The impact of adolescent acne vulgaris on CDLQI and DFIS: What does it depend on?

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ABSTRACT

OBJECTIVE: Acne vulgaris is a chronic and common disease among adolescents. The effects of acne vulgaris on the caregiver's quality of life and its relationship to patient's quality of life have been seldom studied. This study aims to investigate impact of adolescent acne vulgaris on the patients' and their caregivers' quality of life and to evaluate the relationship between these two variables.

METHODS: Acne vulgaris patients aged between 10 and 18 years and their caregivers were included in this prospective study. CDLQI (Children Dermatologic Quality of Life Index) and DFIS (Dermatological Family Impact Scale) questionnaires were used to assess the impact of acne vulgaris on the quality of life of patients and caregivers. SPSS version 21 was used for the statistical analysis; Spearman correlation test and Mann Whitney U test were used.

RESULTS: This study has shown a significant correlation between DFIS and CDLQI, between severity of acne and CDLQI, and between the previous use of systemic antibiotics and DFIS. There is no relationship of age, sex, disease duration, number of siblings, amount of money spent and previous treatment modalities to CDLQI. There is no relationship between age, sex, acne severity, disease duration, number of children and amount of money spent on DFIS.

CONCLUSION: Acne vulgaris not only has an impact on the patient's quality of life but also on the caregiver's quality of life, which in turn affects the patient's quality of life.

Keywords: Acne vulgaris; adolescent; caregivers; quality of life.

Acne vulgaris is a chronic disease of the pilosebaceous unit and it is one of the most common skin disorders. The estimated prevalence of acne vulgaris among the adolescents is 90 percent [1–3]. Not only does the disease cause pain and discomfort at the nodular or cystic stages but also it has a negative impact on self-perception and self-esteem. Especially the acne scars have a devastating impact on the psychology of adolescents [1, 4–6].

In the case of chronic pediatric skin disorders, the caregivers are also at the risk of developing anxiety and depression, which may perpetuate the anxiety and depression of the patients. Adolescents are economically dependent on their caregivers and therefore are affected by the psychology of their caregivers [7]. Even though the psychological effect of acne vulgaris on adolescent patients have been studied in many countries, the effect

of the disease on their caregivers and the relationship among these have rarely been studied [1, 3, 5–10].

The aim of this study is to investigate the psychological impact of adolescent acne vulgaris on the patients and their caregivers and to evaluate the relationship between these two variables. Secondary aims of this study are to evaluate the relationship of the variables (age, sex, disease severity, disease duration, the amount of money spent monthly for the disease and number of children in the family) to the psychological impact of acne vulgaris on the patient and their caregiver.

MATERIALS AND METHODS

Patients

In this multi-centered prospective study (centers involved: A (a military hospital serving only the soldiers and their relatives), B (a private hospital) and C (a state hospital), adolescent acne vulgaris patients aged between 10 and 18 years and their caregivers were included in this study after having signed the informed consent. Hospital A has contributed 15 patients, B has contributed 24 patients and C has contributed 52 patients). Having an already diagnosed psychiatric disorder or a severe medical condition that decreases the quality of life were the exclusion criteria for both the patients and the caregivers. Patients or caregivers who were illiterate or did not speak Turkish were also excluded. Patients with diagnosed hormonal disorders were excluded from this study as well. Being under treatment for acne vulgaris was not an exclusion criterion. The study was conducted between March 2022 and September 2022.

Caregivers

Either the mother or the father, living in the same household with the patient, was included as the caregiver. The grandparents, living in the same household with the patient, were included if both the parents were deceased or were not living in the same household with the patient.

Study Parameters

The age and sex of the patients, disease duration, disease severity, the psychological impact of the disease on the patient, the psychological impact of the disease on the caregiver, the amount of money spent for the disease monthly, the number of children in the family and the previously used treatment modalities were the variables in this study.

Highlight key points

- There is a significant correlation between DFIS and CDLQI, between severity of acne and CDLQI, and between the previous use of systemic antibiotics and DFIS.
- There is no relationship of age, sex, disease duration, number of siblings, amount of money spent and previous treatment modalities to CDLQI.
- There is no relationship between age, sex, acne severity, disease duration, number of children and amount of money spent on DFIS.

Acne Severity

Global Acne Grading Score was used to assess disease severity. In this scoring system, the body is divided into six areas (forehead, right cheek, left cheek, nose, chin, chest and upper back). Each area is graded among itself from 0 to 4 (0- no lesion, 1- comedones, 2- papules, 3- pustules and 4- nodules). Each grade is multiplied by its local factor: two for the forehead, left cheek, and right cheek; one for the nose and the chin; and three for the chest and the upper back. The local scores are added to each other to obtain the global score, which is evaluated as mild if between 1 and 18, moderate if between 19 and 30, severe if between 31 and 38 and very severe if equal to or greater than 39 [11].

