



**Ministry of Higher Education and Scientific Research  
University of Babylon College of Science for Women  
Department of Chemistry**

**Estimation of Total chestrerol and triglycerides levels in patients  
with diabetes mellitus**

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and under the supervision of Dr. Talat Tariq khalil**

**2022-2023**

بسم الله الرحمن الرحيم

يرفع الله الذين امنوا منكم والذين اوتوا العلم درجات والله بما تعلمون خبير

صدق الله العظيم

سورة المجادلة (اية 11 )

### الشكر والتقدير

الحمد لله حبا وامتنانا كان اللسان عاجزا عن بلوغ ادنى شكره

يسرني تقديم هذا الشكر لوالدي و والدتي وكل من كان معي طيلة هذه الرحلة

واشكر كل من علمني او ساهم في تعليمي من اساتذة

واخص بالشكر والتقدير والامتنان استاذي الفاضل الدكتور (طلعت طارق )

على ارشاده لي بالنصح والتصحيح وعلى اختيار العنوان والموضوع المناسب.

## الاهداء

الى من افضلها على نفسي ولم لا فلقد ضحت من اجلي

ولم تدخر جهدا في سبيل اسعادي على الدوام

حبيبتي وصديقتي (امي الغالية)

نسير في دروب الحياة ويبقى من يسيطر على اذهاننا في كل مسلك نسلكه

صاحب الوجه الطيب والافعال الحسنة فلم يبخل علي طيلة حياته

(والدي العزيز)

الى أصدقائي وجميع من وقفوا بجواري وساعدوني بكل ما يملكون وفي اصعدة كثيرة

الى من علموني كل ما اعرفه طيلة سنوات الدراسة الجامعية

(اساتذتي الافاضل) الابوين والاهل والاصدقاء والاساتذة المجلين.....اهديكم بحث تخرجي.

## **Abstract**

The study was designed to evaluate the medical relevance of total Cholesterol levels(T-CH), TG levels, HDL levels ,VLDL levels, LDL in Diabetic disease. Blood samples were taken from departments of a ministry of healthy hospitals. twenty five patient (study group) and twenty five healthy controls (group control). We found that significantly increased Cholesterol levels, LDL levels, TG levels were demonstrated in Diabetic disease ( $p < 0.01$ ). The mean HDL levels in patient with Diabetic disease was significantly lower than the control group ( $p < 0.02$ ).. Moreover, abnormal lipid profile is considered as indicator for insulin resistance (IR) and  $\beta$ -cell dysfunction.

## **Introduction**

Diabetes mellitus defines a group of metabolic disorders characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. It is one of the most common metabolic syndromes, since there are 200 million diabetic individuals in the world; this creates a need to understand the etiology of the disease and the factors influencing its onset(1). Several pathogenic processes are involved in the development of diabetes; these range from autoimmune destruction of the  $\beta$ -cells of the pancreas with consequent insulin deficiency to abnormalities that result in resistance to insulin action(2). Diabetes at least doubles a person's risk of death. The number of people with diabetes is expected to rise to 592 million by 2035(3). In diabetes type 1, the pancreas does not make insulin, because the body's immune system attacks the islet cells in the pancreas that make insulin. In diabetes type 2, the pancreas makes less insulin than used to, and your body becomes resistant to insulin (4). In my study was undertaken to evaluate the association between diabetic mellitus and hyperlipidemia.

## **Triglycerides and Diabetes: What are the Risks?**

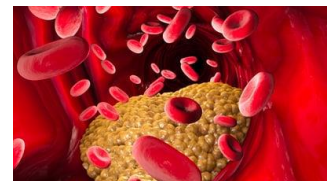
Triglycerides—a type of fat that circulates in the blood along with cholesterol—can be a risk factor for developing diabetes. If you have diabetes, monitoring triglyceride levels may help you better manage your condition.

Much like the link between cholesterol and diabetes, there is a relationship between triglyceride levels and diabetes. While triglycerides may not get much attention, they can be an important indicator of health.

### **How can triglycerides affect diabetes?**

Triglycerides, along with cholesterol, can form fatty deposits that attach to the inside of blood vessels, which can clot, making it difficult for blood to pass through (atherosclerosis). A heart attack or stroke occurs when blood flow to an artery is completely blocked by clot from the fatty deposit.

In addition, having moderately severe to severe hypertriglyceridemia (sHTG) puts you at greater risk of inflammation of the pancreas (pancreatitis), which can cause serious illness and death.



