

# A Study of Serum Lipid Profile among Obese and Non-Obese Individuals: A Hospital based Study from Karbala, Iraq

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## ABSTRACT

**Introduction:** Obesity is a multifactor disorder and its development is due to multiple interactions between genes and environment. This study aims at measuring and correlating values of serum triglyceride level in obese and non-obese individuals.

**Material and methods:** Total Sixty five individuals of the age group between 20-70 yrs, coming for health checkup at Al-Hussain teaching hospital, were selected for the study. They were divided into groups. One group having BMI more than 30 considered as obese group, another group with BMI less than 25 considered as non-obese group. Fasting blood samples were analyzed for blood cholesterol, triglycerides, low density lipoprotein cholesterol (LDL-C) and high density lipoprotein cholesterol (HDL-C), using chemistry analyzer, BS-300 Chemistry Analyzer

**Results:** A significant increase in levels of serum cholesterol and serum LDL-C and a significant decrease HDL-C in obese woman and men were observed. The adult obese has relatively larger changes in serum lipids at any given level of obesity. The study has documented several lipid profile abnormalities among obese and non-obese patients. The study revealed that obesity was high among woman patients and required special attention.

**Conclusion:** The study concluded that, the presence of statistically significant changes in the proportions of fat, which is considered a risk factor for blood vessel and obese in Iraqi's Men and Women.

**Keywords:** Obesity, Serum Lipid Profile, HDL, LDL

## INTRODUCTION

Obesity is a multifactor disorder and its development is due to multiple interactions between genes and environment. The primary cause for being overweight and obese is unhealthy dietary habits, reduced physical activities as well as the genetic predisposition.<sup>1</sup> Obesity is perhaps the most prevalent form of malnutrition. As a chronic disease, prevalent in both developed and developing countries, and affecting children as well as adults, it is now so common that it is replacing the more traditional public health concerns including under nutrition. It is most significant contributors of ill health.<sup>2,3</sup>

In 2014, more than 1.9 billion adults, 18 years and older, were overweight. Of these over 600 million were obese. Overall, about 13% of the world's adult population (11% of men and 15% of women) was obese in 2014. In 2014, 39% of adults aged 18 years and over (38% of men and 40% of women) were overweight. The worldwide prevalence of obesity more than doubled between 1980 and 2014.<sup>4,6</sup>

Obesity refers to excess of body-fat. It is due to greater energy

intake compared with energy expenditure. Despite inbuilt feedback system, how energy intake becomes chronically disproportionate is not properly understood. It is difficult to study obesity because the abnormality is not a single disease and because the result of long-term follow up in large scale is not available in the existing literature. The knowledge that is available today is only a cross-sectional survey in the population. Obesity currently threatens the health, well-being and economic welfare of virtually every country in the world.<sup>7,8</sup> Over 300 million people are estimated to be obese. As a result, up to 1.7 billion of the world's population is at an increased risk of other life-threatening diseases such as heart attack and stroke.<sup>9,10</sup>

Although the exact biochemical mechanisms responsible for the association between obesity and the above diseases have not been completely elucidated, it is known that increase in triglyceride stores is associated with a linear increase in the production of cholesterol which in turn is associated with increased cholesterol secretion in bile and an increased risk of gallstone formation and the development of gall bladder diseases.<sup>11,12</sup> Similarly, increased levels of circulating triacylglycerol in obesity are associated with decreased concentrations of high-density lipoprotein, which may account for the increased risks for cardiovascular disease and heart attack in obese patients.<sup>13-15</sup> Accordingly, the objective of the study was to compare the Serum lipid profile of obese and non-obese men of Karbala City

## MATERIAL AND METHODS

The study was carried out in Biochemistry department of Al-Husain teaching hospital. Municipal Medical College/ Karbala University and Hospital, Karbala, Iraq, during a time period from November 2017 to February 2018. Total sixty five obese subjects of the age group between 20-70 yrs, coming for health check up at this institute, were selected for the study. Subject with BMI 30 or more than 30 are taken as obese.

