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## Original Research Article

## Study of serum lipid profile in acne vulgaris patients

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## ABSTRACT

Acne vulgaris is a common dermatological disease whose etiology and pathogenesis is multi factorial. Our study aims to assess the contribution of alteration in lipid metabolism to the pathogenesis of Acne. 35 acne patients and 35 healthy people were selected and their lipid profiles were compared. Although the parameters were high in acne patients, only elevation in triglycerides was statistically significant. And no significant difference was found among cases and controls in any other lipid profile parameters. Hence further studies are needed to determine the association of lipid profile with the pathogenesis of acne vulgaris and in the treatment of acne.

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## 1. Introduction

Acne vulgaris is one of the common skin disorders affecting pilosebaceous unit in the skin. It is characterized by seborrhea, comedones (blackhead and whitehead), papules, pustules and sometimes scarring of the skin.<sup>1</sup> It is exclusively a human disease most commonly affecting sebaceous follicles of face, chest and back. It affects about 85% of adolescents and begins in pre pubertal period. It usually regresses spontaneously, but in about 5% cases, acne will persist beyond the age of 24 and may extend up to fourth & fifth decades of life.<sup>2</sup>

The pathogenesis of Acne is multi factorial. It mainly involves excess sebum production, abnormal keratinization of follicles, Propionibacterium acnes colonization, inflammation of the follicle and surrounding dermis.<sup>3</sup>

The experience of acne may not be life threatening per se, but it does carry significant psychological disability with it. Higher levels of depression, anxiety, anger, suicidal thoughts are noted in acne patients.<sup>4</sup> Studies have shown

that patients with acne have a more significant impairment of mental health compared to many other chronic conditions like epilepsy, diabetes etc.<sup>5</sup>

The relationship between blood lipids such as triglycerides cholesterol, plasma lipoprotein, apo lipoprotein and acne is not widely reported. Vergani and colleagues showed significantly reduced levels of HDL-C and apo lipoprotein A1 in severe cystic acne patients compared with those of age-matched healthy controls. The mean plasma triglycerides total cholesterol, and LDL-C levels in males and females were not found to be significantly different from those of healthy controls. But LDL-C levels in patients with severe grades of acne are significantly reduced compared to controls.<sup>6</sup>

Akawi and associates determined plasma total cholesterol, triglycerides, LDL-C, and HDL-C levels in 166 acne patients and compared it with 105 of age- and sex matched healthy controls. Results indicated that acne patients had significantly low plasma HDL-C levels. Plasma triglycerides and LDL-C levels in severe acne cases for both sexes and were significantly elevated compared with those in healthy people. Also there was a trend for plasma

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HDL-C of acne patients to decrease as the severity of acne increases.<sup>7</sup>

The aim of the present study is to compare the lipid profile of 35 acne patients with that of 35 healthy people.

## 2. Materials and Methods

### 2.1. Study design

Hospital based cross sectional study done at Department of Biochemistry and Dermatology, Government Medical College Hospital, Thiruvananthapuram. Study period was one year after getting approval from ethical committee (IEC.No.01/28/2014/MCT).

### 2.2. Sample size

35 acne vulgaris patients diagnosed by a dermatologist serve as cases and 35 healthy volunteers serve as controls aged between 13-35 years are included for the study.<sup>8</sup>

### 2.3. Inclusion criteria

Acne patients, clinically diagnosed, both male and female, between 13-35 yrs of age.

### 2.4. Graded using global acne grading system

The Global Acne Grading System (GAGS) is a quantitative scoring system in which the total severity score is derived from summation of six regional sub scores. Each is derived by multiplying the factor for each region by the most heavily weighted lesion within each region (factor for forehead and each cheek is 2, chin and nose is 1 and chest and upper back is 3) (1 for  $\geq$  one comedone, 2 for  $\geq$  one papule, 3 for  $\geq$  one pustule and 4 for  $\geq$  one nodule). The regional factors were derived from consideration of surface area, distribution and density of pilosebaceous units.

### 2.5. Exclusion criteria

1. Systemic illness
2. Smoking or Alcohol abuse.
3. Treatment (systemic or topical) in prior three months,
4. Those who are not willing to participate.
5. Comparative group taken from preventive clinic. (otherwise healthy people coming for routine vaccination).

### 2.6. Collection of samples

About 5 ml of blood was drawn after 12 hours of fasting using disposable syringes and needles under strict aseptic precautions, from cubital vein and collected in a test tube. Serum was separated by centrifugation at 3000 r.p.m for 10 minutes. Serum FLP was immediately analyzed.

### 2.7. Materials

All the chemicals used for reagent preparation were of analytical grade highest purity. Double deionized water was used for reagent preparation. Estimation of lipid profile was done in fully automated analyser (EM360) from Transasia Biomed. Low density lipoprotein was estimated using Friedwald's equation.

