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Dermatology-Related Quality-of-Life Impairment among Saudi Adolescents and Young Adults with Acne Vulgaris: A Cross-Sectional Study

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Abstract **Background:** Acne vulgaris can impair dermatology-related quality of life by affecting emotional well-being, participation, education, relationships and daily activities. This patient-reported burden is distinct from psychiatric morbidity and may not align with clinical disease severity. **Objective:** This study evaluated dermatology-related quality-of-life impairment among Saudi adolescents and young adults with acne and examined sociodemographic differences. **Methods:** A descriptive, exploratory cross-sectional online survey using non-probability convenience sampling was conducted from January to August 2024. Saudi participants aged 16-30 years with acne vulgaris provided demographic information and completed the validated Arabic version of the Dermatology Life Quality Index (DLQI). Data were analyzed using descriptive and inferential statistics; statistical significance was defined as $p<0.05$. **Results:** Among 1,095 participants, the mean age was 23.0±4.5 years and 61.0% were female. A total of 892 participants (81.5%; 95% Confidence Interval [CI]: 79.1-83.7%) reported at least some impairment and 35.2% experienced a very large or extremely large effect. The mean DLQI score was 7.7±6.0. A moderate or greater effect was observed in 56.7%. At least some physical symptoms were reported by 73.9% of participants and embarrassment or self-consciousness was reported by 71.4%. Among age groups, participants aged 16-18 years had the highest mean DLQI score (8.8±6.0). **Conclusion:** A total of 81.5% of participants reported at least some DLQI impairment, with 35.2% experiencing a very large or extremely large effect. These findings should not be interpreted as nationally representative. Quality-of-life assessments may help identify individuals who require evaluation, counseling and psychosocial support as part of acne management in dermatology and primary care settings.

Key Words Acne Vulgaris, Adolescents, Dermatology Life Quality Index, Quality of Life, Saudi Arabia, Young Adults

INTRODUCTION

Acne vulgaris is a chronic inflammatory disease of the pilosebaceous unit, particularly common during adolescence and early adulthood. Its clinical spectrum ranges from open and closed comedones to inflammatory papules, pustules, nodules, cysts, pigmentary sequelae and permanent scarring. Lesions most often appear on the face but may also affect the chest, shoulders and back. Reported prevalence varies across populations because of differences in age ranges, case definitions, diagnostic methods and severity thresholds. Nevertheless, acne vulgaris affects a substantial proportion of youth and often persists into the third decade of life [1,2].

Global burden estimates place acne among the most prevalent human disorders and its early onset and prolonged course can contribute to considerable cumulative disability despite the absence of direct mortality [3].

The pathogenesis of acne involves increased sebum production, abnormal follicular keratinization, Cutibacterium acnes-related dysbiosis and inflammation, with genetic, hormonal and environmental factors also contributing [4].

The consequences of acne are not adequately represented by lesion counts alone. Because acne frequently affects visible sites, it may alter self-image, confidence, social interaction, educational participation, occupational performance, intimate relationships and willingness to be photographed or appear in public. A meta-analysis found increased risks of depression and anxiety among people with acne [5]. Similarly, a recent systematic review identified emotional distress, embarrassment, self-consciousness, appearance-related concern and impaired social functioning as recurring domains of burden while noting that patient-reported impact does not always correspond to clinician-rated severity [6]. Thus, apparently mild disease may be highly disruptive for one person and relatively tolerable for another.

Adolescence and emerging adulthood are periods when body image, peer acceptance, identity, education, employment and relationships change rapidly. Visible acne may therefore have particular psychosocial relevance during these periods. Reviews focused on adolescents have described effects on self-esteem, mood, adherence and social behavior and have encouraged clinicians to ask directly about the patient's experience rather than infer distress from physical severity [7]. School-based research has shown poorer quality of life and less favorable psychosocial outcomes among adolescents with acne, especially when the disease is more severe [8]. These findings support incorporating patient-reported outcomes into clinical assessment.

Saudi studies have also documented meaningful acne-related burden, although their estimates differ because of variations in sampling, age, sex distribution, clinical confirmation, treatment status and measurement instruments. Recent research among adolescents and young adults in Al-Baha demonstrated a high prevalence of acne and associated psychosocial effects [9]. A university-based survey in Majmaah reported a high frequency of acne, limited awareness and psychosocial concerns [10], whereas a later study among secondary-school students in Riyadh reported measurable dermatology-related quality-of-life impairment [11]. Compared with prior Saudi studies that were more geographically or demographically limited, the present study recruited both males and females aged 16-30 years from all five Saudi regions, providing a broader multiregional characterization of acne-related quality-of-life burden. However, because recruitment relied on online convenience sampling, these findings should not be interpreted as nationally representative.