Previous Treatment

The treatment modalities were categorized as over-the-counter drugs, topical treatment modalities, systemic antibiotics and systemic isotretinoin.

Psychological Impact

The impact of the disease on the patients was evaluated with the Child Dermatology Life Quality Index (CDLQI) and on the caregivers, it was evaluated with the Dermatological Family Impact Scale (DFIS).

Questionnaires

CDLQI is a questionnaire which assesses the impact of the disease on the patients with ten questions that the patients answer based on their experiences the previous week. The minimum score is 0 and the maximum score is 30. The validated Turkish version of the questionnaire was used in this study and the scoring and stratification were done based on Lewis-Jones et al.'s proposal [12, 13].

DFIS is a questionnaire that evaluates the impact of the disease on the caregiver's quality of life based on 15

Table 1. Patient characteristics

	Mean±SD	Median (IQR)	n=91 (%)
Age (years)	15.3±1.7	16 (14–17)	
CDLQI	5.7±5.6	4 (2–8)	
DFIS	12.4±9.1	9 (6–19)	
Disease duration (months)	19.2±13.9	12 (7–24)	
Money spent specifically for the disease (TL)	50.6±90.1	0 (0–100)	
Number of children within the household	2±1	2 (2–3)	
Gender			
Female			49.5
Male			50.5
GAGS			
Mild			17.6
Moderate			29.7
Severe			36.3
Very severe			16.4
Over the counter drugs			36.3
Topical modalities			51.6
Systemic antibiotics			18.7
Systemic isotretinoin			11

SD: Standard deviation; IQR: Interquartile range; CDLQI: Children Dermatologic Quality of Life Index; DFIS: Dermatological Family Impact Scale.

questions. Each question is scored between 0 and 4; a maximum score of 60 can be obtained. The Turkish-validated version of DFIS was used in this study [14].

Statistical Analysis

SPSS version 21 (IBM Corp., Armonk, NY, USA) was used for the statistical analysis. The normality distribution of continuous quantitative variables was analyzed using the Q-Q plot, histogram, Shapiro-Wilk and Kolmogorov-Smirnov tests. Categorical variables are described as number (n) and percentage (%) and continuous variables are described as mean±standard deviation and median (interquartile range). Spearman correlation test was used in order to evaluate the relationships between CDLQI and DFIS; the relationship of the patient's age to CDLQI and DFIS; the relationship of disease severity to CDLQI and DFIS; the relationship of disease duration to CDLQI and DFIS; the relationship of number of children in the family to CDLQI and DFIS; and the relationship of the money spent monthly for the disease to CDLQI and DFIS. Interpretation of correlation coefficients are as follows: r=0.25 very weak; r=0.26-0.49 weak; r=0.50-0.69 moderate; r=0.70-0.89

high; r=0.90-1.0 very high association. Mann Whitney-U test was used in order to evaluate the relationship between the patient's gender and CDLQI and DFIS and the relationship between the previous treatment modalities and CDLQI and DFIS. A p-value <0.05 was considered statistically significant.

Ethical Approval

The approval of the Istanbul Kent University, Medical Sciences Research and Publication Ethics Committee was taken before the initiation of the study (27.05.2022) (approval no: 2022-05). The study was performed according to the Helsinki Declaration.

RESULTS

Patient Characteristics

A total of 91 patients were included in this study. Of these patients, 45 (49.5%) were female and 46 (50.5%) were male. The mean age of the patients was 15.3±1.7 years. The mean CDLQI of the patients was 5.7±5.6; the mean DFIS of the caregivers was 12.4±9.1. The mean disease duration was 19.2±13.9 months; the mean

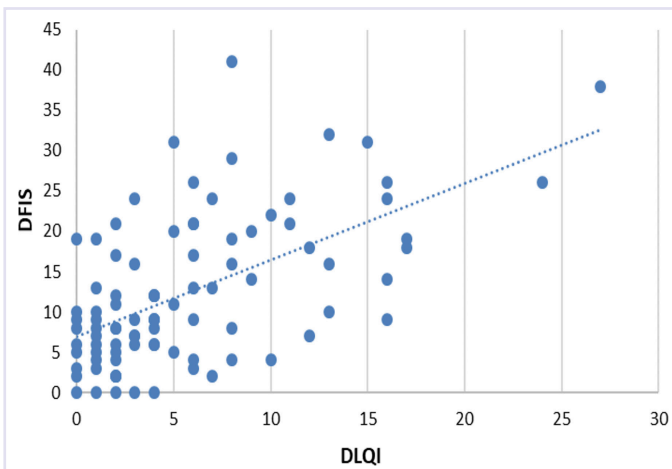FIGURE 1. The relationship between DFIS and CDLQI.

