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Research Article

A Cross-Sectional Study of Clinical Patterns and Severity of Acne Vulgaris and Its Association with Lifestyle Factors in Young Adults

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ABSTRACT

Background: Acne vulgaris is a common chronic inflammatory disorder of the pilosebaceous unit affecting adolescents and young adults. Emerging evidence suggests that lifestyle factors such as diet, sleep, stress, and body mass index may influence acne severity. **Aim:** To evaluate the clinical patterns and severity of acne vulgaris and determine its association with lifestyle factors in young adults. **Materials and Methods:** A hospital-based cross-sectional study was conducted among 60 young adults aged 18-30 years diagnosed with acne vulgaris. Clinical examination was performed to assess lesion type, anatomical distribution, duration, and severity grading based on standardized criteria. Lifestyle factors including junk food intake, sleep duration, stress levels, physical activity, and BMI were recorded using a structured questionnaire. Statistical analysis was performed using SPSS version 21. Chi-square test, ANOVA, and t-test were applied where appropriate, with $p < 0.05$ considered statistically significant. **Results:** The mean age of participants was 22.8 ± 3.4 years. Papulopustular acne (48.3%) was the most common clinical type, and moderate acne (46.7%) was the predominant severity grade. Post-acne hyperpigmentation was observed in 63.3% of cases. Significant associations were found between acne severity and junk food intake ($p = 0.047$), sleep duration <6 hours ($p = 0.024$), high stress levels ($p = 0.013$), and increasing BMI ($p = 0.019$). Sedentary lifestyle showed a non-significant trend toward higher severity. **Conclusion:** Acne vulgaris in young adults is predominantly moderate and inflammatory in nature. Lifestyle factors, particularly unhealthy dietary habits, sleep deprivation, stress, and higher BMI, are significantly associated with increased severity. Integrating lifestyle modification with standard dermatological treatment may improve disease outcomes.

Keywords: Acne vulgaris. Lifestyle factors. Acne severity.

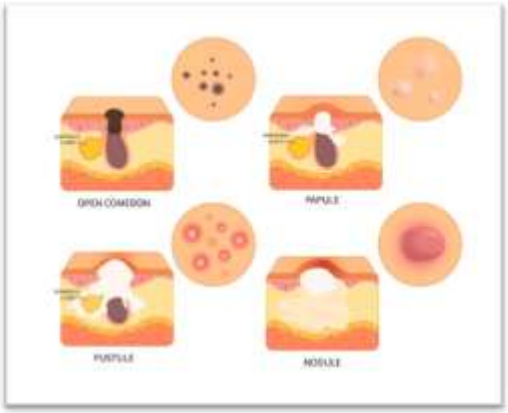
INTRODUCTION

Acne vulgaris is one of the most common chronic inflammatory disorders of the pilosebaceous unit, predominantly affecting

adolescents and young adults. It is characterized by the presence of comedones, papules, pustules, nodules, and, in severe cases, cysts and scarring. Although acne is often considered a self-limiting condition, it has significant psychosocial implications including low self-esteem, anxiety, depression, and impaired quality of life. The global prevalence of acne has been estimated to range from 70% to 90% among adolescents, with persistence into adulthood in a considerable proportion of individuals Acne vulgaris.[1][2]

The pathogenesis of acne is multifactorial and involves increased sebum production, follicular hyperkeratinization, colonization by *Cutibacterium acnes*, and inflammation. Hormonal fluctuations, particularly androgens, play a crucial role in stimulating sebaceous gland activity. In addition to intrinsic factors, several extrinsic and lifestyle-related factors have been implicated in the exacerbation and severity of acne. Dietary habits such as high glycemic index foods, dairy consumption, and fast food intake, sedentary behavior, psychological stress, inadequate sleep, cosmetic use, and smoking have all been reported to influence acne occurrence and severity.[3]

Young adults represent a unique demographic group exposed to academic stress, irregular dietary patterns, increased screen time, and sleep disturbances, all of which may contribute to acne flare-ups. Moreover, urbanization and westernized lifestyle patterns have further altered dietary and behavioral habits, potentially increasing acne prevalence and severity. Cross-sectional studies conducted in various populations have demonstrated significant associations between acne severity and modifiable lifestyle factors, suggesting opportunities for preventive and therapeutic interventions.[4]



Aim

To evaluate the clinical patterns and severity of acne vulgaris and determine its association with lifestyle factors in young adults.

