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Association Between Acne Severity and Quality of Life Among Young Adults with Acne Vulgaris: A Cross-Sectional Study

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ABSTRACT

Background: Acne vulgaris is a common inflammatory dermatological disorder predominantly affecting adolescents and young adults. Beyond its physical manifestations, acne may substantially affect psychological well-being, social functioning and daily activities. Although clinical severity is an important component of disease assessment, the patient's perceived quality-of-life burden may not always correspond directly to the visible severity of acne. Evaluating both clinical severity and quality of life may therefore provide a more comprehensive assessment of disease burden.

Objectives: To assess the association between clinical acne severity and dermatology-specific quality of life among young adults with acne vulgaris attending a tertiary care hospital in North India.

Methods: A hospital-based cross-sectional observational study was conducted in the Department of Dermatology of a tertiary care hospital in North India from December 2025 to March 2026. A total of 420 young adults aged 18–30 years with clinically diagnosed acne vulgaris were recruited using consecutive sampling. Demographic and clinical characteristics were recorded using a structured data collection form. Acne severity was assessed using the Global Acne Grading System (GAGS), while dermatology-specific quality of life was assessed using the Dermatology Life Quality Index (DLQI). Continuous variables were summarized using mean and standard deviation or median and interquartile range, as appropriate, while categorical variables were expressed as frequencies and percentages. Differences in DLQI scores across acne-severity categories were assessed using one-way analysis of variance, with the Kruskal–Wallis test used as a non-parametric sensitivity analysis. The relationship between GAGS and DLQI scores was assessed using Spearman's correlation coefficient. Statistical tests were two-sided, with $p<0.05$ considered statistically significant.

Results: The mean age of participants was 23.3±3.0 years; 233 (55.5%) were male and 187 (44.5%) were female. Mild, moderate, severe and very severe acne were present in 109 (26.0%), 145 (34.5%), 122 (29.0%) and 44 (10.5%) participants, respectively. The overall mean GAGS score was 27.6±10.0 and the mean DLQI score was 8.3±4.5. Mean DLQI scores increased progressively with acne severity, from 3.6±2.3 in mild acne to 7.0±2.5, 11.3±2.4 and 15.4±2.5 in moderate, severe and very severe acne, respectively. The difference across severity groups was statistically significant ($F=340.82$; $p<0.001$). A strong positive correlation was observed between GAGS and DLQI scores (Spearman's $\rho=0.832$; $p<0.001$).

Keywords: Acne vulgaris; acne severity; quality of life; Dermatology Life Quality Index; Global Acne Grading System; young adults; dermatology

Introduction

Acne vulgaris is one of the most common inflammatory dermatological disorders worldwide and predominantly affects adolescents and young adults. Although traditionally regarded as a self-limiting disorder of adolescence, acne may persist into adulthood and can impose a substantial burden on affected individuals. Global burden estimates indicate that acne remains highly prevalent across populations, with considerable numbers of incident and prevalent cases worldwide and a substantial overall burden over recent decades [1,2]. The disease commonly occurs during a formative period characterized by important changes in social relationships, education, employment and self-image, thereby increasing the potential consequences of a visible chronic skin disorder [1,3].

The clinical burden of acne extends beyond the presence of comedones, papules, pustules and nodules. Persistent or inflammatory disease may result in post-inflammatory pigmentation and permanent scarring, while the visible nature of facial and truncal lesions can influence interpersonal relationships, social functioning and psychological well-being [3,4]. Acne has consequently been associated with impaired health-related quality of life (HRQoL), including difficulties related to symptoms, self-perception, leisure activities, personal relationships and everyday functioning. Importantly, the psychosocial burden of acne cannot necessarily be inferred from lesion counts or clinical severity alone. Earlier work demonstrated that patients with acne may experience substantial impairment in quality of life even when the relationship between clinician-assessed disease severity and patient-reported well-being is relatively weak [5]. This highlights the importance of incorporating patient-reported outcomes into the clinical assessment of acne.

Assessment of acne severity itself presents methodological challenges. Several grading systems have been developed, but there is no universally accepted single standard for describing disease severity [6,7]. The need for reproducible severity assessment has therefore been emphasized in acne research and clinical practice. Contemporary approaches have sought to improve the reliability and clinical relevance of global severity assessment, while recognizing that severity may encompass both primary inflammatory lesions and secondary changes such as scarring [6,8]. Standardized clinical grading is particularly important when examining the relationship between objective disease severity and patient-perceived burden.

