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Estimation of the Total Antioxidant Capacity of Obese Patients in Baghdad City

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ABSTRACT: Obesity is a chronic complex disease similar to high atherosclerosis and high blood pressure. The reason of obesity is an imbalance between the energy that is taken from food and the energy that is exhausted. Obesity is often presented as excess body weight, not excess weight, Obesity is usually presented as a body mass index (BMI) of 30 kg/m2 and above. Excess weight is presented as a BMI among 25 and 30 kg/m2, and the normal range is 19-24.9 kg/m2, Obesity increases an individual's risk of developing various metabolic diseases, blood vessel diseases, heart disease, Alzheimer's disease, osteoporosis, depression, and certain types of cancer.

Methods: The study include healthy normal people as an assay group (control), numbering (55) sample, counting (29) female and (26) male, and their age range between (4-17) years.

Patients group: In this study, (53) samples were taken, their ages ranged between (3-18) years, and included (26) males and (27) female, Level of antioxidants become assessed by estimation within the serum convergences of whole cancer prevention agents restriction (TAC) with the aid of UV spectrophotometric approach.

Sample were collecte from patients who were reviewe in (Al Numan General Hospital , Al Kadhimiya Technical Hospital and Al karama Teaching Hospital).

Result : Our study observed showed an important increase (P<0.01) in the total antioxidant capacity (TAC) in the control group and it was higher than the patient group, the patient group and the control group (1.302 ±0.02), patients group (0.919 ±0.03) µg/dl.

KEWWORDS: antioxidant capacity, Obesity, BMI

1. INTRODUCTION

Obesity

Obesity is a chronic complex disease similar to high atherosclerosis and high blood pressure. The reason of obesity is an imbalance amid the energy that is taken from food and the energy that is exhausted. Obesity is often presented as excess body weight, not excess weight. (George A. Bray,2004).

Obesity is usually presented as a body mass index (BMI) of 30 kg/m2 and above. Excess weight is presented as a BMI among 25 and 30 kg/m2, and the normal range is 19-24•9 kg/m2. (Apovian C.M, 2016). Obesity is a major preventable motive of loss of life global, with expanded quotes amongst adults and youngsters. In 2015, 600 million adults (12%) and a hundred million children were overweight in 195 international locations (Afshin A et al., 2015).

Obesity is more not unusual in women than in men. (Woodhouse R, 2008) Body mass index (BMI) - the ratio of an individual's weight in kilograms to the rectangular of his top in meters, “overweight” when the BMI is 25 or higher, “obesity” when the BMI is 30 or higher, and normal frame He is 19-25. (Overweight and Obesity, 2022). Obesity increases an individual's danger of emerging various metabolic diseases, blood vessel diseases, heart disease, Alzheimer's disease, osteoporosis, depression, and certain types of cancer. (Blüher M ,2019).

Causes of Obesity, "1" Staying up late and lacking sleep, "2" causes of endocrine dysfunction (ecological toxins intervene with lipid metabolism), "3" decreases in air fever, "4" decreases in smoking levels since smoking increases zest. "5" usage and use of drug

that may induce Gain extra weight (such as irregular antipsychotics), "6"Relative rises in age groups and group that incline to be heavier,"7" Late pregnancy (possibly leading to obesity in newborns) "8" systemic risk factors across generations, (Keith et al., 2006).

Antioxidant system recognized nutritional antioxidants are vitamins A, C, and E, but the term antioxidant has too been practical to many other food compound that have antioxidant attributes only in vitro, with slight indication of antioxidant attributes in vivo. (Antioxidants in Depth, 2013). Depicts the varying mechanisms responsible for cells defending against free fundamental processes. This system comprises: Water-soluble antioxidant vitamins, which include (Diet C, uric acid) and dietary factors which includes fat-soluble antioxidants. (Tocopherol), and antioxidant enzymes such as glutathione peroxidase (gsh-px). (Surai, 2014).

Aim of study:

Determination of the level of antioxidants in patients serum, compared with healthy people, defining the Cholesterol and triglycerides in the patients serum and comparing it with healthy individual.

2. MATERIALS AND METHODS

Samples collection:

Control Group: The study include healthy normal people as an assay group (control), numbering (55) sample, counting (29) female and (26) male, and their age range between (4-17) years.

Patients group: In this study, (53) samples were taken, their ages ranged between (3-18) years, and included (26) males and (27) female.