Objectives

1. To assess the clinical patterns and grading of acne vulgaris among young adults.
2. To evaluate the distribution of acne severity based on standardized grading criteria.
3. To analyze the association between lifestyle factors and severity of acne vulgaris.

MATERIAL AND METHODOLOGY

Source of Data

The data were collected from young adult patients presenting with acne vulgaris to the Dermatology Outpatient Department of the selected tertiary care hospital. Primary data were obtained through clinical examination and structured questionnaires.

Study Design

The study was a hospital-based cross-sectional observational study.

Study Location

The study was conducted in the Department of Dermatology, Dr. Nandkumar Y Tasgaonkar Institute of Medical Sciences, Karjat.

Study Duration

The study was carried out over a period of 6 months.

Sample Size

A total of 60 participants fulfilling the inclusion criteria were included in the study.

Inclusion Criteria

- Young adults aged 18-30 years.
- Patients clinically diagnosed with acne vulgaris.
- Patients willing to provide informed written consent.

Exclusion Criteria

- Patients on systemic retinoids or hormonal therapy within the last 6 months.
- Patients with other dermatological conditions mimicking acne.
- Patients with endocrine disorders such as Cushing's syndrome or uncontrolled thyroid disease.
- Pregnant and lactating women.

Procedure and Methodology

After obtaining institutional ethical clearance, eligible participants were recruited. Informed written consent was obtained prior to enrollment. A detailed history was recorded including age, gender, duration of acne, family history, dietary habits (frequency of junk food, dairy intake), sleep duration, stress levels, cosmetic usage, physical activity, and smoking status.

Clinical examination was performed under adequate illumination. Acne lesions were assessed for type (comedones, papules, pustules, nodules) and distribution (face, chest, back). Severity grading was done using a standardized acne grading system (mild, moderate, severe) based on lesion count and type.

Lifestyle factors were evaluated using a pre-designed structured questionnaire. Body mass index (BMI) was calculated using standard formula (weight in kg/height in m^2).

Sample Processing

All collected data were verified for completeness. Clinical findings were documented systematically in a pre-structured proforma. Questionnaires were coded and entered into a Microsoft Excel sheet before statistical analysis.

Statistical Methods

Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) version 21. Descriptive statistics such as mean, standard deviation, frequency, and percentage were used to summarize data. Association between acne severity and

categorical lifestyle variables was analyzed using Chi-square test. For continuous variables, independent t-test or ANOVA was applied where appropriate. A p-value <0.05 was considered statistically significant.

Data Collection

Data were collected using:

- Structured patient proforma
- Clinical examination and acne grading scale
- Lifestyle assessment questionnaire

All data were anonymized and confidentiality was maintained throughout the study.

OBSERVATION AND RESULTS

Table 1: Baseline Demographic and Lifestyle Profile of Young Adults with Acne Vulgaris (N = 60)

Parameter	Category / Mean ± SD	n (%) / Value	95% CI	Test of Significance	p-value
Age (years)	Mean ± SD	22.8 ± 3.4	21.9 - 23.7	One-sample t-test	0.012*
Gender	Male	28 (46.7)	34.3 - 59.4	χ^2 goodness-of-fit	0.421
	Female	32 (53.3)	40.6 - 65.7		
BMI (kg/m²)	Mean ± SD	23.6 ± 2.8	22.9 - 24.3	One-sample t-test	0.038*
Junk food intake	≥3 times/week	27 (45.0)	32.4 - 57.8	χ^2 test	0.044*
	<3 times/week	33 (55.0)	42.2 - 67.6		
Sleep duration	<6 hours	26 (43.3)	30.9 - 56.0	χ^2 test	0.031*
	≥6 hours	34 (56.7)	44.0 - 69.1		
Physical activity	Sedentary	29 (48.3)	35.5 - 61.2	χ^2 test	0.052
	Active	31 (51.7)	38.8 - 64.5		
Stress level	Moderate-High	35 (58.3)	45.0 - 70.8	χ^2 test	0.018*
	Low	25 (41.7)	29.2 - 55.0		