Quality of life is similarly best assessed using validated patient-reported instruments. The Dermatology Life Quality Index (DLQI) is a widely used dermatology-specific measure that evaluates the effect of skin disease on several domains of daily life. Its validity and reliability have been demonstrated across dermatological conditions, and systematic evidence has supported its utility in assessing disease severity, psychosocial consequences and other clinically relevant dimensions of dermatological disease [9,10]. Studies specifically involving acne have demonstrated measurable impairment in quality of life and have supported the use of standardized quality-of-life assessment alongside clinical evaluation [5,11].

The Indian context is particularly relevant because acne is frequently encountered among young people attending dermatology services, yet its psychosocial consequences may receive less attention than its physical manifestations. Indian studies have documented significant quality-of-life impairment among adolescents and young adults with acne, including associations between greater clinical severity and poorer quality of life [4,11]. However, available studies have varied considerably in their age groups, severity-assessment methods, quality-of-life instruments and clinical settings. Much of the existing Indian evidence has also originated from individual centres and geographically distinct populations. Consequently, additional hospital-based data from North India using standardized assessment of both acne severity and quality of life may contribute useful regional evidence.

A clearer understanding of the relationship between clinical acne severity and patient-perceived quality of life has practical implications for dermatological care. If increasing severity is associated with greater quality-of-life impairment, clinical assessment should consider not only the visible severity of disease but also its effect on everyday functioning and psychosocial well-being. Conversely, a weak association would emphasize that quality-of-life assessment provides information complementary to conventional clinical grading rather than simply reflecting lesion severity. Establishing this relationship in young adults may therefore help support a more patient-centred approach to acne management and identify individuals whose psychosocial needs may otherwise remain unrecognized.

Methodology

A hospital-based cross-sectional observational study was conducted in the Department of Dermatology of a tertiary care hospital in North India to assess the association between clinical acne severity and dermatology-specific quality of life among young adults. The study followed the principles of the Strengthening the Reporting of Observational Studies in Epidemiology

(STROBE) recommendations for observational studies. The study was conducted over a period of four months, from December 2025 to March 2026.

The study population comprised young adults aged 18–30 years with clinically diagnosed acne vulgaris attending the dermatology outpatient department during the study period. Participants were assessed during a single clinical visit for demographic characteristics, relevant clinical features, acne severity and dermatology-specific quality of life. Participants aged 18–30 years who had clinically diagnosed acne vulgaris involving the face and/or trunk, were willing to participate, and were able to understand the study questionnaire and provide informed consent were eligible for inclusion. Patients with dermatological disorders that could substantially affect quality-of-life assessment independently of acne, significant systemic or psychiatric illness that could interfere with completion or interpretation of the quality-of-life questionnaire, or another major dermatological condition with a potential substantial effect on quality of life were excluded. Patients who had undergone a procedure for acne scarring during the preceding three months and those who were unable or unwilling to complete the study assessment were also excluded.

The sample size was calculated using the single-proportion formula, $n=Z1-\alpha/22pq/d2$. A conservative anticipated proportion of 50% was used, as this provides the maximum sample size for a given level of precision. A 95% confidence level was selected, corresponding to $Z1-\alpha/2=1.96$, with $p=0.50$, $q=1-p=0.50$, and an absolute precision of 5% ($d=0.05$). Thus, $n=(1.96)2(0.50)(0.50)/(0.05)2=384.16$, giving a minimum required sample size of approximately 384 participants. To account for potentially incomplete or unusable data, the sample size is increased to 420 participants. Therefore, 420 participants were included in the final analysis.

Participants were recruited using consecutive sampling. All eligible patients presenting to the dermatology outpatient department during the study period were screened according to the predefined eligibility criteria and enrolled consecutively until the required final sample size of 420 participants was achieved. No therapeutic intervention, randomization or group allocation was performed as part of the study.

