

LIPID PROFILE AMONG PATIENTS OF TYPE 2 DIABETES MELLITUS

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ABSTRACT

Background: Diabetes mellitus is a syndrome having effects on blood sugar and lipid profile. **Objective:** To explore and compare the pattern of dyslipidaemia in male and female patients of type 2 diabetes. **Design:** A observational comparative study. **Setting and place of study:** This study was conducted in Medical Unit-2 of Bahawal Victoria Hospital Bahawalpur, over a period of 6 months from 1st January, 2011 to 30th June, 2011. **Procedure:** A total of hundred diagnosed cases of type 2 diabetes were randomly selected for study. Those who had hyperlipidaemia due to secondary causes such as nephrotic syndrome, hypothyroidism and drugs etc. were excluded. Blood samples were taken for fasting and random sugar and fasting lipid profile. For statistical analysis student "T" test at 5% level of significance was applied. **Results:** The female patients were found to be overweight and hypertensive and they had uncontrolled hyperglycemia as well. Their systolic blood pressure was 150±25.75 mm/Hg and diastolic B.P was 90.6±17.6mm/Hg. The mean blood glucose concentration was 246.64±105mg/dL. The mean concentration of lipids was significantly raised among females as compared to males. Collectively in female patients the values of LDL-C, triglycerides and HDL-C was 191±31.81 mg/dL, 179±93mg/dL and 32±2.4mg/dL respectively, all in high risk range. LDL: HDL ratio was 6.0. Although in male patients the mean concentration of LDL was 174±41mg/dL and it was in high risk category, but HDL-C was borderline (35.2mg/dL), and triglycerides were within normal range. LDL: HDL ratio was also in acceptable range. **Conclusion:** The female diabetics were hypertensive, overweight and had more uncontrolled hyperglycemia along with dyslipidaemia as compared to male. The pattern of dyslipidaemia found in these female patients was increase in LDL-C and strikingly decreased HDL-C level.

Key words: Dyslipidaemia, type 2 diabetes, gender

INTRODUCTION

Diabetes mellitus is a syndrome with inappropriate hyperglycemia and disordered metabolism due to defect in insulin production or insulin resistance. This disease is not only a problem for the individual but it is also considered to have a social impact in developing countries because of its complications, mortality and cost. It is recently estimated that more than 180 million people are affected with diabetes worldwide and this number is likely to be more than double by the year 2025¹ Pakistan ranks 7th on diabetic prevalence list with 7 million diabetic population.² This panorama is more obvious if we consider the fact that almost 80% of death in such patients occur in developing countries due to macrovascular complications like coronary heart disease and stroke.³ The central pathological mechanism leading to these complications is atherosclerosis and it is rapidly accelerated due to dyslipidaemia. Although clustering of risk factors like obesity, hypertension and lack of physical

activity have been commonly found in diabetes, but dyslipidaemia has independent role leading to CHD.^{4,5}

Dyslipidaemia has been found as major prevalent risk factor in more than 50% of diabetic patients with C.H.D.⁶ This paradigm has been characterized by American diabetic association as hypertriglyceridermia or decrease in HDL cholesterol. Moreover LDL particles found are more atherogenic because they are easily glycated and susceptible to oxidation.⁷ An issue of interest is contribution of any above mentioned component to CHD as any component can be independently atherogenic. Several international studies have shown that diabetes eliminates the usual gender gap in mortality and may induce atherogenesis along with dyslipidaemia to a greater extent in females than males. So women with diabetes have 8 times more risk of CHD and stroke than women without diabetes.^{8,9} In particular women have worse prognosis after myocardial infarction than their male counterparts.

Although a lot of work has been done on lipids but the concept behind this article arises from the fact that females are neglected section of our society. They have not been well represented in clinical trials of south punjab.

The present study seeks to compare the usual lipid parameters in native diabetic males and females and to assess if these levels conform or differ with trends

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Already known internationally.

This study was conducted to evaluate the serum sugar and lipid profile among male and female diabetic patients of medical unit of Bahawal Victoria hospital, Bahawalpur.