The Dermatology Life Quality Index (DLQI) is a brief 10-item patient-reported instrument that assesses the influence of a skin condition during the seven days preceding the survey. Its domains include symptoms and feelings, daily activities, leisure, work or study, personal relationships and treatment [12]. Total scores range from 0 to 30, with higher values indicating greater impairment. Standard interpretation bands classify scores of 0-1 as no effect, 2-5 as a small effect, 6-10 as a moderate effect, 11-20 as a very large effect and 21-30 as an extremely large effect on the patient's life [13]. Because the DLQI captures concerns that may not be apparent on physical examination, it can complement clinical assessment and assist in identifying patients whose support needs might otherwise be underestimated.

The principal contribution of this study is the combination of a large multiregional sample spanning all five Saudi regions and detailed item-level DLQI analysis, enabling exploratory comparisons across key demographic groups within a single cohort. This study aimed to evaluate dermatology-related quality-of-life impairment among Saudi adolescents and young adults with acne vulgaris. The primary objective was to determine the distribution of participants across the five standard DLQI impact categories. Secondary objectives included describing responses to individual DLQI items; assessing differences in DLQI impact categories by sex, age group, marital status and educational level; and comparing mean DLQI scores by sex, age group, marital status, region of residence and educational level. These subgroup comparisons were exploratory and unadjusted and were not intended to identify independent demographic determinants of DLQI. The study was not designed to estimate the population prevalence of acne because eligibility was restricted to participants with acne vulgaris and recruitment did not use probability sampling of the general population.

METHODS

Study Design and Setting

A descriptive, exploratory cross-sectional online survey was conducted across Saudi Arabia from January to August 2024 after ethical approval was obtained. This design was used to assess dermatology-related quality-of-life burden and demographic variation during the study period. Participants were recruited using non-probability convenience sampling and the questionnaire was administered electronically through Google Forms. Invitations were distributed across all five Saudi regions. Predefined regional recruitment quotas were used to obtain approximately comparable numbers of participants across the five regions. These quotas were not based on the national population distribution and were not intended to produce a nationally representative sample.

Study Population and Eligibility

The target population comprised Saudi males and females aged 16-30 years with acne vulgaris. The 16-30-year range was prespecified to encompass late adolescence and young adulthood, when acne is common and may persist into the third decade of life. Participants were eligible if they were within the prespecified age range, were Saudi nationals, had previously received a diagnosis of acne vulgaris from a dermatologist and reported that acne was still present at the time of participation, completed the questionnaire and provided the appropriate electronic consent or assent. Responses were excluded if participants did not have acne

vulgaris at the time of participation, had another dermatological disorder that could independently influence DLQI responses, were younger than 16 or older than 30 years, were non-Saudi, did not complete the consent process, had incomplete DLQI responses, or submitted a duplicate or clearly inconsistent response. No standardized clinician-rated acne-severity scale or lesion count was obtained as part of the online survey.

Sample-Size Determination

The minimum sample size was calculated using the single-population-proportion formula. Because no national estimate of acne-related quality-of-life impairment was available, an expected proportion of 50% was used to yield the most conservative estimate. With a 95% confidence level and a 5% absolute margin of error, the minimum required sample was calculated to be approximately 384 participants. Recruitment continued throughout the planned eight-month collection period. The final sample exceeded the minimum required sample size. The calculation targeted the primary outcome; subgroup analyses were not separately powered.

Recruitment and Questionnaire Administration

The questionnaire was administered through Google Forms and the survey link was distributed through WhatsApp, university and student groups and healthcare-related groups across the five Saudi regions using non-probability convenience sampling. The landing page explained the study's purpose, the voluntary nature of participation, confidentiality protections and the participant's right to withdraw at any point before submitting the form. Participants accessed the questionnaire only after electronically agreeing to participate. The instrument contained two sections: sociodemographic characteristics and the validated Arabic version of the DLQI. Recorded characteristics included sex, age, marital status, region, city and educational level. Age was grouped as 16-18, 19-25 and 26-30 years; region of residence was classified as Western, Northern, Eastern, Southern, or Central; and education was grouped as high school or below versus bachelor's degree or higher. Diploma/technical education was included in the bachelor's degree or higher category for analysis. No directly identifying information was required for these analyses. A total of 1,101 form submissions were received. During eligibility assessment and data cleaning, six submissions were excluded: two because the respondents did not have acne vulgaris at the time of participation, two because of incomplete DLQI responses, one because of a duplicate submission and one because of a clearly inconsistent response. The final analysis included 1,095 complete, eligible responses with no item-level missing data. A response rate could not be calculated because the number of individuals who received or viewed the survey invitation was unknown.