After obtaining written informed consent, participants underwent a structured assessment. Demographic characteristics including age and sex were recorded along with relevant clinical characteristics, including duration of acne, predominant anatomical sites, previous acne treatment and presence of acne-related scarring. Acne severity was assessed clinically by a dermatologist using the Global Acne Grading System (GAGS), a standardized numerical system

based on the distribution and characteristics of acne lesions across predefined anatomical regions. Participants independently completed the Dermatology Life Quality Index (DLQI), a validated dermatology-specific patient-reported quality-of-life instrument. The DLQI was scored according to its standard scoring system, with higher scores indicating greater impairment in quality of life. Clinical assessment and questionnaire completion were performed during the same clinical encounter. Each participant was assigned a unique study identification number, and personal identifiers were kept separate from the analytical dataset to maintain confidentiality.

The primary independent variable was clinical acne severity, assessed using the GAGS score and categorized into mild, moderate, severe and very severe disease according to the established GAGS interpretation. The primary dependent variable was dermatology-specific quality of life, assessed using the total DLQI score. Higher DLQI scores represented greater impairment in quality of life. Secondary variables included age, sex, duration of acne, anatomical distribution, previous acne treatment and presence of acne-related scarring. These variables were used to describe the study population and, where appropriate, to examine their relationship with quality-of-life impairment.

Data were entered into a structured database and analyzed using IBM SPSS Statistics. Continuous variables were assessed for distribution using graphical methods and appropriate tests of normality. Normally distributed continuous variables were expressed as mean ± standard deviation, whereas non-normally distributed variables were summarized as median with interquartile range. Categorical variables were presented as frequencies and percentages. Differences in DLQI scores across the four acne-severity categories were assessed using one-way analysis of variance (ANOVA) when the assumptions of normality and homogeneity of variance were satisfied; otherwise, the Kruskal–Wallis test was used. Categorical variables were compared using the chi-square test or Fisher's exact test, as appropriate. The relationship between continuous GAGS and DLQI scores was assessed using Pearson's correlation coefficient for approximately normally distributed variables or Spearman's rank correlation coefficient when distributional assumptions were not satisfied. Where appropriate, multivariable linear regression analysis was planned to assess the independent association between acne severity and DLQI score after adjustment for relevant demographic and clinical variables. Effect estimates were reported with 95% confidence intervals where applicable. All statistical tests were two-sided, and a p-value <0.05 was considered statistically significant.

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki and applicable institutional and national ethical requirements. Institutional Ethics Committee approval was obtained before commencement of participant recruitment. Written informed consent was obtained from all participants after explaining the study objectives, procedures, potential benefits and participant rights. Participation was voluntary, and participants had the right to withdraw from the study without affecting their clinical care. Confidentiality of participant information was maintained throughout data collection, analysis and reporting, and personal identifiers were not included in the analytical dataset or research reports.

Results

A total of 420 young adults with clinically diagnosed acne vulgaris were included in the study. The mean age of the participants was 23.3 ± 3.0 years (range, 18–30 years). There were 233 (55.5%) males and 187 (44.5%) females. The majority of participants had moderate acne (145, 34.5%), followed by severe acne (122, 29.0%), mild acne (109, 26.0%), and very severe acne (44, 10.5%).

The mean duration of acne was 4.1 ± 1.9 years. Facial involvement alone was observed in 205 (48.8%) participants, while 192 (45.7%) had involvement of the face and trunk and 23 (5.5%) had predominantly truncal disease. Acne-related scarring was present in 139 (33.1%) participants, while 189 (45.0%) reported previous treatment for acne. Demographic and clinical characteristics are summarized in Table 1.

Table 1. Demographic and clinical characteristics of the study participants (N=420)

Characteristic	n (%) / Mean ± SD
Age (years)	23.3 ± 3.0
Sex	
Male	233 (55.5)
Female	187 (44.5)
Acne duration (years)	4.1 ± 1.9
Acne severity	
Mild	109 (26.0)
Moderate	145 (34.5)
Severe	122 (29.0)

Very severe	44 (10.5)
Anatomical distribution	
Face only	205 (48.8)
Face and trunk	192 (45.7)
Trunk predominant	23 (5.5)
Acne-related scarring	
Present	139 (33.1)
Absent	281 (66.9)
Previous acne treatment	
Yes	189 (45.0)
No	231 (55.0)

The mean GAGS score increased progressively with increasing clinical severity. Participants with mild acne had a mean GAGS score of 13.9 ± 3.1, compared with 24.3 ± 4.1 among those with moderate acne, 34.8 ± 3.7 among those with severe acne, and 44.1 ± 3.0 among those with very severe acne. The corresponding DLQI scores also demonstrated a progressive increase, from 3.6 ± 2.3 in participants with mild acne to 7.0 ± 2.5, 11.3 ± 2.4, and 15.4 ± 2.5 in the moderate, severe and very severe groups, respectively (Table 2).

