



## BIOCHEMICAL ANALYSIS OF LIPID AND BLOOD SUGAR PROFILE IN PATIENTS WITH DIABETES MELLITUS

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### ABSTRACT

**Introduction:** *Diabetes mellitus* (DM) is a batch of metabolic disorders which can be distinguished by rise of blood glucose level emerging from obstruction in insulin secretion, insulin action, and heart disorders. The current study is dealing with the evaluation lipid and blood sugar profile in patients suffering from diabetes mellitus.

**Material & Method:** The study was carried out at general hospital Al-Dawadmi, Kingdom of Saudi Arabia and the results were compared with the normal range for each parameter with 50 cases and 50 controls. **Result:** The results revealed that the female patients with DM represented the considerable increment in the level of TC, TG and LDL-C in contrast to male patients with DM. Results also exhibited that out of all the patients, 50 % suffered from hypercholesterolemia, 60% from hypertriglyceridemia and 70 % with higher range in LDL-C respectively.

**Summary & Conclusion:** The study shows that the lipid divergence, hypercholesterolemia, hypertriglyceridemia and elevated LDL in patients with DM2.

**KEYWORD:** *Diabetes mellitus* (DM) is a batch and elevated LDL in patients with DM2.

### INTRODUCTION

Diabetes is a persistent, often weakening and sometimes deadly clinical and public health complication in Saudi Arabia as well as across the world. *Diabetes mellitus* (DM) is a batch of metabolic disorders which can be distinguished by rise of blood glucose level emerging from obstruction in insulin secretion, insulin action, and heart disorders.<sup>[1-2]</sup> The longlasting hyperglycemia of diabetes is the impermanence that is linked with long-term damage, dysfunction and nonfunction of various organs, which influence mainly the eyes, kidneys, nerves, heart and blood vessels. Many research portrayed that it is the body composition, in which predominantly the body fat and lipid profiles are accountable for enhancing the prevalence of this disease.<sup>[3-4]</sup> The word "dyslipidemia" is so considerably favoured to ascribe the abnormal variations in lipid profile, substituting the old term "hyperlipidemia". Dyslipidemia circumscribe the changes in High density lipoprotein cholesterol (HDL-C), Low density lipoprotein cholesterol (LDL-C), Very low density lipoprotein cholesterol (VLDL-C) and triglyceride level.<sup>[5-6]</sup> It is also distinguished that hyperlipidaemia has been denounced as a risk factor in coronary heart disease (CHD) and atherosclerosis<sup>[7,8]</sup>, in introduction to other risk factors including diabetes mellitus (DM). It influenced the variety of lipid metabolism mechanisms. Administration of hyperlipidaemia in type 2 DM, implicates dietary management and drug therapy. Treatment of hyperlipidaemia has been portrayed to sake DM patients

in diminishing CHD risk.<sup>[9-11]</sup> The word diabetic dyslipidemia embraces a triad of elevated triglycerides, declined HDLC and surplus of small, dense LDL particles. The lipid irregularities are widespread in diabetes mellitus because insulin resistance or insufficiency influences key enzymes and pathways in lipid metabolism.<sup>[12]</sup> The subsequent processes are altered such as: Apo protein formation, order of lipoprotein lipase, activity of cholesteryl ester, transfer proteins and hepatic and peripheral activity of insulin.<sup>[13,14]</sup> It also has been postulated that the constitution of lipid particles in diabetic dyslipidemia is suplemetary atherogenic<sup>[15]</sup>, which explained that even normal lipid concentrations is more atherogenic in diabetic than nondiabetic. The inventive relationship between atherosclerosis and dyslipidemia is well designed. In diabetes the corresponding hyperglycemia, obesity and insulin variations extremely speed up the advancement to atherosclerosis.<sup>[16-17]</sup> Consequently, the current analysis was carried out to evaluate the association/ relation between serum lipid profile and blood sugar profile, and to detect dyslipidemia in patients with type-2 diabetes mellitus.