DLQI and Scoring

Dermatology-related quality of life was assessed using the validated Arabic version of the DLQI [14], administered electronically through Google Forms. The validated Arabic DLQI wording and response options were reproduced without modification for electronic administration. Participants were instructed to answer all DLQI items with reference to the effects of their acne during the preceding seven days. The 10-item questionnaire assessed symptoms, embarrassment or self-consciousness, shopping and household activities, clothing, social or leisure activities, sports, work or study, personal relationships, sexual difficulties and treatment burden [12]. Responses were scored from 0 to 3: "very much" received 3 points, "a lot" received 2, "a little" received 1 and "not at all" or "not relevant" received 0. For the work or study item, prevention of work or study was scored 3; participants who answered "no" then graded the degree of difficulty. For item 7, a "not relevant" response was scored 0. Item scores were summed to produce a total ranging from 0 to 30. Standard bands were used: 0-1, no effect; 2–5, small effect; 6-10, moderate effect; 11-20, very large effect; and 21-30, extremely large effect [13]. For descriptive analysis, a total score of at least 2 was defined as indicating at least some dermatology-related quality-of-life impairment. The DLQI was treated as a quality-of-life measure and not as a diagnostic instrument for depression, anxiety, or another psychiatric disorder.

Study Outcomes and Explanatory Variables

The primary outcome was the proportion of participants in each of the five standard DLQI impact categories. Because the five DLQI impact categories are ordinal, the binary DLQI ≥2 measure was used only for descriptive reporting, as it does not retain the full information contained in the five-category outcome. Secondary outcomes included the proportion with any impairment (DLQI ≥2), the mean DLQI score, response frequencies for each DLQI item, differences in impact categories across sex, age group, marital status and educational level and differences in mean scores across sex, age group, marital status, region of residence and educational level. Subgroup analyses were exploratory and unadjusted.

Data Management and Statistical Analysis

Responses were exported from Google Forms to Microsoft Excel 2024 for eligibility checking, coding, consistency review and cleaning and were then analyzed using IBM SPSS Statistics for Windows, version 28.0 (IBM Corp., Armonk, NY, USA). Categorical variables were summarized as frequencies and percentages; age and subgroup DLQI scores were summarized as mean ± Standard Deviation (SD). The proportion with any DLQI impairment was accompanied by a 95% Wilson Confidence Interval (CI). Associations between DLQI categories and sex or educational level were evaluated with Pearson's chi-square test. Because sparse expected cells were present in the age-group and marital-status cross-tabulations, Monte Carlo exact p-values based on 1,000,000 sampled tables were used for those comparisons. Mean DLQI scores were compared using Welch's t-tests for two-group variables (sex and education) and Welch's analysis of variance for variables with three or more groups (age, marital status and region).

These robust procedures were used because they do not assume equal variances and are less sensitive to unequal group sizes. All tests were two-sided and $p<0.05$ was considered statistically significant. No post hoc pairwise testing, correction for multiple comparisons, or multivariable modeling was undertaken; therefore, subgroup findings were exploratory and unadjusted. Estimates from very small categories, especially the widowed group, were interpreted cautiously. Because recruitment was based on non-probability sampling, this CI should not be interpreted as a population-representative measure of precision.

Ethical Considerations

The study was conducted in accordance with the Declaration of Helsinki and was approved by the Scientific Research & Ethics Committee, Faculty of Medicine, Al-Baha University, Saudi Arabia (Approval No. REC/MED/BU-FM/2023/88). Electronic informed consent was obtained from all adult participants before they accessed the questionnaire. For participants aged 16-17 years, electronic informed consent was obtained from a parent or legal guardian and electronic assent was obtained from the adolescent before participation.

RESULTS

Participant Characteristics

A total of 1,101 form submissions were received, of which six submissions were excluded during eligibility assessment and data cleaning, leaving 1,095 participants with complete sociodemographic and DLQI data in the final analysis. The mean age was 23.0±4.5 years. Of the 1,095 participants, 668 (61.0%) were female and 427 (39.0%) were male. The largest age group was 19-25 years (n = 574, 52.4%), followed by 26-30 years (n = 327, 29.9%) and 16-18 years (n = 194, 17.7%). Most participants were single (n = 753, 68.8%); 307 (28.0%) were married, 29 (2.6%) were divorced and six (0.5%) were widowed. A bachelor's degree or higher was reported by 684 (62.5%) participants, while 411 (37.5%) had a high school education or lower (Table 1).

