

Evaluation of Interleukin 17 A Level and Lipid Profile in Diabetic Female Patients Treated by Metformin and Glimepiride in Kirkuk City Iraq

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The study was conducted on patients with type 2 diabetes in Kirkuk governorate for the period from March 2016 to July 2016. The aim of the study was to evaluate some variables for diabetics who were referred to clinics and specialized laboratories in Kirkuk governorate. The study included 124 female samples ranging in age from 38-69 years. These samples were divided into 4 groups. A group of 40 healthy samples representing the control group were free of diabetes and chronic diseases. Group (B) of the 18 sample, and included patients with type II diabetes are treated with the drug Glimepiride . And group (C) of 29 samples of diabetic patients treated with metformin and group (D) 37 samples of diabetic patients treated with metformin and Glimepiride together. The results of the present study showed that there were significant statistical differences ($p= 0.05$) for the body mass in general in patients with Type 2 diabetes mellitus when compared with healthy control. Also, there were in statistically significant increase ($p= 0.05$) in HbA1c and blood glucose for diabetic patients in the three groups compared to healthy females. The results of the current study showed that interleukin 17 was higher in diabetic patients in general, especially in the group C, D with a significant level ($p= 0.05$) compared to the healthy. As for the fat level a significant levels were recorded ($p= 0.05$) ($p= 0.01$) . There was a significant overall increase in both TG LDL VLDL CH and a decrease in HDL.

Keywords: Interleukin 17 A; Metformin; Glimepiride; diabetes m; Lipid profile.

Diabetes is defined by the World Health Organization (WHO) and the American Diabetes Association (ADA) is a group of metabolic diseases diagnosed by hyperglycemia and is caused by restricted insulin secretion, insulin action, or both¹.

Diabetes has several side effects affecting body organs that share with each other a basic physiological condition of high level of blood glucose in the serum². Diabetes is classified into two basic types are the most common:

Type 1 is called Insulin dependent diabetes mellitus IDDM -Type, which is a complete

lack of insulin and accounts for 5-10 percent of the total diabetes³ There is no way to prevent the infection of this pattern, which can affect children and adults, but traditionally known as sugar Infants because children are infected mostly⁴.

The second type is called Nondependent insulin diabetes mellitus (NIDDM -type 2), which is common among adolescents and adults, there is insulin secretion but there is insulin resistance⁵.

It is the world's second-most prevalent type, with an annual increase from 150 million in 2000 to 220 million in 2010⁶. High glucose in

both types of patients is attributed to the relative or absolute deficiency of insulin secretion or the action of this hormone or both, causing disturbance in the metabolism of important nutrients, including carbohydrates, fats or proteins, all of which result in an increase in glucose than normal in the blood⁷.

Cholesterol is a fatty substance found throughout the body. Increased rates leading to multiple diseases. As for triglycerides they are necessary for energy source, also high-density lipoprotein (HDL) and very low density (VHDL) has an important role in the human body and the occurrence of any imbalance in fat natural levels cause the emergence of a number of diseases⁸.

Some studies have shown that high blood glucose is often accompanied by an increase in fat^{9, 10} as high fat in diabetic patients usually consists of a marked rise in the level of cholesterol, triglycerides and also LDL¹¹.

The increase in sugar leads to auto oxidation by the glucose leading to additional free radicals (O₂ and HO) production¹². Free radicals generated results in fat oxidation, especially lipid peroxidation, at the root of the cell, producing lipid peroxid¹³, which can be inferred Maldonaldehyde (MDA), which indicates the relationship of fat to the groups of lipoproteins (plasma lipid levels), VLDL, LDL, HDL, triglyceride TG, cholesterol¹⁴.

TH17 cells were recently described as T-cells that produce interleukin 17 (IL-17A), IL-21, IL-17F and IL-22¹⁵. Interestingly, studies have shown that the main cytokines for (TH-1) and (TH-2), such as IL-4, act as a promoter of cell activation and differentiation for (TH-17)¹⁶. The IL-17 family comprises six of the cytokines called IL-17A (IL-17A), IL-17B, IL-17C, IL-17E, IL-17F, and IL-25¹⁷. where IL-17A and IL-17F are produced by (TH-17) and these two types converge in terms of structure where TH-17 cells produce three different forms of these cytokines (IL-17A \ A), IL-17A / F and IL-17RC, These are present in all tissues that have been detected recently¹⁸.

