



Original Research

Evaluation of Depression, Self-esteem, Anxiety, and Dermatological Quality of Life Index in Adolescent Acne Patients: A Case-Control Study

Didem Kazan,¹ Burcu Bahar Inci,² Selin Ilchan,³ Defne Ozkoca⁴

¹Department of Dermatology and Venerology, Kutahya Health Science University, Evliya Celebi Training and Research Hospital, Kutahya, Türkiye; Department of Dermatology and Venerology, Istanbul Arel University, Istanbul, Türkiye

²Department of Dermatology and Venerology, Kutahya Health Science University, Evliya Celebi Training and Research Hospital, Kutahya, Türkiye

³Department of Dermatology and Venerology, Kocaeli University, Kocaeli, Türkiye

⁴Department of Dermatology and Venerology, Zonguldak Ataturk State Hospital, Zonguldak, Türkiye

Abstract

Objectives: Acne vulgaris is a common skin condition that affects adolescents and can have a significant impact on their mental health. In this study, we aimed to evaluate the depression and anxiety symptoms, self-esteem and dermatological quality of life indexes of adolescent patients with acne vulgaris.

Methods: A total of 160 patients aged between 10 and 19 years with acne vulgaris and 100 healthy controls were included in the study. All participants completed the Reynolds Adolescent Depression Scale (RADS), Beck Adolescent Anxiety Scale (BAAS), and Coopersmith Self-Esteem Survey Scale (CSES), alone and independently. The dermatologists evaluated the acne disease severity of the study group using the Global Acne Grading System, while the Children's Dermatological Quality of Life Index (CDLQI) was evaluated in the same group. Age, gender, and scale results of all participants were recorded on case report forms for further analysis.

Results: The study group had significantly higher RADS (27.5% vs 12.5%, $p=0.003$) and BAAS scores (80% vs 64%, $p=0.001$) than the control group. The percentage of patients with CSES scores below 20 in the study group was significantly higher than the control group ($p=0.001$). Higher RADS and BAAS scores were associated with higher CDLQI scores ($p=0.001$, $p=0.001$, respectively), while higher CSES scores were associated with lower CDLQI scores ($p=0.001$).

Conclusion: The study shows that acne vulgaris has a significant impact on the depression, anxiety, and self-esteem levels of adolescent patients. Dermatologists should pay attention to the psychological well-being of patients and provide psychiatric evaluation if necessary.

Keywords: Acne vulgaris, adolescent, depression

Please cite this article as "Kazan D, Bahar Inci B, Ilchan S, Ozkoca D. Evaluation of Depression, Self-esteem, Anxiety, and Dermatological Quality of Life Index in Adolescent Acne Patients: A Case-Control Study. Med Bull Sisli Etfal Hosp 2024;58(2):210-215".

Address for correspondence: Didem Kazan, MD. Department of Dermatology and Venerology, Kutahya Health Science University, Evliya Çelebi Training and Research Hospital, Kutahya, Türkiye; Department of Dermatology and Venerology, Istanbul Arel University, Istanbul, Türkiye

Phone: +90 850 850 27 35 **E-mail:** didem.senses_343@hotmail.com

Submitted Date: December 07, 2023 **Revised Date:** February 25, 2024 **Accepted Date:** March 24, 2024 **Available Online Date:** June 28, 2024

©Copyright 2024 by The Medical Bulletin of Sisli Etfal Hospital - Available online at www.sislietfaltip.org

OPEN ACCESS This is an open access article under the CC BY-NC license (<http://creativecommons.org/licenses/by-nc/4.0/>).



Acne vulgaris (AV) is a common chronic inflammatory disease that affects the hair follicles and sebaceous glands in the skin. It is characterized by the formation of open or closed comedones, reddish papules, pustules, and cysts, which can appear on the face or body. AV usually starts during adolescence, with a prevalence reaching up to 85%.^[1]

The condition of acne can be a significant source of dissatisfaction with facial appearance and impaired self-image, leading to anxiety, depression, decreased self-esteem, and problematic social relations.^[2, 3] Previous studies have shown that AV patients have an increased prevalence of clinical depression and anxiety, as well as lower self-esteem levels.^[2-5] However, the association between AV and these psychological factors may vary depending on gender, age, study setting, personal habits, and region.^[6, 7] As such, there is still no consensus on this issue, and it remains controversial.