### 2.8. Serum total cholesterol

Serum cholesterol was determined by end point enzymatic method using cholesterol esterase and peroxidase

### 2.9. HDL Cholesterol

HDL is solubilized by a special reagent without disrupting other lipoproteins like LDL, VLDL and chylomicrons. HDL cholesterol is enzymatically measured, after the selective disruption.

### 2.10. Serum triglyceride

Determination was done by end point method (GPO Trinder method).

### 2.11. Serum LDL

From the values of total cholesterol, HDL and triglyceride, the value of LDL was determined by using the Friedwald's formula.

$$\text{LDL Cholesterol} = \text{Total cholesterol} - (\text{HDL} + \text{TG}/5)$$

Formula is invalid if triglycerides are more than 400 mg/dL.

## 3. Results

Statistical analysis was performed using SPSS for windows version 22

1. The mean and standard deviation for quantitative variables and percentage for qualitative variables were calculated for 35 acne vulgaris patients and 35 healthy volunteers.
2. Chi square test was used to compare differences in the percentage of qualitative variables between the groups.
3. Differences in means of quantitative variables between the two groups were compared by student t test.
4. Differences in means of quantitative variables between various groups of patients were calculated by ANOVA test.
5. p value of less than 0.05 is considered significant.

### 3.1. Socio demographic parameters:

In the present study, the highest prevalence of acne was found to be in the age group less than 20 years followed

by 20-24 and 25-29 years the last two groups shared equal prevalence of 28.6%.

### 3.2. Gender distribution among patients and healthy volunteers

In present study, 65.7% of cases were females and the rest 34.3% were males. In controls, 54.3% were females and rest 46.7% were males.

### 3.3. Severity among cases

The cases were graded according to the global acne grading system and in present study, 37.1% of cases were having mild acne, another 37.1% were having moderate acne and the rest 25.7% of cases were having severe acne vulgaris.

In this study, 31.4% of cases have the disease for more than 3 years, 14.3% had the disease for 2-3 years, another 14.3% have the disease for 1-2 years. 40% of the cases had the disease for only one year.

### 3.4. Biochemical parameters

The mean total cholesterol values among acne patients are 198.03 mg/dl and that of among healthy controls is 196 mg/dl. The difference was found not to be statistically significant ( $P$  value  $> 0.05$ ).

The mean low density lipoprotein values among acne patients are 183.93 mg/dl and that of among healthy controls is 178.88 mg/dl. The difference was found not to be statistically significant ( $P$  value  $> 0.05$ ).

The mean high density lipoprotein values among acne patients are 38.31 mg/dl and that of among healthy controls is 36.43 mg/dl. The difference was found not to be statistically significant ( $P$  value  $> 0.05$ ).

The mean triglyceride values among acne patients are 121.09 mg/dl and that of among healthy controls is 96.54 mg/dl. The difference was found to be statistically significant ( $P$  value  $< 0.05$ ).

The mean LDL/HDL values among acne patients is 5.09 and that of among healthy controls is 0.79. The difference was found not to be statistically significant ( $P$  value  $> 0.05$ ).

The mean TG/HDL values among acne patients are 3.36 and that of among healthy controls is 2.63. The difference was found not to be statistically significant ( $P$  value  $> 0.05$ ).

The mean TC/HDL values among acne patients are 5.42 and that of among healthy controls is 5.43. The difference was found not to be statistically significant ( $P$  value  $> 0.05$ ).

The mean triglyceride values among acne patients are 121.09 and that of among healthy controls is 96.54. The difference was found to be statistically significant ( $P$  value  $< 0.05$ ).

There is no statistically significant relation between triglycerides among different severities of acne.

There is no statistically significant relation between triglycerides among different age groups of acne

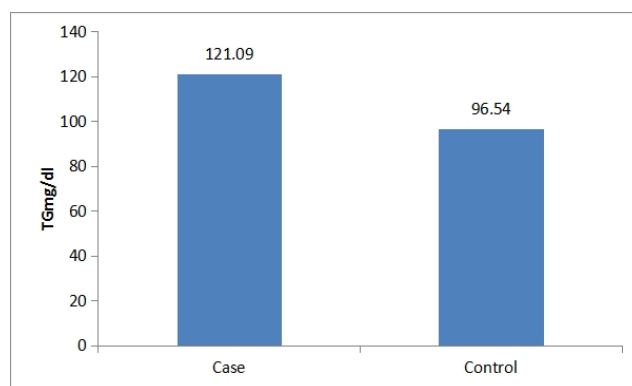


Fig. 1: Serum triglyceride among acne patients and controls

There is no statistically significant relation between triglycerides among different age groups of acne.

