

**MEAN SERUM LEVEL OF C-REACTIVE PROTEIN IN MODERATE  
AND SEVERE ACNE PATIENTS**

**ABSTRACT**

**OBJECTIVE:** To determine the mean serum level of C-reactive protein in moderate and severe acne patients visiting to a tertiary care hospital.

**SETTING AND DURATION STUDY:** This study was conducted at Department of Dermatology, Liaquat University of Medical & Health Sciences (LUMHS), Jamshoro, Pakistan, from November 3, 2020 to May 2, 2021.

**MATERIALS AND METHODS:** This study was conducted in the Department of dermatology, Liaquat University of Medical & Health Sciences (LUMHS), Jamshoro, from November 3, 2020 to May 2, 2021. An informed consent was also taken prior to the enrolment of patients in the study. The selected participants were referred to the laboratory for hypersensitive-CRP (Hs-CRP) measurement. All the patients of any gender, aged between 16 to 40 years associated with moderate and severe acne duration of more than 3 months were included in this study. Effect modifiers were controlled through stratification of age, gender, duration of acne, and severity of acne (moderate / severe) and these stratified groups were compared by applying independent sample t-test by using  $P \leq 0.05$  as significant.

**RESULTS:** Mean  $\pm$  SD of age was  $22.7 \pm 5.3$  years. Mean  $\pm$  SD of C-reactive protein was  $4.15 \pm 1.2$  ( $\mu\text{g/ml}$ ). In distribution of gender, out of 56 patients, 30 (53.6%) were male while 26 (46.4%) were female. Out of 56 patients 21 (37.5%) had moderate acne vulgaris while 35 (62.5%) had severe Acne vulgaris.

**CONCLUSION:** It is to be concluded that mean serum level of C-reactive protein in severe acne patients was high as compared to moderate acne patients. Epidemiological and research data should be expanded by further studies to validate the current findings.

**KEY WORDS :** Acne Vulgaris, C-Reactive Protein, Propionibacterium acnes

## INTRODUCTION

Acne vulgaris is one of the most common skin diseases affecting humans, characterized by inflamed and non-inflamed lesions, manifested as comedones, papules, pustules and nodules<sup>1,2</sup>.

Propionibacterium acnes is known to be involved in the pathogenesis of inflammatory acne. It can be considered as an immune response against antigens P acne in the follicular lumen<sup>3</sup>. Subsequent release of lysosomal enzymes by neutrophils leads to follicular epithelium rupture and progressive inflammation. In addition, P. acne caused monocyte lesions of acne to produce high levels of IL-1 and tumor necrosis factor- $\alpha$  (TNF- $\alpha$ )<sup>4</sup>. C-reactive protein (CRP) appears in acute phase of inflammatory process due to infection, injury and C-reactive protein (CRP) level decreased or disappears when infection is subside or heal the injury<sup>5</sup>. The acne is creating local inflammatory reaction that could potentially become systemic<sup>6</sup>. The inflammation in the acne is very severe it is systemic, then it can be assumed that serum CRP levels increase in patients with acne vulgaris<sup>7</sup>. Today, acne is classified as an inflammatory condition just before clinical lesions appearance<sup>8</sup>. The inflammatory reaction in acne vulgaris occurred because changes in sebum composition. Therefore, CRP levels may be elevated in acne if the amount of local inflammation is high enough<sup>9</sup>. The role of serum level of C-reactive protein in moderate and severe acne patients is underestimated<sup>9,10</sup>. By keeping this in mind the present study is designed to figure out the magnitude of the problem in terms of current fact and figures. If results

of this study show significant rise in the mean level of C-reactive protein, then we will be able to suggest a clear cut link between the rise in C-reactive protein levels with moderate and severe acne in context of our local population. As result of this study will fill the gap, open new forum of discussion and offered additional information to dermatologist that can influence their clinical practice.

## **MATERIAL & METHODS**

This study was conducted in the Department of dermatology, Liaquat University of Medical & Health Sciences (LUMHS), Jamshoro, from November 3, 2020 to May 2, 2021. An inform consent was also taken prior to enrolment of patients in the study. The selected participants were referred to the laboratory for hypersensitive-CRP (Hs-CRP) measurement. All the patients of either gender, age between 16 to 40 years associated with moderate and severe acne duration more than 3 months were included in this study. Patients age >40 years, history of any systemic treatment, particularly vitamin D or calcium supplementation therapy or phototherapy within the last six months history of drug induced acne. Patients with history of diagnosis of a systemic disease, such as diabetes mellitus, parathyroid or thyroid disorders, autoimmune diseases, anemia, atopy, chronic renal or liver disease, malignancy were excluded from this study.