Therefore, the aim of our study is to evaluate the depression and anxiety symptoms, self-esteem and dermatological quality of life indexes of adolescent patients with AV, and to investigate their relationships with each other.

Methods

This is a cross-sectional, case-control study based on a questionnaire. It was conducted in a tertiary dermatology center after obtaining ethics committee approval (Approval Number: 2023/03-22). The study included 160 patients between the ages of 10 and 19 with AV, and 100 healthy controls of the same age and gender admitted to the dermatology outpatient clinic between March and June 2023. All participants provided informed consent forms, along with their families, and the pediatric patient volunteer forms were obtained.

Data Collection

In both groups, Reynolds Adolescent Depression Scale (RADS), Beck's Adolescent Anxiety Scale (BAAS), and Coopersmith Self-Esteem Scale were used to assess self-esteem (CSES). Additionally, the Children's Dermatology Quality of Life Index (CDLQI) was evaluated in the study group. All participants were given the scale forms one by one and responded to them independently. The average time for each participant to fill out the questionnaires was approximately 10-15 minutes.

All participants' ages, genders, and scores of RADS, CSES, and BAAS were recorded in the case report files. Additionally, the duration and severity of the disease, as well as the CDLQI scores of the study group, were obtained and recorded into files. The statistical relationship between the two groups was investigated based on age, gender, RADS, CSES, and BAAS scores. Furthermore, the relationship be-

tween RADS, CSES, BAAS scores, and CDLQI scores of the study group was evaluated.

Instruments

Global Acne Evaluation Scale (GAES)

The GAES was developed by Dreno et al.^[8] to evaluate the severity of acne vulgaris. The severity of the disease is categorized on a scale of 0-5 based on lesion characteristics and number. "0" means "no lesion", "1" is "almost clear, almost no lesion", "2" is mild, "3" is "moderate", "4" is "severe", and "5" is "very severe disease".

Reynolds Adolescent Depression Scale (RADS)

The RADS was developed by Reynolds^[9] in 1987 to assess depression in adolescents. Oskay^[10] performed a Turkish validity and reliability study of the scale. The Turkish version was found to be valid and reliable in measuring depression in adolescent patients. The scale consists of 30 items, and 7 items (1, 5, 10, 12, 23, 25, 29) are scored in reverse. The cut-off value is 77 on the scale with a minimum of 30 points and a maximum of 120 points. Patients with a score above this value were accepted as having depression.

Beck Adolescent Anxiety Scale (BAAS)

The BAAS was developed by Beck et al.^[11] in 1988 to evaluate anxiety in adolescents. Ulusoy et al.^[12] performed a Turkish validity and reliability study of the scale. It consists of 21 questions in total. Each item is scored between 0-3. It is categorized as mild anxiety between 8-15 points, moderate anxiety between 16-25 points, and severe anxiety between 26-63 points.

Coopersmith Self-Esteem Inventory (CSEI)

The CSEI was developed by Coopersmith and Brout^[13] in 1986 to evaluate anxiety in adolescents. Turan and Tufan^[14] performed a Turkish validity and reliability study of the scale. The total scores of the patients were evaluated in 3 groups as <20, 20-30, and >30. The higher the score, the higher the self-esteem of the person.

Children's Dermatological Life Quality Index (CDLQI)

The CDLQI is a dermatological disease-specific questionnaire-based measure for children. It was originally created in English by Lewis-Jones and Finlay^[15] in 1995. A Turkish validity and reliability study of the scale was performed by Balci et al.^[16] in 2007. The questionnaire consists of 10 questions. Each question has 4 answer options and can get 0, 1, 2, or 3 points depending on the answer given. The total score of the index can be a minimum of 0 and a maximum of 30 points. A high score indicates a high impact of the disease on the quality of life.

Statistical Analysis

The statistical analysis was done with IBM SPSS 20.0 (IBM Corp., Armonk, NY, USA) package program. Numerical variables were given as mean±standard deviation or median (25th-75th percentile). Categorical variables were given as frequency (percentage). The relationships between categorical variables were evaluated by chi-square analysis. The Kolmogorov–Smirnov test was used to examine the uniform distribution of the data. Two samples' Student's t-test was used to compare mean values of normally distributed quantitative variables. $p < 0.05$ was considered statistically significant.