### MATERIAL AND METHODS

This study was conducted in the Department of Biochemistry, College of Medicine, Dawadmi Shaqra University KSA in association with Dawadmi General Hospital, Dawadmi. KSA.

**The Study group**

The study included-50 subjects of type2 diabetes and 50 controls

**Inclusion criteria**

- ✓ Type 2 diabetes of 1-10 yrs duration.
- ✓ Age group 40-80 yrs.
- ✓ Cases were selected from Dawadmi Hospital, Dawadmi

**Exclusion criteria**

- ✓ All patients of type1 DM
- ✓ Patients with nephropathy, retinopathy and CAD.

**Parameters estimated**

1. Serum glucose

2. Lipid profile- Cholesterol, LDL ,HDL, Triglyceride, VLDL

All the parameter was analysed by Kit Method and using Fully automated autoanalyser.

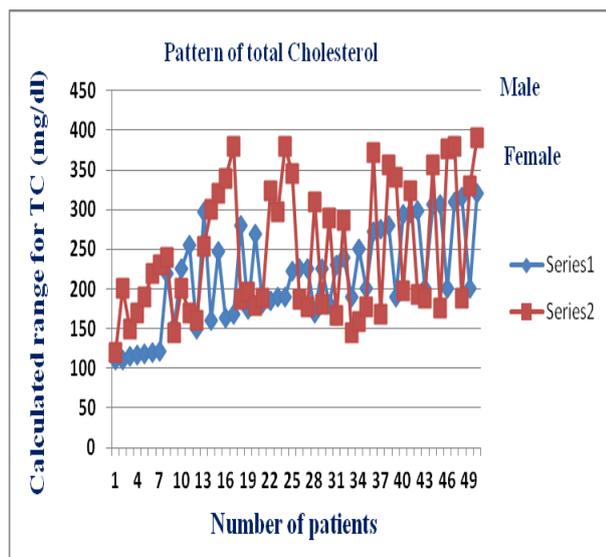
The statistics was done by MedCalc Software.

**RESULTS AND OBSERVATIONS**

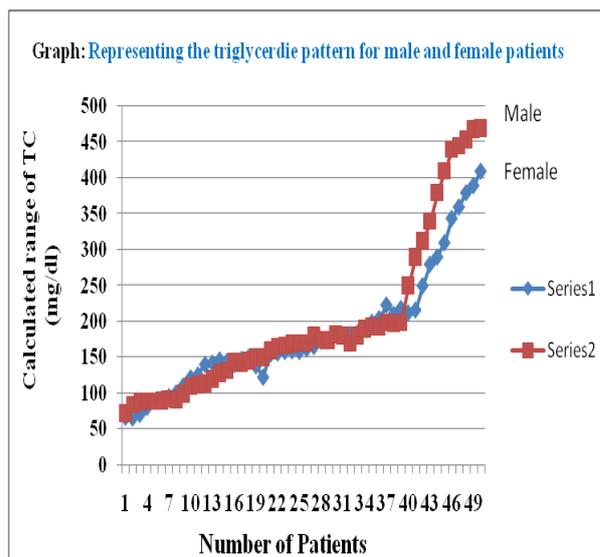
The biochemical investigation displayed that hundred patients both male and female with a ratio 50:50 were studied for the parameters such as Glucose, Cholesterol, triglyceride, HDL-C, LDL-C VLDL-C. The age for both female and male patients under investigation was found 45-78 and 40-75 years respectively. The level of blood sugar displayed that all the patients are hyperglycaemic. The results are reported in **Table-1, figure-1, 2 & 3.**