Table 2. Acne severity and quality-of-life scores according to clinical severity

Acne severity	n	GAGS score, Mean ± SD	DLQI score, Mean ± SD
Mild	109	13.9 ± 3.1	3.6 ± 2.3
Moderate	145	24.3 ± 4.1	7.0 ± 2.5
Severe	122	34.8 ± 3.7	11.3 ± 2.4
Very severe	44	44.1 ± 3.0	15.4 ± 2.5
Overall	420	27.6 ± 10.0	8.3 ± 4.5

There was a statistically significant difference in mean DLQI scores across the four acne-severity categories (one-way ANOVA, $F=340.82$; $p<0.001$). DLQI scores increased consistently with increasing acne severity, indicating progressively greater impairment in dermatology-specific quality of life. A non-parametric sensitivity analysis using the Kruskal–Wallis test produced a similar result ($H=302.99$; $p<0.001$).

Table 3. Comparison of quality-of-life scores across acne-severity categories

Acne severity	DLQI, Mean ± SD	Statistical comparison
Mild	3.6 ± 2.3	
Moderate	7.0 ± 2.5	
Severe	11.3 ± 2.4	
Very severe	15.4 ± 2.5	
Overall	8.3 ± 4.5	F=340.82; p<0.001

The relationship between the continuous GAGS score and DLQI score was also assessed. A strong positive correlation was observed between acne severity and quality-of-life impairment (Spearman's ρ=0.832; p<0.001). Thus, higher clinical severity scores were associated with higher DLQI scores and consequently greater impairment in quality of life (Table 4).

Table 4. Correlation between acne severity and quality-of-life impairment

Variables	Correlation coefficient	p-value
GAGS score vs DLQI score	Spearman's ρ = 0.832	<0.001

Overall, the findings demonstrated a clear positive relationship between clinically assessed acne severity and dermatology-specific quality-of-life impairment. Participants with severe and very severe acne had substantially higher DLQI scores than those with mild or moderate disease, with the greatest quality-of-life impairment observed among participants with very severe acne.

Table 5. Distribution of DLQI categories according to acne severity

Acne severity	No effect (0–1)	Small effect (2–5)	Moderate effect (6–10)	Very large effect (11–20)	Total
Mild	21	79	9	0	109
Moderate	3	50	92	0	145
Severe	0	3	47	72	122
Very severe	0	0	1	43	44
Total	24	132	149	115	420

The distribution of DLQI categories showed a progressive shift toward greater quality-of-life impairment with increasing acne severity. Most participants with mild acne had a small effect on quality of life, whereas moderate acne was predominantly associated with a moderate effect. Participants with severe and very severe acne more frequently had very large impairment in quality of life. No participant in the study had a DLQI score within the extremely large effect category (21–30).

Discussion

The present study demonstrated a clear and statistically significant association between clinical acne severity and dermatology-specific quality of life among young adults attending a tertiary care hospital in North India. Quality-of-life impairment increased progressively across the clinical severity categories, with mean DLQI scores rising from 3.6 in participants with mild acne to 15.4 among those with very severe acne. A strong positive correlation was also observed between GAGS and DLQI scores (Spearman's $\rho=0.832$; $p<0.001$), indicating that participants with greater clinical severity generally experienced greater impairment in quality of life. These findings support the importance of assessing both the physical manifestations and patient-perceived burden of acne during routine dermatological care.

The association observed in the present study is consistent with previous literature demonstrating that acne can substantially affect quality of life. Mallon et al. reported that patients with acne experienced significant impairment in quality of life compared with individuals with several other common medical conditions, emphasizing that the psychosocial consequences of acne may be considerable despite its generally low physical morbidity [5]. Similarly, Durai and Nair, in a study of young adults with acne in South India, reported impaired quality of life and highlighted the relevance of acne severity and psychosocial factors in determining patient burden [11]. The findings from the present North Indian cohort therefore broadly reinforce evidence from other Indian populations.

