Associated Factors of Quality of Life in Adult Female Acne Coexisting with Hyperandrogenism and Polycystic Ovarian Syndrome using the Dermatology Life Quality Index

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ABSTRACT

Objective: This study aimed to assess the effects of AFA and its associated factors, especially those coexisting with hyperandrogenism or PCOS, on QoL using the Dermatology Life Quality Index (DLQI).

Materials and Methods: A retrospective cross-sectional study was conducted on AFA patients who had been treated between May 2018 and January 2020. Dermatologists had performed history taking and determined the clinical severity of the acne, and gynecologists had identified PCOS. Aggravating factors and DLQI were self-reported by the patients.

Results: A total of 208 AFA patients, aged 31.8±7.1 years on average, were included. The mean DLQI score was 8.0±5.4 (range: 0-23). Patients with moderate to severe acne had significantly higher total DLQI scores compared to those with almost clear to mild acne (P=0.043). Similarly, patients who reported acne aggravated by diet, androgenetic alopecia, or perioral and chin lesions had significantly higher total DLQI scores (P=0.025, P=0.049, and P=0.014, respectively). However, PCOS and hirsutism did not significantly impact QoL. The aspect most affected was feeling embarrassed and self-conscious, with significantly greater impacts observed in patients with moderate to severe acne compared to mild acne. The daily activities of patients with androgenetic alopecia were significantly impacted in terms of their choice of clothes and sexual difficulties.

Conclusion: AFA mostly had a moderate to extremely large effect on patients' QoL. Knowing the factors influencing QoL, such as acne severity, dietary aggravation of acne, and androgenetic alopecia, may enable physicians to improve the QoL of patients.

Keywords: Acne; adult female acne; DLQI; quality of life; hyperandrogenism; androgenetic alopecia (Siriraj Med J 2023; 75: 744-751)

INTRODUCTION

Acne vulgaris is one of the most prevalent dermatological diseases. It is commonly found in adolescents but can sometimes persist through adulthood.[1] It is generally accepted that acne negatively impacts patients' lives, including embarrassment and limitations to daily and social activities.[2] The impact of acne is evident in the form of decreases in the quality of life (QoL) that are as severe as those found with other debilitating diseases, such as asthma, epilepsy, diabetes mellitus, back pain, and arthritis.[3] "Adult female acne" (AFA) is defined as acne in women over the age of 25.[4-6] Previous reports

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Received 24 July 2023 Revised 29 August 2023 Accepted 12 September 2023
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https://doi.org/10.33192/smj.v75i10.264327

have mentioned that AFA affects mental and emotional health, social and personal behavior, and QoL.[7,8]

Acne vulgaris is also one of the signs of hyperandrogenism and polycystic ovary syndrome (PCOS), which also negatively affect patients' QoL.[9] QoL is a crucial aspect of the morbidity related to acne, and it is an essential consideration when determining treatments. The number of studies specifically exploring QoL in AFA is limited, especially in AFA with PCOS, and few factors associated with QoL have been identified.[10,11] Several dermatological questionnaires are available to measure the impact of skin disorders on QoL. One of these is the Dermatology Life Quality Index (DLQI), a 10-item self-administered questionnaire to measure the effects of skin diseases on patients' QoL. It has been translated and validated in many languages, including Thai.[12,13]

This study aimed to assess the effects on patients' QoL of AFA (especially AFA coexisting with hyperandrogenism or PCOS) and associated factors. Assessments were made using the Thai version of the DLQI.

MATERIALS AND METHODS

This retrospective cross-sectional study was approved by the Siriraj Institutional Review Board of the Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand (COA no. Si 1043/2021). We enrolled female patients aged 25 or older who presented with AFA disease at the Siriraj Dermatology Clinic between May 2018 and January 2020 and had DLQI scores in their medical records. Patients were excluded if they had been previously treated with any systemic therapy for acne or if no DLQI information was available.

