



Abstract:

This study was conducted to evaluate the effect of blood sugar level, cumulative sugar on for diabetic patients of Non- Insulin Dependent Diabetes Mellitus and study the change of the physiological and biochemical parameter as (BMI,CBC,TG,LDL,LHL, protein total, Albumin contact) for the patients. The study was conducted on a group of patients from El-Gubba city from within El-Mina General Hospital, where samples were collected, analyzes and tests were performed on patients, the study included 180 for males from type 2 with ages ranging from 30 to 50 years and classification depended to the weight for three group (G1) include 60 patients the range weight from 60 to 75 kilogram and (G2) include 60 patients the weight 75-90 kilogram . and the (G3) include 90 to +100 kilogram and were also taken from 20 healthy people they had the same age and weight around 60 kilogram and this group was free from diabetes or other diseases, so it was considered a control group. The results of the study showed that there was no significant effect for the period of infection in patients, the result showed that a significant differences ($P \leq 0.05$) in BMI between the three groups G1,G2,G3 when comparing with the control group , when comparing G1 with the control group we founded there was no significant difference in the BMI. As the results showed a significant differences at ($P \leq 0.05$) between the G1,G2,G3 with control groups it was found that there were significant differences for the blood groups (WBC/PLT/HB) The results showed a significant increase ($P < 0.05$) in both the FBS,HbA1c level in diabetic patients, comparison with the control group, when comparison the G3 had the highest concentration than G1,G2 comparison with the control group .The results shown indicate a significant increase ($P \leq 0.01$) in the rate of concentration (LDL) and (HDL) in G2 and G3 more than G1 ,while the first group, had similar result to the control group, The results shown indicate a significant increase ($p \leq 0.05$) When comparing the three weight groups, we find that the concentration of TG , increases as the weight of the patients increases , The results shown indicate a significant increase ($p \leq 0.05$) in Total protein, Albumin concentration for G2,G3 than G1 when compared the G1 with the control group we founded no significant differences.



Keywords: Diabetes Mellitus, obesity, physiological, biochemical parameter

Introduction:

Diabetes Mellitus(D.M) :

Recently, diabetes is considered one of the most prevalent modern diseases, as this disease includes a group of metabolic disorders, which are characterized by high blood sugar, which is due to the relative or absolute decrease in insulin secretion as a result of the failure or inability of the pancreatic (B) cells to secrete insulin (CDCP , 2005; AACE, 2000) and this disease was classified into two types:

Type 1: insulin dependent _ diabetes mellitus (IDDM)

Type 2: non-insulin dependent _ diabetes mellitus (NIDDM)

The longer the long-term chronic rise in blood sugar, the greater its effect on various organs of the body, especially the eyes, kidneys, nerves, and vascular tissues (Donnelly et al,2000).

One of the main consequences of chronic hyperglycemia is the glycation of proteins and some other cellular molecules to remove increased amounts of glucose in the blood by chemically binding to free amino acid units in the protein strand, forming an unstable complex that quickly disintegrates back into sugar and protein in the case of The return of the blood sugar level to its normal level, but if the opposite happens, and the blood sugar concentration continues to rise, the reaction will continue in a complex series of irreversible pathways, which results in stable compounds that accumulate in the cell called the final products of advanced glycation, which by accumulating inside the cell leads to damage to the metabolic pathways Normal cell function and loss of normal cell function (Kneedy, L. and Lyon, S., 1989).



The disease also affects the large blood vessels, and the most important thing that results from this is the occurrence of atherosclerosis, which leads to Inadequate blood supply to the feet, which leads to chronic ulcers and gangrene About being a reason for the occurrence of occipital and cerebral apoplexy (Genuth, 2006).

The study Problem:

The prevalence of diabetes in the city of Al-Qubba in particular and in different age groups, which calls for studying this disease from a physiological and statistical point of view.

Aim of study:

The aim of this study is to shed light on one of the causes of diabetes and the most dangerous for the sufferers, which is obesity, which has serious repercussions for society.

The importance of studying:

This study is important in that it covers statistical studies on diabetes, age group and type of diabetes, as well as showing the most important factors affecting this study.