Subjects taking lipid lowering agents, with hypothyroidism, taking oral contraceptive pills and with any metabolic disorder affecting lipid profile were excluded The ethical

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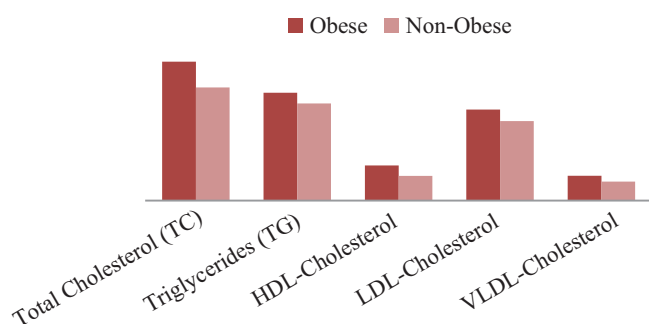
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Lipid Profile	Obese I ( $\pm$ SD) No. of Cases=35 (20-50)Yrs	Non-Obese I ( $\pm$ SD) No. of Cases=30 (20-50)Yrs	Test of Significance
Total Cholesterol (TC)	156.12 $\pm$ 31.32	127.16 $\pm$ 34.10	Significant $p \leq 0.05$
Triglycerides (TG)	121.17 $\pm$ 25.23	109.19 $\pm$ 31.95	Significant $p \leq 0.05$
HDL-Cholesterol	39.45 $\pm$ 11.23	27.81 $\pm$ 7.52	Significant $p \leq 0.05$
LDL-Cholesterol	102.34 $\pm$ 17.74	89.34 $\pm$ 25.38	Significant $p \leq 0.05$
VLDL- Cholesterol	27.93 $\pm$ 5.75	21.36 $\pm$ 5.52	Significant $p \leq 0.05$

TC: Total cholesterol, TG: Triglyceride, HDL-C: High density lipoprotein - Cholesterol, LDL-C: Low density lipoprotein - Cholesterol, VLDL-C: Very High density lipoprotein - Cholesterol

**Table-1: Comparison of lipid levels (mg/dL) on obese and Non-Obese Individuals**



**Figure-1:** Comparison of lipid profile of obese and Non-Obese Individuals

committee of the hospital gave ethical approval for the study. Informed consent prior to study was taken from all the subjects. Information about Name, Age (years), Sex, Education, Occupation, Weight (kilogram), Height (meter), Address, any history of metabolic diseases (diabetes, hypertension etc.) is obtained from each subjects.

#### Collection of blood samples and lipid profile analysis

After an overnight fasting of 10-12 hours, about 5 ml of whole blood was collected via vena puncture with the help of a disposable syringe in between 8.00am and 9.00am. Different Lipid fractions were estimated along with fasting plasma glucose. Glucose- detected by enzymatic reaction (glucose oxidase and peroxidase=GOD-POD). Serum total cholesterol was determined by an enzymatic (CHOD-PAP) colorimetric method.<sup>16</sup> Triglycerides were determined by an enzymatic (GPO-PAP) method.<sup>17</sup> HDL-Cholesterol was estimated by a precipitant method. LDL-Cholesterol was estimated by using Friedewald formula.<sup>18</sup> LDL-Cholesterol = Total Cholesterol – (HDL cholesterol + Triglycerides/5).<sup>19</sup>

#### STATISTICAL ANALYSIS

Statistical analysis was carried out using standard deviation and chi-square test from which “P” value is derived. The “P” value less than 0.05 were considered significant.

#### RESULTS

The total cholesterol was significantly higher (156.12mg/dl) in Obese group in comparison with the Non-Obese group (127.16 mg/dl),  $p < 0.05$ . Triglycerides were also significantly higher (121.17 mg/dl) in Obese group compared to the Non-Obese group (109.19 mg/dl),  $p < 0.05$ . LDL-C was found to be significantly higher (102.34/dl) in Obese group compared to the Non-Obese group (89.34 mg/dl),  $p < 0.05$ .