Other IL-17 producing cells, including PMNs, CD8 + T cell cells, macrophages and fibroblasts¹⁹. have increased evidence in recent years that any defect in gene expression in cytokines (IL- 17) may play a role in rheumatoid arthritis²⁰.

T2DM may alter the function of immune cells and produce inflammation which in which

is chronic low grade and associated with chronic low grade and associated with insulin resistance²¹

Recent studies have been demonstrated that T-helper cell 17 as a subset of CD4 t cell has an important role in the development of auto immunity in animal and human models of diabetes mellitus²²

There is a wide range of treatments that work in different mechanisms including those controlling fats and other enzymes or hormones lead to control the glucose level of in the blood, such as metformin reduces the glucose in the liver and reduces the glucose taken from the body and thus reduce glycation, controlling weight, affects the metabolism of fat and sugars and decrease urination by 5%.²³.

The effect of Clibramide also has a role in controlling blood glucose. The present study aims to monitor the effect of antiglycemic drugs on lipid levels and interleukin 17 in patients with type 2 diabetes and the putative relationship between them.

MATERIALS AND METHODS

Laboratory Materials and Kits

In the present study, several materials and kits whose names and originators are listed below, have been used:

Study Population

The study was conducted in the city of Kirkuk on women with type II diabetes for the period from March 2016 to July 2016. Samples selected from healthy women accompanying patients and the patients with diabetes type II attending private clinics and hospitals. Also the collection of samples taken from other places

Table A. The names of the Kits used in the present study

Kits	Manufacture / Origin
CHOL ₂ Kit	Cobas C111 / USA
HDLC ₃ Kit	Cobas C111 / USA
LDL-c Kit	Cobas C111 / USA
TRIG Kit	Cobas C111 / USA
HbA _{1c} Kit	Stanibo
Suger Kit	Randox
Human IL-17 Elisa Kit	Bio assay Technology - laboratory / USA

scattered From the city of Kirkuk. The conducted analytical and laboratory tests done on blood samples in a private laboratory in doctors street in Kirkuk city.

About (120) samples of women with type 2 diabetes were selected (age 38-69) years. These samples were divided into 4 groups and were as follows. Group (A) consists of 40 healthy samples representing the control group, where this group is free from diabetes and chronic diseases. And Group B (18) patients with type 2 diabetes are treated with Glimperiride . And group (C) of 29 patients with diabetes treated with metformin and group (D) and included 37 samples of diabetes patients treated with metformin and Glimperiride together.

The specific information on the Questionnaire sheet was recorded accurately for each samples under study. The samples were selected based on the criteria of selection and survey. Information was collected about socio-demographic characteristics, age, weight, height and lifestyle , And the type of medication they take for each patient. In this study, the samples were collected excluding those who suffer from fat disorders and those who suffer from diabetes, hypertension, kidney diseases, cardiovascular disease, acute infections, liver diseases and chronic diseases Other for the control group.

Collection of Blood Samples

Blood samples were collected after fasting (10-14) hours for both healthy and diabetic patients, and 5 mL of venous blood was withdrawn from each sample by slow motion of the venous blood by a needle syringe. The blood sample was placed in disposable tubes and then left at room temperature for 15 minutes for blood clotting. Then the tubes were centrifuged for five minutes at 3000 cycles per minute. The blood serum was then separated and tested. The TG-LDL-HDL-CHO of fat groups was examined and VLDL was calculated by dividing the triglycerides by 5 (al et Friedewald, 1972), and the glucose and HbA1c were calculated on the same day .The remaining part of the serum in the tubes kept in Eppendorf tubes under (20 C) until interleukin 17 to be tested.

