

Al-Qadisiyah University Collage of Pharmacy



**Relation between some parameters
and patients with type 2 Diabetes Mellitus**

A research

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requirements*

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

وَأَفِيضْ يَا اللَّهُ رَوْحِي إِلَى جَلِيلِي

صَدْرِي يَا اللَّهُ الْعَظِيمِ



Dedication

To the fountain of patience and optimism
and hope

To each of the following in the presence of
God and His Messenger, **my dear mother**

To those who have demonstrated to me
what is the most beautiful of **my brothers life**

To the big heart **my dear father**

To the people who paved our
way of science and **knowledge**

All our **doctors Distinguished**

To the taste of the most
beautiful moments with **my
friends**



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Abstract:

This studying aimed to evaluate the relation between some factors and patients with Diabetes Mellitus type 2.

The study was conducted at AL- Hussain hospital from 1/8/2016 to 15/2/2017 .

Parameters which were involved in this studying include total cholesterol, high density lipoproteins, low density lipoproteins , triglyceride, urea, creatinine , ALT , ALP , systolic and diastolic pressure in patients with type 2 Diabetes Mellitus compared with control groups,

Results recorded significant increase in total cholesterol , low density lipoproteins , urea, creatinine , ALT , ALP , systolic and diastolic pressure in patients with type 2 Diabetes Mellitus compared with control groups, While there was a significant decrease in level of High density lipoproteins in patients with type 2 DM compared with control group .

Introduction:

Diabetes mellitus is a metabolic disorder of multiple etiologies. Its characterized by chronic hyperglycemia together with disturbances of carbohydrate, fat and protein metabolism resulting from defects of insulin secretion, insulin action or both ⁽¹⁾.

It is estimated that 366 million people had DM in 2011; by 2030 this would have risen to 552 million ⁽²⁾. The number of people with type 2 DM is increasing in every country with 80% of people with DM living in low- and middle-income countries. DM caused 4.6 million deaths in 2011⁽²⁾. The incidence of type 2 DM varies substantially from one geographical region to the other as a result of environmental and lifestyle risk factors ⁽³⁾.

It is predicted that the prevalence of DM in adults of which type 2 DM is becoming prominent will increase in the next two decades and much of the increase will occur in developing countries where the majority of patients are aged between 45 and 64 years ⁽⁴⁾. It is projected that the latter will equal or even exceed the former in developing nations, thus culminating in a double burden as a result of the current trend of transition from communicable to non-communicable diseases ⁽⁵⁾.

Type 2 DM is due primarily to lifestyle factors and genetics ⁽⁶⁾. A number of lifestyle factors are known to be important to the development of type 2 DM. These are physical inactivity, sedentary lifestyle, cigarette smoking and generous consumption of alcohol ⁽⁷⁾. Environmental toxins may contribute to the recent increases in the rate of type 2 DM. A weak positive correlation has been found between the concentration in the urine of bisphenol A, a constituent of some plastics, and the incidence of type 2 DM ⁽⁸⁾.

There is a strong inheritable genetic connection in type 2 DM, having relatives (especially first degree) with type 2 DM increases the risks of developing type 2 DM substantially. Concordance among monozygotic twins is close to 100%, and about 25% of those with the disease have a family history of DM ⁽⁹⁾. There are many medical conditions which can potentially give rise to, or exacerbate type 2 DM. These include obesity, hypertension, elevated cholesterol (combined hyperlipidemia), and with the condition often termed metabolic syndrome (it is also known as Syndrome X, Reaven's syndrome) ⁽¹⁰⁾. Other causes include acromegaly, Cushing's syndrome, thyrotoxicosis, pheochromocytoma, chronic pancreatitis, cancer, and drugs ⁽¹¹⁾.

Often, people with type 2 diabetes have no symptoms at first. They may not have symptoms for many years. The early symptoms of diabetes may include: Bladder, kidney, skin, or other infections that are more frequent or heal slowly, Fatigue, Hunger, Increased thirst ,Increased urination The first symptom may also be: Blurred vision ,Erectile dysfunction, Pain or numbness in the feet or hands⁽¹²⁾.

Materials and methods:

this study involved two groups:

1-paients group : included 30 patients (20 males and 10 females) with age (15-80) years and weight (50-120) kg.

2- control group : included 15 healthy subjects (10 males and 5 females) with age (15-80) years and weight (50-120) kg

This research is done in Alhussein education hospital in Al-Muthana city for about seven months from 1/8/2016 to 1/3/2017.

we record many information from patients and control subjects such age,gender,weight,job,physical activity and smoking .

we carried on the following tests for each group of patients and control:

1-High density lipoprotein: found by enzymatic method by use kit manufactured by Randox company(England).

2- Low density lipoprotein: found by enzymatic method by use kit manufactured by Randox company (England).

3- Triglyceride : measured by enzymatic method by use kit manufactured by Randox company(England).

4- Total Cholestrol: measured by enzymatic method by use kit manufactured by Randox company(England).

5- Aspartate transaminase (AST): measured by enzymatic method by use kit manufactured by Randox company(England).

6-Alkaline phosphatase(ALP): measured by enzymatic method by use kit manufacture by Randox company (England).

7-Creatinine : measure by enzymatic method by use kit manufacture by Randox company (England).

Results:

The current study showed significant differences between patients with type2 Diabetes Mellitus and healthy subject.

Table (1) indicate significant increase in total cholesterol , triglyceride , and low density lipoproteins compared with control group.

