Dermatology Practical & Conceptual

Assessment of Eating Attitude and Psychiatric Parameters in Patients with Acne Vulgaris

Hazel Ezgi Kaya[1], İlknur Kıvanç Altunay[1], Aslı Aksu[1]

1 University of Health Sciences, Şişli Hamidiye Etfal Training and Research Hospital, Dermatology Department, Seyrantepe, İstanbul, Turkey

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Corresponding Author: Hazel Ezgi Kaya, MD. University of Health Sciences, Şişli Hamidiye Etfal Training and Research Hospital, Dermatology Department, Seyrantepe, Huzur Mah., Cumhuriyet ve Demokrasi Cad., No: 1, Sarıyer, İstanbul, Turkey. ORCID ID: 0000-0002-5146-138X. E-mail: hazelezgikaya@gmail.com

ABSTRACT

Introduction: Redundancy of psychological comorbidities in acne vulgaris may contribute to disturbed eating attitude.

Objective: The aim of this study was to investigate a possible relationship between acne vulgaris and disturbed eating attitude.

Methods: One hundred acne patients and 86 healthy volunteers evaluated by the Symptom Checklist-90 Revised (SCL-90) and possible indication of disordered eating using the Eating Attitudes Test-40 (EAT-40) and Eating Disorders Examination-Questionnaire (EDE-Q).

Results: Mean EAT-40 score was significantly higher in acne group (24.1±17.4) compared to control group (14.2±9.0) (P=0.001). Global score of EDE-Q and all subscores were statistically higher in acne group (for each, P=0.001). The proportion of participants whose meaningful scores for Restraint Eating and Weight Concern subscores of EDE-Q was significantly higher in the patient group compared to the control group (P=0.003 and P=0.034, respectively). Obsessive-compulsive and Depression

subscores of SCL-90-R among acne patients had meaningful EAT-40 scores that were statistically higher compared to those had EAT-40 scores <30 (P=0.030 and P=0.006, respectively).

Conclusion: Because of higher mortality and morbidity rates, clinicians should screen acne patients for possible disordered eating, with particular attention to those with obsessive-compulsive disorder and depression.

Introduction

Acne vulgaris is a chronic inflammatory disease of pilosebaceous unit that affects 85% of adolescents [1]. Considering the involvement of visible areas such as the face and neck, which cannot be concealed easily and the age group affected, acne and its sequelae can affect many domains of life, leading to social dysfunction as well as to substantial psychological burden [2]. It has long been known that acne is associated with problems of self-esteem/self-confidence, disturbed body image, embarrassment/social withdrawal, anger, preoccupation with acne, frustration/confusion, limitations in lifestyle, and problems with family relationships [3]. A meta-analysis revealed that anxiety and depression were more prevalent among acne patients [4]. Furthermore, among facial dermatoses, the most severe symptoms of anxiety and depression, as well as a higher frequency of suicidal ideation were found in acne patients [5]. All of these may lead to inappropriate selection of coping strategies to regulate emotional stress. Eating disorders are psychological disorders characterized by abnormal and disturbed eating attitudes with or without compensatory behaviors, as diagnosed by Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5) [6]. Behaviors include food restriction, binge-eating, purging, laxative use, diet pills, and excessive exercise. Disordered eating is a condition characterized by the same features of lesser frequency or lower level of severity as that of an eating disorder [6]. Eating disorders are relatively common, with a point prevalence of 7.8%, as demonstrated in a recent meta-analysis, while disordered eating was predicted to be twice as common [7]. Psychological outcomes common in acne vulgaris may contribute to disordered eating, since aforementioned comorbidities are core risk factors for disordered eating. Case reports regarding the association between acne vulgaris and eating disorders have been published as early as 1991. Lee et al. [8] report two patients that had body image concerns caused by acne vulgaris, leading to exacerbated eating disorder while searching for pseudosolutions. In a study conducted by Gupta and Gupta [9], it is emphasized that body image pathologies such as eating disorders may coexist with acne vulgaris, since body image disturbance in eating disorders is not necessarily confined to a distorted perception of body shape but also may generalize to concerns about different aspects of body image, including dissatisfaction with skin appearance.