Demographic characteristics and acne-related information were gathered. The data comprised patient age, onset subtype, precipitating cause of acne flare, type and sites of lesions, extent of acne lesions, blood pressure, body weight, height, and waist circumference. Acne presenting in women aged 25 or older was defined as AFA,[4,5] whereas acne in women older than 45 was referred to as "perimenopausal acne."[14] The onset of AFA is classified into 3 subtypes: persistent, late-onset, and relapsed.[5] Acne developing in adolescence and continuing into adulthood is deemed "persistent acne," whereas acne that first occurs after age 25 is called "late-onset acne." Acne that occurs during adolescence for a few years and then reoccurs after 25 is termed "relapsed acne."

All patients were evaluated for acne severity by dermatologists using the Investigator's Global Assessment. The severities were classified as follows:[15]

- "Almost clear:" rare comedones or 1 inflammatory lesion
- "Mild:" some comedones with few inflammatory lesions without nodular lesions
- "Moderate:" up to many comedones with some inflammatory papules but no more than 1 small nodular lesion
- "Severe:" many comedones and inflammatory papules, and few nodular lesions
- "Very severe:" many comedones, inflammatory papules, and nodular lesions

The skin signs of hyperandrogenism, including androgenetic alopecia and hirsutism, were recorded. "Androgenetic alopecia" (AGA) was defined as grade I or more under Ludwig's classification.[16] In Asian populations, a Modified Ferriman–Gallwey score of ≥ 6 indicates hirsutism,[16] and a body mass index (BMI) ≥ 23 kg/m^2 denotes an overweight or obese status.[17]

Gynecologists evaluated PCOS with the consent of the AFA patients. Diagnoses of this condition were based on recommendations from international evidence-based guidelines for assessing and managing PCOS.[16] QoL impairment was recorded using the validated Thai version of the DLQI.[13] The questionnaire has 10 items that evaluate 6 dermatological aspects of life: symptoms and feelings, daily activities, leisure activities, work or school, personal relationships, and treatment. Each item has a score ranging from 1 to 3. The total DLQI score is calculated by summing the scores for the 10 items, giving a possible maximum of 30 and a minimum of 0. Higher scores signify greater degrees of impairment of QoL. The total DLQI scores are interpreted as follows: 0–1, no effect on QoL; 2–5, small effect; 6–10, moderate effect; 11–20, very large effect; and 21–30, extremely large effect.[12,13]

The statistical analysis was undertaken using IBM SPSS Statistics for Macintosh, version 27.0 (IBM Corp., Armonk, NY, USA). Data are presented as numbers and percentages, means and standard deviations, and ranges. Mean differences between continuous variables were calculated by an independent *t*-test or 1-way ANOVA. Differences in categorical data were calculated by the chi-squared test or Fisher's exact test. Statistical significance was set at $P < 0.05$, and the results are reported with a 95% confidence interval.

RESULTS

Two hundred and eight AFA patients were included. Their mean age was 31.8 ± 7.1 years, ranging from 25.2 to 59.4 years. Perimenopausal acne was identified in 14 patients (6.7%). Most patients presented with persistent acne (47.1%); late-onset and relapsed acne accounted for 26.9% and 26.0% of cases, respectively. Half of the

patients (51%) had moderate severity of acne, followed by mild acne (38%), severe acne (8.1%), and almost clear acne (2.9%). Twenty-four patients (11.5%) had hirsutism, and 12 (5.8%) had AGA. Fifty-four patients consented to undergo evaluations by gynecologists, of whom 26 (48.1%) were diagnosed with PCOS.

All patients completed all 10 questions of the DLQI questionnaire. The overall mean DLQI score was 8.0 (standard deviation, 5.4; range, 0–23). No, small, moderate, very large, and extremely large effects on QoL were found in 8.2%, 32.7%, 29.3%, 27.4%, and 2.4% of patients, respectively. The mean total DLQI scores for each characteristic are detailed in Tables 1 & 2. Perimenopausal acne had lower mean total DLQI scores than non-perimenopausal acne, with no significant differences noted. All acne subtypes had a moderate effect on QoL, whereas late-onset acne had the lowest mean total DLQI scores. Patients with moderate to severe acne had significantly higher mean total DLQI scores than patients with almost clear to mild acne ($P = 0.043$).

