Study of some biochemical parameters for patients withType II Diabetes Mellitus in Al Rifai district

1. **Zahraa Arhym Sabar**
2. **Fatima Karim**

[1,2] University of Sumer – College of Science Department of pathological analyzes

Abstract: Diabetes type second, constitutes a major threat to the health of public, and not ideal it control leads to chronic high level of glucose in the blood, the cause of this type occur due to either resistant cells of the body to the action of insulin hormone, or may be due to the lack of produce adequate amount of insulin from before the pancreas, the spectrum is caused by multiple factors, most notably, weight gain and lack of physical activity .

Symptoms include this disease excessive urination and thirst, constant hunger, weight loss, blurred vision and fatigue. These symptoms may appear suddenly. Diabetes can cause O over time damage to the heart, blood vessels, eyes, kidneys and nerves. second type of diabetes the beta cells are producing insulin naturally, they may also produce a larger quantity, but not be enough to glucose metabolism in the body. This study was conducted in the laboratory of the year Rifai were examined blood samples for patients with diabetes.

These are designed to determine the levels of study (Glucose- Cholesterol _ Triglyceride)It was divided on the basis of the measured calibrator:

1_healthy control aged (15_30) number 20.

2_Diabetic patient aged (15_30) and the number 40.

Where section by women and men were compared between the proportions of healthy and disease show me the results of a significant increase in concentrations

(Glucose_ Cholesterol _ Triglyceride) Compared with healthy and there is also the effect of sex.There are other factors that affect the patient's environment, heh, and his condition for social and Inherit patients and injury to blood pressure.

Key words: DM, lipid, Dhi-qar

1.1. Introduction

Diabetes mellitus (DM) is a chronic metabolic disease, involving in increasing the level of blood glucose due to either impaired insulin production or the body cells doesn't respond to insulin action (insulin resistance) [1]. There are several types of diabetes but the most prevalent type is type 2 diabetes (T2DM) which is account for (90-95%) of diagnosed DM occurs more commonly in adults and elderly people [2]. The most important physiological event in T2DM is insulin resistance which is a condition in which cells dose not respond insulin properly. as the disease progress, a lack of insulin may develop as a result of B-cell dysfunction [3]. The most common risk factors for T2DM are a combination of obesity and physical inactivity [4] Type 2 diabetes mellitus is considered as the ninth leading cause of mortality, as in 2017 alone there was 1 million death attributed to T2DM, globally about 462 million individuals diagnosed with T2DM corresponding to 6.28% of the world's population [5]. T2DM affects approximately 1.4 million Iraqis, with prevalence ranging from 8.5 percent to 13.9 percent [6]. Insulin is a peptide hormone synthesized by pancreatic B-cells Consists of 51 amino acids, it's a heterodimer of A-chain and B-chain attached together by disulfide bridge [7]. Insulin regulates glucose homeostasis by a direct action on liver, muscles, and adipocytes, insulin increases glucose entry to the muscle and adipose tissue, stimulate conversion of glucose to glycogen (glycogenesis) in liver and muscle [8].

The primary task of health management in Type 2 diabetes (T2D) patients is to prevent diabetes-related complications. Previous studies have shown that good control of lipid profiles and glycemic levels can effectively prevent complications such as cardiovascular disease, diabetic nephropathy and diabetic retinopathy [9]. Lipid profiles referred to lipids in plasma, generally including triglyceride (TG), total cholesterol (TC), high density lipoprotein (HDL), and low density lipoprotein (LDL) clinically [10]. For patients with cardiovascular disease and T2D, lipid profiles should be strictly controlled to reduce mortality and complications [11]. According to the American Diabetes Association guidelines, glycemic control needed to be determined based on levels of self-monitoring of blood glucose (SMBG) and glycosylated hemoglobin (HbA1c). As a gold standard for evaluating long term -lycemic control, HbAlc <7.0 was clinically defined as glycemic control [12]. Moreover, thereis a close relationship between glycemic control and control of lipid profiles. On one hand, good control of lipid profiles was one of the important factors influencing glycemic control in patients with T2D [13]. For example, infusion therapy of HDL increased plasma high density lipoprotein cholesterol (HDL-C) levels and reduced plasma glucose levels in T2D patients by increasing plasma insulin and activating AMP-activated protein kinase in skeletal muscles [14]. On the other hand, good glycemic

control contributed to control of lipid profiles for patients with T2D. Fujita Y, et al. reported that short-term intensive glycemic control could significantly decrease levels of TC by improving lipid metabolism [15]. Therefore, good control of glycemic levels and lipid profiles are very important as well as being complicated in patients with T2D. It is worth mentioning that the rate of diabetes the second type are more common with age, but the infection rate for people Azgr not recorded a growing rise was a result of a diet unhealthy and low physical activity. And suffering from obesity.