Objectives

The aim of the present study was to determine whether there is a relationship between acne vulgaris and disordered eating attitudes. A secondary aim was to evaluate the psychological dimensions associated with disordered eating attitude in acne vulgaris patients.

Methods

Study Design

We designed a prospective study consisting of 100 acne vulgaris patients and 86 healthy volunteers. Patients were recruited from among those of the dermatology outpatient clinic between June 2020 and October 2020 and a control group of healthy volunteers. To meet the inclusion criteria, patients had to be 16–40 years old and diagnosed with acne vulgaris by a dermatologist. Patients who had psychological disorders, known psychiatric drug usage or medications that can affect mood or appetite, endocrinological problems that may affect eating cycle (such as diabetes mellitus, hypothyroidism, adrenal gland disease), who had a body mass index (BMI) ≤16 kg/m^2, polycystic ovary syndrome, hirsutism, or who had declared menstrual irregularities were excluded. All participants were asked to answer a questionnaire designed by authors which included sociodemographic information and that, for acne vulgaris patients, included duration of acne disease and age at disease onset recorded. Patients with acne vulgaris were subdivided into the following three categories according to the Classification of the American Academy of Dermatology: 1) mild acne, characterized by the presence of a few papules and pustules mixed with comedons, but no nodules; 2) moderate acne, characterized by the presence of many papules and pustules, together with a few nodules; or 3) severe acne, characterized by the presence of numerous or extensive papules and pustules as well as many nodules [10]. Body mass index (BMI) was calculated using formula weight (kg)/height^2 (m).

Screening Tools

All participants were requested to complete the EAT-40 (Eating Attitudes Test-40) and SCL90-R (Symptom Check List-90 Revised) and EDE-Q (Eating Disorder Examination Questionnaire) to crosscheck and identify the characteristics of a possible eating disorder. In a review assessing

the tools used to estimate eating disorders, EAT-40 is the most commonly used screening tool, highlighting the need for further psychological assessment [11]. EAT-40 is a 40-item self-report Likert-type scale. The rating range is from "always" to "never," and the resulting score ranges from 0 to 120. Individuals scoring ≥30 points are considered to be at high risk for eating disorders. The questionnaire was developed by Garner et al. [12] in 1979, and the Turkish validity and reliability study was conducted by Savaşır et al. [13]; internal consistency calculated by Cronbach alpha was 0.70. The SCL-90-R, developed by Derogatis et al. [14], is a 90-item self-report symptom inventory. Each item is rated on a five-point scale of distress (0–4), ranging from "not at all" to "extremely." This scale is a psychiatric screening tool that measures the severity of psychiatric symptoms and negative stress reactions that person experiences. It is used in patient populations over age 17 years. Due to assessment difference, we were unable to include patients with acne vulgaris aged <16 years. The questionnaire evaluates the nine dimensions of psychological symptoms, including somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism; the Turkish validity and reliability study was conducted by Kılıç [15]. The EDE-Q was developed by Fairburn et al. [16] and adapted into Turkish by Yücel et al. [17] in 2011, with an internal consistency coefficient of 0.93 and reliability of 0.91. EDE-Q is composed of 28 self-report questions that score between 0–6 on Likert-type response categories, and higher sores indicate the extent of eating disorder. By taking the average of relevant questions, five subscales are calculated: restraint eating (RE), eating concern (EC), shape concern (SC), binge eating (BE), and weight concern (WC). The global score is calculated by taking the average of RE, SC, WC, and EC subscale scores as cognitive features, since the BE evaluates open-ended questions that exhibit behavioral dimensions of eating disorder. Global score and subscores ≥4 are considered clinically indicative of disordered eating behaviors requiring further psychological assessment through clinical interview, and disordered eating is classified as a global EDE-Q score ≥1.52 [18]. EDE-Q assesses only the previous 28 days. Reported frequencies were considered representative of the previous three months for the purpose of fulfilling diagnostic criteria.