Regarding promoting factors, patients who reported that diet was related to acne had a significantly higher mean total DLQI score than those who did not ($P = 0.025$). Stress, sleep deprivation, pre-menstruation, sunlight, dust, and exercise did not significantly affect the mean total DLQI scores. Patients with cosmetic products promoting acne had significantly lower mean total DLQI scores ($P = 0.018$).

As for the risk for metabolic syndrome, patients with moderate to severe acne had a significantly higher mean BMI (22.6 ± 4.4) than patients with almost clear to mild acne (21.4 ± 3.1) ($P = 0.031$). However, the mean DLQI score of patients at risk of metabolic syndrome did not differ from that of patients with AFA who did not have the risk. In addition, AFA with AGA had a significantly greater mean total DLQI score (11.0 ± 7.4) than AFA without AGA ($P = 0.049$). However, significant differences were not found between AFA with and without hirsutism, or between AFA with and without PCOS.

A comparison of the DLQI scores for the various acne characteristics is presented in Table 2. Regarding the sites of acne lesions, patients with acne in the perioral area and chin had significantly greater mean total DLQI scores than those without such lesions ($P = 0.014$). More extensive acne resulted in higher total DLQI scores, especially when comparing the mean total DLQI score for 1 site versus the involvement of ≥ 2 sites ($P = 0.05$). Mixed comedones and inflammatory papules had the highest mean total DLQI scores.

Concerning DLQI, the dermatological aspect of life most frequently affecting patients was feeling embarrassed and self-conscious. This factor had the highest mean ± SD score (1.7 ± 1.0) and was followed by symptoms, leisure activities, and daily activities (Table 3). Regarding the severity of acne, patients with moderate to severe acne reported greater impacts on feeling embarrassed and self-conscious, daily activities, and leisure activities than those with mild acne. As mentioned earlier, patients with AGA experienced a marked impact on their QoL compared with patients without AGA. In particular, the daily activities of patients with AGA were significantly impacted in terms of their choice of clothes and sexual difficulties. As for age, most aspects of DLQI did not vary by age; the exception was perimenopausal acne, which had relatively less effect on the choice of clothes.

DISCUSSION

This study highlights that AFA can have moderate to substantial effects on QoL. Patients with AFA in the perimenopausal group tended to have a better QoL than those in the non-perimenopausal group. This difference may result from younger patients paying more attention to their appearance, thereby negatively affecting their social and personal lives. However, *Lasek* et al. reported that acne had greater effects on the QoL of older patients,[18] which may be due to differences in self-perception related to ethnicity. A previous study showed that even mild acne could enormously affect patients' QoL.[19, 20] In the current investigation, 17.6% of the patients with almost clear to mild acne reported very large effects on their QoL. Although previous studies reported no correlation between acne clinical severity and QoL scores,[3,21] our work revealed a correlation between the impact of acne on QoL and the severity of acne. The clinical severity of acne among AFA patients affected their QoL more than the subtype of acne.

According to the effects of aggravating factors and the QoL, the patients with diet-aggravated acne stated that they had a worse QoL than those who did not report that diet exacerbated the condition. In addition, in our study on adult acne patients, those who reported the use of cosmetic products that exacerbated their acne also exhibited a significantly lower impact on their quality of life, possibly suggesting a potential link between the use of cosmetics and the role of cosmetic camouflage, although further investigation is required to elucidate this relationship.

Feeling embarrassed was the aspect that mainly affected QoL in cases of AFA, which is consistent with earlier studies on acne patients in Thailand.[19,20] An extensive study on different racial groups also reported that AFA

TABLE 1. Demographic, clinical characteristics, and the Dermatology Life Quality Index of adult female patients with acne (N = 208).

