ORIGINAL ARTICLE

# Metabolic Syndrome Frequency in Patients with Acne Vulgaris

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**ABSTRACT**

**Objectives:** To determine the frequency of metabolic syndrome in patients with *Acne Vulgaris* at unit of Dermatology Liaquat Medical University Hospital Hyderabad.

**Study Design:** Case Control Study.

**Place and Duration of Study:** The Dermatology Unit Liaquat Medical University Hospital Hyderabad from 1st August 2018 to 31st December 2019.

**Materials and Methods:** A total of 75 patients with acne vulgaris were included in this study. The demographic characteristics of patients have been carried out. After a detailed history and a full clinical review, the patients underwent relevant investigations, which were established earlier, for which overnight fasting blood sample of each patient was sent to the institutional pathology laboratory where the Pathology Consultant prepared each report and the data were collected on pre-designed proforma. Confounders and effect modifiers including age, gender, BMI, occupation and socio-economic status were addressed through stratification and post stratification. Statistical test conducted was Chi-square.

**Results:** Metabolic syndrome association in patients with acne vulgaris was observed in 13.33% (10/75) cases. Stratification was performed and observed that, in patients with acne vulgaris, incidence of metabolic syndrome was not statistically significant with respect to age groups, BMI, duration of acne vulgaris, occupation, socio economic status and gender.

**Conclusion:** The frequency of metabolic syndrome in patients with acne vulgaris showed a weak positive association.

**Key Words:** *Acne Vulgaris, Chronic Inflammatory Disease, Insulin Resistance, Metabolic Syndrome.*

## Introduction

Acne is a chronic inflammatory condition that occurs in age groups of teenagers. There is variety of misconceptions and misperceptions, in patients and also healthcare professionals, on the causes and treatment of acne.[1] Acne is a common pilosebaceous unit multifactorial disease. The functions of sebaceous gland androgenic stimulation, Hyperkeratosis of inflammation of the follicular infra infundibulum, and classically well-known etiological factors in acne pathogenesis are increased colonization of propionic bacterium acnes.[2] Abnormalities in metabolism of androgenic steroids, resistance to insulin, different clinical symptoms can result in cell signaling and uncontrolled inflammation that includes Acne Vulgaris.[3] It affects around 85% of adolescent patients and about 3% of the world's adult patients aged 35 and under about 44.[4] It is not disease that threatens life, depression, low self-esteem and low living standards are associated with it. Besides these results, it can also be associated with systemic disorders including chronic syndromes of hypovitaminosis, metabolic syndrome, and Behcet's syndrome.[5] Metabolic syndrome (MS) defined as an increased waist circumference with ethnicity-specific values plus any of the following four factors: triglyceride levels of at least 150 mg/dL; HDL cholesterol levels of at least 40 mg/dL for males and below 50 mg/dL for females; systolic BP levels of at least 130 mm Hg or diastolic BP levels of at least 85 mm Hg; and fasting plasma glucose levels of at least 100 mg/dL. It is a collection of predisposing factors, raising the risk of type 2 diabetes mellitus and heart disease.[6] The main risk factors are elevated dyslipidemia, blood pressure, central obesity and hyperglycemia.[7] Although

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metabolic syndrome in itself is not a dermatological diagnosis, many skin indications are a clinical predictor, increasing metabolic syndrome facilitating early diagnosis.[8]

The rationale for the study was small national and international data, and therefore the findings of international data are not relevant to our population as we are genetically and geographically distinct. This research was carried out in our community to determine the frequency of metabolic syndrome in patients with *Acne Vulgaris* at unit of Dermatology, Liaquat Medical University Hospital Hyderabad.

## Materials and Methods

It was a case control study, conducted at Unit of Dermatology, Liaquat Medical University Hospital Hyderabad from 1st August 2018 to 31st December 2019. The sample size calculated for this study was 75. A non-probability consecutive sampling technique was used to select the patients. Ethical approval was received from the Research Ethics Committee of the College of Physicians and Surgeons of Pakistan (CPSP) before the study was performed.

Inclusion criteria were confirmed cases of acne vulgaris for at least one year in both genders aged 18 to 30 years. The exclusion criteria were considered to be other skin disorders associated with metabolic syndrome such as Psoriasis, patients already on medications that cause hyperglycemia, dyslipidemia or hypertension, and patients who were not willing to participate in the study.

All the diagnosed cases of acne vulgaris presented in outdoor patients were enrolled in the study by the principal investigator. Demographic characteristics like age, BMI, abdominal circumference in centimeter, blood pressure, weight, height, total cholesterol and fasting blood sugar of the patients were obtained on pre-designed proforma. After an extensive history and complete clinical examination (local and general), the patients undertook the requisite investigations described before, for that overnight, the fasting blood sample of each patient was sent to the institutional pathology laboratory where the pathology consultant drafted every sample. All patients received informed consent to participate in the study. An examination of metabolic syndrome in patients with acne vulgaris was the primary outcome variable. Using SPSS (Registered) Version 22, the data was analyzed. For qualitative variables such metabolic syndrome, gender, occupation, socio economic status frequencies and %ages were calculated. Quantitative data like age, weight, height, BMI and abdominal circumferences were presented as mean ± standard deviation. Confounders and effect modifiers including age, gender, BMI, occupation and socio-economic status were addressed through stratification and post stratification. Statistical test conducted was Chi-square. Confidence interval was set at 95% and probability value ≤0.05, as statistically significant.

