ORIGINAL ARTICLE

GENDER DIFFERENCES OF DYSLIPIDEMIA IN TYPE 2 DIABETICS

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Background: Type II diabetic patients are at an increased risk of coronary artery disease and cerebrovascular disease because of deranged lipid metabolism. Female diabetic patients are predominantly at risk. The objective of this cross-sectional study was to determine effects of gender on dyslipidemia of type II diabetic patients. **Methods:** This study was carried out at Out-Patients Department, Medical A Unit, Ayub Teaching Hospital Abbottabad from 27th May to 27th November 2009. All type II diabetic patients who were above 40 and gave consent were included in the study. Data was collected through a structured proforma. Pattern of dyslipidemia in type II diabetic patients were estimated by computing all the four types of dyslipidemia like hypertriglyceridemia, low HDL, increased serum total cholesterol and increased serum LDL. **Results:** There were 150 patients with mean age 65.67±11.29 years. There were 80 (53.33%) male and 70 (46.7%) female patients. Mean BMI was 28.45±3.30 Kg/m^2. Mean serum cholesterol level was 3.9±1.31 mmol/L, triglyceride level was 2.98±1.14 mmol/L, LDL level was 3.28±0.85 mmol/L and HDL was 0.95±0.02 mmol/L. Women were more frequent to have low level HDL as compare to men ($p<0.05$), while no significant difference was found regarding serum cholesterol, serum triglyceride and serum LDL ($p>0.05$). **Conclusion:** Female diabetic patients have increased frequency of low level of serum HDL as compared to males.

Keywords: diabetes, dyslipidemia, gender

INTRODUCTION

Presence of lipoprotein disorders is a very common finding in diabetic patients and is the major contributor to the morbidity and mortality from cardiovascular diseases. According to ATP 111 guidelines, diabetic dyslipidemia is defined by the presence of high serum total cholesterol, high serum triglyceride, high LDL-C and low serum HDL in type 2 diabetic patients.[1]

The typical pattern of dyslipidemia present in type 2 diabetic patients is a raised triglyceride levels and low HDL cholesterol. Other associated findings may include increase in LDL particle number, small dense LDL, and apolipoprotein (apo) B.[2] Patients with diabetic dyslipidemia have lipid particles that are more artherogenic than in general population and even are at slightly increased risk of cardiovascular morbidity and mortality.[3] Diabetic patients have a tendency of increased transport of large amounts of fatty acids to liver which are then reassembled in to triglycerides and secreted in VLDL, defective insulin action and hyperglycaemia could lead to these lipoproteins abnormalities.[4] Control of hyperglycaemia and associated lipid abnormalities is very well identified as a modifiable risk factor among patients with type II diabetes and is also a very important primary preventive measure for coronary artery disease.[5] It has been reported that type 2 DM increase the risk of CHD more markedly in women than in men.[6–8]

MATERIAL AND METHODS

This study was conducted at Ayub Teaching Hospital Abbottabad from 27th May 2009 to 27th November 2009. Patients, who were of age ≥40 years and either sex, diagnosed as a case of diabetes mellitus type 2, were included in the study. Diabetic patients with chronic renal failure, nephrotic syndrome, myxedema, family history of dyslipidemia and patients taking drugs like beta-blockers, thiazide diuretics or glucocorticoids were excluded from the study.

Consent was taken from the patients to record the data that include age, sex, height, weight, BMI, serum lipid profile. All the data was recorded on pre-designed proforma. The weight and height of all the included patients were measured by using health scale ZT-120. The patients were weight with minimum clothes and without shoes. Body mass index was calculated by using the Quetelet formula [weight (Kg)/height (m^2)]. Serum lipid profile fasting was assessed by Latest Auto-analysers Selectra 2 (Merck). Patients were divided into two groups based on gender.

All data were entered into SPSS-10 for analysis. Descriptive statistics were used to calculate Mean±SD for numeric variables like age, height, weight, and serum HDL cholesterol, LDL cholesterol, triglycerides and total cholesterol levels. Chi-square test was used to see associations between the variables of two groups; *p*-value of ≤0.05 was considered significant.