We calculated the sample size through G^* power 3.1. We included the chi-square analysis of RADS scores between the study and control groups with an effect size of $w=0.356$. The calculated power of the study was 79.5% when 100 patients were included in each group.

Results

The study included a total of 260 participants, consisting of 160 patients with AV and 100 healthy controls. Of the study group, 76 (47.5%) were females and 84 (52.5%) were males, with a mean age of 15.6 ± 1.52 years. The median disease duration for the study group was 2.02 ± 0.96 years. There was no significant difference in age and gender between

the two groups ($p=0.655$ and $p=0.814$, respectively).

The study found that the RADS and BAAS scores of the study group were significantly higher than those of the control group (27.5% & 12.5%, $p=0.003$; 80% & 64%, $p=0.001$). Moreover, the percentage of patients with CSES scores below 20 was significantly higher in the study group compared to the control group ($p=0.001$) (Table 1).

The results of Table 2 showed that higher RADS and BAAS scores were linked to higher CDLQI scores ($p=0.001$, $p=0.001$; respectively). On the other hand, higher CSES scores were associated with lower CDLQI scores ($p=0.001$). We observed a significant relationship between the RADS and CSES scores of the study group and disease severity, but no relationship between BAAS scores and disease severity (Table 3).

Discussion

A total of 260 adolescent patients, 160 with acne vulgaris (AV), and 100 healthy controls were evaluated in a study to assess the psychological effects of AV. The patients with AV had significantly higher depression and anxiety symptoms, as measured by RADS and BAAS scores, compared to controls. Additionally, the patients with AV had significantly lower levels of self-esteem, as measured by CSES scores. The mean CDLQIA was calculated as 14.57 ± 8.37 , and it was

Table 1. Comparison of the groups in terms of gender, age, disease duration, severity of disease and test scores

	Study group (n=160)	Control group (n=100)	p
Gender			
Female	76 (47.5%)	46 (46%)	0.814 ^c
Male	84 (52.5%)	54 (54%)	
Age (mean±SD)	15.6±1.52	15.6±1.54	0.655 ^t
Duration of disease (mean±SD) (year)	2.02±0.96		-
Severity of the disease (Global acne score) (median)	2.5 (1-4)		-
Reynolds adolescent depression scale score			
< 77	116 (72.5%)	88 (88%)	0.003 ^{c*}
> 77	44 (27.5%)	12 (12%)	
Coppersmith self-esteem investigory score			
<20	12 ^a (7.5%)	0 ^b (0%)	0.001 ^{c*}
20-30	84 ^a (52.5%)	40 ^b (40%)	
>30	64 ^a (40%)	60 (60%)	
Beck adolescent anxiety score			
<7	32 ^a (20%)	36 ^b (36%)	0.001 ^{c*}
8-15	56 ^a (35%)	8 ^b (8%)	
16-25	30 ^a (18.8%)	24 ^a (24%)	
26-63	42 ^a (26.3%)	32 ^a (32%)	
Children dermatological life quality index score	14.57±8.37		

^{a-b}: Bonferroni adjustment; ^c: chi-square; ^t: Student t-test.

Table 2. The relationship between CDLQI test scores and Reynould, Beck, Coppersmith tests scores of the study group

	CDLQI test scores n=160		p
	<14.57	>14.57	
Disease severity			
1	4 ^a (6.9%)	0 ^b (0%)	0.001*
2	36 ^a (62.1%)	40 ^b (39.1%)	
3	10 ^a (17.2%)	34 ^b (33.3%)	
4	8 ^a (13.8%)	28 ^b (27.5%)	
Reynould depression test scores			
<77	64 (100%)	52 (54.2%)	0.001*
>77	0 (0%)	44 (45.8%)	
Coppersmith test scores			
<20	0 ^a (0%)	12 ^b (12.5%)	0.001*
20-30	16 ^a (25%)	68 ^b (70.8%)	
>30	48 ^a (75%)	16 ^b (16.7%)	
Beck anxiety test scores			
<8	32 ^a (50%)	0 ^b (0%)	0.001*
8-15	20 ^a (31.3%)	36 ^a (37.5%)	
16-25	4 ^a (6.3%)	26 ^b (27.1%)	
26-63	8 ^a (12.5%)	34 ^b (35.4%)	