PATIENTS AND METHODS

This hospital based comparative non interventional study was carried out in medical Unit-II of BVH Bahawalpur during 6 months period from 1st January 2011 to 30th June 2011. One hundred diagnosed cases of type 2 diabetes comprising equal number of males and females, and between age of 30-70 years, were randomly selected for study. History and clinical examination was recorded on each perform after taking informed consent.

Those with B.P > 140/90 mm/Hg taken twice or those on anti hypertensives were defined as hypertensive. Fasting blood samples were collected after overnight fast, centrifuged within 15 minutes of venepuncture and lipid levels were determined by means of ELISA (Randox Lab). The concentration of LDL-C was calculated by using the friedwald formula $LDL.C = TC - HDLC$ Serum sugar fasting and random was determined by enzymatic colour test on spectrophotometer. All these collected data were fed and analyzed through computer software SPSS (Version 10). Different frequencies were calculated and presented in tabulated form. Mean values of quantitative data were presented as mean \pm SD (standard deviation). Student "T" test was applied for lipid levels and values were tested at 5% significance level. On the basis of history and physical examination, those patients suffering from chronic liver disease, nephrotic syndrome, hypothyroidism and pregnancy were excluded. Patients with history of contraceptive pills, beta blockers and thiazide diuretics were also excluded.

Current American Diabetic Association and NCEP ATP-III guidelines were used to classify lipoproteins in different risk categories.^{10,7} The values used to define low, borderline and high risk LDL-C were <100mg/dL, 100-129 mg/dL and >130 mg/dL respectively. Cut off values of triglycerides were <200 mg/dL. For HDL values in men, the high risk, borderline and low risk were <35 mg/dL, 35-45 mg/dL and > 45 mg/dL respectively and for women, the cut off points

were <45mg/dL, 45-55 mg/dL and > 55mg/dL respectively. Regarding LDL: HDL ratio, as indicator of cardiovascular disease, for men the acceptable ratio is 4.5 or below and for women it is 4.0 or below. It is noteworthy that LDL: HDL ratio is more pure ratio than TC:HDL ratio, as HDL is measure of 'good cholesterol' and LDL is measure of 'bad cholesterol'.¹¹

RESULTS

A data of hundred patients of type 2 diabetes was analyzed. A comparison of clinical and demographic parameters of subjects are shown in table I. This table shows characteristic differential features by gender. Females were found to be hypertensive and overweight. Systolic blood pressure was 135.7 ± 21.29 mm/Hg in male and 150 ± 25.75 mm/Hg in females, while diastolic B.P was 80.21 ± 13.38 mm/Hg and 90.6 ± 17.6 mm/Hg respectively.

Table No. I: Features of patients based on sex distribution.

Variables	Male	Female
Systolic Blood Pressure	135.71 ± 21.29	150 ± 25.75
Diastolic Blood Pressure	80.21 ± 13.38	90.6 ± 17.6
Blood Glucose (mg%)	228.57 ± 101.6	246.64 ± 105.66
Weight (Kg)	54.39 ± 10.14	60.37 ± 14.75

The mean blood glucose level in males was 228.57 ± 101.6 mg/dL and 246.64 ± 105 mg/dL in females. Both groups showing poor glyemic control, but females had more uncontrolled hyperglycemia and also hypertensive as compared to males.

Table No. II: Mean and standard deviation of lipid concentrations in both sexes.

Lipid Concentrations (mg / dL)	Males N = 50	Females N = 50
Triglycerides	165 ± 49 ☆	179 ± 93
LDL - C	174 ± 41 ☆	191 ± 31.61
HDL - C	35.2 ± 5.2 ☆	32 ± 2.4
LDL:HDL Ratio	4.9	6.0

☆ Significant

Atable. II shows the comparative values of lipoproteins among male and female subjects. In female patients the mean values of LDL-C and HDL-C was 191 ± 31.6 mg/dL (T-value=-2.01 significant) and 32 ± 2.4 mg/dL (T-Value=-23.57 very highly significant) respectively. Both values were in high risk category. LDL: HDL ratio was 6 and significantly raised.

In male patients the mean concentration of LDL-C was 174 ± 41 mg/dL (T-value=13.2) and it was in high risk category while HDL-C was borderline 35.2 mg/dL (T-Value=-6.53).