Statistical Analysis

All statistical analyses were carried out using SPSS for Windows Version 15.0 (SPSS Inc., Chicago, IL). Descriptive statistics are presented as numbers and percentages for categorical variables and as average, standard deviation, minimum, maximum, median and interquartile range for numerical variables. Comparisons of categorical variables in independent groups were performed with Pearson's chi-squared test. To compare numerical variables between two independent groups, the Student's t-test was used when the normal distribution condition was met; the Mann-Whitney U test was used when the normal distribution condition was not met. The relationships between numerical variables were evaluated with Pearson Correlation if variables provided normal distribution and with Spearman Correlation if not. Statistical significant was defined as $P<0.05$.

Results

A total of 100 patients and 86 healthy volunteers were included in the study. The mean age was 23.0±5.2 among acne patients and 23.0±4.3 for the control group, with no statistically significant difference ($P=0.472$). Mean BMI was 21.6±3.1 for acne patients and 21.4±2.3 for control group, again, with no statistically significant difference ($P=0.821$). There was also no statistically significant difference in terms of marital status, education level, or smoking habits between groups ($P=0.401$, $P=0.342$, and $P=0.280$, respectively). The baseline sociodemographic characteristics are summarized in Table 1. The questionnaire and scale scores were analyzed in study groups (Table 2). The mean EAT-40 score was significantly higher in acne group (24.1±17.4) compared to control group (14.2±9.0) ($P=0.001$) (Figure 1). Likewise, a significantly higher proportion of acne patients (27%) had EAT-40 score ≥30 compared to the control group (6.97%) ($P=0.001$) (Table 3). The global score of EDE-Q and each subscore were statistically higher in the acne group ($P=0.001$) (Figure 2). The proportion of participants who received 4 or above for the Restraint Eating and Weight Concern subscores of EDE-Q was significantly higher in the patient group compared to the control group ($P=0.003$ and $P=0.034$, respectively) (Table 3). EAT-40 scores were positively correlated with EDE-Q scores for each group ($P=0.001$) (Figure 3). The Anxiety, Hostility, and Psychoticism subscales of SCL-90R were statistically higher among acne patients compared to the control group ($P=0.001$, $P=0.002$, and $P=0.021$ respectively). When we evaluated the SCL-90-R subscores among acne patients, we found that Obsessive-Compulsive ($P=0.026$; r=0.222), Depression ($P=0.003$; r=0.295), and Phobic Anxiety subscores ($P=0.044$; r=0.202) were positively correlated with EAT-40 scores (Table 4). Also, we found that Obsessive-Compulsive and Depression subscores of acne patients who had meaningful EAT-40 scores were statistically higher compared to those that had EAT-40 scores <30 ($P=0.030$ and $P=0.006$, respectively). Different from the patient group, Somatization, Interpersonal Sensitivity, and Paranoid Ideation subscores of the controls who had meaningful EAT-40 scores were statistically higher compared to those that had EAT-40 scores <30 ($P=0.022$, $P=0.014$, and $P=0.044$, respectively) (Table 5). The correlation between SCL-90 subscores

Table 1. Sociodemographic Characteristics of Study Groups.

		Acne Patients N=100		Control Group N=86		
		N	%	N	%	p
Sex	Male	30	30.0%	32	37.2%	0.298
	Female	70	70.0%	54	62.8%	
Age Mean±SD (Min-Max)		23.0±5.2 (16-39)		23.0±4.3 (16-37)		0.472
BMI Mean±SD (Min-Max)		21.6±3.1 (16.9-34.4)		21.4±2.3 (18.1-28.4)		0.821
Marital Status	Single	93	93.0%	77	89.5%	0.401
	Married	7	7.%	9	10.5%	
Educational Status	High School	24	24.0%	18	20.9%	0.342
	Degree	64	64.0%	51	59.3%	
	Postgraduate	12	12.0%	17	19.8%	
Smoking habits		39	39.0%	27	31.4%	0.280

Abbreviations: BMI = body mass index; SD standard deviation

Table 2. Scores and Subscores of EDE-Q, SCL-90, and EAT-40 for Acne Patients and Control Group.

