

Agreement between Various Length Acne-specific Quality of Life Questionnaires and Clinical Acne Assessment Scores in Adults

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(Ann Coll Med Mosul 2024; 46 (2):237-243).

Received: 23th May 2024; Accepted: 29th July 2024.

ABSTRACT

Background: Various length questionnaires have been invented to assess the psychosocial impact of adult acne. However, there is still disagreement regarding the optimal number of items that ensure reliable response and clinical applicability.

Aim: to estimate the relationship and concordance between the clinical score and the different lengths of acne-specific QoL questionnaires (long 19-item Acne-QoL, mid-length 9-item AQOL, and short 5-item CADI).

Patients and Methods: This cross-sectional study includes 94 adult acne patients recruited from a teaching hospital. The patients will disclose their sociodemographic characteristics. The dermatologist used the Global Acne Grading (GAGS) to determine the severity of acne. Acne-specific self-administered quality of life questionnaire of three different lengths will be used to assess the psychosocial impact of illness.

Results: Adult acne predominantly affected women (71.3%), persisted from adolescence (69.1%), was mainly on the face (67.0%), and was mild (85.1%). The average adult acne QoL scores were (50.8±21.7) in long Acne-QoL, (6.2 ± 3.4) in mid-length AQOL, and (4.50±2.22) in short CADI. The correlation coefficient between various length acne-specific QoL questionnaires and clinical grade was (R=-0.36) in long Acne-QoL, (R=0.25) in short CADI, and (R = 0.19) in mid-length AQOL. Bland-Altman agreement between clinical grade and mid-length AQOL yields the least bias (0.0197), moderate bias (-0.165) in long Acne-QoL, and considerable bias (-0.213) in the short CADI.

Conclusions: Mild facial acne persists beyond age 25, is particularly common in adult females, and negatively impacts patients' psychosocial lives. The 9-item AQOL was the most consistent with clinical assessment results and was the most effective instrument for assessing the impact of acne

Keywords: Adult acne, Quality of life, Acne QOL, AQOL, CADI, Bland-Altman blot agreement test.

التوافق بين استبيانات نوعية الحياة الخاصة بحب الشباب المختلفة الطول ونتائج تقييم حب الشباب السريري لدى البالغين

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الخلاصة

الخلفية: تم اختراع استبيانات مختلفة الطول لتقييم التأثير النفسي والاجتماعي لحب الشباب عند البالغين. ومع ذلك، لا يزال هناك خلاف بشأن العدد الأمثل من العناصر التي تضمن كلا من الاستجابة الموثوقة والتطبيق السريري

اهداف الدراسة: تقدير العلاقة والتوافق بين النتيجة السريرية والأطوال المختلفة لاستبيانات QoL الخاصة بحب الشباب (استبيان حب الشباب الطويل المكون من 19 عنصرًا، و AQOL متوسط الطول 9 عناصر، و CADI قصير مكون من 5 عناصر).

المرضى وطريقة البحث: هذه دراسة شملت 94 مريضًا بالغًا بحب الشباب تم اختيارهم من مستشفى السلام التعليمي في الموصل. سيتم الكشف عن الخصائص الاجتماعية والديموغرافية من قبل المرضى. استخدم طبيب الأمراض الجلدية التصنيف العالمي لحب الشباب (GAGS) لتحديد شدة حب الشباب. سيتم استخدام استبيان نوعية الحياة الخاص بحب الشباب بثلاثة أطوال مختلفة لتقييم التأثير النفسي والاجتماعي للمرض.