TABLE 2. The relationship of the patient's gender to DFIS and CDLQI

	Female	Male	p*
CDLQI			0.133
Mean±SD	6.4±5.5	5±5.5	
Median (IQR)	4 (2–10.5)	4 (1–6.25)	
DFIS			0.793
Mean±SD	12±7.7	12.7±10.3	
Median (IQR)	10 (6–19)	9 (5–19.25)	

SD: Standard deviation; IQR: Interquarantile range; CDLQI: Children Dermatologic Quality of Life Index; DFIS: Dermatological Family Impact Scale; *: Mann-Whitney U test.

TABLE 3. The relationships between disease duration, number of children in the household and the amount of money spent specifically for the disease per month to CDLQI and DFIS

	CDLQI	r*	DFIS	r*
Disease duration	0.121	0.254	0.150	0.155
Number of children in the household	0.072	0.5	0.044	0.676
Amount of money spent specifically for the disease per month	0.159	0.131	0.196	0.063

CDLQI: Children Dermatologic Quality of Life Index; DFIS: Dermatological Family Impact Scale; *: Spearman Correlation Test.

money spent specifically for the disease per month was 50.6±90.1 Turkish Liras. On average, the patients' family included 2±1 children.

The patients were further categorized according to disease severity. Sixteen (17.6%) of the patients had mild acne vulgaris, 27 (29.7%) had moderate acne vulgaris, 33 (36.3%) had severe acne vulgaris and 15 (16.4%) had very severe acne vulgaris.

Over-the-counter drugs have been used by 33 patients (36.3%); topical treatment modalities (retinoic acid, benzoyl peroxide, antibiotics or combinations of these) were used by 47 patients (51.6%); systemic antibiotics by 17 patients (18.7%) and systemic retinoic acid by 10 patients (11%).

Patient characteristics are summarized in Table 1.

The Relationship of DFIS and CDLQI

A Spearman Correlation Coefficient of rs=0.537 was calculated (moderate association), which is statistically significant (p<0.001). Thus, there is a positive relationship between DFIS and CDLQI (Fig. 1).

The Relationship of the Patient's Age to DFIS and CDLQI

There is no statistically significant relationship between patient's age and DFIS or CDLQI. The Spearman correlation coefficients and p-values for DFIS and CDLQI are rs=-0.018 p=0.867 and rs=0.032 p=0.763 respectively (all have weak associations).

The Relationship of the Patient's Sex to DFIS and CDLQI

The p-values for DFIS and CDLQI were 0.793 and 0.133, respectively. The psychological impact of disease on the patient and his/her caregiver are independent of patient's sex (Table 2).

The Relationship of Disease Severity to CDLQI and DFIS

A coefficient of 0.230 (a very high association) with a p-value of 0.028 was obtained for CDLQI; a statistically significant positive correlation exists between the disease severity and

Table 4. The relationship of previous treatment modalities to CDLQI and DFIS

	CDLQI Mean±SD Median (IQR)	p*	DFIS Mean±SD Median (IQR)	p*
Over the counter drugs		0.234		0.552
Used	6.6±5.4		13.3±9.6	
	5 (2–11.5)		12 (6–19)	
Not used	5.3±5.6		11.9±8.9	
	4 (2–7)		9 (5–19.25)	
Topical modalities		0.294		0.209
Used	6.1±5.5		13.7±9.8	
	5 (2–8)		11 (6–20)	
Not used	5.3±5.6		10.9±8.1	
	3.5 (1.25–8)		9 (4.25–18)	
Systemic antibiotics		0.05		**0.038**
Used	7.5±5.1		16.4±9.7	
	8 (3.5–11.5)		16 (8.5–22.5)	
Not used	5.3±5.6		11.5±8.8	
	4 (1.75–7)		9 (4.75–18)	
Systemic isotretinoin		0.422		0.213
Used	4.1±3.6		14.7±6.9	
	3 (1–8.25)		16.5 (8.25–20.5)	
Not used	5.9±5.7		12.1±9.4	
	4 (2–8)		9 (5–18.5)	

SD: Standard deviation; IQR: Interquartile range; CDLQI: Children Dermatologic Quality of Life Index; DFIS: Dermatological Family Impact Scale; *: Mann-Whitney U test.

CDLQI. Whereas a coefficient of 0.095 (weak association) with a p-value of 0.371 was calculated for DFIS, meaning that DFIS is independent of disease severity.

The Relationships between Disease Duration, Number of Children in the Household and the Amount of Money Spent Specifically for the Disease per month to DLQI and DFIS

No statistically significant relationship was found between the disease duration, number of children in the household and the money spent specifically for the disease per month to CDLQI and DFIS (Table 3).