Geographic Distribution

Participants were distributed relatively evenly across the five Saudi regions. The Southern region contributed 228 (20.8%) respondents, the Central region 224 (20.5%), the Northern region 220 (20.1%), the Western region 215 (19.6%) and the Eastern region 208 (19.0%). Among locations recorded at the city or subregional level, Makkah contributed 141 participants, Riyadh 115, Al-Qassim 109, Al-Jawf 108, Al-Baha 102, Tabuk 89, Al-Madinah 74, Asir 66, Najran 60 and the Northern Borders 23. For the Eastern region, only the regional-level category was available in the analyzed dataset; therefore, a city-level or subregional breakdown could not be presented, unlike the other regions (Table 2).

Responses to Individual DLQI Items

Symptoms and appearance-related concerns were frequent. During the preceding week, 112 (10.2%) participants reported that itching, soreness, pain, or stinging affected them "very much," 219 (20.0%) reported "a lot," and 478 (43.7%) reported "a little"; therefore, 73.9% reported at least some symptom burden.

Table 1: Sociodemographic Characteristics of the Study Participants (n = 1,095)

Variable	Category	n (%)
Sex	Male	427 (39.0)
	Female	668 (61.0)
Age group	16-18 years	194 (17.7)
	19-25 years	574 (52.4)
	26-30 years	327 (29.9)
	Mean±SD, years	23.0±4.5
Marital status	Single	753 (68.8)
	Married	307 (28.0)
	Divorced	29 (2.6)
	Widowed	6 (0.5)
Region	Western	215 (19.6)
	Northern	220 (20.1)
	Eastern	208 (19.0)
	Southern	228 (20.8)
	Central	224 (20.5)
Educational level	High school or below	411 (37.5)
	Bachelor's degree or higher	684 (62.5)

SD: Standard Deviation. Diploma/technical education was included in the bachelor's degree or higher category for analysis

Table 2: Geographic Distribution of Participants

Region	City/subcategory	n (%) of total sample
Western	Makkah	141 (12.9)
	Al-Madinah	74 (6.8)
Northern	Northern Borders	23 (2.1)
	Tabuk	89 (8.1)
	Al-Jawf	108 (9.9)
Eastern	Eastern region	208 (19.0)
Southern	Al-Baha	102 (9.3)
	Asir	66 (6.0)
	Najran	60 (5.5)
Central	Riyadh	115 (10.5)
	Al-Qassim	109 (10.0)

Table 3: Responses to the DLQI Items (n = 1,095)

DLQI item	Very much/Yes, n (%)	A lot, n (%)	A little, n (%)	Not at all, n (%)	Not relevant, n (%)	Any impairment, n (%)
1. Itchy, sore, painful, or stinging	112 (10.2)	219 (20.0)	478 (43.7)	286 (26.1)	—	809 (73.9)
2. Embarrassed or self-conscious	141 (12.9)	222 (20.3)	419 (38.3)	313 (28.6)	—	782 (71.4)
3. Shopping or home/garden activities	80 (7.3)	153 (14.0)	279 (25.5)	244 (22.3)	339 (31.0)	512 (46.8)
4. Influence on clothes worn	58 (5.3)	117 (10.7)	302 (27.6)	358 (32.7)	260 (23.7)	477 (43.6)
5. Social or leisure activities	69 (6.3)	157 (14.3)	278 (25.4)	315 (28.8)	276 (25.2)	504 (46.0)
6. Difficulty with sport	77 (7.0)	137 (12.5)	224 (20.5)	353 (32.2)	304 (27.8)	438 (40.0)
7. Work or study	49 (4.5)	115 (10.5)	277 (25.3)	523 (47.8)	131 (12.0)	441 (40.3)
8. Problems with partner/friends/relatives	122 (11.1)	121 (11.1)	235 (21.5)	341 (31.1)	276 (25.2)	478 (43.7)
9. Sexual difficulties	59 (5.4)	121 (11.1)	179 (16.3)	340 (31.1)	396 (36.2)	359 (32.8)
10. Treatment burden	76 (6.9)	160 (14.6)	241 (22.0)	324 (29.6)	294 (26.8)	477 (43.6)

DLQI: Dermatology Life Quality Index. For item 7, the first response column represents "Yes, prevented work or study"; the remaining columns represent "a lot," "a little," "not at all," and "not relevant." A dash indicates that the response option does not apply. Any impairment was defined as any non-zero response; for item 7, this included prevention of work or study, "a lot," or "a little"