Materials and methods:

The chemicals used were all of the pure analytical type and from various foreign companies. They were obtained ready-made and in the form of standard kits, as shown below:

-1 glucose meter

2-Measuring Kit

Collection of Blood Sample:

In this study, (180) blood samples were collected from people suffering from type 2 diabetes, where these samples were divided into 60 samples for males with an average

age of (30-50) and weight from 60 to 75 kilogram and 60 samples for males with same age and weight from 75-90 kilogram and 60 samples for 90- 100 kilogram , blood was drawn from the study samples by a 10 ml syringe then the blood was divided into two parts ,part in tube type EDTA to perform the HbA1C and CBC test and the other part in Gel Tube to get blood serum and then perform the rest of tests under study .

For comparison purposes, samples were taken (20) sample for males, as this group was free of diabetes with weight from 60kilogram , so it was considered a control group.

Measure weight, height and body mass index:

Body mass index (BMI) or Quetelet world index function is a measure of the human body based on body mass is the best way to measure an individual's height gain. Perform an arithmetic operation based on the measurement of both weights and tables, and is calculated by dividing the weight of the body in kilograms divided by the square of the length in meters (Ahmed and Crandall ,2010).

Table(1) representing the classification of weight according to the BMI standard (WHO,2008)

Risk of Disease	BMI (Kg/m ²)	Obesity	Weight classification
Low	<50		Under weight
Normal	50-60		Normal
Increased	60-75		Over weight
High	75-90	Obese	Obesity
Very high	90-100	Sever obese	
Extremely High	≥100	Morbidly obese	



Physiological examinations:

Determination of glucose in the serum:

The concentration of glucose in the serum was estimated using the enzymatic method calorimetric according to (Young, 2000), using the ready-made kit.

Measurement of Glycohemoglobin :

HbA1c glycated hemoglobin was measured using a colorimetric assay (Anjum et al .,2019).

Complete blood count (CBC) :

According to the Ruby DYN-CELL system, it is a common blood test that helps with: Diagnosing diseases, this analysis uses the MAPSS technology. The analysis includes many The test gives details about the three blood cells, which are red blood cells, RBC, and blood cells WBC and platelets (PLT) Platelet, which measures the level of each in the blood In addition to determining the physical properties of these cells, such as size, shape and components contain it (Dacie & Lewis,1984).

Biochemical examinations:

Determination of Triglycerides Concentration in serum Blood:

Serum triglycerides were estimated using the enzymatic method by using a ready-made analysis kit (Schettler and Nüsse ,1975).

Determination of HDL-C level in serum:

To estimate the concentration of C-HDL in the serum based on the enzymatic method by using the ready-made analysis kit K (Gordon et al. ,1977).



Determination of LDL-C level in serum:

Calculate the concentration of low-density lipoprotein (C-VLDL) according to the following equation: $VLDL-C \text{ con. [mg/dl]} = TG \text{ con.} / 5$

Total protein and Albumin concentration in serum :

Serum protein concentration was quantitatively determined according to the Biuret method (using the Biuret reagent) and spectrophotometer (Zilva et al,1988) .

Statistical Analysis:

The results were analyzed according to the ANOVA analysis of variance program and these values represented in the tables(Mean \pm SD) for the purpose of the presence of significant differences between the groups (Scheffler,1980).

Results and discussion:

body mass index:

The result showed that asignificant differences ($P \leq 0.05$) between the three groups G1,G2,G3 when comparing with the control group from the (BMI) will the mean of BMI for the G1(67.03 ± 5.50) , BMI for the G2 (83.40 ± 6.61) ,BMI for the G3 (212.24 ± 20.23) ,when comparing G1 with the control group we founded there was no significant differernt in the BMI.

Complete blood count (CBC):



The results showed a significant differences at ($P \leq 0.05$) between the three groups and control groups. When comparing the three weight groups with the control group, it was found that there were significant differences for the blood groups (WBC/PLT/HB). This can be attributed to Significant increase in the average number of neutrophils, and since neutrophils constitute 70% of the quantitative number of white blood cells (Ganong, 1995). Therefore, as in table below a significant increase in the relative average in the blood may lead to a significant increase in the quantitative number rate for white blood cells.

The results in table 2 show that there was no significant change in the average number of red blood cells in the blood of non-diabetic patients insulin dependent compared with the control group.

. It can be attributed to the reason for the lack of significant change in the rate of hemocytosis. Erythropoietin in diabetic patients is not affected by the hormone Erythropoietin, which is responsible for stimulating stem cells in the bone marrow. on division and formation of new mature erythrocytes (Dabich & Ringler 1979).