		Acne patients (N=100)	Control group (N=86)	
		Mean ±SD (Min-Max)	Mean ±SD (Min-Max)	P
EDE-Q	Dietary Restraint	2.10±1.71 (0-6)	1.09±1.13 (0-4.20)	**0.001**
	Eating Concern	0.92±0.98 (0-3.60)	0.20 (0-0.60)[#]	**0.001**[+]
	Shape Concern	2.14±1.49 (0-7.20)	1.00±0.94 (0-4.38)	**0.001**
	Binge Eating	0.50 (0-0.95)[#]	0 (0-0.60)[#]	**0.001**[+]
	Weight Concern	1.65±1.28 (0-5.20)	0.64±0.68 (0-2.60)	**0.001**
	Global score	1.50±1.07 (0-4.10)	0.68±0.64 (0-2.97)	**0.001**
SCL90[*]	GSI	0.41 (0.22-0.74)[#]	0.42±0.36 (0-1.48)	0.074[+]
	SOM	0.71±0.71 (0-3.17)	0.52±0.58 (0-2.50)	0.053
	OC	0.20 (0-0.40)[#]	0.27±0.30 (0-1.10)	0.498[+]
	INS	0.33 (0.22-0.88)[#]	0.82±0.82 (0-3.11)	0.387[+]
	DEP	0.89±0.75 (0-2.92)	0.61 (0.30-1.01)[#]	0.296[+]
	ANX	0.40 (0.20-1.00)[#]	0.25±0.31 (0-1.20)	**0.001**[+]
	HOS	0.35±0.46 (0-1.83)	0.18±0.22 (0-0.80)	**0.002**
	PHO	0.14 (0-0.28)[#]	0.13±0.18 (0-1.14)	0.090[+]
	PAR	0.33 (0-0.66)[#]	0 (0-0.28)[#]	0.955[+]
	PSY	0.25±0.31 (0-1.40)	0.14±0.16 (0-0.60)	**0.021**
EAT-40		24.10±17.40 (3-76)	14.20±9.00 (0-41)	**0.001**

[#]Median (Interquartile range) [+]Mann-Whitney U test. Abbreviations: ANX = anxiety; DEP = depression; EAT-40 = Eating Attitudes Test-40; EDE-Q = Eating Disorders Examination Questionnaire; HOS = hostility; GSI – General Severity Index; INS = interpersonal sensitivity; OC = obsessive-compulsive; PAR = paranoid ideation; PHO = phobic anxiety; PSY = psychoticism; SCL-90 = symptom checklist-90; SD = standard deviation; SOM = somatization.

and EAT-40 scores among the study groups are shown in Figures 4, 5 and 6. Twenty-nine percent of patients had mild, 28% had moderate, and 43% of patients had severe acne. The severity of disease was not correlated with the EAT-40 scores (P=0.747). Also, disease duration, age at disease onset, presence of family history of acne, and acne subtype (vulgaris, conglobata, cosmetica, and others) were not correlated with EAT-40 scores among acne patients (P=0.092, P=0.966, P=0.148, and P=0.572, respectively). Likewise, sociodemographic characteristics such as age, BMI, and sex were not correlated with EAT-40 scores among acne patients (P=0.361, P= 0.551, and P=0.432, respectively).