Demographic data		Number (%)	Mean total DLQI scores (SD)	Range	*P* value
Age groups of patients (years)					0.18
25 - 44		194 (93.3)	8.15 (5.5)	0-23	
45 - 60		14 (6.7)	6.14 (4.0)	1-14	
Onset subtypes of acne					0.92
Persistent acne		98 (47.1)	8.03 (5.5)	0-23	
Late-onset acne		56 (26.9)	7.80 (5.6)	0-22	
Relapse acne		54 (26.0)	8.22 (5.1)	0-22	
Investigator's Global Assessment Scale for acne severity					**0.043***
Almost clear to mild		85 (40.9)	7.11 (5.4)	0-21	
Moderate to severe		123 (59.1)	8.65 (5.4)	1-23	
Promoting factors					
Pre-menstruation	Yes	151 (72.6)	8.25 (5.6)	0-23	0.32
	No	57 (27.4)	7.40 (4.8)	0-20	
Stress	Yes	112 (53.8)	8.29 (5.4)	0-21	0.45
	No	96 (46.2)	7.71 (5.5)	0-23	
Sleep deprivation	Yes	108 (51.9)	7.69 (5.3)	0-21	0.37
	No	100 (48.1)	8.37 (5.6)	0-23	
Diet	Yes	71 (34.1)	9.18 (5.3)	1-21	**0.025***
	No	137 (65.9)	7.42 (5.4)	0-23	
Sunlight	Yes	35 (16.8)	9.00 (5.6)	1-21	0.24
	No	173 (83.2)	7.82 (5.4)	0-23	
Cosmetic products	Yes	29 (13.9)	6.24 (4.0)	1-17	**0.018***
	No	179 (86.1)	8.31 (5.6)	0-23	
Dust	Yes	14 (6.7)	8.14 (6.4)	1-22	0.93
	No	194 (93.3)	8.01 (5.4)	0-23	
Exercise	Yes	11 (5.3)	8.91 (5.4)	1-20	0.58
	No	197 (94.7)	7.97 (5.4)	0-23	
Patients at risk for metabolic syndrome					
Waist circumference >80 cm	Yes	58 (27.9)	8.76 (5.4)	1-22	0.22
	No	150 (72.1)	7.73 (5.4)	0-23	
SBP >130 or DBP >85 mmHg	Yes	24 (11.5)	9.21 (5.6)	1-20	0.25
	No	184 (88.5)	7.86 (5.4)	0-23	
BMI ≥23 kg/m^2 (overweight-obese status)	Yes	68 (32.7)	8.68 (5.4)	1-22	0.22
	No	140 (67.3)	7.70 (5.4)	0-23	
Hirsutism (Modified Ferriman–Gallwey Score of ≥6)					0.33
Yes	24 (11.5)	9.04 (5.7)	1-21		
No	184 (88.5)	7.89 (5.4)	0-23		
Androgenetic alopecia					**0.049***
Yes		12 (5.8)	11.0 (7.4)	0-23	
No		196 (94.2)	7.84 (5.2)	0-22	
PCOS diagnosis					0.06
Yes		26/54 (48.1)	6.38 (5.0)	0-18	
No		28/54 (51.9)	9.43 (6.4)	1-23	

*A *P* value <0.05 indicates statistical significance.

Abbreviations BMI, body mass index; DBP, diastolic blood pressure; DLQI, Dermatology Life Quality Index; PCOS, polycystic ovary syndrome; SBP, systolic blood pressure; SD, standard deviation

TABLE 2. The Dermatology Life Quality Index scores for different characteristics of acne.

Clinical characteristics		Number (%)	Mean total DLQI scores (SD)	Range	*P* value
Sites of acne lesions					
Forehead and temples	Yes	145 (69.7)	7.91 (5.0)	1-23	0.69
	No	63 (30.3)	8.27 (6.4)	0-22	
Nose	Yes	25 (12.0)	8.52 (5.8)	1-22	0.62
	No	183 (88.0)	7.95 (5.4)	0-23	
Cheeks	Yes	181 (87.0)	7.93 (5.3)	0-23	0.59
	No	27 (13.0)	8.63 (6.4)	0-20	
Perioral area and chin	Yes	170 (81.7)	8.45 (5.4)	0-22	**0.014***
	No	38 (18.3)	6.08 (5.3)	0-23	
Neck	Yes	31 (14.9)	9.23 (5.2)	2-22	0.18
	No	177 (85.1)	7.81 (5.4)	0-23	
Chest	Yes	47 (22.6)	8.64 (5.4)	1-23	0.38
	No	161 (77.4)	7.84 (5.4)	0-22	
Back	Yes	64 (30.8)	8.77 (5.5)	1-23	0.19
	No	144 (69.2)	7.69 (5.4)	0-22	
Extent of acne					
≥2 sites	Yes	189 (90.9)	8.25 (5.3)	1-23	0.05
	No	19 (9.1)	5.74 (6.2)	0-20	
≥3 sites	Yes	144 (69.2)	8.18 (5.2)	1-23	0.52
	No	64 (30.8)	7.66 (5.9)	0-20	
≥4 sites	Yes	77 (37.0)	8.12 (4.9)	1-22	0.84
	No	131 (63.0)	7.96 (5.7)	0-23	
Lesion types					0.27
Comedones		14 (6.7)	5.79 (5.1)	0-16	
Inflammatory papules		46 (22.1)	8.00 (5.9)	0-20	
Mixed lesions		148 (71.2)	8.24 (5.3)	1-23	