النتائج: يصيب حب الشباب في الغالب النساء (٧١.٣٪)، ويستمر منذ سن المراهقة (٦٩.١٪)، وكان معظمه على الوجه (٦٧.٠٪)، وكان طابعه خفيفاً (٨٥.١٪). كان متوسط درجات QOL لحب الشباب للبالغين (٢١.٧ ± ٥٠.٨) في استبيان حب الشباب الطويل، (٣.٤ ± ٦.٢) في الاستبيان متوسط الطول AQOL، و (٢.٢٢ ± ٤.٥٠) في اختصار CADI. كان معامل الارتباط بين استبيانات QoL الخاصة بحب الشباب المختلفة الطويلة والدرجة السريرية ($R = -0.36$) في حب الشباب الطويل، ($R = 0.25$) في اختصار CADI، و ($R = 0.19$) في الاستبيان متوسط الطول AQOL. تنتج اتفاقية Bland-Altman بين الدرجة السريرية و AQOL متوسط الطول أقل تحيز (٠.١٩٧)، والتحيز المعتدل (-٠.١٦٥) في Acne-QOL الطويل، والتحيز الكبير (-٠.٢١٣) في CADI القصير.

الاستنتاجات: يستمر حب الشباب الخفيف في الوجه بعد سن ٢٥ عاماً شائعاً بشكل خاص في الإناث البالغات، وله تأثير سلبي على الحياة النفسية والاجتماعية للمرضى. كانت العناصر التسعة AQOL في الاستبيان هي الأكثر اتساقاً مع نتيجة التقييم السريري وكانت الأداة الأكثر فعالية لتقييم تأثير حب الشباب.

الكلمات المفتاحية: حب الشباب للبالغين، جودة الحياة، حب الشباب QOL، AQOL، CADI، اختبار Bland-Altman، التوافق.

INTRODUCTION

Chronic adult acne is a common cutaneous disorder¹ that adversely impacts one's psychological, social, and emotional well-being². It either persists from teenage acne or started lately after age 25.³ The chronic course of illness increases its burden, particularly since it occurs concomitantly with the emergence of concerns about body image, socializing, and sexuality in adolescent life^{4,5}.

The discrepancy between the patient's view of their acne and the doctor's assessment of its severity has led to the invention of a series of quality of life (QoL) questionnaires specifically tailored to acne sufferers. The length of the questionnaires varies from an extremely long scale (the 48-item Acne Disability Index—ADI)⁶ to a very small scale (the four items of Acne-Q4)⁷.

Long questionnaires could aid in gathering comprehensive information about illness, but they could lead to premature termination, erratic responses, and other undesirable behaviors due to loss of motivation⁸. However, the critical issue is the 'What is the least length' of acne-specific QoL questionnaire that can preserve the most trustworthy data, avoid survey fatigue, and maintain the clinical value. This study selects three scales of different lengths to assess the acne-specific QoL. The selected questionnaires include A long Acne Quality of Life (Acne-QoL) consisting of 19 items⁹, a mid-length Acne Quality of Life Scale (AQOL) composed of 9 items¹⁰, and a short Cardiff acne disability index (CADI) consisted of 5 items¹¹.

The questionnaires will be used on a common sample of adult acne, aiming to:

- (1) estimate the impact of adult acne on patients' lives according to demographic and clinical data.
- (2) determine the correlation and concordance of the different length acne-specific QoL questionnaires with clinical severity grading.

PATIENTS AND METHODS

A cross-sectional study was conducted at a dermatology clinic in a teaching hospital in Iraq between March and July 2022. Patients with adult acne older than 25 were asked to participate in the study after signing a consent form. Self-administered questionnaires were used to collect data for the survey regarding sociodemographic variables, acne onset, severity, predominance location, and acne-specific quality of life.

Instruments

Acne Severity Index

Dermatologists use the Global Acne Grading Scale (GAGS) to grade the severity of acne. The instrument provides an overall evaluation of acne in six acne-prone areas. Each site was assigned a 'factor' based on its surface area: one for the nose and chin, two for the forehead, right and left cheeks, and three for the chest and upper back. Each area was given a 'grade' based on the type of lesion as follows: (0= no lesion; 1= comedone; 2= papule; 3= pustule; and 4= nodule). The local score for each site's equal factor is multiplied by the grade. The global score (0 to 52) results from summing up the six local values. Acne severity is graded as mild (score 1–18), moderate (score 19–30), severe (score 31–38), and extremely severe (score more than 38)¹².

