher value is better	-
Borderline High	200 - 239	130 – 159	-	150- 199
High	240 and above	160- 189	59- 40	200- 499
Very high	-	190 and above	< 40	500 and above

Classification of lipids NCEP ATP 111



Graph 1: Distribution of deranged lipid markers from normal value in human body according to Gender



Graph 2: Distribution of deranged lipid markers from normal value in human body according to age group

Total No of Patients with deranged lipid markers from normal value in human body (210)	No of patients with elevated Serum cholesterol 140	Percentage % 66.6%
	Total no of patients with elevated Serum triglycerides (TG) 120	57%
	Total no of patients with elevated LDL-C 160	76%

Table 2: Percentage of Derangement in Lipid profile in Diabetics

of population from simple village life to mechanize life of cities, minimal physical activity due to the use of these hi-tech appliances and change of pure diet plan using junk meal causes increase weight that leads to development of tendency to have increase blood sugar level.[20] The risk of cardiovascular diseases in diabetic patients is more likely as compared to normal human beings. Lipid abnormalities (increased level of low-density lipoprotein, triglycerides and decrease levels of High-density lipoprotein) are a predisposing factor for deposition of these lipid in arteries. Deranged lipid markers from normal value may be due to unbalanced metabolic state in diabetes and better control of diabetes does result in progressive decline in diabetes-associated deranged lipid markers from normal value in human body. In our study elevated low density lipoprotein (76%) followed by the next common abnormalities being increase in serum cholesterol (66.6%) and TG level. (57%) (table 2) is also consistent with studies done in the past.[21,22] In the other study done in past showed elevated triglycerides more than serum cholesterol.[23] In our study maximum (68.5%) of the sample population were 40 years. Comparing in different age groups, among diabetics, patients who are specially in 46 to 55 years of age, were more found to have deranged lipid markers from normal value in human body (65%) (graph 2) then other age groups. The next age group which was more affected was 56 -70 years of age in which 53% of patients were having deranged lipid markers from normal value in human body (graph2). Previous studies also showed that increasing life span plays a major role in the risk of developing hyperglycemia.[17,24] Mortality in diabetics is associated with deranged levels of different of lipid marker.[19,25,26,27,28] So early detection and treatment of deranged lipid markers from normal value in human body especially with hyperglycemia can prevent the progression of disease and limit the morbidity and mortality due to cardiovascular events, and cerebrovascular accident.[29] The limitation of the study was the small sample size in one lab and the financial constrains. It was recommended that patients with diabetes should be considered to be given lipid lowering therapy like statins along with life style modifications to prevent them from coronary artery disease especially in an age group of 55-70 years.

CONCLUSION:

It was concluded that diabetes was associated with higher frequency of deranged lipid markers from normal value in human body and was associated with increased atherosclerotic changes in coronary arteries.

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