Anthropometric Variables

The body weight was measured in kilograms with an error rate of not more than 0.01 kg (24). In addition, (BMI). These measurements were used to calculate body mass index (BMI). Body mass index (BMI) was measured from the measurement of weights and height using the following equation:

$BMI = \text{Weight in kg} / \text{height (height) in meters}^2$
Global levels such as body mass index (BMI) were adopted:

Table 1. Comparison of body mass of healthy patients with groups of diabetics according to different types of treatment

DNO=37	CNo=29	Mean ±SD BNo=18	ANo=40	Study group Variable
25.4±2.19*	28.3±5.11*	27.6±3.29*	22.1± 1.33	BMI Kg/m ²

Table 2. Comparison of the level of sugar and HbA1c for patients and healthy controls

D NO=37	C No=29	Mean+SD B No=18	A No=40	Study group Variable
7.97±2.71*	8.85±3.99*	7.49±2.91*	4.33±1.12	HbA1c%
170.33±31.44*	200.71±42.15*	185.41±29.22*	93.15± 8.9	Fasting blood suger mg/dL

** Highly significant $p \leq 0,01$

*Significant $p \leq 0.05$

ns : Non significant $p > 0.05$

Underweight (BMI) <18.5 kg / m²

Normal Weight (BMI) = (18.5-24.5) kg / m²

Overweight BMI = (25-29.9) kg / m²

Obese BMI- (30-34.9) kg / m²

Very obese (Several obese) BMI = (35-39.9) kg / m²

Statistical analysis

The statistical data were statistically analyzed using the TAB test. The mean and standard deviation of the data under study were obtained. P_value was used as a significant statistical significance (p < 0.05) and high statistical significance (P < 0.01)

RESULTS AND DISCUSSION

The samples were divided into 4 groups and were as follows. Group (A) consists of 40 healthy samples representing the control group where this group is free from diabetes and chronic diseases. And Group B (18) of patients with Type 2 diabetes are treated with Glimepiride . And group (C) of 29 samples of diabetes patients treated with metformin and group (D) 37 samples of diabetic patients treated with metformin and Glimepiride together. The body mass of the control group was compared with groups of diabetics of different species.

The results of the study showed that there were significant statistical differences for

the body mass. The results showed a significant increase (P < 0.05) in overall body mass in patients with type 2 diabetes. This is consistent with many studies²⁶⁻²⁵ Body Mass and Type II Diabetes The increase in muscle mass leads to lipin secretion, which causes insulin resistance, which interferes with the recipient's phosphorylation of insulin and is followed by the site of the substance on the recipient and thus leads to non-secretion of cells to the hormone²⁷. BMI as signs of obesity The main risk factor for infection With diabetes, these are supported by our study^{28,29}.

Table 2 shows that there is significant difference in the HbA1c rates and glucose significantly increased (p= 0.05) for diabetics compared to the control group, there were significant differences in the rates of HbA1c and sugar groups of B ,C and D.

The continued high glucose in the serum leads to the entry of glucose into the red blood cells, which leads to the sugar of proteins inside the cells leads to the production of hydrogen peroxide H₂O₂ and the presence of iron in the group of free radicals that produce free radicals as in the reaction Fenton³⁰. In general, there was a significant increase in the three groups, but the group of patients treated with Glimepiride with the group D had a lower percentage of glucose and sugar concentration compared with the rest of the treatments (where the results were significantly

Table 3. Comparison of the level of Interleukin 17 for patients and healthy controls

Mean±SD				Study group Variable
D NO=37	C No=29	B No=18	A No=40	
3.16±1.2*	4.99±2.1*	2.71±1.5ns	1.82 ±1.0	IL-17 pg/ml

Table 4. Comparison of the level of lipid profile for patients and healthy controls

NO=37	No=29	Mean ± SD (mg /dL)		Study group Lipid Profile
		No=18	No=40	
200.02±9.9ns	251.19±15.3**	233.15±9.5*	179.36±6.3	Cholesterol
209.41±12.7*	251.11±22.3**	221.12±14.5*	113.22±11.9	Triglyceride
92.55±5.1ns	141.38±7.9**	125.21±7.1*	83.41±4.8	LDL
37.61±2.1*	30.82±1.1*	35.70±2.5*	45.11±3.8	HDL
41.88±2.5*	50.23±4.4**	44.23±2.9*	22.64±2.4	VLDL

increased) ($P < 0.05$), but less in this group. Like all sulfonylureas, glimepiride acts as an insulin secretagogue. It lowers blood sugar by stimulating the release of insulin by pancreatic beta cells and by inducing increased activity of intracellular insulin receptors. On the other hand, Metformin increases the tissue response to insulin and reduces the amount of sugar produced from the liver. Therefore, the two work together and despite the differences in the values of both glucose and HbA1c, Sugar level and HbA1c within the limits required for the diabetic patient and consistent with³¹