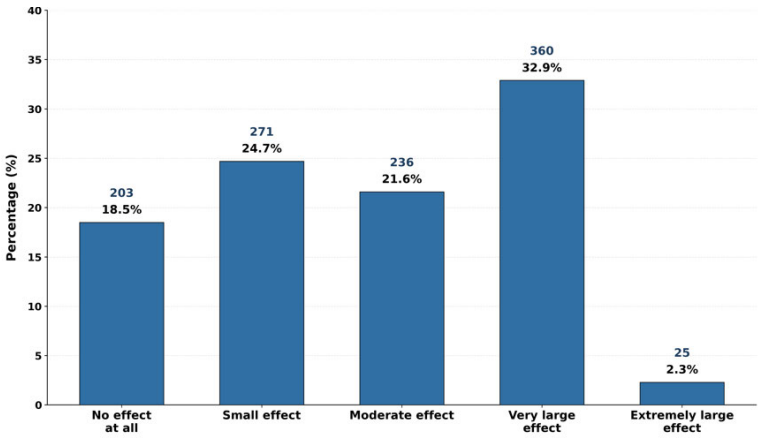

Figure 1: Distribution of Study Participants across DLQI Impact Categories, DLQI: Dermatology Life Quality Index. Percentages sum to 100.0%. Percentages represent the study sample and should not be interpreted as national prevalence estimates

Embarrassment or self-consciousness affected 141 (12.9%) participants "very much," 222 (20.3%) "a lot," and 419 (38.3%) "a little," with 71.4% reporting at least some appearance-related concern. The proportions reporting that shopping or household activities, clothing choice, social or leisure activities and sports were affected "very much" or "a lot" were 21.3, 16.0, 20.6 and 19.5%, respectively.

The skin condition prevented work or study for 49 participants (4.5%). An additional 115 (10.5%) reported "a lot" of difficulty at work or study, 277 (25.3%) reported "a little" difficulty, 523 (47.8%) reported "no difficulty," and 131 (12.0%) considered work or study "not relevant." Problems involving a partner, close friend, or relative were reported by 43.7% of participants, while sexual difficulties and treatment burden were reported by 32.8 and 43.6%, respectively. The complete distribution of DLQI item responses is presented in Table 3.

DLQI Impact Categories

The mean DLQI score was 7.7. The distribution showed marked heterogeneity: 203 participants (18.5%) reported no effect, 271 (24.7%) reported a small effect, 236 (21.6%) reported a moderate effect, 360 (32.9%) reported a very large effect and 25 (2.3%) reported an extremely large effect (Figure 1). Overall, 892 participants (81.5%; 95% CI: 79.1-83.7%) had DLQI ≥ 2, indicating at least some impairment. A moderate, very large, or extremely large effect was present in 56.7%, and 35.2% were in the combined very large or extremely large categories.

Associations between DLQI Category and Sociodemographic Characteristics

The five-category DLQI distribution differed by sex (p = 0.008), age group (Monte Carlo p = 0.004), marital status (Monte Carlo p = 0.030) and educational level (p = 0.004) (Table 4). A very large effect was reported by 37.7% of males and 29.8% of females, whereas a small effect was more frequent among females (28.3%) than males (19.2%). In the very large-effect category, participants aged 16-18 years had the highest proportion (41.8%) compared with those aged 19-25 years (29.8%) and 26-30 years (33.0%).

Married participants were more frequently classified in the very large-effect category than single participants (40.4% versus 30.0%). The widowed subgroup comprised only six participants; its category distribution is shown descriptively in Table 4 and was not substantively interpreted. Participants with a high school education or lower were more often in the very large-effect category than those with a bachelor's degree or higher (39.4% versus 28.9%). Because the comparisons were unadjusted, the observed differences may partly reflect correlated demographic characteristics.

Table 4: Association between Selected Sociodemographic Characteristics and DLQI Impact Categories

Variable	Category	No effect, n (%)	Small effect, n (%)	Moderate effect, n (%)	Very large effect, n (%)	Extremely large effect, n (%)	p-value
Sex	Male	81 (19.0)	82 (19.2)	93 (21.8)	161 (37.7)	10 (2.3)	0.008
	Female	122 (18.3)	189 (28.3)	143 (21.4)	199 (29.8)	15 (2.2)	
Age group	16-18 years	31 (16.0)	35 (18.0)	44 (22.7)	81 (41.8)	3 (1.5)	0.004
	19-25 years	113 (19.7)	167 (29.1)	108 (18.8)	171 (29.8)	15 (2.6)	
	26-30 years	59 (18.0)	69 (21.1)	84 (25.7)	108 (33.0)	7 (2.1)	
Marital status	Single	148 (19.7)	206 (27.4)	155 (20.6)	226 (30.0)	18 (2.4)	0.030
	Married	47 (15.3)	60 (19.5)	71 (23.1)	124 (40.4)	5 (1.6)	
	Divorced	7 (24.1)	4 (13.8)	9 (31.0)	7 (24.1)	2 (6.9)	
	Widowed	1 (16.7)	1 (16.7)	1 (16.7)	3 (50.0)	0 (0.0)	
Education	High school or below	71 (17.3)	89 (21.7)	77 (18.7)	162 (39.4)	12 (2.9)	0.004
	Bachelor's degree or higher	132 (19.3)	182 (26.6)	159 (23.2)	198 (28.9)	13 (1.9)	