The Relationship of Previous Treatment Modalities to CDLQI and DFIS

DFIS is higher in those who have used systemic antibiotics previously. DFIS was independent of the rest of the treatment modalities. CDLQI was independent of all of the previously received treatment modalities (Table 4).

DISCUSSION

Impact of Acne Vulgaris on CDLQI

The impact of acne vulgaris on the quality of life of the patients has been studied in many countries previously [1, 3, 5–10]. Eyüboglu et al. [6] concluded that acne vulgaris has a significant negative impact on the quality of life of adolescents, and this effect is independent of the patient's age, severity of acne and disease duration. Tasoula et al. [9] concluded a negative impact of acne vulgaris on the quality of life of the patients. This impact was independent of the patient's sex. However, they found that the patient's quality of life further decreases as the severity of acne increases. Jankovic et al. [10] also confirmed a negative impact of acne vulgaris on the quality of life of the adolescents suffering from the disease. In contrast to Tasoula et al. [9] Jankovic et al. [10] concluded that female patients suffer more than the male patients. Durai and Nair [15] found a statistically

significant negative relationship between the quality of life of the patients and increased age, positive family history, having received previous treatment and the presence of facial acne. Hazarika and Rajaprabha [16] concluded that the negative impact of acne vulgaris on the quality of life was significantly associated with age greater than 25 years, increased severity of acne vulgaris, increased duration of acne vulgaris, presence of more than 10 acne scars and the presence of post-inflammatory hyperpigmentation. Vilar et al. [17] also confirmed a negative impact of acne vulgaris on the patient's quality of life. There was a statistically significant relationship between increased acne severity and decreased quality of life. Boon-Bin Yap [18] concluded that there was a significant relationship of decreased quality of life with female sex and decreased family income. The relationship was insignificant for age and acne severity and disease duration to the quality of life of patients.

Similar to Tasoula et al. [9], Hazarika and Rajaprabha [16] and Vilar et al. [17] we also found that the quality of life of the patient decreases with increasing acne severity. However, in contrast to the previous literature, our study did not demonstrate any relationship between the patient's quality of life and patient's age, sex, number of siblings, disease duration, previous treatment modalities and money spent specifically for the disease.

Impact of Acne Vulgaris on DFIS and the Relationship between DFIS and CDLQI

The quality of life of the caregivers of children with chronic skin disorders is also decreased with the disease; anxiety and depression are common in the caregivers of children suffering from chronic skin diseases such as psoriasis, atopic dermatitis and vitiligo [7, 19]. Although this impact has been studied many times in other chronic skin disorders, the impact of acne vulgaris on caregivers' quality of life has been seldom studied. In this study, we have found a moderate association between DFIS and CDLQI. Similar to our result, a recent Turkish study has concluded a significant correlation between DFIS and CDLQI [20]. Likewise, Martinez-Garcia et al. [21] also concluded a negative impact of acne vulgaris on the quality of life of both the patients and their co-habitants. Thus, physicians treating adolescent acne should not only focus on the patient's psychological state but also on the impact of the disease on the caregiver since these two are significantly correlated.

The Impact of Disease Severity on CDLQI and DFIS

This study revealed a statistically significant positive correlation between disease severity and CDLQI. Tasoula et al. [9], Hazarika and Rajaprabha [16] and Vilar et al. [17] have previously reported similar results. This study showed no relationship between acne severity to DFIS; likewise, Yildirim et al. [20] concluded that DFIS was independent of acne severity. Thus, the severity of acne lesions affects the patient's quality of life significantly but has no effect on the caregivers' quality of life.

The Impact of Previous Treatment Modalities on DLQI and DFIS

This study showed no relationship between treatment modalities and CDLQI; however, a significant decrease in the quality of life of the caregiver with the previous use of systemic antibiotics has been documented in this study, which we could explain with the antibiotic-phobia of the parents [22]. Previously, Durai and Nair [15] reported that having received previous treatment decreases the quality of life of patients; however, there is no study in the literature reporting a relationship between treatment modalities of acne and parental quality of life.

The forthcomings of this study are that it not only evaluates the impact of acne vulgaris on CDLQI but also on DFIS and the relationship between the two, which is a seldomly studied subject in the literature. The limitation of this study is its limited sample size.

Conclusion

This study has shown a significant correlation between DFIS and CDLQI; between severity of acne and CDLQI; and between the previous use of systemic antibiotics and DFIS. There is no relationship between age, gender, disease duration, number of children, amount of money spent and previous treatment modalities to CDLQI. There is no relationship between age, gender, acne severity, disease duration, number of children and amount of money spent on DFIS. In light of the findings of this study, dermatologists treating adolescent acne vulgaris, in order to provide enhanced patient care, should not only elaborate on the concerns of the patients but also their caregivers since CDLQI and DFIS have a strong correlation. The previous use of systemic antibiotics is a major concern for the caregivers, which should be addressed by the treating physicians.

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