

# Association between Plasma Lipid Profile and CRP Levels among Sudanese Females with Acne Vulgaris - A Pilot Study in Khartoum State

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## ABSTRACT

### BACKGROUND

Acne is a skin inflammation that results from over activity of the oil gland as the base of specialized hair follicles. Elevated C - Reactive Protein (CRP) has been reported to occur in acne and many other dermatological conditions. These studies aimed to assess the levels of plasma lipid profile and CRP levels among Sudanese females with acne in Khartoum state.

### METHODS

This cross - sectional study was conducted from May to December 2018, involving fifty Sudanese females with acne their age ranged from 20 - 40 years, The levels of Total Cholesterol (TC), Triglyceride (TG), and High - Density Lipoprotein - Cholesterol (HDL - C) were measured by bio-system Bts -310, the Low - Density Lipoprotein - Cholesterol (LDL - C) was calculated using FriedWald equation, and CRP was measured by bio-system. Data analysis was carried out using SPSS version 21.

### RESULTS

The results revealed an increase in Body Mass Index (BMI), and CRP while there were normal levels of TC, TG, and HDL - C, and LDL - C in females with acne when compared with the reference values. Also, there was no correlation between CRP, and age, total cholesterol, triglyceride, HDL - C, LDL - C, TG / HDL - C. ratio , LDL / HDL - C. ratio , ( r = - 0.142, p value = 0,3) ( r = - 0.26 , p value = 0.06) ( r = - 0.1, p, value = 0.48) ( r = - 0.21 p value = 0.14) ( r = - 0.084 , p value = 0.5) ( r = - 0.17, p value = 0,2) ( r = - 0.02 , p value = 0.8) as well as no correlation between age, TC and TG / HDL - C ratio ( r = 0.26, p , value = 0.07) ( r = - 0.145 , p - value = 0.3), while there were significant positive correlation between LDL - C, LDL / HDL - CR and TG / HDL - c ratio ( r = 0.33, p value = 0.018) ( r = 0.6 p, value = 0.000) , also there was significant positive correlation between LDL / HDL - c ratio and age ( r = 0.4, p value = 0.004).

### CONCLUSION

Females with acne had normal total cholesterol, Triglycerides, LDL - C, HDL - C, High CRP levels.

### KEYWORDS

Lipid profile, CRP, Acne, Sudanese females, Triglyceride, Cholesterol, HDL

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**INTRODUCTION**

Acne is one of the main concerns during dermatology consultations remaining due to its high incidence and effect, patient's sociability, and self - esteem.<sup>1</sup> The map of body acne includes pimples on the peak of the head (scalp acne), neck acne, back and shoulder acne, chest acne, butt and crotch acne, arm acne, and the last one is leg acne. The elevated levels of plasma cholesterol lead to the elevated secretion of androgen, which is one of the main predisposing factors for the start of acne lesions.<sup>2</sup> Elevated levels of androgen could reasonably elucidate coronary heart disease among women with a history of acne CRP may have a pro - atherogenic action related to LDL and VLDL and was supported by its detection in atherosclerotic plaque. The inflammatory mechanism plays an essential role in all phases of atherosclerosis, from the initial recruitment of circulating leukocytes of the arterial wall to the rupture of unstable plaques, which result in the clinical manifestation of the disease. It has been reported that in females with acne atherosclerosis may be developed as their LDL cholesterol is increased.<sup>3,4</sup> To the best of our knowledge, limited data were found concerning this issue in the Sudanese population. Accordingly this study aimed to assess plasma lipid profile and CRP levels among Sudanese females with acne.

**MATERIALS AND METHODS**

This cross - sectional study was approved by a committee of Medical Laboratory Science at Sudan International University. The study was conducted in Khartoum state, Sudan, during the period from May to December 2018. The study included 50 Sudanese females with acne their age range was between 20 - 40 years. Females with infections, hypertension, diabetes mellitus, nephrotic syndrome, liver disease, cardiovascular disease, a history of surgery or trauma, cancer, and smokers were excluded from this study. After obtaining informed consent from participants of the study, the demographic data were collected by using a questionnaire, and then about 5 ml of venous blood sample was taken from every fasting participant under aseptic conditions. The collected blood was drawn into two containers 2.5 ml in a lithium heparin container for measurement of lipid profile and 2.5 ml of a plain container for measurement of CRP. The samples were then centrifuged at 4000 rpm to obtain plasma, and then analyzed immediately.

**Methods**

TC, TG, and HDL - C levels were measured by Bio-system Bts - 310 and LDL - C was calculated using Friede Wald equation and bio-system was used for estimation of CRP.

**Quality Control**

Pathological and normal control sera were used to assure the accuracy and validity of the results.

**Data analysis**

Collected data were analyzed by a computer system using the Statistical Package for Social Sciences (SPSS) version 21. One sample t - test was used to compare the results with reference values Person's correlation test was used to find associations between study parameters and study variables, P - value considered significant when less than 0.05.