DLQI: Dermatology Life Quality Index. Percentages are calculated within each sociodemographic category. Pearson's chi-square tests were used for sex and education; Monte Carlo exact p-values based on 1,000,000 sampled tables were used for age group and marital status because of sparse expected cells. Very small subgroups should be interpreted cautiously

Table 5: Mean DLQI Scores across Sociodemographic Characteristics

Variable	Category	n	Mean±SD	p-value
Sex	Male	427	8.2±6.0	0.048
	Female	668	7.5±6.1	
Age group	16-18 years	194	8.8±6.0	0.004
	19-25 years	574	7.2±6.1	
	26-30 years	327	8.0±5.8	
Marital status	Single	753	7.3±6.1	0.026
	Married	307	8.7±5.7	
	Divorced	29	8.3±7.1	
	Widowed	6	10.2±7.0	
Region	Western	215	9.3±6.6	<0.001
	Northern	220	6.9±5.7	
	Eastern	208	9.6±6.2	
	Southern	228	5.7±5.4	
	Central	224	7.5±5.5	
Education	High school or below	411	8.6±6.3	<0.001
	Bachelor's degree or higher	684	7.2±5.8	

DLQI: Dermatology Life Quality Index; SD: standard deviation. Welch's t-tests were used for sex and education, and Welch's analysis of variance was used for age group, marital status, and region. All p-values are two-sided. Means and SDs are presented to one decimal place

Mean DLQI Scores across Sociodemographic Groups

Mean DLQI scores are presented in Table 5. Males had a mean score of 8.2±6.0, while females had a mean score of 7.5±6.1; the mean difference was 0.7 points (95% CI, 0.01 to 1.39; Hedges' g = 0.12; p = 0.048). This finding should be interpreted cautiously because the p-value was close to the significance threshold and the analysis was unadjusted. Mean scores differed across age groups (Welch p = 0.004), with the highest mean among participants aged 16–18 years (8.8±6.0), followed by those aged 26–30 years (8.0±5.8) and 19-25 years (7.2±6.1). Welch's analysis of variance also indicated differences by marital status (p = 0.026): means were 7.3±6.1 for single, 8.7±5.7 for married, 8.3±7.1 for divorced and 10.2±7.0 for widowed participants. The widowed subgroup comprised only six participants and its mean was reported descriptively without substantive interpretation.

Mean DLQI scores differed by region (Welch p<0.001). The Eastern region had the highest mean (9.6±6.2), followed by the Western (9.3±6.6), Central (7.5±5.5), Northern (6.9±5.7) and Southern (5.7±5.4) regions. Mean DLQI scores also differed by educational level (Welch p<0.001): participants with a high school education or lower had a mean of 8.6±6.3 compared with 7.2±5.8 among those with a bachelor's degree or higher.

DISCUSSION

This study identified substantial dermatology-related quality-of-life impairment among Saudi adolescents and young adults with acne vulgaris. Within the study sample, 81.5% of participants reported at least some dermatology-related quality-of-life impairment and 35.2% reported a very large or extremely large effect. The mean DLQI score was 7.7. Symptoms and embarrassment were especially frequent, while effects on work or study, daily activities, sports, relationships and treatment were also evident. These findings reinforce the importance of asking patients directly how acne affects their daily lives rather than relying solely on visible lesion severity.

The proportion of participants with impairment was higher than that reported in several clinic- and community-based studies. Direct comparisons are limited by differences in recruitment, age range, acne definition, treatment status, clinical severity and questionnaire administration. A recent Indian study of adolescents and young adults documented body-image disturbance and quality-of-life impairment among patients with acne [15]. In Riyadh, Alqahtani *et al.* [16] found that 40% of young people reported no effect on quality of life according to the DLQI, while the remainder experienced varying levels of burden. A study of young females in the Eastern Province also documented meaningful quality-of-life impairment using an Arabic DLQI [17] and research from Madinah similarly

reported adverse effects of acne on quality of life and self-esteem [18]. These differences may reflect variation in recruitment and unmeasured clinical characteristics.