Research importance and objectives:

These diagnostic criteria and classification serve two main objectives: -

1- classifying people with diabetes to secure appropriate treatment.

2-Providing a means for epidemiological studies and determining the prevalence and incidence of diabetes, and its risk factors, with the aim of planning public health or research on causalities.

3-Providing logical and realistic explanations for the research problem.

4 - That this research contributes, even a little, to enriching this specialty at the governorate level.

2.Materials and Methods:

2.1. Design of Study:

This study has been conducted a group of patients at Diabetics type 2- Al-Rifai General Hospital, Dhi Qar It included (60) samples Disease (41) (males 20 / females 21) of the healthy (19) (males 11 females 8). They age (15_ 30).

2.2. Collection of Blood Sample:

About 6mL of blood samples from Diabetics with treatment and controls were taken and allowed to clot at room temperature in disposable tubes centrifuge to separate it in the centrifuge at 3000 rotor per minute (rpm) for 10 min, serum samples were separated and stored at (-20°C) for later measurement of biochemical parameters, unless used immediately. Measure of Glucose, Cholesterol and Triglyceride by spectrophotometry method

2.3 Statistical analysis

Data analyses were performed through statistical package for social sciences (SPSS) version 26 for Windows. If the P value was less than 0.05, the findings were deemed meaningful. Baseline characteristics were assessed with the student's t-test for continuous variables, and the x^2 test for categorical variables, with two-tailed P-values, less than 0.05 taken as significant.

3-1 Results

The study includes patients' disease with diabetic (number = 40) that compared with healthy control (number = 20) . The clinical and biochemical parameters are measured, including; glucose, triglyceride and cholesterol as shown in figure (3-1).
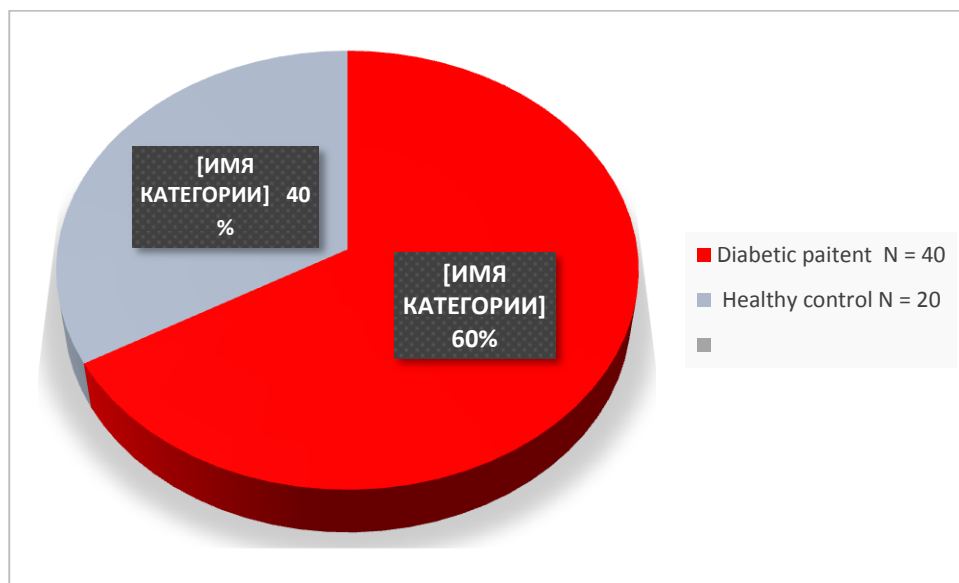
Figure (3-1): The demographic characteristic of study.

Table (3-1): Statistical analysis for Gender, glucose, cholesterol and triglyceride in diabetic patient group compared to healthy control group , using independent t-test (two tailed) and Mann-Whitney *U* test.

Parameter	Diabetic patient (N=40)		Healthy control (N=20)		P value
	mean	SD	mean	SD	
Gender	40		20		0.3610
Glucose	280	89.3	118	32.2	<0.001
Cholesterol	259	63.5	142	28.3	<0.001
Triglyceride	373	145	98.0	22.4	<0.001

This table shows:

• Biochemical parameter (glucose, cholesterol and triglyceride) level showed significantly increase difference (The P value < 0.05) compared to the control group as (total, male and female) numbers,

• There was no non-significant difference for Gender (The P value > 0.05).

Table (3-2): Statistical analysis for Gender, glucose, cholesterol and triglyceride in diabetic patient group as male compared to female , using independent t-test (two tailed) and Mann-Whitney *U* test.