Acne Quality of Life Questionnaires

Each patient fills out three different length self-administered acne-specific QoL questionnaires to assess the impact of acne on their life, as follows:

1. Acne Quality of Life (Acne-QoL) is an instrument created by Martin et al. It consisted of 19 items rated from 0 to 6 (intense to not at all). The items covering four domains of life of acne patients are as follows: self-perception (0–30), role-emotional (0–30), role-social (0–24), and symptoms (0–30). The total score varies from 0–114; higher scores indicate a better level of health-related QoL¹³.

2. Acne quality of life scale (AQOL) developed by Gupta et al. The scale is nine items scored on a 0–3 scale, with a maximum of 27. Higher scores indicated a higher level of morbidity¹⁰.

3. Motley and Finlay developed the Cardiff acne disability index (CADI) as a five-item version. The items address psychological and social dimensions, interference with activities (items 2 and 3), feelings (items 1 and 4), and the overall severity of acne (item 5). Scoring was based on responses and ranged from 0 to 3, with higher scores indicating greater disability. (score 0–5 = mild impairment); (score 6–10 = moderate impairment); and (score 11–15 = severe impairment)¹¹.

Statistical Analysis

SPSS Version . 26 was used to summarize and analyze the study data. Continuous data were expressed as mean and standard deviation, whereas categorical data were expressed as percentages. Impact differences between gender, residence, job, onset, and acne location were assessed by the Mann-Whitney U test. In contrast, impact differences among various education levels and acne severity strata were evaluated by the Kruskal-Wallis test. The QoL and GAGS data were standardized using the Min-Max Scaling technique before comparing the results. They have an unequal item number and response scale, which helps turn the data into a consistent scale from 0 to 1. A Spearman correlation test was used to correlate acne-specific QoL with clinical grade. Later, their concordance was assessed by constructing a Bland-Altman agreement plot¹⁴. The significance threshold was defined as a p-value ≤ 0.05.¹⁵

RESULTS

Ninety-four patients who suffered from adult acne participated in the current study. The female sex was more prevalent, forming 67 (71.3%) of the sample, and 27 (28.7%) were males, with a female: male ratio of 2.48:1. The female patients were significantly ($p = 0.001$) older than the male patients (32.36 ± 3.09 years vs. 28.63 ± 2.18 years, respectively). Persistent adult acne is found in 65 (69.1%) patients, and late-onset acne is found in 29 (30.9%). The face was the predominant site in 63 (67.0%), and the rest were mainly truncal in 31 (33.0%) patients. The severity of acne was mild in 80 (85.1%), moderate in 10 (10.6%), and severe in 4 (4.2%). The characteristics of adult acne patients are shown in Table 1.

Table 1. The demographic and clinical characteristics of adult acne according to gender

Parameters	Total N=94	Female N=67	Male N=27	P- value
Age, mean±SD	31.41±3.36	32.36±3.09	28.63±2.18	0.001
Educational level, No. (%)				
Low	22 (23.4%)	16 (23.9%)	6 (22.3%)	0.8
Intermediate	60 (63.8%)	46 (68.7%)	14 (51.8%)	0.1
High	12 (12.8%)	5 (7.4%)	7 (25.9%)	0.01
Residence, No. (%)				
Urban	69 (73.4%)	53 (79.1%)	16 (59.3%)	0.03
Rural	25 (26.6%)	14 (20.9%)	11 (40.7%)	0.04
Job, No. (%)				
Employed	23 (24.5%)	14 (20.9%)	9 (33.3%)	0.2
Unemployed	71 (75.5%)	53 (79.1%)	18 (66.7%)	0.2
Onset, No. (%)				
Persistence	65 (69.1%)	49 (73.1%)	16 (59.3%)	0.05
Late-onset	29 (30.9%)	18 (26.9%)	11 (40.7%)	0.1
Site of acne, No. (%)				
Face	63 (67.0%)	48 (71.6%)	15 (55.6%)	0.1
Torso	31 (33.0%)	19 (28.4%)	12 (44.4%)	0.1
Severity of acne, No. (%)				
Mild	80 (85.1%)	60 (89.6%)	20 (74.1%)	0.05
Intermediate	10 (10.6%)	6 (8.9%)	4 (14.8%)	0.4
Severe	4 (4.2%)	1 (1.5%)	3 (11.1%)	0.03