Sample were collecte from patients who were reviewe in (Al Numan General Hospital , Al Kadhimiya Technical Hospital and Al karama Teaching Hospital)

Collection and preservation of blood Samples:

Samples had been amassed by using drawing (**8**) ml of blood from a vein using a plastic syringe, and the drawn blood changed into positioned in sterile plastic tubes (ordinary tubes) manufactured from Poly Styrene and an EDTA-free anticoagulant. It spends for (10) mins at room temperature till it then coagulates in a expedient (centrifuge) at a pace of 5000 rpm (10rpm), then the clear serum is taken and then frozen at -20°C.

Measuring height and weight and calculating body mass factors (BMI):

Weight and top (for wholesome human beings) and (sufferers) have been measure using a top scale in centimeters (cm) and weight the use of a sensitive individual scale in kilograms (kg). Body mass size became calculated in step with the law:

Body mass index (BMI) = weight (kg) / Length (m2)

Methods

A measure of the level of total antioxidant capacity (TAC) in serum

Principle:

The antioxidant capacity is determined by the reaction of the antioxidant in the sample with a limited amount of externally present hydrogen peroxide (H2O2). The antioxidant available in the sample act by displacing a specific quantity of hydrogen peroxide provide. The remainder (H2O2) is assigned a color scale by means of an enzymatic reaction that involves converting 3,5-dichlorohydroxybenzenesulfonate into a color produce.

Stability:

Stable until the limited expiry date when store at +4 to +8°C.

Reagents:

1	**Substrate (H2O2) {dilute 1000 times before usage}**
2	**Chromogen**
3	**Enzyme _ Buffer**

Procedure:

1_Dilute R1 1000 time directly before usage (10 µ R1 + 10 ml d. water mix) Discrad after usage.

_We only took 10 ml distilled water.

_We took 50 ml distilled water and added 1,000 µl R1 (H2O2).

2_Working Reagent : Mix equal amounts of R2 and R3 directly before usage .

_ We took 50 µl repeat 5 times of R2 and the same amount of R3 and added them together in one tube.

Reagents	Blank (ml)	Sample (ml)
distilled water (H2O)	0.02	_
Sample	_	0.02
R1 (Substrate)	0.50	0.50
Mix well. Incubate 10 min. at 37 C° then add :		
Working Reagent	0.5	0.5
Mix well. Incubate 5 min. at 37 C°		

_Have been read directly the absorbance of blank (AB), and sample (ASA) against d.water at 505 (500_510).

Calculation:

Total concentration of antioxidants

mM/L = AB _ ASA X 3.33

Measurement of cholesterol in the serum

The basic principle for this measurement is (enzymatic colorimetry) whereby cholesterol esters are hydrolyzed by the act of (cholesterol esterase) to create cholesterol and fatty acid, after which (cholesterol oxidase) is prepared.

The oxidation method affects cholesterol to (Cholest-4-en-3-one) and (hydrogen peroxide) composed of oxidative coupling of phenol, to create an aminoquinone structure. The color intensity of the composition corresponds straight to the cholesterol concentration, and this is determined by the method of increasing the absorbance (absorbance). Using the Copas deviceC111 .

3.5.2 Measurement of Triglycerides (TG)

TRIGIL was used to quantitatively measure TG in blood serum usage a Cobas C111 device.

As a principle for quantitative Triglyceride analysis in this method, the enzyme (Lipoprotein Lipase) used by microorganisms is used to perform a rapid and complete analysis of (Triglycerides') into glycerol, follow by the glycerol oxidation process to form (Dihydroxy acetone phosphate) and (Hydrogen Peroxyde H2O2), and by emphasis (H2O2) In this process, the author reacts with (4-aminophenazone) and (4-chlorophenol) with the enzyme (peroxidase) to form a red multiple. The color intensity of the direct formula corresponds to the triglyceride (TG) concentration, and is assigned as a measure of the increase in absorption.

Statistical Analysis:

The Statistical Analysis System - SAS (2018) software became usage to locate the impact of different groups (patients and controls) on the study parameter. The T-test was usage to test the significance among mean. The Chi-square test was usage to liken the percentages (probability 0.05 and 0.01) in this study.

3. RESULTS

The result of the statistical values for the disease included those suffering from obesity, which were measure in the research in the serum of patients and in the control group, and rendering to the method, the result were as shadow:

3.1 Comparison between control and patients in Age and BMI

The result of the current study showed, as expose in Table (1), an important increase (P≤0.01) In to healthy persons ages (11.17 ±0.45) likened to patients' age (11.05 ±0.56), as shown in Table (1), that there was a significant increase (P≤0.01) in BMI patients (33.74 ±1.21) compared to healthy persons (19.21 ±0.26).

Table 1: Comparison between control and patients groups in Age and BMI

Group	Mean ± SE	
	Age (year)	BMI (kg/m2)
Control	11.17 ±0.45	19.21 ±0.26
Patients	11.05 ±0.56	33.74 ±1.21
T-test	1.428 NS	2.420 **
P-value	0.866	0.0001
**(P≤0.01).		