Parameter	Diabetic patient male	Diabetic patient female	P value

	(N=19)		(N=21)		
	mean	SD	mean	SD	
Gender	19		21		0.3610
Glucose	271	85.6	283	96.9	0.574
Cholesterol	255	75.0	257	56.5	0.801
Triglyceride	403	153	343	131	0.190

This table shows:

- There was no non-significant difference for Gender and Biochemical parameter (glucose, cholesterol and triglyceride) (The P value > 0.05), when compared male with female in the same diabetic patient groups.

3-2 Discussion:

Glucose is the major source of energy used by the cells. However, Glucose cannot enter the cell unless insulin is there. In a normally Functioning pancreas, an adequate amount of insulin is produced To move glucose into cells. In an abnormal pancreas, little or no Insulin is produced or the body cells do not respond to insulin that Is produced. As a result, glucose accumulates in the blood and its Concentration is elevated and causes diabetes mellitus . The results of this study showed significant increase of glucose in T2DM when compared with control subjects. The reasons of this State which usually appears after the age of 40 years may include Weakness of β-cell, modicums of insulin production and/ or Function and increasing insulin resistance .

This result matched with the results study of Beltrán-Sánchez et al (2013) and a significant increase in concentrations of FBG in MS group because of that all patients with metabolic syndrome they are diabetics type 2. Where a group of experts tried to develop the common definition of the metabolic syndrome to become more acceptable on a large scale from these definitions given by the World Health Organization (WHO), which is the first organization proposed criteria for determining metabolic syndrome in 1999, Where this organization requires in the diagnosis of metabolic syndrome is substantiate either insulin resistance or diagnosed DM 2 through elevation of fasting plasma glucose (FPG) .[16]

The results of This study showed statistically significant increase in total Cholesterol in diabetes patients when compared with control Subjects. This finding could be attributed to decrease in muscular Exercise or inhibition of cholesterol catabolism.

This result matched with the results of study of . The low level of HDL-c in diabetic patients may increase the risk of atherosclerosis due to the important role played by HDL-c in the transfer of cholesterol from the cells of the body to the liver and thus reduce blood cholesterol. The low level of HDL-c in diabetic patients leads to increased cholesterol levels in the blood .[17]

Moreover triglycerides level was found to be Significantly increased in diabetic patients when compared with Controls. This is attributed to insulin deficiency causing Hyperglycemia and

mobilization of fatty acids from adipose tissue . The fatty acids from adipose tissue are mobilized for energy Purpose and excess fatty acids are accumulated in liver and are Converted to triglyceride.

This result matched with the results study of Grundy SM (1998) who reported that hypertriglyceridemia commonly occurs along with other components of the metabolic syndrome Many investigations reveal that hypertriglyceridemia is closely linked to insulin resistance (Despres J-P1998,Steiner G1994) where Mostaza et al (1998) found that patients with primary hypertriglyceridemia have an elevated turnover rate of non-esterified fatty acids. This elevation suggests that patients with primary hypertriglyceridemia have insulin resistance at the level of adipose tissue. Many studies have also indicated an important predictive role of increased serum TG levels contributing to the risk for CHD, especially patients with type 2 diabetes.[16]

4. Conclusions

Diabetes is a common disease with an increasing prevalence and is divided into three main types: type 1 diabetes, in which the patient needs to use insulin as the main treatment for the disease, and type 2 diabetes, whose treatment depends on a healthy lifestyle and some medications in some cases. Gestational diabetes, which appears in some women during pregnancy and disappears after childbirth, which can be controlled by following the necessary advice and instructions during pregnancy, note that some women may need to take insulin to control blood sugar levels during pregnancy and avoid any.

Epidemiological studies indicate that the incidence of diabetes mellitus, in particular type 2 diabetes, will in- crease significantly over the next few years.Studies have appeared basic significance of, overweight and heftiness especially of long length, in the advancement of sort 2 electrolyte diabetes and support the current public health recommendations long these to diminish the danger of T2DM by forestalling overweight.[18]

From the data in this study, it was conclude the following points:

1- The presence of metabolic syndrome in type 2 diabetic patients lead todisturbances in FBG, thereby HbA,c ratio.

2- There is a significant impact for sex on concentrations of FBG, HbAc, TG, TC, HDL-c,

3- Aging has a negative role on the studied parameters in diabetic patients with

5. References

1. Zou Q, Qu K, Luo Y, Yin D, Ju Y, Tang H. Predicting Diabetes Mellitus With Machine Learning Techniques. Frontiers in Genetics. 2018;9(515).
2. Zheng Y, Ley SH, Hu FB. Global aetiology and epidemiology of type 2 diabetes mellitus and its complications. Nature Reviews Endocrinology. 2018;14(2):88-98.
3. Oguntibeju OO. Type 2 diabetes mellitus, oxidative stress andinflammation: examining the links. International journal of physiology, pathophysiology and pharmacology. 2019;11(3):45.
4. Glovaci D, Fan W, Wong ND. Epidemiology of diabetes mellitus and cardiovascular disease. Current cardiology reports. 2019;21(4):1-8.