The results of the table reveal the following: significant disparities between males and females regarding residence [females reside in urban areas ($p = 0.03$), while males reside in rural areas ($p = 0.04$)]. Female preponderance in the persistent mode of onset of acne (73.1 percent vs. 59.3 percent); female preponderance in mild acne ($p = 0.05$); and finally male preponderance in severe acne ($p = 0.03$).

The impact of adult acne on quality of life was assessed using three different length QoL questionnaires. Using the lengthy 19-item Acne-QoL, the mean impact score and SD equal 50.8 and 21.7, respectively (range 9–94). The mean±SD score for each domain was as follows: self-perception (13.4±7.1); role-social (11.7±7.4); role-emotional (12.6±6.9); and acne symptom (12.8±5.6). The mean score of the intermediate nine items AQOL score was 6.2 ± 3.4 (min-max range from 2–19). Lastly, the average of the five items in the CADI score was 4.50 ± 2.22 , with a range of 1–8 points. Based on the reported score, impact was considered mild impairment in 56 individuals (59.6%), moderate impairment in 38 patients (40.4%), and none was classified as severe impairment.

In each of the three QoL questionnaires, additional analysis was done to see how the effects of adult acne on QoL varied by gender, location, time of onset, and severity of acne. The important variations shown in Table 2 are as follows: Only the CADI score demonstrated a statistically significant difference between genders, with female CADI scores higher than male scores indicating a more significant impact. Both AQOL and CADI also demonstrate substantial increases in scores with increased severity. Acne-QoL and AQOL scores show significant differences in different sites, particularly facial sites. Lastly, the persistence of acne has a higher impact on quality of life, as estimated by Acne-QoL and CADI

Table 2. The impact of adult acne on life was assessed using three different length acne-specific QoL questionnaires according to gender, site, onset, and severity of acne.

Variable		Acne-QoL	AQOL	CADI
Gender	Male	53.1±18.2	5.7 ± 3.7	3.2±1.5
	Female	45.6±22.5	6.4 ± 3.1	4.9 ±0.9
	P-value	0.06	0.1	0.001
Severity	Mild	54.3±27.8	5.7 ± 2.0	4.0±1.1
	Moderate	51.6±19.8	7.4 ± 3.1	4.7±0.9
	Severe	42.5±20.1	8.5 ± 4.3	6.6 ±1.2
	P-Value	0.7	0.008	0.001
Site	Facial	45.6±20.5	6.6 ± 2.9	4.8±0.85
	Truncal	57.1±18.2	5.1 ± 3.2	4.2±1.8
	P-value	0.003	0.01	0.04
Onset	Persistent	41.4±25.6	6.0 ± 3.2	3.9±1.4
	Late-onset	56.4±22.8	6.4 ± 2.9	4.8±0.85
	P-value	0.004	0.2	0.001

Figure 1 shows the findings of the scattered blot graph used to analyze the connection of varied length acne-specific QoL questionnaires with clinical grade. The findings show that long Acne-QoL has a significant negative relationship with clinical grading ($R = -0.36$, $P = 0.001$), short CADI has a significant direct relationship with clinical grading ($R = 0.25$, $P = 0.01$), and mid-length AQOL has a direct but non-significant relationship with clinical grading ($R = 0.19$, $P = 0.06$). According to grade, a linear regression study produced the following models for assessing how adult acne affects patients' lives:

$$\text{Acne QoL} = 59.83 - 1.16 * (\text{clinical grading})$$

$$\text{CADI} = 3.91 + 0.07 * (\text{clinical grading})$$

$$\text{AQOL} = 6.45 + 0.1 * (\text{clinical grading})$$

The Bland-Altman agreement graphs were constructed to analyze the concordance of the varied length acne-specific QoL questionnaires with clinical grading. Before comparing the outcomes, the data from both acne QoLs and clinical grading were standardized with uneven item numbers and response scales to generate a consistent scale ranging from 0 to 1. The results reveal that mid-length AQOL and clinical grading had the best concordance, reflected by low bias (0.0197, 95% CI = -0.079 to 0.040) and narrow limits of agreement (-0.593 to 0.553). The long-acne QoL and clinical grading had intermediate concordance (bias = -0.165, 95% CI range from -0.248 to -0.081) and agreement limits (-0.963 to 0.633). Lastly, short CADI and clinical grading had the least agreement (estimate bias = -0.213, 95% CI range from -0.277 to -0.149, the limit of agreement ranges from -0.825 to 0.399).

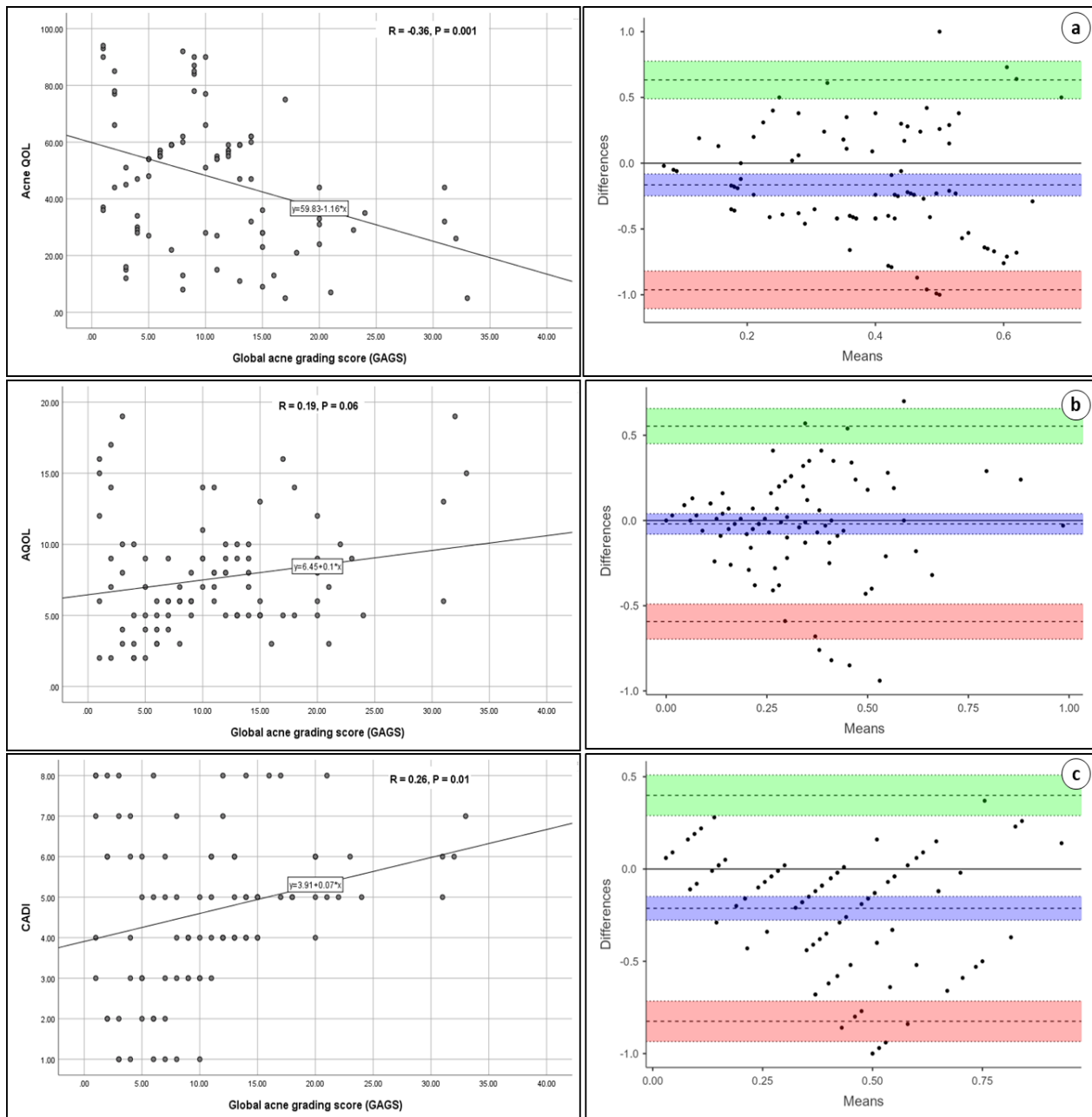


Fig 1. The relationship and agreement between the results of three various lengths of acne-specific QoL questionnaires (Acne QoL, AQOL, and CADI) and the global acne grading score (GAGS).

DISCUSSION

The current study provides further evidence for the female preponderance in adult acne. The female-to-male ratio (2.48:1) is slightly lower but still consistent with the findings of the Goulden et al. study¹⁶.

They report that the prevalence of adult acne in women was four times higher than in men (12 vs. 3 percent, respectively). In the current study, 67.0 percent of lesions were predominantly facial, especially in the surgical mask distribution. This frequency is lower than that found in a large-scale survey of 374 female patients with adult acne.

They report that 89.8% of the women had acne lesions in multiple face areas. The difference could be partially explained by limiting their sample to females, while the current study includes both genders. Furthermore, the result shows that males have more truncal acne. The mild severity of adult acne, found in most patients (85.1%), is consistent with the frequency reported by Skroza et al.⁴.

Validation of a measurement in a clinical setting involves all possible procedures demonstrating its ability to estimate the target variable. Unfortunately, every estimate has some errors, which become apparent compared to other tests.