^{a-b}: Bonferroni adjustment.

found to have a positive statistical relationship with RADS and BAAS and a negative statistical relationship with CSES. Most dermatological diseases, including AV, have a psychological effect on patients. A study conducted by Ceren et al.^[17] from our country reported that the first five dermatological diseases that affected the quality of life the most

were psoriasis, acne, eczema, seborrheic dermatitis and pruritus. Furthermore, Gupta et al.^[18] showed that acne patients have higher depression levels than patients with alopecia areata, atopic dermatitis, and psoriasis. They also revealed that some acne patients may develop suicidal thoughts, highlighting the need for psychological evaluation and support from the psychiatry department.^[18]

In a meta-analysis conducted by Samuels et al.^[19], acne was found to increase the risk of depression and anxiety in both adults and adolescents from different countries. From Turkey, Yazici et al.^[20] evaluated the Hospital Anxiety and Depression Scale, Acne Quality of Life Scale, and Dermatological Life Quality Indexes of 61 patients with AV and 38 healthy controls. They found higher depression and anxiety levels in patients with AV than controls, especially in adolescent patients. Recently, Güler et al.^[21] reported significant correlations between quality of life scores, anxiety and depression levels, self-esteem levels, and lack of emotional support (LES) scores. Thus, they also emphasized the importance of family emotional support in adolescent acne patients and offered different perspectives on the matter.

Yolaç et al.^[22] investigated the depression, anxiety, and self-esteem levels of both adolescent and adult patients, 83 patients with AV and 58 controls, according to the Liebowitz Social Anxiety Scale, Automatic Thoughts Scale, Rosenberg Self-Esteem Scale, and Hospital Anxiety and Depression Scale. They declared that higher social anxiety, social avoidance/withdrawal, general anxiety, depression, negative automatic thoughts, and lower self-esteem were in acne patients than controls. Psychological symptoms were negatively correlated with age, however, no statistically

Table 3. The relationship between the disease severity and Reynould, Beck, Coppersmith tests scores of the study group

	Disease severity				p
	1	2	3	4	
Reynould depression test scores					
<77	4 ^{a,b} (100%)	68 ^b (89.5%)	24 ^a (54.5%)	20 ^a (55.6%)	0.001
>77	0 ^{a,b} (0%)	8 ^b (10.5%)	20 ^a (45.5%)	16 ^a (44.4%)	
Coppersmith test scores					
<20	0 ^{a,b} (0%)	0 ^b (0%)	8 ^a (18.2%)	4 ^a (11.1%)	0.001
20-30	0 ^a (0%)	40 ^a (52.6%)	20 ^a (45.5%)	24 ^a (66.7%)	
>30	4 ^a (100%)	36 ^{a,b} (47.4%)	16 ^{a,b} (36.4%)	8 ^b (22.2%)	
Beck anxiety test scores					
<8	4 (100%)	16 (21.1%)	4 (9.1%)	8 (22.2%)	0.822
8-15	0 (0%)	24 (31.6%)	16 (36.4%)	16 (44.4%)	
16-25	0 (0%)	18 (23.7%)	4 (9.1%)	8 (22.2%)	
26-63	0 (0%)	18 (23.7%)	20 (45.5%)	4 (11.1%)	

^{a-b}: Bonferroni adjustment.

significant relationship was observed between psychological status and gender, acne severity, and localization. On the other hand, Unsal and Ayranci^[23] discovered that students with AV on their faces had a significantly higher risk of depression compared to those who did not have acne. In our study, we did not examine the effect of the affected anatomical side.

