

## Prevalence of Dyslipidemia in Obese Patients in Saudi Arabia

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### ABSTRACT

**Background:** Dyslipidemia is defined as defect or over production of lipoprotein, it is a consequence of obesity. Dyslipidemia can result in several complications and diseases including stroke, cardiovascular diseases and atherosclerosis. The prevalence of both obesity and dyslipidemia are increasing as a result of change in dietary content and change in life styles.

**Aim:** To investigate the prevalence of dyslipidemia in obese patients.

**Methods:** The study included 150 participants who were divided into 2 groups; the obese group and non-obese group. Total cholesterol, LDL, HDL and triglycerides were estimated for all individuals.

**Results:** There were 90 obese person and 60 non-obese individuals. The mean± SD of TC for non-obese participants and obese was 191±12.7 mg/dl and 234.5±14.2 mg/dl respectively (P-value=0.04), while for LDL was 97.2± 5.4 mg/dl for non-obese and 166± 7.3 mg/dl for obese (P-value=0.02). Triglycerides mean ± SD for non-obese was 117.7±5.3 mg/dl and for obese was 160.7±12.4 mg/dl (P-value=0.012), regarding HDL mean± SD was 117.7± 7.2 mg/dl for non-obese and 160.8± 12.6 mg/dl for obese individuals (P-value=0.044).

**Conclusion:** The prevalence of dyslipidemia was high in obese patients and the most common type was hypertriglyceridemia.

**Keywords:** Dyslipidemia, types of dyslipidemia, dyslipidemia prevalence.

### INTRODUCTION

Dyslipidemia is the disruption of lipids. Most dyslipidemia is hyperlipidemia which is low levels of high density lipoprotein (HDL) in blood or the increase in the plasma level of triglycerides (TGs), cholesterol or both <sup>[1]</sup>. Dyslipidemia develops rapidly with changes in lifestyle changes <sup>[2]</sup>. The prevalence in dyslipidemia increases all over the world and it became a worldwide public health problem, the prevalence varies between different nations according to cultural, socioeconomic and ethnic characteristics <sup>[2]</sup>.

In Saudi Arabia, dyslipidemia became apparent because of the dietary, sociodemographic and lifestyle changes through the recent decades <sup>[3]</sup>. Worldwide, the prevalence of dyslipidemia was ranged from 2.7% to 51.9% <sup>[4-9]</sup>, while it was reported to range from 20% to 44 % in Saudi study <sup>[10]</sup>. Dyslipidemia is one of the major risk factors for several chronic non-communicable diseases which results in critical morbidity and mortality <sup>[10]</sup>. Dyslipidemia is responsible for the development of stroke <sup>[11,12]</sup>, type 2 diabetes <sup>[13,14]</sup>, atherosclerosis <sup>[15,16]</sup> and cardiovascular diseases <sup>[17,18]</sup>. Obesity act as an independent risk factor for dyslipidemia<sup>[19]</sup>. Obesity is measured by body mass index (BMI) <sup>[19]</sup>, obesity is defined as BMI equal 30kg/m<sup>2</sup> <sup>[20]</sup>. Obesity is a chronic complex condition which is associated with morbidity and mortality and is prevalent worldwide <sup>[21-23]</sup>. Several studies in Saudi

Arabia and other gulf countries reported that the incidence of overweight and obesity was 13-50% <sup>[24-29]</sup>. In the present study we aimed to estimate the prevalence of different types of dyslipidemia in obese patients and to compare the prevalence between obese and non-obese persons.

### SUBJECTS AND METHODS

The present study included 200 individuals, 50 were excluded as they were suffering either thyroid or renal disease, also some of excluded persons were on steroid therapy, smokers and alcoholic consumers, postmenopausal women also excluded. 150 participants were included, they were divided into 2 groups; the obese group which included 90 individuals and a non-obese group which included 60 individuals.

The study was conducted in Dr.Abdulrahman Faisal Hospital. Routine physical examination was performed for all patients, Total cholesterol, LDL, HDL and triglycerides were measured for all individuals.

The study was approved by the Ethics Board of Imam Muhammad ibn Saud Islamic University.

### Statistical analysis

Statistical analysis was done using SPSS 16.0 statistical software package. Results were presented as mean and standard deviation for quantitative data, while frequencies and percent

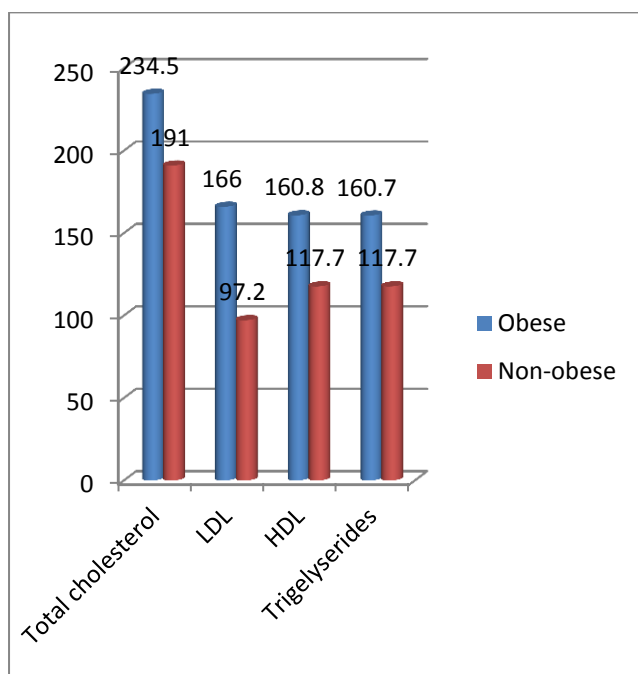
were used for qualitative data. P-value <0.05 was considered statistically significant.