While High density lipoproteins decreased significant in patients with type 2 Diabetes Mellitus compared with control group.

Table(2) demonstrated significant increase in AST , ALP , Glucose , Systolic and diastolic pressure compared with control group. While ther was not significant differences in the level of ALP between both groups

Table (1) : lipid profile in patients with DM and control.

Test type	Patients	Controls
Total cholesterol mg/dl	205.13 ± 10.73 *	187.33± 7.42
T.G mg/dl	223.83± 58.23 *	196 ± 11.37
LDL mg/dl	136.2 ± 24.88 *	120.86 ± 5.81
HDL mg/dl	42.46 ± 8.11 *	46.13 ± 3.6

***Refers to significant difference between patients and control group**

Table (2) Biochemical and physiological parameters in patients with DM and control

Test type	Patients	Control
AST u/l	30.86 ± 7.82 *	24.6 ± 5.46
ALP u/l	65.86 ± 6.06 *	63.06 ± 3.69
Cr mg/dl	1.73 ± 0.86 *	1 ± 0.66
Blood glucose mg/dl	245.93 ± 26.87 *	105.73 ± 8.37
Systolic pressure	144.33 ± 14.24 *	133.86 ± 6.32
Diastolic Pressure	98.83 ± 9.16 *	90.66 ± 3.71

***Refers to significant difference between patients and control groups.**

test	T	P value
cholesterol	4.36	0.01
LDL	2.31	0.03
HDL	2.59	0.02
T.G	2.22	0.04
AST	2.37	0.03
ALP	2.93	0.01
Cr	3.65	0.05
Blood glucose	2.26	0.04
Systolic BP	3.84	0.02
Diastolic BP	3.35	0.05

Discussion

Many metabolic disorders may occur in type 2 DM

Biochemical problems :

a- Glucose level

If plasma glucose concentration exceeds about 10 mmol/L, glycosuria would be expected. High urinary glucose concentrations produce an osmotic diuresis and therefore polyuria. Cerebral cellular dehydration due to hyperosmolality, secondary to hyperglycaemia, causes thirst (polydipsia). A prolonged osmotic diuresis may cause excessive urinary electrolyte loss. These 'classic' symptoms are suggestive of diabetes mellitus. The decreasing of insulin level lead to decrease the entrance of glucose to cells, this lead to decrease the intracellular energy and increase the hunger (polyphagia) ⁽¹⁹⁾

b- lipid profile

These may be secondary to insulin deficiency. Lipolysis is enhanced and plasma fatty acids concentrations rise. In the liver, fatty acids are converted to acetyl CoA and ketones, or are reesterified to form endogenous triglycerides and incorporated into VLDLs; the latter accumulate in plasma because inhibition of lipoprotein lipase, which is necessary for VLDL catabolism, insulin stimulate lipoprotein lipase. HDL concentration tends to be low in type 2 diabetes. If insulin deficiency is very severe, there may also be chylomicronaemia. The rate of cholesterol synthesis is also increased, with an associated increase in plasma LDL concentrations. Consequently, patients with diabetes may show high plasma triglyceride, raised cholesterol and low HDL cholesterol concentrations ⁽¹⁹⁾

Metabolic reasons for lower HDL levels have not been fully documented. Decreased synthesis of HDL has been found in one small study (Increased clearance of HDL particles from the plasma space may also be operative

particularly in patients with hypertriglyceridemia ⁽¹⁵⁾. Schmitt *et al* ⁽¹⁶⁾. suggested that LDL uptake by fibroblasts may be impaired in type 2 diabetics. This leads to increase in LDL: HDL ratio in type 2 diabetics ⁽¹⁹⁾.

c-Liver enzyme

In hyperglycemic states, there will be intracellular glycogen accumulation in the hepatocytes due to increased glycogen synthesis, causing typical biochemical findings of mild to moderately elevated aminotransferases, normal liver synthetic function, with or without mild elevations of alkaline phosphatase. All these biochemical disturbances and hepatomegaly are found to be reversible with good glycemic control⁽¹⁷⁾.

Strong epidemiological, biochemical, and therapeutic evidence support the premise that the primary pathophysiological derangement, in most patients with NAFLD, is insulin resistance⁽¹⁸⁾. Insulin resistance leads to increased lipolysis, triglyceride synthesis, increased hepatic uptake of free fatty acids, and accumulation of hepatic triglyceride⁽¹⁹⁾. Our data, demonstrating higher serum triglycerides and lower HDL cholesterol in the raised ALT group, support this hypothesis.

d-Glucoseuria

Glycosuria appears when the blood glucose level exceeds the renal threshold for reabsorption of glucose. This normally lies at about 180 mg/dL, but it may be lower in renal tubular disease or elevated in diabetics to above 300 mg/dL. Thus, glycosuria may be absent in these patients despite markedly elevated blood glucose levels ⁽¹⁹⁾

e-Urea and creatinine

in long term of diabetic type 2 kidney function will defect so will decrease GFR so will increase urea and creatinine with urine⁽¹⁹⁾.

f- Blood pressure

hypertension can lead to many complications of diabetes, including diabetic eye disease and kidney disease, or make them worse. Most people with diabetes will eventually have high blood pressure, along with other heart and circulation problems. High blood pressure, or hypertension, is a condition that often affects people with type 2 diabetes. It is unknown why there is such a significant correlation between the two diseases, but it is widely assumed that obesity, a high-fat, high-sodium diet, and inactivity have led to a rise in both conditions ⁽²⁰⁾.

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