Table 2: Values of Complete blood count (CBC)

WIEGHT GROUP				
Parameter	(G1) (75-60) N=60	G 2)(-75) (90N=60	G3)(-95) (+100N=60	Control group N=20
RBC 10- 6/ μ L	4.64 \pm 0.42	5.90 \pm 0.05	5.90 \pm 0.62	5.55 \pm 0.75
WBC10- 3/ μ L	8.04 \pm 3.37	13.3 \pm 0.73	14.8 \pm 0.54	6.02 \pm 1.16
PLT 10- 3/ μ L	167.0 \pm 13.2	237.6 \pm 27.9	326.9 \pm 43.9	12.5 220.7 \pm
HB g/dl	14.05 \pm 0.95	13.1 \pm 0.56	12.1 \pm .36	14.23 \pm 3.51

Variables blood sugar concentration:

The results showed a significant increase ($P < 0.05$) in both the blood sugar level in diabetic patients, as well as a rise in the cumulative sugar in comparison with the control group, and there was significant difference in the glucose concentration between three groups comparison the G3 had the heist concentration than G1,G2 comparison with the control group . after finding the arithmetic mean and standard deviation for each of the variables under study, and the results of patients were compared among themselves within groups and periods of injury, as well as compared to the control group.

The results showed a significant increase ($P \leq 0.05$) between all diabetes patients groups in the cumulative blood sugar , when comparing the three weight groups ,we find that the G3 with the highest weight is the most high in sugar levels and cumulative sugar when compared with control group as in table 3 where the average concentration in HbA1c the blood serum (Genuth S 2006).

Table 3: Values of glucose in diabetic patients of Non- Insulin Dependent

WIEGHT GROUP				
Parameter	(G1) (75-60) N=60	G 2)(-75) (90N=60	G3)(-95) (+100N=60	Control group N=20
FBS mg/dl	47.69 ± 145.6	54.08±180.4	62.85±197.3	66.8±8.28
RBS mg/dl	65.73±174.8	67.29±208.7	73.02±234.1	62.87±9.26
HbA1c mmol/mol	2.05±7.64	8.86±2.13	9.50 ± 2.61	.910.84 ±4

Biochemical examinations:

The results shown in Table (4) indicate a significant increase ($P \leq 0.01$) in the rate of concentration (LDL) and (HDL) in G2 and G3 more than G1, while the first group had similar result to the control group, was the lowest in concentration compared with the control group. The reason for this may be due to that the low-density protein analysis which is high in cholesterol content, as well as the reason for that is the loading of low-density lipoprotein (LDL) from Loss of affinity for receptor-B Apo (low-density-lipoprotein-LDL-cholesterol) binding.C, which carries cholesterol into the cells (Hamadani - Al 2002), which contributes to an increase in the quantitative cholesterol level in the serum of diabetic patients.

The results shown in Table (4) indicate a significant increase ($p \leq 0.05$) when comparing the three weight groups, we find that the concentration of triglycerides increases as the weight of the patients increases, and the reason for this rise is due mainly due to the absence of the hormone insulin necessary to activate the enzyme lipoprotein lipase (LPL) which plays an important role in the formation of tertiary chymers (Foster, 1984), in the process of metabolizing from the plasma, thus increasing its concentration in the serum. It may explain the rise in concentration TG in the patients of this study

, especially in advanced ages greater than (30) years, on the basis that these ages suffer from Obesity, which is one of the main reasons for the high level of TG(Fuller et al,1982).

As the result showed in table 4 there in a significant increase ($P \leq 0.05$) in the level of total protein The reason for the high protein in patients with diabetes mellitus may be due to the significant increase in the serum quantitative albumin concentration and since albumin constitutes the largest part of the quantitative protein concentration in the serum (Ganong, 1995), therefore the significant increase in its concentration rate, there is a significant increase in the rate of quantitative protein concentration in the serum as in table 4.

Table 4: Values of biochemical changes in diabetic patients of Non- Insulin Dependent

WIEGHT GROUP				
Parameter	(G1) (75-60) N=60	G 2)(-75) (90N=60	G3)(-95) (+100N=60	Control group
HDL mg/dl	41.96±5.89	59.06±2.57	60.45±5.68	49.1±11.1
LDL mg/dl	1.30±49.8	91.0±0.13	115.9±10.2	96.9±30.9
TG	120.0±1.00	186.8±8.62	224.8±15.3	94.9±9.3
Total protein	5.74±0.41	8.28±0.83	10.04±0.62	5.5± 0.5
Albumin	5.61±0.84	12.0±0.18	14.5±0.92	5.51±0.5



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