In females LDL: HDL ratio was significantly in high risk category (6.0), and it provides useful additional information as predicator of CHD, while in males, LDL:HDL ratio was (4.9). The mean concentrations of triglycerides were 165 ± 49 mg/dl in male and 179 ± 93 among females.

DISCUSSION

Despite advances in prevention and management, dyslipidaemia has alarmingly significant relationship in female diabetic patients and have been referred as "Bad companion". This paradigm amplifies its coronary risk in concert with other conventional risk factors like age, obesity and uncontrolled hyperglycemia. The current study is a unique work of paramount importance for this region of South Punjab and it showed striking findings. As far as the baseline parameter are concerned, our study clearly demonstrate that females are hypertensives and overweight than males and they had uncontrolled hyperglycemia as well. It is advantageous here to compare with a large population based survey conducted by Shera AS.¹² They have described useful up-to-date database information. According to their remarkable report, the 79% of diabetic females and 25% of males were overweight. Similarly 70% of females had controlled hyperglycemia and found to be hypertensive as well.

Our baseline results are also inconformity with those reported by Talat Naheed et al¹³ and Sohail Rafiq et al.¹⁴ They have concluded that females had poor glycemic control and they were heavier and hypertensive as compared to male diabetics. Particularly after menopause the diabetic females develop atherosclerosis much faster. This may explain the four fold increased risk of coronary heart disease and stroke in diabetic females.¹⁵

Regarding the pattern of lipoproteins, our female

diabetic patients had significantly elevated level of serum LDL, very low HDL-C and increased LDL:HDL-C ratio, all in high risk range. In male patients, although the LDL was raised but other lipoproteins turned out to be within normal range. Our findings are comparable to international cut off values in diabetics as determined by ADA and NCEP ATP-III. According to their recommendations HDL-C should be essentially more than 45mg/dL for diabetic women and more than 35mg/dL for diabetic men. Moreover LDL-C should be below 100mg/dL.^{7,10}

Considering the above mentioned guidelines, our findings were clearly in high risk range. Taking this perspective our results are also verified by several large longitudinal trials. UKPDS, with the aim to compare lipoproteins among type 2 diabetics, showed that LDL-C was raised and HDL-C was low in diabetic females as compared to male counterparts. Obviously these patients had raised LDL: HDL ratio as well. In practice the results of UKPDS has useful worth. Similar results were made by Bhatti SM et al.¹⁶ Their female diabetic patients had general pattern of dyslipidaemia as raised LDL-C (143 ± 32 mg/dL) and HDL-C levels (39 ± 4 mg/dL), both in high risk category, which triglyceride within normal limits. The results do not always hold the same for similar population group. Our data are in contrast to those recently reported by Riffat Sultana et al.¹⁷ Their female patients have shown normal LDL levels (103mg/dL) and HDL in borderline range (45mg/dL). Our finding of hypercholesterolemia and low HDL-C is further supported by Shahid Habib et al.¹⁸ They have estimated high level of LDL (3.3 mmol/dL), decreased HDL (0.9 ± 0.4 mmol/dL) and borderline triglycerides (2 ± 0.3 mmol/dL) in diabetic females as compared to males while lipid profile was equal in non diabetic males and females. It is high time to consider the results of an international Swedish study because these major trials provide evidence based approach for making recommendations. In this large population cohort it was concluded that 80% of female diabetic had pattern of dyslipidaemia as decreased HDL and increased LDL-C levels.¹⁹

In addition some international observational studies have shown some remarkable conclusion that HDL-C is more frequent risk factor for CHD in women than high LDL-C.²⁰ Almost all of the above reported studies have considered profound clinical interest bringing together to a unifying consideration that in

diabetic females decrease HDL-C is more frequent pattern of dyslipidaemia followed by increased HDL-C levels.

Limitation of our study was small sample size and based on single ward data. Additionally cluster of risk factors should have been analyzed. Further longitudinal studies are required in South Punjab whether our findings can be generalized.

CONCLUSION

In this study we have found that diabetic females had increased LDL and decreased HDL levels along with increased LDL: HDL ratio. They also had hypertension and uncontrolled hyperglycemia as compared to males. In fact this pattern of dyslipidaemia has strong relationship with macrovascular complications.

The health care workers should consider the females as primary focus for advising active life style, heart healthy diet, regular use of statin and optimal glycemic control.

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