The data was entered and analyze into statistical packages for social science (SPSS Version 22.0). Mean $\pm$ SD was calculated for age, duration of acne, global acne grading system GAGS score and serum level of C-reactive protein. Frequencies and percentages were calculated for gender and severity of acne (moderate / severe). Effect modifier were controlled through

stratification of age, gender, duration of acne, and severity of acne (moderate / severe) and these stratified group were compared by applying independent sample t-test by using  $P \leq 0.05$  as significant.

## RESULTS

In distribution of gender, out of 56 patients, 30 (53.6%) were male while 26 (46.4%) were female. Out of 56 patients, 21 (37.5%) patients had moderate Acne vulgaris while 35 (62.5%) had severe Acne vulgaris.

In this study 56 patients were included to assess the mean serum level of C-reactive protein in acne patients visiting to a tertiary care hospital and the results were analyzed as: Mean  $\pm$  SD of age was  $22.7 \pm 5.3$  with C.I (21.28--24.11) years. Mean  $\pm$  SD of duration of acne was  $33.2 \pm 6.2$  with C.I (31.53--34.86) months. Mean  $\pm$  SD of global acne grading system GAGS score was  $26.5 \pm 5.1$  with C.I (25.13--27.86). Mean  $\pm$  SD of C-reactive protein was  $4.15 \pm 1.2$  with C.I (3.82--4.47) ( $\mu\text{g/ml}$ ) as shown in **TABLE 1**. Stratification of age group, gender, duration of acne and severity of acne was done with respect to C-reactive protein in order to assess significant difference as shown in **TABLE No.2**.

**TABLE # 1**  
**DESCRIPTIVE STATISTICS**  
**n=56**

<b>VARIABLE</b>	<b>MEAN</b>	<b>95% CONFIDENC E INTERVAL</b>	<b>MINIMUM</b>	<b>MAXIMUM</b>
• <b>AGE (Years)</b>	<b>22.7±5.3</b>	<b>21.28--24.11</b>	<b>16</b>	<b>40</b>
• <b>DURATION OF ACNE(Months)</b>	<b>33.2±6.2</b>	<b>31.53--34.86</b>	<b>3</b>	<b>120</b>
• <b>Global Acne Grading System GAGS SCORE</b>	<b>26.5±5.1</b>	<b>25.13--27.86</b>	<b>19</b>	<b>38</b>
• <b>C-REACTIVE PROTEIN(µg/ml)</b>	<b>4.15±1.2</b>	<b>3.82--4.47</b>	<b>3.0</b>	<b>7.7</b>

**TABLE # 2**  
**STRATIFICATION OF DIFFERENT VARIABLE WITH C-REACTIVE**  
**PROTEIN**  
**n=56**

Variable	C-REACTIVE PROTEIN		P-VALUE
	Mean	±SD	
AGE GROUP [In Years]			
16 – 25 (n=43)	4.11	1.0	0.639
>25 (n=13)	4.27	1.3	
GENDER WITH C-REACTIVE PROTEIN			
Male (n=30)	4.21	1.2	0.652
Female (n=26)	4.08	0.9	
DURATION [In Months] OF ACNE WITH C-REACTIVE PROTEIN			
3 – 30 (n=39)	4.28	1.3	0.361
>30 (n=17)	3.96	0.9	
SEVERITY OF ACNE WITH C-REACTIVE PROTEIN			
Moderate (n=21)	4.05	1.0	0.435
Severe (n=35)	4.31	1.3	

## DISCUSSION

Acne vulgaris (AV), a chronic inflammatory disease of skin<sup>11,12</sup>. *P. acnes* colonization within the follicles and inflammation triggers hyperkeratinization and the obstruction of the pilosebaceous follicles leading to the occurrence of acne lesions<sup>13,14</sup>. Inflammation is a major factor in the pathogenesis of acne. CRP, the most commonly used inflammatory biomarker, is produced primarily by hepatocytes under the influence of cytokines such as IL-6 and TNF-alpha, which are elevated in AV patients<sup>15,16</sup>.