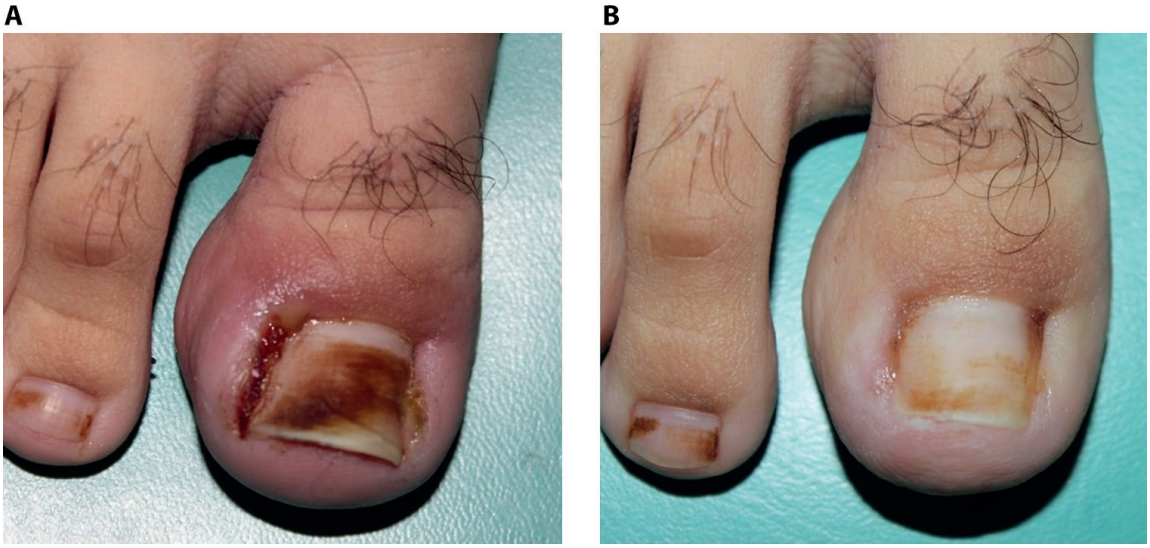

Figure 1. EAT-40 score distribution among study groups

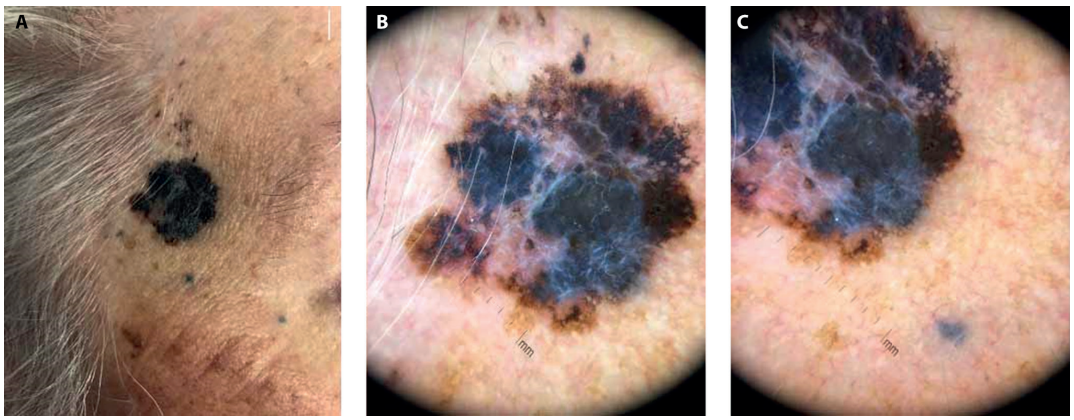

Figure 2. EDE-Q global score and subscore distribution among study groups

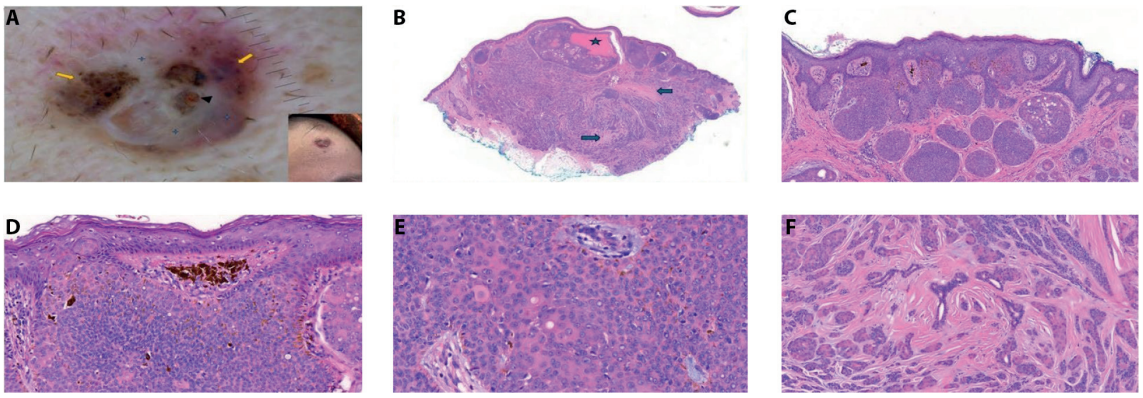

Figure 3. Correlation between EDE-Q and EAT-40 scores among study groups

Table 3. Comparison of EDE-Q and EAT-40 Scores Between Study Groups.