### **How can having diabetes affect triglycerides?**

The best way to lower triglycerides in people with diabetes—whether type 1 or type 2—is to control blood sugar,” said Dr. Charles Alexander, an endocrinologist and diaTribe’s scientific and medical advisor. “For many people with type 1 diabetes, “this may mean they need automated insulin delivery,” he said.

For people managing type 1 diabetes, there are other factors that can cause elevated triglyceride levels. These include fasting, diabulimia, or simply not having enough insulin on board. Alexander also cautions that, for someone with type 1, having elevated triglycerides in combination with severe abdominal pain could also indicate acute pancreatitis.

### **What causes elevated triglycerides (hypertriglyceridemia)?**

If you have diabetes, having glucose levels higher than your target range can, over time, lead to elevated triglycerides.

Being over recommended weight guidelines or drinking large amounts of alcohol frequently can also be causes of hypertriglyceridemia. So can eating a high carbohydrate or high calorie diet.

### **Triglycerides vs. cholesterol: What's the difference?**

While both triglycerides and cholesterol are often mentioned together, they have different functions. Both are types of blood lipids and are connected to heart health. While triglycerides store unused calories that will eventually be converted into energy, cholesterol is used to build cells, vitamin D, bile, and certain hormones.

### **How are triglycerides measured?**

Triglyceride levels are measured with a fasting blood test called a lipid panel, which also measures LDL, HDL, and total cholesterol levels.

According to the Mayo Clinic, the standards for fasting triglyceride levels are as follows:

1. Normal: Less than 150 milligrams per deciliter (mg/dL), or less than 1.7 millimoles per liter (mmol/L)
2. Borderline high: 150 to 199 mg/dL (1.8 to 2.2 mmol/L)
3. High: 200 to 499 mg/dL (2.3 to 5.6 mmol/L)
4. Very high: 500 mg/dL or above (5.7 mmol/L or above)

While being tested for triglyceride levels, don't forget to check other blood lipids (such as HDL, LDL, and total cholesterol), too.

## **Diabetes and high cholesterol often occur together**

That diabetes often lowers HDL (good) cholesterol levels and raises triglycerides and LDL (bad) cholesterol levels. Both of these increase the risk for heart disease and stroke.

An LDL cholesterol level under 100 milligrams/deciliter (mg/dL) is considered ideal.

100–129 mg/dL is close to ideal.

130–159 mg/dL is borderline elevated

High cholesterol levels can be dangerous. Cholesterol is a type of fat that can build up inside the arteries. Over time, it can harden to form a stiff plaque. That damages arteries, making them stiff and narrow and inhibiting blood flow. The heart has to work harder to pump blood, and risk for heart attack and stroke go up.

Lipid tests, such as triglycerides, as well as high-density lipoprotein (HDL) cholesterol, are performed by reading the reflection intensity with the (LipidPlus) device, which is carried out through a series of stages, which are:

Putting the blood sample into the (LipidPlus) device.

Discoloration in the test area, caused by the reaction of the enzyme with substances contained within the test strip.

Automatically decode the tape measure based on the blood sample.

View the final result of the test.

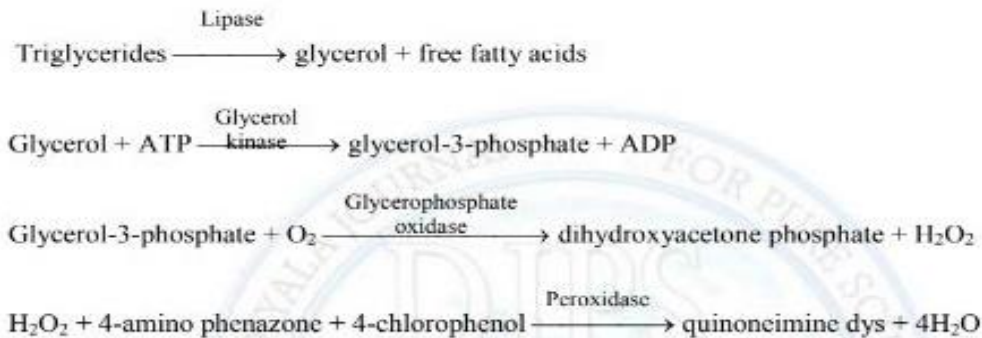
Lipid check

Lipid tests, such as triglycerides, as well as high-density lipoprotein (HDL) cholesterol, are performed by reading the reflection intensity with the (LipidPlus) device, which is carried out through a series of stages, which are