CRP serum levels have been widely studied in many diseases because it is a cheap and accessible marker of inflammation<sup>17</sup>. When measured by high sensitivity tests, CRP population distribution was generally static for both genders and ethnic groups: Values of 0.3, 0.6, 1.5, 3.5, and 6.6 µg/l have been reported as estimates of the 10th, 25th, 50th, 75th, and 90th percentiles respectively for middle-aged people<sup>18</sup>. In addition, CRP levels are not altered by diet. Therefore, CRP is considered an appropriate marker for assessing systemic inflammatory levels. Inflammatory markers CRP level increased in blood after inflammation non-specific inflammation<sup>19</sup>. CRP is an acute phase protein mainly synthesized in liver cells and regulated by many cytokines<sup>20</sup>.

The findings of our study are comparable with multiple studies conducted by various researchers. In our study, the mean age was  $22.7 \pm 5.3$  years. The study of Ramanand SJ, et al<sup>21</sup> noted age as  $20.73 \pm 0.38$  years. Mohammed RH, et al<sup>22</sup> reported mean age as  $20.6 \pm 3.7$  years, Jiménez-Gallo D, et al<sup>23</sup> noted as  $37.4 \pm 12.0$  years whereas El-Taweel AA, et al<sup>24</sup> noted as  $19.4 \pm 2.62$  and  $20.2 \pm 1.64$  years in cases and control groups. In current study, the mean duration of acne was  $33.2 \pm 6.2$  months. Karabay EA, et al<sup>10</sup> noted the duration of disease as  $37.97 \pm 28.19$  months. In current study, the mean CAGS score was  $26.5 \pm 5.1$ . In recent study, the mean C-

reactive protein was  $4.15 \pm 1.2$  ( $\mu\text{g/ml}$ ). The study of Karabay EA, et al<sup>10</sup> noted the level CRP as  $3.79 \pm 0.95$ . Ramanand SJ, et al<sup>21</sup> reported CRP level as  $2.01 \pm 0.19$  whereas Mohammed RH, et al<sup>22</sup> noted as  $6.9 \pm 4.9$ . Another study of El- Taweel AA, et al<sup>24</sup> reported the level of C-reactive protein as  $3.97 \pm 4.07$  and  $2.26 \pm 1.87$  in cases and controls respectively whereas Namazi MR, et al<sup>25</sup> reported as  $2.27 \pm 4.87$   $\mu\text{g/ml}$  in cases and  $3.12 \pm 3.67$   $\mu\text{g/ml}$  in controls.

In present study, out of 56 patients, 30 (53.6%) were male while 26 (46.4%) were female. There were 38.2% males and 61.8% females noted in Mohammed RH, et al<sup>22</sup>. The study of Jiménez-Gallo D, et al<sup>23</sup> reported to have 36 (48.64%) males and 38 (51.36%) females. El-Taweel AA, et al<sup>24</sup> reported to have 38 (63.33%) females. In our study, 21 (37.5%) patients had moderate Acne vulgaris while 35 (62.5%) had severe AV. Karabay EA, et al<sup>10</sup> further reported that 08 patients (12.3%) had mild, 14 patients (21.5%) had moderate and 43 patients (66.2%) had severe acne vulgaris. Mohammed RH, et al<sup>22</sup> reported the severity of AV as moderate in 38 patients (55.9%), 12 patients (17.6%) with mild and other 12 patients with severe form with (17.6%) prevalence. Namazi MR, et al<sup>25</sup> reported to have 22 cases of moderate acne and 20 cases of severe acne. In this study, stratification of confounders / effect modifiers with respect to C-reactive protein, insignificant difference was noted in age group ( $P=0.639$ ), gender ( $P=0.652$ ), duration of acne ( $P=0.361$ ) and severity of acne ( $P=0.435$ ).

## CONCLUSION

It is to be concluded that mean serum level of C-reactive protein in severe acne patients was high as compare to moderate acne patients. There is a need to conduct random studies using a large sample size with multiple study centers in Pakistan to confirm the results of future and current research.

Ethical Approval:



As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

#### Consent

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

#### **COMPETING INTERESTS DISCLAIMER:**

**Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.**

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