3.2 Total antioxidant capacity (TAC) concentration level for healthy people and patients

The result in Table (2) showed an important increase (P<0.01) in the total antioxidant capacity (TAC) in the control group and it was higher than the patient group and the control group (1.302 ±0.02), patients group (0.919 ±0.03).

Table 2: Comparison between control group and patient group TAC

Group	Mean ± SE of TAC
Control	1.302 ±0.02
Patients	0.919 ±0.03
T-test	0.078 **
P-value	0.0001
**(P≤0.01).	

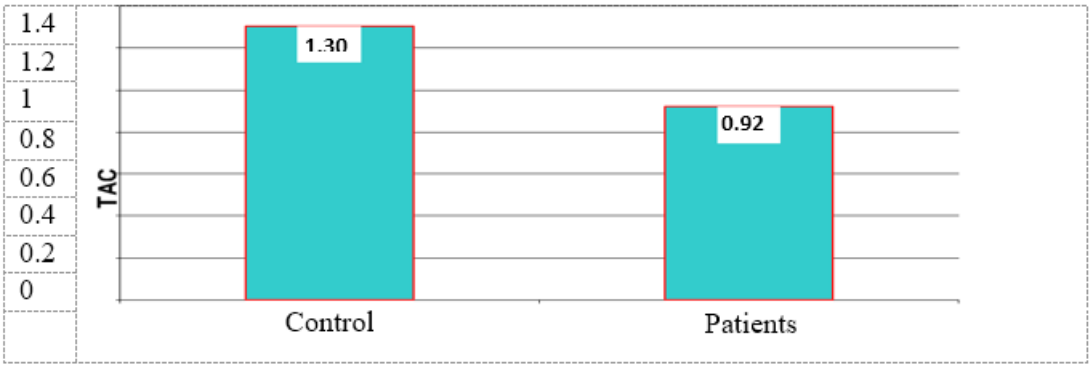

Figure 1. Comparison between control and patient group in TAC

3.3 The level of cholesterol in patients and control.

The results showed as shown in Table (3) there is a significant increase (P≤0.01), As the group of patients have a greater serum cholesterol concentration than the control group, patients group (189.29 ±8.19) , control group (75.83 ±2.32) .

Table (3) : Comparison between control and patient in (Cholesterol)

Group	Mean ± SE of Cholesterol ( )
Control	75.83 ±2.32
Patients	189.29 ±8.19
T-test	16.617 **
P-value	0.0001
**(P≤0.01).	

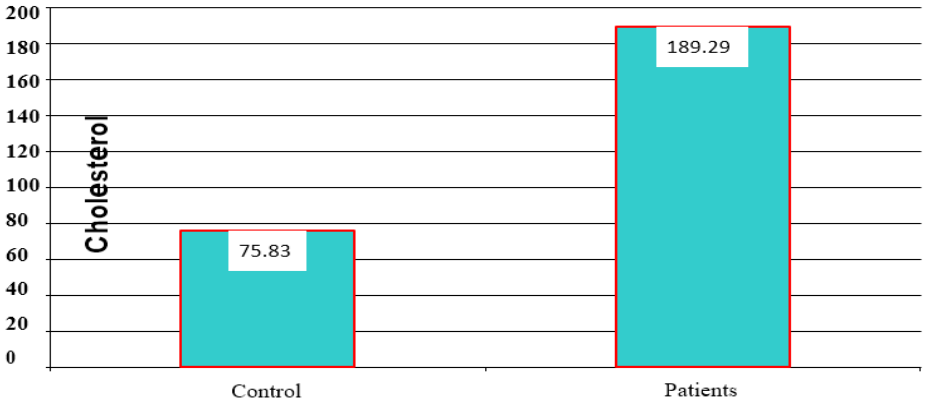

Figure 2. Comparison between control and patient group in Cholesterol

3.4 The level of Triglyceride (T.G) in patients and control.

The result show as exposed in Table (4) there is a significant increase (P≤0.01), As the Group of patient have a greater serum (T.G) attentiveness than the control group, patient group (141.75 ±5.01) , control group (72.07 ±2.25) .

Table 4: Comparison between control and patient groups in Triglyceride

Group	Mean ± SE of Triglyceride
Control	72.07 ±2.25
Patients	141.75 ±5.01
T-test	10.743
P-value	0.0001
**(P≤0.01).	