The mean DLQI score of 7.7 exceeded the scores of 4.5 reported among young adults with acne in India [19] and 6.84 reported in a large Chinese outpatient study [20]. It was lower than the score of 11.14 reported in another recent Indian young-adult cohort [21]. A multi-country population-based survey further showed greater quality-of-life impairment among individuals with combined facial and truncal acne than among those with facial acne alone [22]. Such variation should not be interpreted as evidence that one population is inherently more affected than another. Patient-reported burden is shaped by lesion location, severity, duration, scarring, post-inflammatory pigmentary change, treatment experience, social expectations, coping resources and cultural context. The clinically relevant finding is that the present sample included a large subgroup whose daily life was strongly affected.

Physical symptoms were prominent, with 73.9% of participants reporting at least some itching, soreness, pain, or stinging. Although acne is often discussed primarily as an appearance-related condition, pruritus and discomfort are also recognized aspects of the patient experience. A large French population study documented pruritus and pain among people with acne [23], while recent adolescent research reported an association between acne-related quality of life and mental health [24]. In the present survey, the symptom item combined several sensations, so their individual contributions cannot be separated. The reported symptoms may also have been related to irritation from topical treatment. Future studies should distinguish active acne symptoms from treatment-related adverse effects and examine their relationships with lesion distribution and clinical severity. Because treatment exposure was not collected, this remains a hypothesis rather than an explanation of the observed findings.

Embarrassment or self-consciousness affected 71.4% of participants to some degree. Recent research has linked acne with poorer body satisfaction, self-esteem and quality of life [25], while another adolescent study found associations between acne severity, poorer body image, depressive symptoms and reduced quality of life [26]. In the present study, the five-category DLQI distribution differed by sex and males had a slightly higher mean DLQI score than females (8.2 versus 7.5; $p = 0.048$). The small absolute difference and the unadjusted analysis warrant cautious interpretation.

Age-related differences were among the clearest subgroup patterns. Participants aged 16-18 years had both the highest mean DLQI score and the greatest proportion in the very large-effect category. Younger adolescents may be especially sensitive to peer evaluation, school-based social interaction, body-image concerns and rapid developmental change. Nevertheless, impairment remained relevant in the 26-30-year group, whose mean exceeded that of participants aged 19-25 years. Persistent or adult acne may be accompanied by concerns related to chronicity, scarring, visibility at work, intimate relationships and repeated treatment. Because the study was cross-sectional and the analyses were unadjusted, an independent association between age and DLQI cannot be established, particularly because age is related to education and marital status.

DLQI categories and mean scores differed by marital status. Married participants had a higher mean DLQI score than single participants (8.7 versus 7.3) and a very large effect was more frequent among married than single participants (40.4% versus 30.0%). Divorced participants had a mean DLQI score of 8.3. The widowed subgroup was not substantively interpreted because it included only six participants.

Mean DLQI scores differed by region. The Eastern region had the highest mean score (9.6), followed by the Western (9.3), Central (7.5), Northern (6.9) and Southern (5.7) regions ($p<0.001$). These regional differences are descriptive and should not be interpreted as genuine geographic effects, because important potential confounders, including clinical severity, socioeconomic status, healthcare access and treatment status, were not measured. Given the online convenience-sampling approach, regional differences may also reflect differences in the reach of recruitment channels, participant characteristics, or response behavior across regions rather than true differences in acne-related quality of life.

The DLQI category distribution and mean scores differed by educational level. Participants with a high school education or lower reported greater average impairment and were more often in the very large-effect category than those with a bachelor's degree or higher. The observed education-related difference may reflect age or other correlated characteristics; because the analyses were unadjusted, an independent association between education and DLQI cannot be established. Health literacy, treatment access, financial resources and school-based social pressure may also contribute to this difference. These factors were not measured and are presented only as possible explanations rather than demonstrated mechanisms. These findings highlight the importance of providing clear and accessible acne information, particularly for younger people and those with lower educational attainment.

The item-level results have practical clinical value. Brief administration of the DLQI, or focused questions about symptoms, embarrassment, education or work, sports, relationships and treatment burden, may reveal concerns that patients do not volunteer during a lesion-centered consultation. Patients with substantial impairment may benefit from timely evidence-based treatment, realistic counseling about response and recurrence and management of treatment irritation, scarring and pigmentary sequelae. Screening for mood or anxiety symptoms may also be appropriate when clinically indicated. The DLQI is not a psychiatric diagnostic or mental-health screening instrument; rather, it can prompt further clinical assessment and, when appropriate, referral or additional support. Management should integrate patient priorities with objective disease severity, scarring risk, previous treatment, adherence and safety.