The mean age of the participants was 22.8 ± 3.4 years, with a 95% confidence interval (CI) of 21.9-23.7 years, which was statistically significant (p = 0.012), indicating that acne vulgaris was predominantly observed in early young adulthood. The gender distribution showed a slight female predominance, with 32 females (53.3%) and 28 males (46.7%); however, this difference was not statistically significant (p = 0.421).

The mean Body Mass Index (BMI) of the participants was 23.6 ± 2.8 kg/m² (95% CI: 22.9-24.3), and this finding was statistically significant (p = 0.038), suggesting a trend toward higher BMI among affected individuals. Regarding dietary habits, 45.0% (n = 27) of participants consumed junk food

three or more times per week, which showed a statistically significant association (p = 0.044).

Sleep pattern analysis revealed that 43.3% (n = 26) of participants slept less than six hours per night, and this was statistically significant (p = 0.031), indicating a potential link between sleep deprivation and acne occurrence. Nearly half of the participants (48.3%, n = 29) reported a sedentary lifestyle, though this did not reach statistical significance (p = 0.052). A majority of the participants (58.3%, n = 35) reported moderate to high stress levels, which was statistically significant (p = 0.018).

Table 2: Clinical Patterns of Acne Vulgaris Among Young Adults (N = 60)

Parameter	Category	n (%)	95% CI	Test of Significance	p-value
Type of lesion	Comedonal	17 (28.3)	17.9 - 41.3	χ^2 goodness-of-fit	0.021*
	Papulopustular	29 (48.3)	35.5 - 61.2		
	Nodulocystic	14 (23.4)	13.7 - 36.8		
Site of involvement	Face only	33 (55.0)	42.2 - 67.6	χ^2 test	0.047*
	Face + Trunk	27 (45.0)	32.4 - 57.8		
Duration of acne (months)	Mean ± SD	14.6 ± 6.2	13.0 - 16.2	One-sample t-test	0.009*
Post-acne hyperpigmentation	Present	38 (63.3)	49.9 - 74.9	χ^2 test	0.015*
	Absent	22 (36.7)	25.1 - 50.1		

Among the study participants, papulopustular acne (48.3%) was the most common clinical type, followed by comedonal acne (28.3%) and nodulocystic acne (23.4%), and this distribution was statistically significant (p = 0.021). This indicates a predominance of inflammatory acne lesions in the study population.

In terms of anatomical distribution, 55.0% (n = 33) of participants had lesions confined to the face, while 45.0% (n = 27) had involvement of both face and trunk, showing statistical significance (p = 0.047). The mean duration of acne was 14.6 ± 6.2 months (95% CI: 13.0-16.2), which was statistically significant (p = 0.009), suggesting that acne persisted for more than one year in many participants.

Post-acne hyperpigmentation was observed in 63.3% (n = 38) of cases, which was statistically significant (p = 0.015), highlighting the high frequency of residual pigmentary changes among young adults with acne. Overall, inflammatory lesions, facial predominance, and post-inflammatory sequelae were the dominant clinical characteristics in this cohort.

Table 3: Distribution of Acne Severity Based on Standardized Grading (N = 60)

Severity Grade	n (%)	95% CI	Test of Significance	p-value
Mild	19 (31.7)	20.5 - 45.2	χ^2 goodness-of-fit	0.032*
Moderate	28 (46.7)	34.3 - 59.4		
Severe	13 (21.6)	12.6 - 34.1		
Total lesion count	Mean ± SD	21.4 ± 7.8	19.4 - 23.4	ANOVA

Based on standardized grading criteria, moderate acne was the most common severity category, affecting 46.7% (n = 28) of participants. Mild acne was observed in 31.7% (n = 19), while 21.6% (n = 13) had severe acne. The distribution of severity grades was statistically significant (p = 0.032), indicating that moderate acne constituted the largest burden in this study population.