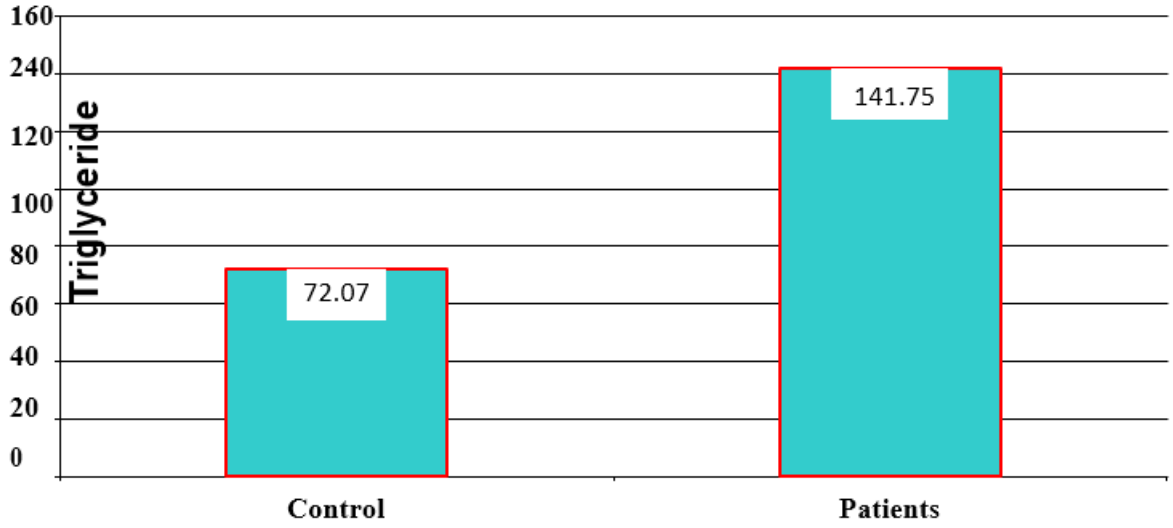

Figure 3. Comparison between control and patient group in Triglyceride

3.5 Dividing the study sample according to gender between patients and controls

Percentage of healthy males compared to percentage of of sick males, healthy males (27sample) (49.09%), sick males (36 sample) (67.92%). Percentage of healthy women compared to percentage of of sick women, healthy woman (28 sample) (50.91%), sick women (17sample) (32.08%).

Table 5: Dividing of sample study according to Sex in patients and control

Factor		Control (No=55)	Patients (No= 53)	P-value
Sex: No (%)	Male	27 (49.09%)	36 (67.92%)	0.049 *
	Female	28 (50.91%)	17 (32.08%)	0.042 *
	P-value	0.902 NS	0.0083 **	----
*(P≤0.05), **(P≤0.01)				

DISCUSSION

This study found that serum concentrations of low total antioxidant capacity (TAC) were higher in the control group than in patients. Total antioxidant capacity (TAC) is an analyte often usage to estimate the antioxidant profile in organic sample and may estimate the reaction of antioxidants in opposition to unfastened radicals produced in a given sickness. Measured with the help of TOC concentrations and OSI values, antioxidant protection decreased at the similar time as slow by TAC concentrations likened to non-obese children in overall antioxidant willpower (Tatzber, 2003).

Oxidative stress has been reported in obese individuals, increased ROS production leads to oxidative stress, and it is considered that excess supply of energy substrates in obesity results in elevated ROS formation (Mhalhal et al., 2006). High calorie intake increases the burden on the mitochondria, which in turn result in a mitochondrial defect. The result of this defect revealed a weakness in fatty acids. (Prabha, M. 2020). A lipid profile is a blood test panel that is produced as an preliminary screening gadget

for lipid abnormalities, counting triglyceride and cholesterol. The results of this test can assign specific genetic diseases and can assign approximate risks for cardiovascular disease, positive categories of pancreatiti, and other diseases.
It is normal for the fat percentage in individuals who suffer from obesity to be advanced than that found in healthy people, meaning that the lipid profile [Cholesterol, HDL, LDL, Triglycerides, VLDL] in our study were all advanced for patients who suffer from Obesity compared to healthy people.

CONCLUSIONS

The observed increase in total antioxidant capacity (TAC) In the control group suggests the not present of oxidative stress in control group. Whereas, (TAC) was less serum concentrated in obese patients compared with the control group. This indicates the presence of (oxidative stress and free radicals) in obese patients. that cause a lot of damage and diseases, including (obesity). Our study has demonstrated the importance of characterizing body fat distribution.
We found the Lipids profile (Cholesterol and Triglycerides) Higher in the obese patient group than the control group. Thus, Serum antioxidants and trace factors might also have an impact on obesity in overweight Iraqi people. Therefore, appropriate nutritional intervention with vitamins, trace factors and wholesome fats-loose meals may also decorate obesity management and decrease its complications in obese Iraqi people.

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