Several features strengthen the study. The final sample was nearly three times the calculated minimum sample size and included both males and females across the full 16-30-

year age range. Respondents came from all five Saudi regions, allowing descriptive comparisons across geographically diverse groups. The use of the validated Arabic version of the DLQI provided a standard scoring framework. Reporting individual item responses, interpretation bands, the mean score and a confidence interval for any impairment provided a more informative picture than reliance on a single summary measure.

The findings should be interpreted in light of several limitations. First, online non-probability convenience sampling may have introduced selection and recruitment-channel bias, because individuals who were more active online, more concerned about acne, or more distressed about their appearance may have been overrepresented. Recruitment through WhatsApp, university/student groups and healthcare-related groups may also have reached different participant groups, limiting generalizability to the wider Saudi population. Second, although eligibility required a reported prior diagnosis by a dermatologist, this was not independently verified and current acne status was not clinically confirmed. Objective disease severity and relevant clinical variables, including disease duration, distribution, scarring, post-inflammatory hyperpigmentation, lesion type, current and previous treatment, treatment failure, adherence, healthcare access and socioeconomic factors, were not assessed. Thus, relationships between clinical severity and DLQI impairment could not be evaluated and unmeasured factors may have confounded subgroup differences. Third, the cross-sectional design precludes causal inference and without multivariable adjustment, differences by age, sex, education, marital status and region should not be interpreted as independent associations. No correction for multiple comparisons was applied, so false-positive findings remain possible, particularly for the borderline sex difference ($p = 0.048$). Finally, the DLQI measures dermatology-related quality of life, not psychiatric morbidity.

Future research should use probability-based or stratified recruitment, clinician-confirmed diagnosis and standardized severity assessment across multiple Saudi regions. Studies should collect information on disease duration, lesion sites, scarring, pigmentary sequelae, treatment exposure, adherence, healthcare access and socioeconomic factors. Multivariable modeling is needed to determine whether demographic differences persist after clinical and social factors are considered. Longitudinal studies could assess whether effective treatment improves quality of life and whether early recognition of severe patient-reported burden reduces educational, social, or emotional consequences. Qualitative interviews may also help explain why patients with apparently limited clinical disease sometimes report substantial impairment.

CONCLUSION

Among the 1,095 surveyed participants who reported having previously been diagnosed with acne vulgaris by a dermatologist, 81.5% experienced at least some dermatology-related quality-of-life impairment and 35.2% reported a very large or extremely large effect. At least some symptoms were reported by 73.9% of participants, while 71.4% reported embarrassment or self-consciousness, indicating that both physical discomfort and appearance-related concerns contributed to the burden. Participants aged 16–18 years had the highest mean DLQI score, while unadjusted differences were also observed by sex, marital status, region and education. These findings support incorporating a brief patient-reported quality-of-life assessment into acne care to help ensure that management addresses daily functioning, personal concerns and the need for psychosocial support alongside visible lesions and scarring risk. The results describe an online convenience sample and should not be interpreted as a national estimate of acne prevalence, evidence of causation, or proof that demographic characteristics independently determine impairment. Future multicenter and longitudinal studies with clinician-confirmed diagnoses are needed to identify independent determinants of burden and evaluate whether effective acne treatment improves quality of life.

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Author Contributions

Conceptualization, H.S.A.-G., M.A.A. and K.T.A.; Methodology, H.S.A.-G., M.A.A., O.K.A. and K.T.A.; Investigation, O.K.A., A.A.A.H., E.A.A., F.A.A., H.H.A., W.A.A. and Z.S.A.-S.; Data Curation, M.A.A., O.K.A. and K.T.A.; Formal analysis, H.S.A.-G., M.A.A. and K.T.A.; Validation, H.S.A.-G., M.A.A. and K.T.A.; Visualization, H.S.A.-G. and O.K.A.; Writing-original draft preparation, H.S.A.-G., M.A.A. and O.K.A.; Writing-review and editing, all authors; supervision, H.S.A.-G.; Project administration, H.S.A.-G. and M.A.A. All authors reviewed and approved the final manuscript and agree to be accountable for the accuracy and integrity of the work.

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Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki and was approved by the Scientific Research & Ethics Committee, Faculty of Medicine, Al-Baha University, Saudi Arabia (Approval No. REC/MED/BU-FM/2023/88).

Informed Consent Statement

Electronic informed consent was obtained from all adult participants before they accessed the online questionnaire. For participants aged 16-17 years, electronic informed consent was obtained from a parent or legal guardian and electronic assent was obtained from the adolescent before participation.

Data Availability Statement

The anonymized data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to ethical and privacy restrictions.

Conflicts of Interest

The authors declare no conflicts of interest.

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