**RESULTS**

Table 1 shows the results of study participants when compared to reference values, which was as follow: mean Body Mass Index (BMI) + SD was 22.1 + 4 Kg / M<sup>2</sup>, total cholesterol means + SD was 136 + 26 mg / dl, triglycerides mean + SD was 73 + 17.2 mg / dl, HDL - C mean + SD was 58 + 19.4 mg / dl, LDL - C mean + SD was 63.6 + 30.7 mg / dl, TG / HDL - C ratio mean + SD was 1.5 + 0.76, LDL / HDL - C ratio mean + SD was 1.3 + 1, and CRP mean + SD was 7.74 + 4.3 mg / L. The results revealed no correlation between CRP and age, total cholesterol, triglycerides, HDL - C, LDL - C, TG / HDL - C ratio, LDL / HDL - C ratio (Table 2), as well as no correlation between TG / HDL - C ratio with age and total cholesterol. There was a positive correlation between TG / HDL - C ratio and BMI, LDL - C, LDL - C / HDL - C ratio (Table 3). There was a positive correlation between LDL - C / HDL - C ratio and age, while there was no correlation between LDL - C / HDL - C ratio and BMI and a positive correlation between LDL - C / HDL - C ratios with age (Table 4).

Variables	Mean + SD	R.V
BMI ( kg / m <sup>2</sup> )	22.1± 4 (15.4 - 33.9)	18.5 - 25
Table cholesterol ( mg / dl )	136 ± 26 (41 - 214)	Up to 200
Triglyceride (mg / dl)	73 ± 17.2 ( 51 - 134)	Up to 150
HDL - C (mg / dl )	58 ± 19.4 (20 - 100)	35 - 60
LDL - C (mg / dl )	63.6 ± 30.7 (5 - 141)	Up to 135
TG / HDL - C ratio	1.5 ± 0.76 (0.6 - 3.4)	Less than 2
LDL - c / HDL - C ratio	1.3 ± 1 (0.06 - 5.1)	Less than 3.5
CRP (mg / L)	7.74 ± 4.3 (3 - 23)	Less than 0.10

**Table 1. Comparison of Means of Study Variables among Sudanese Females with Acne.**

Variables	R	P - value
Age	- 0	0.3
Total cholesterol	- 0	0.06
Triglyceride	- 0	0.48
HDL - C	- 0	0.14
LDL - C	- 0	0.5
TG / HDL - C ratio	- 0	0.2
LDL - C / HDL - C Ratio	- 0	0.8

**Table 2. Correlations between CRP and Study Variables.**

Variables	R	P - value
Age	0	0.07
BMI	0	0.006
LDL - C	0	0.018
Total cholesterol	- 0	0.3
LDL / HDL - C ratio	1	0

**Table 3. Correlations between TG / HDL - C Ratio And Study Variable.**

Variables	R	P - value
Age	0.4	0.004
BMI	0	0.7

**Table 4. Correlation between LDL / HDL - C Ratio and Study Variables.**

## DISCUSSION

We Lipid profile could be influenced by many factors like age and weight. The results of the current study showed no statistical difference between the lipid profiles of acne vulgaris patients when compared to reference values.<sup>5</sup> This result is similar to the study result, which reported no significant difference in lipid profile in females with acne compared to the control group (p - value  $\geq$  0.05). In contrast, the result disagreed with many studies that showed a significant association between lipid profile and acne vulgaris. The good explanation is that only the process of food or diet does not affect fat metabolism, but it is also influenced by ethnicity, lifestyle, genetic and environmental factors, different nutritional status, and lifestyle.<sup>6-9</sup> Literature has shown little evidence on the role of lipid synthesis in the secretion of sebum and the development of acne vulgaris. Since there are no significant differences in lipid profile in acne vulgaris patients when compared to reference values, the effect of serum lipid concentration was suggested to be influenced by the environment, genetic, and lifestyle. In response to inflammatory cytokines, the liver synthesizes CRP. IL - 1, IL - 6, and TNF -  $\alpha$  so IL - 1, IL - 6, and TNF -  $\alpha$  that found in acne lesions which mainly enhance the production of CRP.<sup>10</sup> Thus, CRP levels could be increased in acne if the amount of local inflammation was high enough. Elevation of CRP has been reported to occur in acne and chronic systemic inflammation. The results of the current study showed a significant increase in CRP level of acne Vulgaris when compared to reference values although this result disagreed with other study done in Turkey, Which showed no statistical significance between female patients with acne and CRP level.<sup>11</sup> The result of the current study showed no correlation between CRP and age in females with acne. This result is parallel to many results these results could also be explained by lifestyle, environmental factors, and nutritional status.<sup>12,13</sup>

## CONCLUSION

Females with acne had normal lipid profile and high CRP levels, so a larger survey study is recommended to study if the increasing level of CRP could predict coronary heart diseases in females with acne.

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