## RESULTS

The present study included 150 participants, the participants were divided into 2 groups the non-obese group which included 6 individuals and the obese group which included 90 individuals, the age of individuals ranged from 30 to 64 years old. There were equal percent of female and male in this study; male to female ration=1:1.

The mean  $\pm$  SD of total cholesterol for non-obese participants was  $191 \pm 12.7$  mg/dl and for obese individuals was  $234.5 \pm 14.2$  mg/dl (P-value=0.04). The mean  $\pm$  SD of LDL for non-obese persons was  $97.2 \pm 5.4$  mg/dl and for obese patients  $166 \pm 7.3$  mg/dl (P-value=0.02). The mean  $\pm$  SD of HDL for non-obese participants was  $117.7 \pm 7.2$  mg/dl and for obese individuals was  $160.8 \pm 12.6$  mg/dl (P-value=0.044).

The mean  $\pm$  SD of Triglycerides for non-obese was  $117.7 \pm 5.3$  mg/dl and for obese was  $160.7 \pm 12.4$  mg/dl (P-value=0.012), the mean of parameters between the two groups is shown in figure1. The values of HDL considered low in case of <40mg/dl in men and <50mg/dl in women. The distribution of participants in both groups regarding the 4 parameters is shown in table1.



**Fig1: The mean of the four parameters between the obese and non-obese groups**

**Table 1: Distribution of participants regarding the level of the 4 parameters in the two groups**

Variables	Obese (90) N (%)	Non-Obese (60) N (%)
<b>Total cholesterol (TC)</b>		
<200 mg/dl	25 (27.8%)	<b>40 (66.7%)</b>
>200 mg/dl	65(72.2%)	<b>20 (33.3%)</b>
<b>LDL</b>		
<100 mg/dl	22(24.4%)	<b>35 (58.3%)</b>
>100 mg/dl	68 (75.6%)	<b>25 (41.7%)</b>
<b>HDL</b>		
Low	50 (55.6%)	<b>38 (63.3%)</b>
Normal/ High	40 (44.4%)	<b>22 (36.7%)</b>
<b>Triglyceride</b>		
<150 mg/dl	20 (22.2%)	<b>48 (80%)</b>
>150 mg/dl	70 (77.78%)	<b>12 (20%)</b>

## DISCUSSION

The present study included 150 individuals, 90 of them were obese (60%) and 60 (40%) were non-obese, the BMI of obese patients was considered at 30. The prevalence of obesity in this study was high (60%), while in a previous Saudi study, it was found that obesity prevalence ranged from 34% to 40% [27]. Dyslipidemia is one of the consequences of obesity. They are group of several disorders of lipoprotein metabolism, including deficiency and overproduction of lipoprotein [27]. Dyslipidemia is of several types; when cholesterol level exceed 200 mg/dl and/or LDL level more than 100 mg/dl, it is called hypercholesterolemia, and it is called hypertriglyceridemia when triglyceride level more than 150 mg/dL and low HDL-C at HDL level is lower than 40 mg/dL in men and 50 mg/dL in women [28]. Mixed hyperdislipidemia is represented by presence of more than one abnormal lipid component [28]. in the present study, regarding cholesterol level, there were 72.2% of obese patients had cholesterol level more than 200 mg/dl, while in non-obese individuals there were 33.3% had high cholesterol level, this means that the prevalence of hyperdislipidemia regarding cholesterol level was higher in obese patients than non-obese patients by more than 2 times. Also, in this study the mean level of both cholesterol and LDL was higher in obese patients than non-obese patients which made these findings agreed with those of **Jacob et al. [19]**. Also in another study [29] it was found that cholesterol level was higher in obese individuals when compared to non-obese

ones. By estimating hyper-dyslipidemia regarding LDL level, it was found that 75.6% of the obese patients had hyper dyslipidemia vs 41.7% of non-obese patients. Hypertriglyceridemia was prevalent in 77.78% of obese patients and 20% in non-obese patients regarding triglycerides, while regarding HDL, there were 55.6% of the obese patients had hypertriglyceridemia and 63.3% of non obese patients had low HDL. Also the mean of the triglycerides was higher in obese patients than non-obese individuals, this was in agreement with previous studies by **Jacob et al.**<sup>[19]</sup> and **Lemieux et al.**<sup>[30]</sup>. In the present study, the prevalence range of hyperdyslipidemia was 55.6% to 77.78% and the most common type of dyslipidemia was hypertriglyceridemia (77.78%), this was in agreement with the findings of Chinese study [2] which reported that hypertriglyceridemia and low HDL-C were the major types of dyslipidemia among Chongqing adults, whereas in our study the second most common type was high LDL-C (75.6%). A study by **Akanji**<sup>[31]</sup> showed that almost 75% of the Kuwaiti individuals who attending the lipid clinic showed either hypertriglyceridemia or hyperlipidemia. In the current study, the increase in cholesterol and triglycerides as well as LDL was more common in obese patients, so these types of dyslipidemia are associated with obesity, whereas low HDL was more associated with non-obese individuals. The previous findings were similar to the findings of a previous Saudi study<sup>[27]</sup> where it was found that all types of dyslipidemia were associated with obesity, except HDL. The present study had some limitations which included that we didn't compare female with male regarding the prevalence of dyslipidemia and we didn't correlate the demographics of individuals with dyslipidemia, however this study showed a significant associations.

## CONCLUSION

The prevalence of dyslipidemia ranged from 55.6% to 77.78% in obese patients and the most common type was hypertriglyceridemia. All types of dyslipidemia was associated with obesity except for HDL which was associated with non-obesity.

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