## Results

This research included a total of 75 patients with Acne Vulgaris. Table-I indicates the age distribution of the patients. The average age of the patients was 24.45±2.90 years. Similarly, the other demographic characteristic of the patients is also shown in Table I. There were 80% male and 20% female. Most of the patients 56 (74.67%) were working in inside office and 19 (25.33%) doing field work. Socio economic status of the patients was 26 (34.67%) were earning >30,000 and 49 (65.33%) were 15,000 to 30,000. Average of abdominal circumference, serum triglyceride, HDL, SBP, DBP and blood fasting sugar are also reported in Table II.

Metabolic syndrome frequency in patients with acne vulgaris was observed in 13.33% (10/75) cases. Stratification was performed and observed that, in patients with acne vulgaris, incidence of metabolic syndrome was not statistically significant with respect to age groups, BMI, duration of acne vulgaris, occupation, socio economic status and gender shown in Table III.

**Table I: Descriptive Characteristics of Patient (n=75)**

| Variables | Mean | 95% Confidence Interval for Mean | | Std. Deviation |
|---|---|---|---|---|
| | | Lower Bound | Upper Bound | |
| Age (Years) | 24.45 | 23.78 | 25.12 | 2.90 |
| Weight (kg) | 74.34 | 70.32 | 78.37 | 17.48 |
| Height (cm) | 161.11 | 158.93 | 163.28 | 9.45 |
| BMI (kg/m$^2$) | 28.67 | 27.08 | 30.26 | 6.91 |
| Duration of Acne Vulgaris (Months) | 16.99 | 15.92 | 18.05 | 4.62 |

**Table II: Clinical Characteristics of Patients (n=75).**

| Variables | Mean | Std. Deviation | 95% Confidence Interval for Mean | |
|---|---|---|---|---|
| | | | Lower Bound | Upper Bound |
| Abdominal Circumference (cm) | 89.67 | 9.67 | 87.44 | 91.89 |
| Serum Triglyceride(mg/dl) | 145.89 | 42.27 | 136.17 | 155.62 |
| HDL (mg/dl) | 42.69 | 13.02 | 39.70 | 45.69 |
| SBP (mmHg) | 129.13 | 9.84 | 126.87 | 131.4 |
| DBP (mmHg) | 78.73 | 7.21 | 77.07 | 80.39 |
| Blood Fasting Sugar (mg/dl) | 86.20 | 11.19 | 83.62 | 88.78 |

**Table III: Frequency of Metabolic Syndrome in Patients with Acne Vulgaris In Male and Female (n =75)**

| Gender | Metabolic Syndrome | | Total | P-Value |
|---|---|---|---|---|
| | Yes | No | | |
| Male | 7(11.7%) | 53(88.3%) | 60 | 0.396 |
| Female | 3(20%) | 12(80%) | 15 | |

Chi-Square= 0.721

## Discussion

In present study, most of the patients were under the age of 25 years, with a mean age of 24.45±2.90 years. A total of 80% male and 20% female were part of the study sample. The mean duration of Acne Vulgaris was 16.99 months and the mean BMI was found to be 28.67 kg/m$^2$. Although, 25.3% of field workers have been identified with it. The prevalence of office work as an occupational effect on acne vulgaris is shown by 74.67% of patients. In this study, a prevalence rate of 20.7% was found in the 26-30 years age group. The occurrence of metabolic syndrome was observed in 13.33% (10/75) cases.

In their community-based research, Alshammrie et al[9] recorded the age of respondents in a range of five years. Much of the respondents were between 21 and 25 years of age. In comparison to our study, most of the respondents (84%) were female. Thirty-eight percent had a body mass index (BMI) equal to more than 30%. Most of the respondents were Saudis (98%) and Hail City residents (93%).

Acne is seen in 85% of adolescents in the U.S.[4] An overall prevalence of 60.7% was observed among Turkey's female secondary students.[10] Whereas another community-based research conducted in China found a prevalence of acne of 38% among women aged 15-19 years.[11] According to research conducted in Saudi Arabia, the overall prevalence of female secondary school students was 14.3 per cent. Most of these studies were carried out in middle school or high school students and very few in college or university.[12]

In similarity to our study, Neupane et al. stated that, according to BMI, 65.5% were average, 12 % were overweight, 20.5 % were underweight, and 2 % were obese. Much of the patients had Grade 2 acne (52.6%). Just 4.8% of the population had grade 4 acne. Grade 2 and 3 acne were more prevalent in females, while grade 3 and 4 acne were more prevalent in males.

Agreeing to current study, Babar et al.[13] reported that approximately half of the participants reported that their clothing was not affected by their skin. Social and recreational habits of 60% of participants were influenced by acne at 9.7%, 14.5% a lot, 35.8% a little, and 40% not at all. The majority of participants 67.3% were not affected by their acne in sports. In addition, 73.9% of participants were not affected by acne when studying and working, and more than half of them did not have an acne impact on their relationship with their partners and close friends.

In comparison to our research, the prevalence of metabolic syndrome was 39.0% in the Indonesian population and 29.2% in the Dutch population. The sex-stratified prevalence was 28.0% and 46.2% for men and women in Indonesia and 36.2% and 23.8% for men and women in the Netherlands. Males had a higher prevalence than women of four out of five metabolic syndrome components in the Netherlands population, with the exception of abdominal obesity reported by Sigit et al.[14]The higher prevalence can be explained by the age of the studied populations in the present study: one study included elderly people and the other younger.[15,16]

Acne vulgaris is one of the world's most common skin disorders and is usually seen in teenagers. Androgens have been identified as raising the size of the sebaceous glands, enhancing sebum production, inducing keratinocyte proliferation, which is what triggers acne.[13,17,18]

The limitation of research is a small sample size and minimal study setting. By incorporating more

research variables and wider study settings, it is recommended to design studies on a larger scale.

## Conclusion

In our research, the frequency of metabolic syndrome in patients with acne vulgaris showed a positive association in cases.

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