The most crucial step is to show how well the test and reference match. Previous research used the product-moment correlation coefficient (r) between the results of the two tests to indicate concordance. However, even a high coefficient may be deceptive or not guarantee a firm agreement. Instead, it reflects the strength of the relationship between each pair of variables. Recently, Bland and Altman created a scatterplot between the averages of the two tests and their differences to create an agreement analysis. It allows for calculating the new test's bias relative to the reference test and determining the degree of precision (i.e., the degree of dispersion of the data within the upper and lower limits of agreement).

A well-designed questionnaire saves researchers time and provides the most relevant information quickly. However, the connection between survey response rates and length remains unclear¹⁷.

While Beebe et al. (2010) conclude that short questionnaires may reduce response rates because respondents may consider them unimportant¹⁸, Stanton et al., on the other hand, declare that long questionnaires increase the response effort, reflected in a lower response rate and higher missing data¹⁹. Furthermore, lengthy surveys have a lower data quality than shorter surveys²⁰ (Galesic & Bosnjak, 2009).

The results of a correlation analysis between different lengths of QoL questionnaires and clinical grading showed that the most extended questionnaire (19 items Acne-QoL) had the highest correlation ($R = -0.36$). In contrast, the shortest questionnaire (5 items CADi) had a medium correlation ($R = 0.25$), and the medium-length questionnaire had the lowest correlation ($R = 0.19$; 9 items AQOL). Further data analysis using the recent and most commonly used tool for assessing agreement between various lengths of QoL questionnaire and clinical grading (Bland-Altman blot)²¹

Show that medium length with nine items AQOL yields the best agreement and accuracy (least bias and highest precision). The bias was only 0.0197 percent. The short five items of CADi yield the highest bias, while the long 19 items of Acne-QoL yield moderate bias (-0.165 and -0.213, respectively).

In conclusion, this study showed that mild adult facial acne is common in women over 25 and usually persists from the teenage years. It has a negative psychosocial impact. The mid-length, nine-item AQOL quality of life questionnaire was the most valid and consistent with the clinical grading score.²²

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