## Estimation of triglyceride level in blood serum

The level of triglycerides in the blood serum was estimated using the analysis kit (Kit) from (Syrbio, Syria), which is

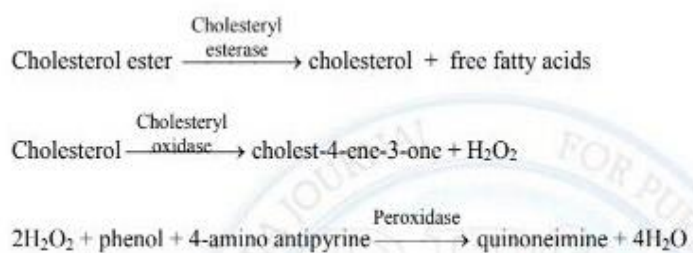
By enzymatic methods



Where the absorbance is measured at a wavelength of (500) nanometers, then the concentration is calculated in comparison with the concentration of the solution (COLLEGE OF SCIEN) Standard and using the simultaneous equation:

## Estimation of total cholesterol level in blood serum

Serum total cholesterol level was estimated using the enzymatic method by the analysis kit (Kit) from the company.



$$\text{T.G (mg/dL)} = \frac{A_{\text{sample}}}{A_{\text{standard}}} \times \text{St.con. (200mg/dl)}$$

$$(\text{mg/dL}) \text{ T.G} \times 0.0113 = \text{mmol/L T.G}$$



Where the absorbance is measured at a wavelength of (500) nanometers, and through the absorbance the cholesterol concentration is calculated

Total compared to the concentration of the standard solution (200mg/100ml) according to the following equation:

$$\text{Cholesterol(mg/dl)} = \frac{A_{\text{sample}}}{A_{\text{standard}}} \times \text{St.con. (mg/dl)} (200 \text{ mg/dl})$$

$$\text{mg/dL (Ch.)} \times 0.0259 = \text{mmol/L (Ch.)}$$

### Experimental Section



**Patient**

40

**control**

40



**Collection of Blood Samples**

5 CCm



**Centrifuge of Blood to obtain serum**

**Lipid profile**

**Spectrophotometric method**

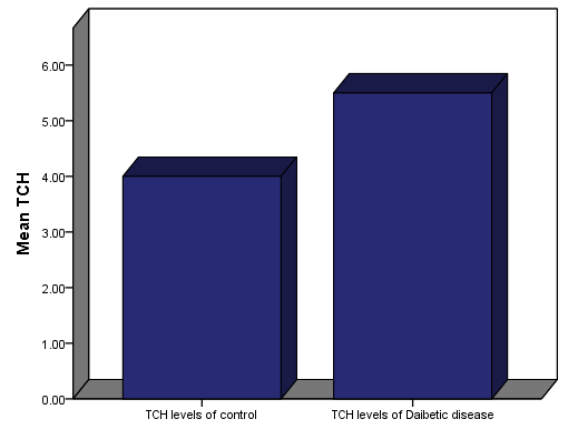


**TG**

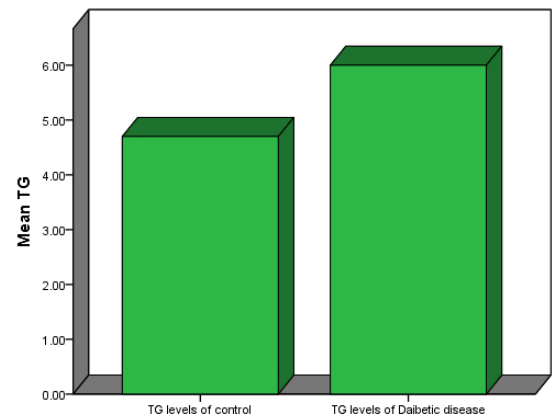
**CH**

## Results and Discussion

### 1-Study TCH in patients of diabetic mellitus.



### 2-Study TG in patients of cardiac disease with and without renal failure



## Conclusion

- 1- The Cholesterol levels, LDL levels, , VLDL levels, and TG levels were more increased in patients with diabetic mellitus than the healthy group.
- 2- The HDL levels were decreased more increased in patients with diabetic mellitus than the healthy group.
- 3- abnormal lipid profile is considered as indicator for insulin resistance (IR) and  $\beta$ -cell dysfunction.
- 4-Diabetic mellitus were caused to development of arthrosclerosis disease.

## References

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