But a significantly lower value (39.45 mg/dl) was obtained in Obese group compared to the Non-Obese group (27.81 mg/dl),  $p < 0.05$  for HDL-C.

#### DISCUSSION

The statistical analysis of the results showed As shown in Table 1 and Figure 1 that the lipid levels were generally higher in obese individuals when compared with non-obese where it appeared that there was a significant decreases, significant ( $P < 0.05$ ) for total cholesterol (TC) in obese individuals when compared with a non-obese, where the proportion of the study (Table 1) was recorded (156.12mg/dl) (127.16 mg/dl), respectively. The results of the present study showed that there are a statistically significant differences for triglycerides (TG), the results reported a significantly increased ( $P < 0.05$ ).

As for (HDL-C) there was a significant decrease ( $P < 0.05$ ) obese individuals when compared with non-obese individuals as well as the case for (LDL-C) where there was a statistically significant increase ( $P < 0.05$ ) which reported obese. Concerning (VLDL-C) in obese individuals, the results recorded a significant increase when compared with non-obese individuals.

The results obtained in this study regarding cholesterol levels agree with several research articles. The results agreed with the research conducted by<sup>20</sup> which has recorded similar data values exhibited by the current study, especially in terms of the proportion of the TC where it was fully compatible with the current study, scoring non significant increased levels ( $P > 0.05$ ) as the results of our study also coincided with the research presented by.<sup>21</sup> It is worth mentioning that there are differences in the levels of fat that is obtained and recorded in different individuals on the basis of race, age, sex, body mass (obesity), exercise, smoking, alcohol, diet and many diseases such as diabetes, hypertension and chronic liver and kidney disease pressure, however, we tried in the current study excluded overlapping variables that increase the statistical error, and after excluding these factors possibly we have taken results obtained scientifically criterion correct natural increase, but the current study data values contrary to numerous studies in different regions of the world with respect to the levels of fat in postmenopausal women.

In a cross-sectional study conducted by<sup>22</sup> the differences of data rate and standard deviation of TG values, were not significant in postmenopausal women when compared with

women before menopause, as well as levels of VLDL-C, this study reported a significant decrease ( $P < 0.05$ ) in women after menopause when compared with women before menopause, but the study concluded that there were significant differences, which reported a significant decrease in HDL-C and a significant increase in LDL-C and non-significant differences in TC and this agrees with what we got from the results in this study. In another study conducted by<sup>23</sup>, the results were compatible with the present study in which there was no significant change in the TC cholesterol levels when compared to postmenopausal women with women before menopause. Furthermore,<sup>24</sup> recorded results which were consistent with the results of the current study for the level of HDL, LDL has earned a morale levels and, on the other hand his results contrasted the findings of the results of our study in each of the TG and TC. The results of our study agreed with<sup>25</sup> in the levels of each of the TC, HDL, TG, VLDL except LDL level was not significant. This is a contradiction with what we got in our study. In studies conducted in some developed countries centers demonstrated a highest value regarding the level of cholesterol TC so that it reached the boundary of significance which scored by<sup>15</sup> and this contradicts what we found in the present study, where the proportions of the TC in our study were not significant. When various parameters of blood lipid profile were compared it was observed that there was significant difference between obese in comparison to non-obese individuals. The Obtained value of total cholesterol, triglycerides, low density lipoprotein and high density lipoprotein level were found to be different in obese and non obese. In fact from table 1, it was observed that there is a significant high level of cholesterol and triglycerides. It was also viewed that there is relatively small increase in level of low density lipoprotein (dense LDL-C). On the contrary, it was observed that there is a significant lower level of high density lipoprotein (HDL-C) in obese group as compare to high level of high density lipoprotein (HDL-C) in non-obese group.

## CONCLUSION

In view of hyperlipidaemia and hypercholesterolaemia that occur in obesity, it is a risk factor for atherosclerosis. In fact, obesity is associated with an increase in the incidence of coronary heart disease, congestive heart failure and strokes. The study concluded that, the presence of statistically significant changes in the proportions of fat, which is considered a risk factor for blood vessel and obese in Iraqi's Men and Women.

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