## 4. Discussion

This hospital based cross-sectional study was done to determine the influence of lipid profile parameters in the pathogenesis of acne vulgaris. In the present study, various biochemical parameters like serum total cholesterol, serum triglycerides, HDL and LDL were analysed among the 35 acne vulgaris patients and 35 healthy volunteers.

In this study, 35 acne vulgaris patients and 35 healthy volunteers in the age group of 13-35 years were selected.

In the present study, the highest prevalence of acne was found to be in the age group less than 20 years followed by 20-24 and 25-29 years. The last two groups shared equal prevalence of 28.6%. In this study, 65.7% of cases were females and the rest were males. In controls, 54.3% were females and rest males. The cases were graded according to the global acne grading system and in present study, 37.1% of cases were having mild acne, another 37.1% were having moderate acne and the rest 25.7% of cases were having severe acne vulgaris. In this study, 31.4% of cases have the disease for more than 3 years, 14.3% had the disease for 2-3 years, and another 14.3% have the disease for 1-2 years. 40% of the cases had the disease for only one year.

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**Table 1:** Serum Lipid profile among acne patients and controls

S.No	Lipid profile	Case (35)	Control (35)	t	p
		Mean $\pm$ SD (mg/dl)	Mean $\pm$ SD (mg/dl)		
1	Total Cholesterol	198.03 $\pm$ 26.61	196.00 $\pm$ 12.03	.411	.682
2	LDL	183.93 $\pm$ 34.82	178.88 $\pm$ 16.40	.776	.440
3	HDL	38.31 $\pm$ 8.51	36.43 $\pm$ 3.13	1.231	.223
4	TG	121.09 $\pm$ 62.64	96.54 $\pm$ 22.43	2.182	0.033
5	LDL/HDL	5.09 $\pm$ 1.64	4.97 $\pm$ 0.79	.409	.684
6	TG/HDL	3.36 $\pm$ 1.93	2.68 $\pm$ 0.73	1.932	.058
7	TC/HDL	5.42 $\pm$ 1.42	5.43 $\pm$ 0.69	.033	.974

**Table 2:** Serum triglycerides among different severities of acne patients

Severity	N	TG		F	p
		Mean mg/dl	SD		
Mild	13	124.31	71.54	.086	.917
Moderate	13	123.15	71.68		
Severe	9	113.44	34.66		
Total	35	121.09	62.64		

**Table 3:** Serum triglycerides among different age groups of acne patients

Age	N	TG		F	p
		Mean mg/dl	SD		
<20	28	106.0	70.0	.184	.907
20-24	20	105.9	27.8		
25-29	14	116.4	22.3		
>30	8	112.8	30.0		
Total	70	108.8	48.3		

**Table 4:** Serum triglycerides among different duration of acne

Duration	N	TG		F	p
		Mean mg/dl	SD		
<1 year	14	128.2	94.3	.094	.963
1-2 year	5	116.0	29.9		
2-3 year	5	115.2	25.6		
>3 year	11	117.0	32.4		
Total	35	121.1	62.6		

lipid ratios were also found not to be significant statistically.

Previous studies on the lipid profile in acne vulgaris patients have not produced any consistent results. In a study conducted by Hao, Jiang et al, total cholesterol, LDL level were increased in patients with severe acne vulgaris.<sup>9</sup> Triglycerides were increased in patients with severe and moderate acne patient compared to healthy controls and they suggest glycemic index should be considered in Acne pathogenesis and treatment. In this study also triglycerides are elevated in cases compared to controls. In a study done by, Halimi, Monirehetal total cholesterol, LDL and triglycerides were elevated in cases compared to controls and HDL was significantly reduced.<sup>10</sup> They found strong relation between abnormal lipid profile and severe Acne vulgaris and suggests dietary factors are involved in Acne pathogenesis.

In a study done by Nasution K et al found no relationship between the lipid profile and acne vulgaris<sup>11</sup> and another study by Younis S, Shamim S, Nisar K, Deebea F et al total cholesterol, LDL and triglycerides were elevated in cases compared to controls and HDL-C was significantly reduced.<sup>12</sup> They suggest nutrition plays an important role in acne development though exact mechanism not known.

## 5. Limitations of Study

1. This study involved smaller group of participants, so there is a need for larger studies in future.
2. As the present study was done on a particular area further studies are needed to confirm the results in other racial groups.

## 6. Conclusions

In this study, the mean triglyceride values among acne patients is higher than that of healthy volunteers and the difference was found to be statistically significant (p value < 0.005). And no significant difference was found among cases and controls in any other lipid profile parameters.

Lipid profile is affected by environment, diet, genetics, hormones and geographical regions. Hence, further studies are needed to determine the association of lipid profile with the pathogenesis of acne vulgaris and in the treatment of acne.

## 7. Source of Funding

None.

## 8. Conflict of Interest

The authors declares that there is no conflict of interest.

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