The progressive increase in DLQI scores observed with increasing acne severity is also biologically and clinically plausible. More extensive inflammatory lesions are more visible and may be associated with pain, tenderness, post-inflammatory changes and scarring. Facial involvement may be particularly important because visible lesions can influence self-perception and interactions with others. Acne frequently develops during a period in which appearance and social acceptance may have considerable importance, potentially amplifying the effect of clinically more severe disease on everyday activities and interpersonal relationships

[1,3]. The presence of acne-related scarring may further contribute to persistent psychosocial burden even when active inflammation subsequently improves.

Nevertheless, the relationship between clinical severity and quality of life should not be interpreted as absolute. Previous research has shown that objective disease severity does not always fully capture the patient's perception of disease burden [5]. Individual psychological characteristics, concerns about appearance, social circumstances, previous experiences with acne, expectations regarding treatment and the presence of scarring may influence quality of life independently of lesion severity. Consequently, a patient with relatively limited clinical disease may still experience considerable distress, while another patient with more extensive disease may report relatively little impairment. The strong association observed in the present study indicates a substantial relationship at the population level but does not imply that GAGS can replace patient-reported assessment.

The use of standardized measures of both acne severity and quality of life represents an important strength of the study. GAGS provides a structured approach to clinical assessment, while the DLQI captures the patient's perception of the impact of dermatological disease on daily life. Employing both measures allows the clinical and patient-centred dimensions of acne to be considered together. The relatively large sample of 420 participants also provides adequate precision for examining the relationship between the two principal measures. Furthermore, consecutive recruitment from a tertiary dermatology service reduces the likelihood that participants were selected solely on the basis of particularly unusual clinical presentations.

The findings have practical implications for dermatological practice. Clinical evaluation of acne should extend beyond lesion morphology and severity grading to include assessment of its effect on quality of life, particularly among patients with moderate-to-severe disease. Identifying substantial quality-of-life impairment may help clinicians recognize patients who require more comprehensive counselling and individualized management. Quality-of-life assessment may also provide a useful outcome measure when evaluating treatment response because improvement perceived by the patient may not always be completely reflected by changes in clinical lesion counts.

Several limitations should be considered when interpreting these findings. First, the cross-sectional design permits assessment of association but does not establish a temporal or causal relationship between acne severity and impaired quality of life. Second, the study was conducted at

a single tertiary care hospital in North India; therefore, the findings may not be directly generalizable to community populations or other geographical regions. Third, quality of life was assessed using a self-reported instrument and may consequently be influenced by individual perceptions and response patterns. Fourth, although relevant demographic and clinical characteristics were collected, unmeasured psychosocial factors could have contributed to the observed relationship. Finally, because participants were assessed at a single clinical encounter, the study cannot determine whether changes in acne severity over time are accompanied by corresponding changes in quality of life.

Despite these limitations, the study adds regional evidence that greater clinical severity of acne is associated with substantially poorer dermatology-specific quality of life among young adults. Future multicentre prospective studies could further clarify temporal relationships between acne severity, treatment response, scarring and quality of life and could evaluate whether systematic quality-of-life assessment improves patient-centred acne management. Overall, the findings support an integrated approach in which objective assessment of acne severity is complemented by direct evaluation of the patient's quality of life.

Conclusion

In this cross-sectional study of young adults with acne vulgaris, greater clinical acne severity was associated with substantially greater impairment in dermatology-specific quality of life. DLQI scores increased progressively across the mild, moderate, severe and very severe acne categories, and a strong positive correlation was observed between GAGS and DLQI scores. These findings indicate that the burden of acne extends beyond its physical manifestations and is reflected in patients' perceived quality of life. Routine assessment of acne should therefore incorporate both standardized clinical severity grading and patient-reported quality-of-life evaluation, particularly in individuals with moderate-to-severe disease. Recognizing significant quality-of-life impairment may facilitate more comprehensive, patient-centred management and appropriate counselling. Further multicentre prospective studies are warranted to evaluate the longitudinal relationship between changes in acne severity and quality of life and to determine whether interventions that improve clinical disease also produce meaningful improvements in patient-reported outcomes.

Declarations

Funding: None.

Conflict of Interest: None declared.

Ethical Approval: The study was conducted following approval from the Institutional Ethics Committee and in accordance with the Declaration of Helsinki.

Consent: Written informed consent was obtained from all participants before enrollment.

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