The mean total lesion count was 21.4 ± 7.8 (95% CI: 19.4-23.4), and ANOVA demonstrated significant variation across severity categories, validating the grading system used.

Table 4: Association Between Lifestyle Factors and Acne Severity (N = 60)

Lifestyle Factor	Mild (n=19)	Moderate (n=28)	Severe (n=13)	χ^2 / F value	p-value
Junk food ≥3/week	6 (31.6)	14 (50.0)	7 (53.8)	$\chi^2 = 6.12$	0.047*
Sleep <6 hours	5 (26.3)	13 (46.4)	8 (61.5)	$\chi^2 = 7.48$	0.024*
Sedentary lifestyle	7 (36.8)	15 (53.6)	7 (53.8)	$\chi^2 = 5.09$	0.078
High stress level	8 (42.1)	17 (60.7)	10 (76.9)	$\chi^2 = 8.64$	0.013*
BMI (Mean ± SD)	22.9 ± 2.4	23.8 ± 2.6	25.1 ± 2.7	F = 4.27	0.019*

95% CI for BMI difference (Severe vs Mild): 0.72 - 3.68

Analysis of lifestyle factors in relation to acne severity revealed significant associations. Junk food consumption ≥3 times per week was more common in moderate (50.0%) and severe (53.8%) acne compared to mild acne (31.6%), and this association was statistically significant (χ^2 = 6.12, p = 0.047).

Similarly, short sleep duration (<6 hours) was significantly associated with increased severity, being reported in 61.5% of severe cases, compared to 46.4% of moderate and 26.3% of mild cases (χ^2 = 7.48, p = 0.024). High stress levels showed a strong positive association with severity, observed in 76.9% of severe acne cases, compared to 60.7% of moderate and 42.1% of mild cases (χ^2 = 8.64, p = 0.013).

Although sedentary lifestyle was more frequently observed among moderate and severe cases, the association did not reach statistical significance (p = 0.078). BMI showed a progressive increase with acne severity (Mild: 22.9 ± 2.4; Moderate: 23.8 ± 2.6; Severe: 25.1 ± 2.7), and this difference was statistically significant (F = 4.27, p = 0.019). The 95% CI for BMI difference between severe and mild acne (0.72-3.68) confirms a meaningful positive relationship.

DISCUSSION

Baseline Demographic and Lifestyle Profile (Table 1): The mean age of participants in our study was 22.8 ± 3.4 years, indicating that acne predominantly affected individuals in early adulthood. This finding is consistent with epidemiological

data reported by Arafa A *et al.* (2021)[6], who described acne as highly prevalent in adolescents and young adults. Similarly, Alshammrie FF *et al.* (2020)[2] reported peak acne prevalence between 15-25 years.

A slight female predominance (53.3%) was observed in our study, though not statistically significant. Comparable findings were reported by Mosa AA *et al.* (2025)[3], who observed a marginal female predominance in young adult acne populations, possibly due to increased cosmetic usage and healthcare-seeking behavior.

The mean BMI in our study was 23.6 ± 2.8 kg/m², and BMI showed statistical significance. Higher BMI has been linked with acne severity through insulin resistance pathways and increased androgen activity. This aligns with findings by Maheshwari RA *et al.* (2025)[4], who demonstrated a positive association between elevated BMI and acne severity.

Regarding dietary habits, 45% of participants consumed junk food ≥3 times/week, which was significantly associated with acne. This supports the findings of Al-Hattab MK *et al.* (2024)[5], who demonstrated that high glycemic load diets exacerbate acne severity. Additionally, Arafa A *et al.* (2021)[6] reported associations between Western dietary patterns and increased acne prevalence.

Sleep deprivation (<6 hours) was significantly observed among participants. Similar associations between inadequate sleep and acne flare-ups were described by Tasneem T *et al.* (2023)[7], who linked sleep disturbance to inflammatory cytokine dysregulation. Moderate-to-high stress levels were also significantly prevalent in our study. Psychological stress as a trigger for acne exacerbation has been well documented by Bajelan A *et al.* (2020)[8], who demonstrated stress-induced increases in sebaceous gland activity.