*A *P* value <0.05 indicates statistical significance.
Abbreviations: DLQI, Dermatology Life Quality Index; SD, standard deviation

had the greatest impact on self-esteem and perceptions across all population groups.[22] It has also been reported that AGA can affect psychological and social experiences as well as QoL, especially in female patients,[23,24] which is similar to our findings. Our investigation determined that AFA with AGA had substantial and statistically significant adverse effects on QoL, especially regarding the choice of clothes and sexual difficulties.

This study has a few limitations. First, the number of patients was insufficient to draw some significant associated factors. In addition, the aggravating factors were subjective, given that patients reported them. Last, evaluating QoL with only 1 tool means that not all aspects of the QoL of the patients may have been captured.

In conclusion, our study demonstrated that AFA had moderate to very large effects on patients' QoL. There was a correlation between the clinical severity of acne and QoL scores. The greatest impacts on QoL were associated with AGA, acne on the perioral area and chin, and patients' perception that their diet aggravated AFA. PCOS and hirsutism did not affect patients' QoL. These data highlight the impact of acne and the associated factors in AFA patients. This underscores the multifaceted nature of adult acne and highlights the need for a holistic approach in understanding and managing this dermatological condition and it presents a compelling avenue for future research and potential interventions to enhance the quality of life for individuals affected by acne.

TABLE 3. Percentage of affected patients and mean score for each aspect of the Dermatology Life Quality Index, compared by the severity of acne, the presence of androgenetic alopecia, and the status of perimenopausal acne.

Aspect of DLQI		Total	Severity of acne*			Androgenetic alopecia			Perimenopausal acne		
		N = 208	Almost clear to mild N = 85	Moderate to severe N = 123	*P* value	Yes N = 12	No N = 196	*P* value	Yes N = 14	No N = 194	*P* value
Symptoms:											
Sore, painful, stinging, itching	Affected patients (%)	166 (79.8)	64 (75.3)	102 (82.9)	0.17	9 (75.0)	157 (80.1)	0.45	10 (71.4)	156 (80.4)	0.30
	Mean score (SD)	1.29 (0.9)	1.12 (0.9)	1.38 (0.9)	0.60	1.33 (1.0)	1.29 (0.9)	0.85	1.00 (0.8)	1.31 (0.9)	0.20
Feelings:											
Embarrassed, self-conscious	Affected patients (%)	182 (87.5)	70 (82.4)	112 (91.1)	0.06	10 (83.3)	172 (87.8)	0.46	12 (85.7)	170 (87.6)	0.55
	Mean score (SD)	1.75 (1.0)	1.53 (1.1)	1.89 (1.0)	**0.012**	2.08 (1.2)	1.72 (1.0)	0.23	1.43 (1.0)	1.77 (1.0)	0.23
Daily activities:											
Limits going shopping, looking after home or garden	Affected patients (%)	132 (63.5)	48 (56.5)	84 (68.3)	0.08	10 (83.3)	122 (62.2)	0.12	9 (64.3)	123 (63.4)	0.95
	Mean score (SD)	1.00 (0.9)	0.80 (0.9)	1.13 (1.0)	**0.011**	1.33 (0.9)	0.98 (0.9)	0.21	0.71 (0.6)	1.02 (1.0)	0.12
Influenced the clothes	Affected patients (%)	87 (41.8)	36 (42.4)	51 (41.5)	0.90	9 (75.0)	78 (39.8)	**0.016**	3 (21.4)	84 (43.3)	0.11
	Mean score (SD)	0.66 (0.9)	0.64 (0.9)	0.67 (0.9)	0.76	1.33 (1.1)	0.62 (0.9)	**0.008**	0.21 (0.4)	0.69 (0.9)	**0.001**
Leisure activities:											
Affected any social or leisure activities	Affected patients (%)	138 (66.3)	52 (61.2)	86 (69.9)	0.19	10 (83.3)	128 (65.3)	0.17	10 (71.4)	128 (66.0)	0.46
	Mean score (SD)	1.13 (1.0)	0.95 (0.9)	1.24 (1.0)	**0.036**	1.67 (1.1)	1.09 (1.0)	0.05	0.93 (0.7)	1.13 (1.0)	0.33
Difficult to do any sport	Affected patients (%)	85 (40.9)	36 (42.4)	49 (39.8)	0.41	7 (58.3)	78 (39.8)	0.17	5 (35.7)	80 (41.2)	0.69
	Mean score (SD)	0.63 (0.9)	0.62 (0.8)	0.64 (0.9)	0.88	1.00 (1.0)	0.61 (0.9)	0.14	0.43 (0.7)	0.65 (0.9)	0.36