RESULTS

There were 150 diabetic patients enrolled with mean age of 65.67±11.29 years. There were 80 (53.33%) male and 70 (46.7%) female patients. Mean height of the patients was 166.7±6.14 Cm, mean weight was 75.95±9.43 Kg and mean BMI was 28.45±3.30 Kg/m^2. Mean serum

cholesterol level was 3.9±1.31 mmol/L, triglyceride level was 2.98±1.14 mmol/L, LDL level was 3.28±0.85 mmol/L and HDL was 0.95±0.02 mmol/L. There were 58.0% (87/150) patients with high level of serum cholesterol, out of which 49.4% (43/87) were male and 50.5% (44/87) were female with high level of serum cholesterol and this difference was not significant statistically (p>0.05). There were 82.7% (124/150) diabetic patients with increased level of serum triglyceride, out of which 52.4% (65/124) were male and 47.6% (59/124) female patients with hypertriglyceridemia with no statistically significant differences (p>0.05). Raised LDL level was found in 54.7% (82/150) of the patients, out of which 47.5% (39/82) were male and 52.4% (43/82) were female with no statistically significant difference (p>0.05). While low HDL level was found 64.6% of the patients, out of which 30% (29/97) were male and 70% (68/97) were female, frequency of female patients with low HDL level were high as compare to male patients and this difference was statistically significant (p<0.05).

Table-1: Demographic parameters of all diabetics

Parameters	Value
Age	65.67±11.29 years
Male	80 (53.3%)
Female	70 (46.7%)
Height	166.7±6.14 Cm
Weight	75.95±9.43 Kg
BMI	28.45±3.30 Kg/m^2

Table-2: Gender differences between anthropometric parameters of diabetics

Variables	Gender		*p*-value
	Male (n=80)	Female (n=70)	
Weight	76.6±8.62	82.8±6.79	0.584
Height	167.68±5.687	167.35±5.182	0.946
BMI	27.49±3.46	29.53±2.74	0.001

Table-3: Lipid profile of all patients (Mean±SD)

Variables	Value
Serum Cholesterol	3.9±1.31
Triglycerides	2.98±1.14
Low Density Lipoproteins (LDL)	3.28±0.86
High Density Lipoproteins (HDL)	0.959±0.02

Table-4: Lipid profile level in male and female diabetics

Variables	Total (n=150)	Men	Women	*p*-value
Raised Serum Cholesterol	87 (58.0%)	43 (49.4%)	44 (50.5%)	0.441
Raised TG	124 (82.7%)	65 (52.4%)	59 (47.6%)	0.293
Raised LDL	82 (54.7%)	39 (47.5%)	43 (52.4%)	0.528
Low HDL	97 (64.6%)	29 (30%)	68 (70%)	0.000

DISCUSSION

The prevalence of different risk factors in patients of both genders was studied. As all of them were diabetics, males and females were compared for the presence of high serum cholesterol, serum triglycerides, serum LDL cholesterol and low serum HDL levels. High serum TGs was most frequent while raised LDL cholesterol was least frequent. Low serum HDL was the second most prevalent factor. Combination of high serum TGs and low HDL was the most common finding. Similar observations were also reported in African Americans[9] and Urban Korean population.[10] Hypertriglyceridemia was the most common component of diabetic dyslipidemia in this study. Another study in Pakistan also showed hypertriglyceridemia to be the most common component of diabetic Dyslipidemia.[11]

It has been studied that the increase in CHD risk in patients with diabetes is greater in women than in men.[12,13] Low HDL, rather than high LDL cholesterol, is more predictive of coronary risk in women.[14,15] We found that low HDL was frequent in female diabetic patients as compare to male diabetic patients. In western India, the prevalence of low HDL cholesterol was 90.2% in women and 54.9% in men.[16]

CONCLUSION

Female have high frequency of low HDL which is an important risk factor for Coronary Heart Diseases especially in diabetic patients. It is therefore recommended that every diabetic patient should be have a fasting lipid profile measured especially the female to reduce the risk of CHD.

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