**Table 1: Representing the FBS, PPBS, TC, TG, HDL-C, LDL-C and VLDL-C profile in female and male patients with DM.**

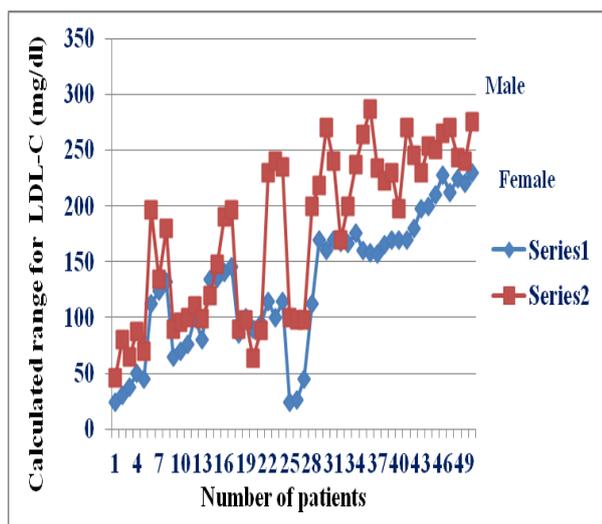
Gender	Test	Normal range (mg/dl)	Calculated range (mg/dl)	Mean (mg/dl)
Male	Glucose (FBS)	70-140	110-460	160.0
Female	Glucose (FBS)	70-110	115-348	155.2
Male	Glucose (PPBS)	70-140	138-600	305.0
Female	Glucose (PPBS)	110-140	139-570	276.0
Male	Total Cholesterol	< 200	110-320	214.9
Female	Total Cholesterol	< 200	128-394	245.9
Male	Triglyceride	50-150	65-450	193.2
Female	Triglyceride	50-150	70-420	181.3
Male	HDL-Cholesterol	35-55	20-65	40.6
Female	HDL-Cholesterol	45-65	25-68	45.0
Male	LDL-Cholesterol	< 100	24-230	129.3
Female	LDL-Cholesterol	< 100	46-275	177.2
Male	VLDL-Cholesterol	15-30	18-136	36.0
Female	VLDL-Cholesterol	15-30	16-80	33.9



**Figure 1: Representing the Total Cholesterol pattern in fifty male and fifty female patients with DM.**



**Figure 2: Representing the triglyceride pattern in fifty male and fifty female patients with DM.**



**Figure 3: Representing the LDL-C pattern in fifty male and fifty female patients with DM.**

### DISCUSSION

The range and mean value of FBS in females were 115-348 mg/dl and 155.2 mg/dl, while the range and mean value of PPBS in females were 139-570 mg/dl and 276.0 mg/dl respectively. While the range and mean value of FBS in males were 110-460 mg/dl and 160.0 mg/dl, while the range and mean value of PPBS in males were 138-600 mg/dl and 305.0 mg/dl respectively. From the results for FBS and PPBS for both male and female patients indicated that in some patient the level of FBS was found disciplined while the level of PPBS undisciplined because of that in some patients the level of FBS was obtained undisciplined. The mean values for TC, TG, HDL-C, LDL-C and VLDL-C in female patients were 200.8 mg/dl, 170.0 mg/dl, 45.0 mg/dl, 123.0 mg/dl and 33.9 mg/dl respectively. The mean values for TC, TG, HDL-C, LDL-C and VLDL-C in male patients were  $180.8 \pm 4.5$  mg/dl, 129.0 mg/dl, 40.6 mg/dl, 103.2 mg/dl and respectively. From the results it can be concluded that the female patients with DM represented considerably the increased level of TC, TG and LDL-C as compared to male patients. Among all patients 50% corresponded to hypercholesterolemia, 60% hypertriglyceridemia and 70% had increased level of LDL-C.

### SUMMARY AND CONCLUSION

The current investigation represented the lipid divergence hypercholesterolemia, hypertriglyceridemia and elevated LDL-C in patients with type-2 diabetes. The analysis was done using the biochemical state of hundred patients suffering from diabetes mellitus. Results of the estimation portrayed that diabetic females have notably higher level of TC, TG and LDL-C than male patients. Among all patients hypercholesterolemia was found in 50% individuals. Similarly, hypertriglyceridemia was found in 60% individuals, and increased LDL-C was found in 70% individuals.

### RECOMMENDATION

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