TABLE 3. Percentage of affected patients and mean score for each aspect of the Dermatology Life Quality Index, compared by the severity of acne, the presence of androgenetic alopecia, and the status of perimenopausal acne. (Continue)

Aspect of DLQI		Total	Severity of acne*			Androgenetic alopecia			Perimenopausal acne		
		N = 208	Almost clear to mild N = 85	Moderate to severe N = 123	*P* value	Yes N = 12	No N = 196	*P* value	Yes N = 14	No N = 194	*P* value
Work or school:		58 (27.9)									
Difficulties at work or studying	Affected 0patients (%)	.38 (0.7)	24 (28.2)	34 (27.6)	0.93	3 (25.0)	55 (28.1)	0.56	4 (28.6)	54 (27.8)	0.95
	Mean score (SD)		0.38 (0.7)	0.38 (0.7)	0.95	0.50 (0.9)	0.37 (0.7)	0.52	0.43 (0.8)	0.38 (0.7)	0.81
Personal relationships:											
Created problems with partner, close friends, relatives	Affected patients (%)	56 (26.9)	21 (24.7)	35 (28.5)	0.55	4 (33.3)	52 (26.5)	0.41	2 (14.3)	54 (27.8)	0.22
	Mean score (SD)	0.39 (0.7)	0.32 (0.6)	0.45 (0.8)	0.19	0.67 (1.1)	0.38 (0.7)	0.38	0.21 (0.6)	0.41 (0.7)	0.26
Sexual difficulties	Affected patients (%)	13 (6.3)	5 (5.9)	8 (6.5)	0.86	3 (25.0)	10 (5.1)	**0.030**	1 (7.1)	12 (6.2)	0.61
	Mean score (SD)	0.09 (0.4)	0.09 (0.4)	0.09 (0.4)	0.93	0.50 (0.9)	0.67 (0.3)	0.13	0.07 (0.3)	0.09 (0.4)	0.84
Treatment:											
Making home messy, taking up time	Affected patients (%)	91 (43.8)	37 (43.5)	54 (43.9)	0.96	4 (33.3)	87 (44.4)	0.45	6 (42.9)	85 (43.8)	0.94
	Mean score (SD)	0.70 (0.9)	0.62 (0.8)	0.76 (1.0)	0.29	0.58 (1.0)	0.71 (0.9)	0.65	0.71 (0.9)	0.70 (0.9)	0.96

* Severity of acne was evaluated by the Investigator's Global Assessment Scale.
A *P* value <0.05 indicates statistical significance.
Abbreviations: DLQI, Dermatology Life Quality Index; SD, standard deviation

ACKNOWLEDGMENTS

The authors gratefully acknowledge the patients who willingly joined this study, Assistant Professor Chulalak Komoltri for her assistance with the statistical analyses, and Dr. Waratchaya Panjapakkul for her kind support. The authors are also indebted to Mr. David Park for the English-language editing of this paper.

Funding sources

None

Conflicts of interest

None declared

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