		Acne Group (N=100)		Control Group (N=86)		
		n	%	n	%	p
EDE-Q Dietary Restraint	≥4	19	19.0%	4	4.65%	**0.003**
EDE-Q Eating Concern	≥4	3	3.0%	1	1.16%	0.625
EDE-Q Shape Concern	≥4	12	12.0%	4	4.65%	0.075
EDE-Q Binge Eating	≥4	11	11.0%	5	5.81%	0.209
EDE-Q Weight Concern	≥4	10	10.0%	2	2.32%	**0.034**
EDE-Q-Global score	≥4	2	2.0%	0	0.0%	0.500
EAT-40	≥30	27	27.0%	6	6.97%	**0.001**

Abbreviations: EAT-40 = Eating Attitudes Test-40; EDE-Q = Eating Disorders Examination Questionnaire.

Conclusions

Although the skin findings and increased prevalence of acne among patients with eating disorders are well known, there are few studies in the literature investigating the disturbed eating attitude among acne patients. In a pilot study designed by Öner et al. [19], the mean EAT-40 score of acne patients was significantly higher compared to the control group; this result

Table 4. Correlation Between EAT-40 and SCL-90 Subscores.

		EAT-40					
		Total		Acne Patients		Control Group	
		r	p	r	p	r	p
SCL90	GSI	0.282	**0.001**	0.192	0.056	0.435	**0.001**
	SOM	0.212	**0.004**	0.096	0.342	0.411	**0.001**
	OC	0.277	**0.001***	0.222	**0.026***	0.292	**0.001**
	INS	0.195	**0.008***	0.079	0.435*	0.416	**0.001**
	DEP	0.331	**0.001**	0.295	**0.003**	0.438	**0.001***
	ANX	0.291	**0.001***	0.168	0.095*	0.264	**0.015**
	HOS	0.224	**0.002***	0.168	0.095	0.250	**0.012**
	PHO	0.246	**0.001***	0.202	**0.044***	0.244	**0.024***
	PAR	0.220	**0.003***	0.146	0.148*	0.356	**0.002**
	PSY	0.267	**0.001***	0.167	0.098	0.300	**0.008**

*GSI: General Severity Index; SOM: Somatization; OC: Obsessive-Compulsive; INS: Interpersonal sensitivity; DEP: Depression; ANX: Anxiety; HOS: Hostility; PHO: Phobic anxiety; PAR: Paranoid ideation; PSY: Psychoticism *Spearman Correlation Analysis. Abbreviations: ANX = anxiety; DEP = depression; EAT-40 = Eating Attitudes Test-40; HOS = hostility; GSI – General Severity Index; INS = interpersonal sensitivity; OC = obsessive-compulsive; PAR = paranoid ideation; PHO = phobic anxiety; PSY = psychoticism; SCL-90 = symptom checklist-90; SD = standard deviation; SOM = somatization.

Table 5. SCL-90 Subscore Correlations Among Participants According to the EAT-40 Scores.

	EAT-40		
	<30	≥30	
	Mean±SD (Min-Max)	Mean±SD (Min-Max)	P
Acne Patients			
SOM	0.65±0.70 (0-3.17)	0.86±0.71 (0-2.33)	0.133
OC	0.30±0.47 (0-2.50)	0.45±0.46 (0-1.70)	**0.030**
INS	0.72±0.88 (0-4.11)	0.70±0.71 (0-2.67)	0.879
DEP	0.76±0.66 (0-2.92)	1.23±0.86 (0-2.92)	**0.006**
ANX	0.61±0.81 (0-4.70)	0.93±0.91 (0-3.70)	0.051
HOS	0.31±0.42 (0-1.67)	0.46±0.56 (0-1.83)	0.343
PHO	0.19±0.27 (0-1.14)	0.30±0.42 (0-1.83)	0.245
PAR	0.42±0.47 (0-2.17)	0.57±0.60 (0-2.50)	0.302
PSY	0.21±0.27 (0-1.20)	0.37±0.37 (0-1.40)	0.050
Control Group			
SOM	0.48±0.56 (0-2.50)	1.07±0.71 (0.42-2.08)	**0.022**
OC	0.26±0.31 (0-1.10)	0.33±0.25 (0.10-0.80)	0.191
INS	0.76±0.78 (0-3.11)	1.67±0.95 (0.56-2.78)	**0.014**
DEP	0.72±0.64 (0-3.50)	1.26±0.84 (0.46-2.77)	0.054
ANX	0.24±0.30 (0-1.20)	0.35±0.42 (0-1.10)	0.510
HOS	0.18±0.22 (0-0.80)	0.31±0.19 (0-0.50)	0.116
PHO	0.12±0.19 (0-1.14)	0.19±0.15 (0-0.43)	0.141
PAR	0.41±0.40 (0-1.33)	0.78±0.44 (0.33-1.33)	**0.044**
PSY	0.13±0.16 (0-0.60)	0.23±0.19 (0-0.50)	0.118