The cumulative sugar or total percentage of hemoglobin associated with glucose is the best estimate of the average sugar rate compared to the routine tests for the measurement of blood glucose concentration and is often the most widely used as a chronic sugar dispenser³²

The results of the current study, as shown in table 3, showed that interleukin 17 was higher in diabetic patients in general, especially in group C, D with a significant increase ($p = 0.05$) compared to healthy controls, recording the highest values in group C may be the reason that BMI in this Higher group of diabetic patients³³ Overall, the proportion of interleukin was higher in female diabetic patients in one study³⁴. This study showed that the rate of interleukin 17 is higher in the female diabetics in Kirkuk governorate.

A number of studies have reported a positive correlation between serum IL-17 and glucose levels³⁵. My results also showed that there was a significant positive correlation between IL-17 and insulin level. It has been shown that IL-17 inhibits glucose uptake in vitro and impairs glucose and insulin metabolism in metabolic syndrome and diabetes in young mice³⁶. It seems that patients with type 2 diabetes mellitus, especially females, have significantly higher IL-17 level

The results, as shown in Table 4, showed a significant increase in all levels of Cholesterol, triglyceride, GTL, LDL, and significant decrease in LDL cholesterol levels. High-density lipoprotein (HDL) in the group of diabetic women and that the high level of glucose in the blood often accompanied by high fat level in body³⁷ Overall, the proportion of fat in a group taking metformin and glimepiride less.

The results showed a rise in triglycerides in the group C group. The increase in GT may

be due to the presence of insulin resistance and reduced activity of lipase lipoprotein. The low activity of this enzyme leads to increased levels of triglycerides (GT) Triglyceride³⁸, possibly due to the fact that metformin increases the body's response to insulin and inhibits the process of carrying glycogenolysis³⁹

This group may be larger in body mass. Increased body mass increases the number of diseases, including and resistance to insulin and is associated with increasing the production of cholesterol and primarily increase LDL and thus lead to increased the incidence of atherosclerosis and other heart diseases⁴⁰, and in a study found that there are significant levels Higher than TG and low levels of HDL-C in women of advanced age and who suffer from excess weight. To explain this, it was found that overweight women in advanced age due to the accumulation of fat and in turn lead to increased release of free fatty acids in circulation. Paving ways for liver cells to increase TG production⁴¹

The results also showed a decrease in HDL. The reason for the increased concentration of TG is insulin resistance and reduced lipoprotein lipase. This decreases the TG level in the blood and thus increases the level of VLDL because it contains a large proportion of TG leading to low HDL and heart disease⁴². The study has shown that there is a relationship between cell resistance to insulin and levels of fatty acids in the serum converted to triglyceride in the liver, muscles and heart, and treatments that increase the sensitivity of insulin cells to the level of these acids⁴³ of the table There is a significant decrease in all groups in HDL, where a decrease in HDL increases the risk of heart disease and arteriosclerosis because it has a significant role in transferring cholesterol from the body cells to the liver and thus reducing cholesterol in the blood vessels⁴⁴. In a previous study performed by our group we recorded, in general, an increase in lipid profile in Kirkuk city Iraq⁴⁵.

Liposuction is also increased in fatty tissues and triglycerides (GT) and low-density lipoproteins (LDL) Because of the low activity of the enzyme Lipase Lipoprotein. So any condition elevating cytokines such as (α-TNF) (IL β-1) in the blood, have the potential to cause fat-increasing⁴⁶.

CONCLUSION

The results of the current study showed that interleukin 17 was higher in patients with diabetes in general, especially in the group C, D with a significant level ($P < 0.05$) compared to the healthy As for the proportion of fat was The significant percentages ($P < 0.05$) ($P < 0.01$) were lost There was a significant overall increase in both TG LDL VLDL CH and a decrease in HDL

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