There are controversial results in the literature regarding the relationship between acne disease severity and depression or anxiety levels. Aktan et al.^[24] conducted a study with 2657 participants in which they found no significant differences in the anxiety and depression subscale scores between the adolescent acne and control groups. However, they revealed the anxiety subscale scores of girls were significantly higher than those of boys in the acne group. On the other hand, Grahame et al.^[25] reported a significant relationship between depression, anxiety, self-esteem and acne severity. In our study, we found a significant relationship between disease severity and the depression and anxiety scores of the study group, however, we did not find a relationship between the self-esteem levels of the study group and disease severity. These results showed us various factors such as the study's design, the selection of the participants, and the choice of the survey used, and also personal traits, cultural habits, and regional differences could affect this relationship. Therefore, more comprehensive studies are required to obtain a clearer understanding of the psychosocial effects in patients with acne.

In our study, we found higher depression and anxiety symptoms and lower self-esteem than controls. However, we found a significant relationship between disease severity and high DLQI scores. We believe that this difference can be explained by the fact that we only evaluated adolescent patients, who are more preoccupied with body image and related worries and have limited coping abilities. Additionally, our evaluation of a larger number of patients may have provided a better chance of observing a statistical relationship. Furthermore, the increasing use of social media and the perception of perfection nowadays can aggravate acne patients more psychologically than before.^[26]

The study's main advantage is that it is a case-control study with a high number of patients. The use of different scales in the measurement of depression and anxiety symptoms, and self-esteem and the statistical relationship between scale results and the pediatric dermatological quality of life indexes of the participants are among its superior features. However, the study's limitation is that it did not include a psychiatric evaluation, which could have helped examine the effects of the participants' personality characteristics, family support and social environment on their mood.

Conclusion

AV affects the depression, anxiety, and self-esteem levels of adolescent patients. The use of questionnaires in practical life provides helpful information for clinicians to understand the definition of the disease for patients, the real effect of the disease on patients, patients' needs, and medical assessments. Psychiatric evaluation and support are recommended when necessary.

Disclosures

Ethics Committee Approval: Approval for the study was obtained from the Kutahya Health Science University Scientific Research Ethics Committee (date: 09.03.2023, decision number: 2023/03-22).

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

Authorship Contributions: Concept – D.K.; Design – D.K.; Supervision – D.K.; Data collection &/ or processing – D.K., B.B.I.; Analysis and/or interpretation – D.K., B.B.I., S.I., D.O.; Literature search – D.K., B.B.I., S.I., D.O.; Writing – D.K., B.B.I., S.I., D.O.; Critical review – D.K., B.B.I., S.I., D.O.

Use of AI for Writing Assistance: None declared.

References

1. Bhate K, Williams HC. Epidemiology of acne vulgaris. *Br J Dermatol* 2013;168:474–85. [\[CrossRef\]](#)
2. Bowe WP, Doyle AK, Crerand CE, Margolis DJ, Shalita AR. Body image disturbance in patients with acne vulgaris. *J Clin Aesthet Dermatol* 2011;4:35–41.
3. Thomas DR. Psychosocial effects of acne. *J Cutan Med Surg* 2004;8:3–5. [\[CrossRef\]](#)
4. Vallerand IA, Lewinson RT, Parsons LM, Lowerison MW, Frolkis AD, Kaplan GG, et al. Risk of depression among patients with acne in the UK: A population-based cohort study. *Br J Dermatol* 2018;178:e194–5. [\[CrossRef\]](#)
5. Uhlenhake E, Yentzer BA, Feldman SR. Acne vulgaris and depression: a retrospective examination. *J Cosmet Dermatol* 2010;9:59–63. [\[CrossRef\]](#)
6. Golchai J, Khani SH, Heidarzadeh A, Eshkevari SS, Alizade N, Eftekhari H. Comparison of anxiety and depression in patients with acne vulgaris and healthy individuals. *Indian J Dermatol* 2010;55:352–4. [\[CrossRef\]](#)
7. Hassan J, Grogan S, Clark-Carter D, Richards H, Yates VM. The individual health burden of acne: appearance-related distress in male and female adolescents and adults with back, chest and facial acne. *J Health Psychol* 2009;14:1105–18. [\[CrossRef\]](#)
8. Dréno B, Poli F, Pawin H, Beylot C, Faure M, Chivot M, et al. Development and evaluation of a Global Acne Severity Scale (GEA Scale) suitable for France and Europe. *J Eur Acad Dermatol Venerol* 2011;25:43–8. [\[CrossRef\]](#)