5. Khan MAB, Hashim MJ, King JK, Govender RD, Mustafa H, Al Kaabi J. Epidemiology of type 2 diabetes–global burden of disease and forecasted trends. Journal of epidemiology and global health. 2020;10(1):107.

6. Abusaib M, Ahmed M, Nwayyir HA, Alidrisi HA, Al-Abbood M, Al- Bayati A, et al. Iraqi experts consensus on the management of type 2 diabetes/prediabetes in adults. Clinical Medicine Insights: Endocrinology and Diabetes. 2020;13:1179551420942232.

7. Hirsch IB, Juneja R, Beals JM, Antalis CJ, Wright Jr EE. The evolution of Insulin and how it informs therapy and treatment choices. Endocrine reviews. 2020;41(5):733-55.

8. Petersen MC, Shulman GI. Mechanisms of insulin action and insulin Resistance. Physiological reviews. 2018;98(4):2133-223.

9. Jaiswal, M.; Schinske, A.; Busui, R.P. Lipids and lipid management in diabetes. Best Pract. Res. Clin.Endocrinol. Metab. 2014, 28, 325–328. [CrossRef] [PubMed]

10. Catapano, A.L.; Graham, I.; De Backer, G.; Wiklund, O.; Chapman, M.J.; Drexel, H.; Hoes, A.W.; Jennings, C.S.;Landmesser, U.; Pedersen, T.R.; et al. 2016 ESC/EAS guidelines for the management of dyslipidaemias.0Eur. Heart J. 2016, 37, 2999–3058. [CrossRef] [PubMed]

11. Alalwan, T.A.; Perna, S.; Mandeel, Q.A.; Abdulhadi, A.; Alsayyad, A.S.; D'Antona, G.; Negro, M.; Riva, A.; Petrangolini, G.; Allegrini, P.; et al. Effects of Daily Low-Dose Date Consumption on Glycemic Control,Lipid Profile, and Quality of Life in Adults with Pre- and Type 2 Diabetes: A Randomized Controlled Trial.Nutrients 2020, 12, 217. [CrossRef] [PubMed]

12. Basu, A. Role of Berry Bioactive Compounds on Lipids and Lipoproteins in Diabetes and Metabolic Syndrome.Nutrients 2019, 11, 1983. [CrossRef]

13. Silvio, E.I.; Richard, M.B.; John, B.B.; Michaela, D.; Ele, F.; Michael, N.; Anne, L.P.; Apostolos, T.; Richard, W.; David, R.M. Management of Hyperglycaemia in Type 2 Diabetes, 2015: A Patient-Centred Approach. Update to a Position Statement of the American Diabetes Association and the European Association for the Study of Diabetes. Diabetologia 2015, 58, 429–442.

14. Artha, I.M.J.R.; Bhargah, A.; Dharmawan, N.K.; Pande, U.W.; Triyana, K.A.; Mahariski, P.A.; Yuwono, J.;Bhargah, V.; Prabawa, I.P.Y.; Manuaba, I.B.A.P.; et al. High level of individual lipid profile and lipid ratio as a predictive marker of poor glycemic control in type-2 diabetes mellitus. Vasc. Health Risk Manag. 2019, 15,149–157. [CrossRef]

15. Drew, B.G.; Duffy, S.J.; Formosa, M.F.; Natoli, A.K.; Henstridge, D.C.; Penfold, S.A.; Thomas, W.G.; Mukhamedova, N.; de Courten, B.; Forbes, J.M.; et al. High-density lipoprotein modulates glucose metabolism in patients with type 2 diabetes mellitus. Circulation 2009, 119, 2103–2111. [CrossRef]

16. J, Hameed B, Das G, Siddiqui MA, Ahmad I (2005). Postprandial hypertriglyceridemia and carotid intima – media thickness in north Indian type 2 diabetic subjects. Diabetes Res Clin Pract 69:142-50. Aisen, P. (1984). Transferrin metabolism and the liver. Semin. Liver Dis. 4:193-206.

17. Genest, J.J.; Cohnjs, A.; Am, J. and Cardiol, (1995) 67:8.

18. Powers, A.C. (2005). Diabetes Mellitus. In: Kasper DL (ed). Harrison's Principles of Internal medicine. 16th ed. Mc Graw- Hill companies. Inc.; Vol II: pp 2152-8