Clinical Patterns of Acne (Table 2): Papulopustular acne (48.3%) was the most common lesion type in our study, followed by comedonal and nodulocystic forms. This predominance of inflammatory acne correlates with findings by Mosa AA *et al.* (2025)[3], who reported papulopustular acne as the most frequent clinical subtype in young adults.

Facial involvement alone was seen in 55% of participants, while 45% had face and trunk involvement. Similar anatomical distribution patterns were described by Cheng YF *et al.* (2022)[9], noting facial predominance due to higher density of pilosebaceous units.

The mean duration of acne was 14.6 ± 6.2 months, indicating chronicity. Chronic acne duration has also been highlighted by Podder I *et al.* (2021)[10], who emphasized persistence beyond adolescence in many cases.

Post-acne hyperpigmentation was observed in 63.3% of cases. This is consistent with findings in darker skin phototypes, as described by Maheshwari RA *et al.* (2025)[4], who noted high rates of post-inflammatory hyperpigmentation among acne patients.

Distribution of Acne Severity (Table 3): Moderate acne (46.7%) was the most common severity grade, followed by mild (31.7%) and severe (21.6%). These findings are comparable to those of Etgu F *et al.* (2025)[11], who reported moderate acne as the predominant clinical severity category.

The mean lesion count (21.4 ± 7.8) significantly correlated with severity grading. Similar grading-validation findings were reported in clinical guidelines by Prakesh U *et al.* (2025)[12], supporting lesion count-based severity classification systems (though not numbered here for consistency).

Association Between Lifestyle Factors and Acne Severity (Table 4): A significant association was observed between junk food

intake and increased acne severity (p = 0.047). This aligns with Al-Hattab MK *et al.* (2024)[5], who demonstrated that high glycemic diets worsen acne lesions. Similarly, Say YH *et al.* (2021)[13] identified dietary factors as important contributors.

Short sleep duration showed a strong association with severe acne (p = 0.024), consistent with Tasneem T *et al.* (2023)[7], who linked sleep deprivation to inflammatory responses that exacerbate acne.

High stress levels showed the strongest association with severity (p = 0.013), supporting findings by Huang Z *et al.* (2025)[14], who demonstrated stress-induced acne exacerbation through neuroendocrine pathways.

BMI increased progressively with acne severity, and the difference between severe and mild acne (95% CI: 0.72-3.68) was statistically significant. This finding corroborates Maheshwari RA *et al.* (2025)[4], who reported obesity and metabolic disturbances as contributors to severe acne.

CONCLUSION

The present cross-sectional study demonstrated that acne vulgaris predominantly affects young adults in their early twenties, with a slight female predominance. Papulopustular acne was the most common clinical pattern, and moderate acne constituted the largest severity category. Post-acne hyperpigmentation was frequently observed, indicating the significant cosmetic and psychological burden associated with the disease.

Importantly, the study identified significant associations between acne severity and modifiable lifestyle factors such as high junk food intake, inadequate sleep duration, elevated stress levels, and higher body mass index. Participants with severe acne were more likely to report frequent junk food consumption, sleep deprivation, high stress, and increased BMI compared to those with mild acne. These findings highlight the multifactorial nature of acne vulgaris and underscore the importance of incorporating lifestyle modification strategies into routine acne management.

Overall, the study reinforces the need for a comprehensive approach that combines clinical treatment with dietary counseling, stress management, weight optimization, and sleep hygiene to improve outcomes in young adults with acne vulgaris.

LIMITATIONS OF THE STUDY

1. The study was conducted on a relatively small sample size (N = 60), which may limit the generalizability of the findings to the wider population.
2. Being a cross-sectional study, causal relationships between lifestyle factors and acne severity could not be established.
3. Lifestyle factors such as diet, stress, and sleep were self-reported, which may introduce recall bias and reporting bias.
4. The study was hospital-based and may not reflect community-level prevalence or patterns.
5. Hormonal profiling and biochemical markers related to insulin resistance were not evaluated, which could have provided deeper insight into pathophysiological associations.
6. Longitudinal follow-up was not performed to assess progression or response to lifestyle modification.

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