9. Reynolds W. Reynolds Adolescent Depression Scale (RADS). In: Hersen M, Segal DL, Hilsenroth M, editors. *Comprehensive Handbook of Psychological Assessment and Psychopathology*. New Jersey: Wiley; 2004. p. 224–36.
10. Oskay G. Adaptation of Reynolds adolescent depression scale to the Turkish culture and reliability and validity culture and its reliability and validity. *Turk J Psychol Couns Guidance [Article in Turkish]* 1997;2:17–26.
11. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: Psychometric properties. *J Consult Clin Psychol* 1988;56:893–7. [\[CrossRef\]](#)
12. Ulusoy M, Şahin N, Erkmen H. Turkish version of the Beck Anxiety Inventory: psychometric properties. *J Cogn Psychother* 1998;12:163–72.
13. Coopersmith M, Brout R. Threshold concentration for the existence of ferromagnetism in dilute alloys. *J Phys Chem Solids* 1961;17:254–8. [\[CrossRef\]](#)
14. Turan N, Tufan B. Validity-reliability study of the Coopersmith self-esteem inventory (CEES). *Proceedings of the 23rd National Congress of Psychiatry and Neurological Sciences; 1987 May 30 – Jun 1; Istanbul, Türkiye; 1987*. p. 816–7.
15. Lewis-Jones MS, Finlay AY. The Children's Dermatology Life Quality Index (CDLQI): initial validation and practical use. *Br J Dermatol* 1995;132:942–9. [\[CrossRef\]](#)
16. Balcı DD, Sangün Ö, İnandı T. Cross validation of the Turkish version of Children's Dermatology Life Quality Index. *J Turk Acad Dermatol* 2007;1:71402a.
17. Ceren E, Altunay İK, Köşlü A, Pürisa S. Quality of life measurement using Turkish dermatology quality of life instrument on dermatology outpatients. *Sisli Etfal Hastan Tip Bul [Article in Turkish]* 2010;44:56–60.
18. Gupta MA, Gupta AK. Depression and suicidal ideation in dermatology patients with acne, alopecia areata, atopic dermatitis and psoriasis. *Br J Dermatol* 1998;139:846–50. [\[CrossRef\]](#)
19. Samuels DV, Rosenthal R, Lin R, Chaudhari S, Natsuaki MN. Acne vulgaris and risk of depression and anxiety: a meta-analytic review. *J Am Acad Dermatol* 2020;83:532–41. [\[CrossRef\]](#)
20. Yazici K, Baz K, Yazici AE, Köktürk A, Tot S, Demirseren D, et al. Disease-specific quality of life is associated with anxiety and depression in patients with acne. *J Eur Acad Dermatol Venereol* 2004;18:435–9. [\[CrossRef\]](#)
21. Güler HA, Koç Yıldırım S, Güler D. The relationship between adolescents' perception of family emotional atmosphere and acne severity, self-esteem, and quality of life in adolescents diagnosed with acne vulgaris. *Turk Arch Pediatr* 2023;58:646–52. [\[CrossRef\]](#)
22. Yolaç Yarpuz A, Demirci Saadet H, Erdi Şanlı H, Devrimci Özgüven H. Social anxiety level in acne vulgaris patients and its relationship to clinical variables. *Turk Psikiyat Derg [Article in Turkish]* 2008;19:29–37.
23. Unsal A, Ayranci U. Prevalence of students with symptoms of depression among high school students in a district of western Turkey: an epidemiological study. *J Sch Health* 2008;78:287–93.
24. Aktan S, Ozmen E, Sanli B. Anxiety, depression, and nature of acne vulgaris in adolescents. *Int J Dermatol* 2000;39:354–7. [\[CrossRef\]](#)
25. Grahame V, Dick DC, Morton CM, Watkins O, Power KG. The psychological correlates of treatment efficacy in acne. *Dermatol Psychosom* 2002;3:119–25. [\[CrossRef\]](#)
26. Rieder EA, Andriessen A, Cutler V, Gonzalez ME, Greenberg JL, Lio P, et al. Dermatology in contemporary times: Building awareness of social media's association with adolescent skin disease and mental health. *J Drugs Dermatol* 2023;22:817–25. [\[CrossRef\]](#)