Abbreviations: ANX = anxiety; DEP = depression; HOS = hostility; INS = interpersonal sensitivity; OC = obsessive-compulsive; PAR = paranoid ideation; PHO = phobic anxiety; PSY = psychoticism; SD = standard deviation; SOM = somatization.

was attributed to psychopathological mechanisms common in acne and in eating disorders. The relation between disordered eating and acne vulgaris is multidimensional and likely to be a result of the interplay between psychological, hormonal, and metabolic influences. Regarding the psychological dimension, the research consistently shows that among psychosocial variables, body image distortion is the strongest predictor of disordered eating behaviors [20]. It is also known that body image disturbances are central to eating disorders both at the onset and maintenance [20]. As one of the psychological

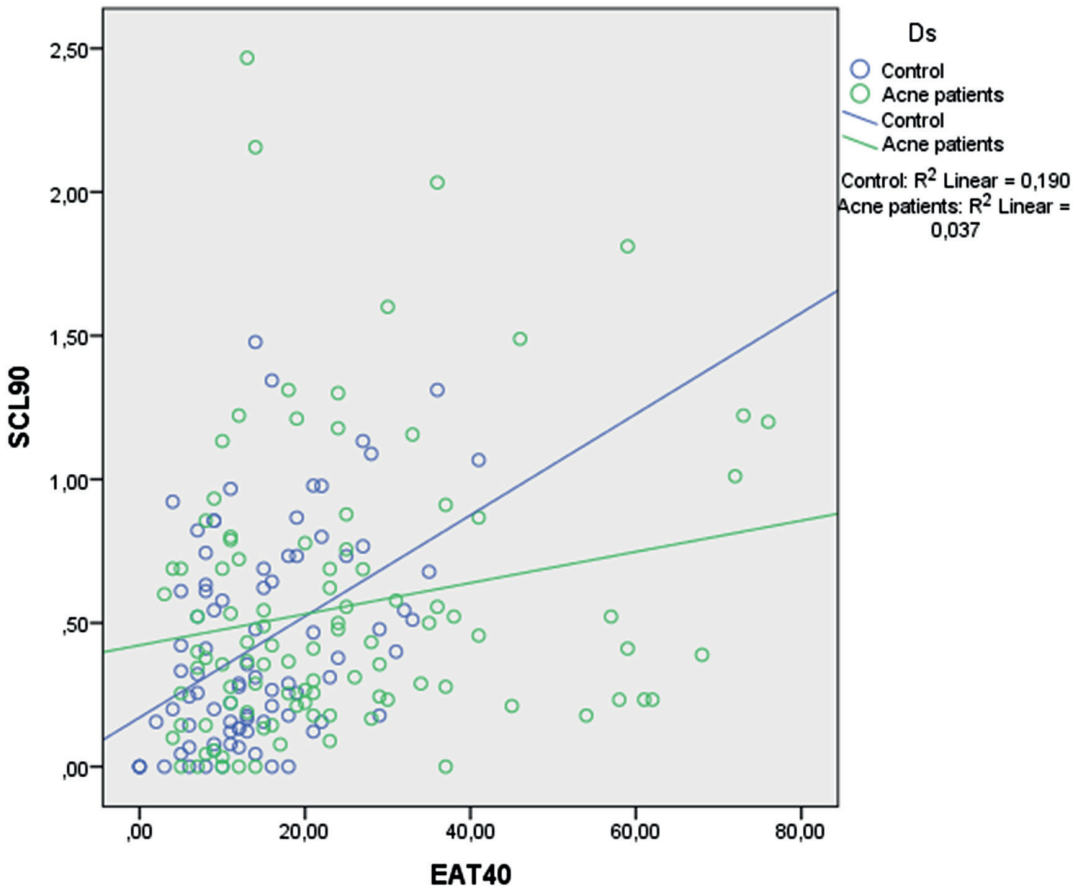

Figure 4. Correlation between General Severity Index of SCL-90 and EAT-40 scores among study groups

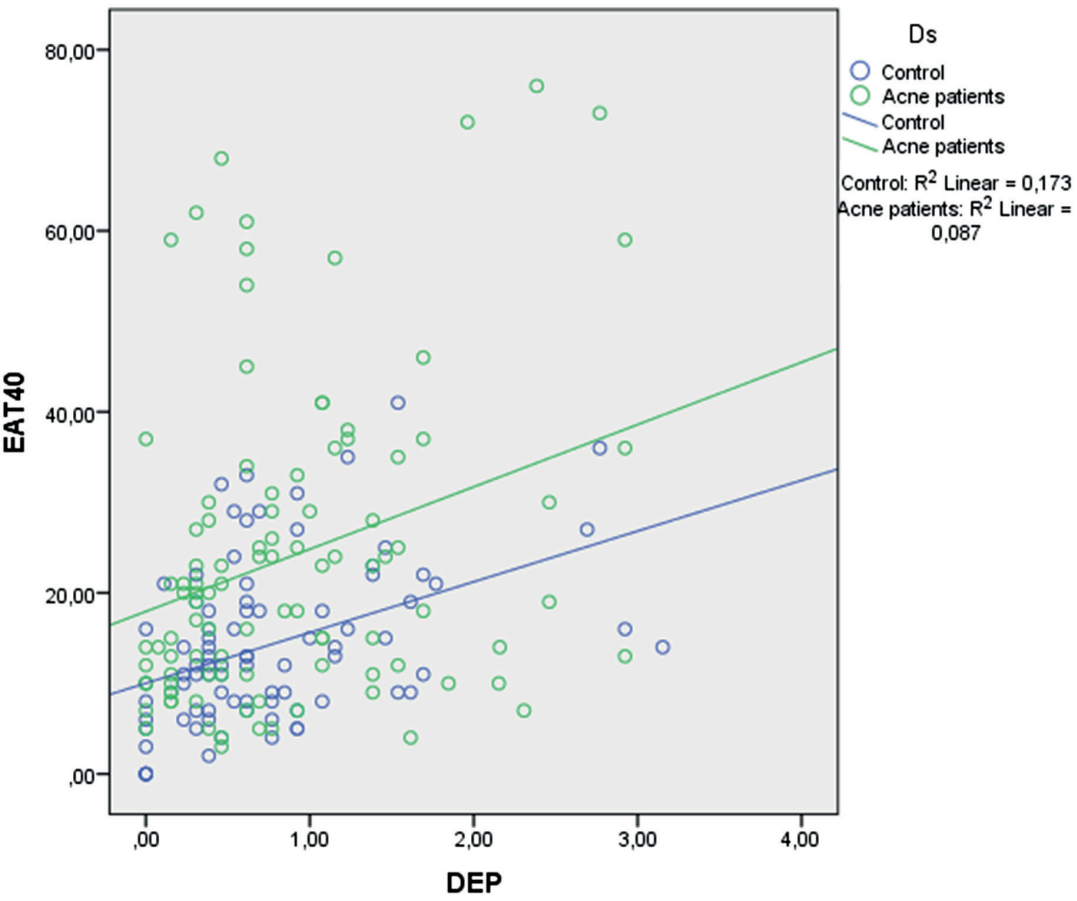

Figure 5. Correlations of Depression subscores of Scl-90 and EAT-40 scores among study groups

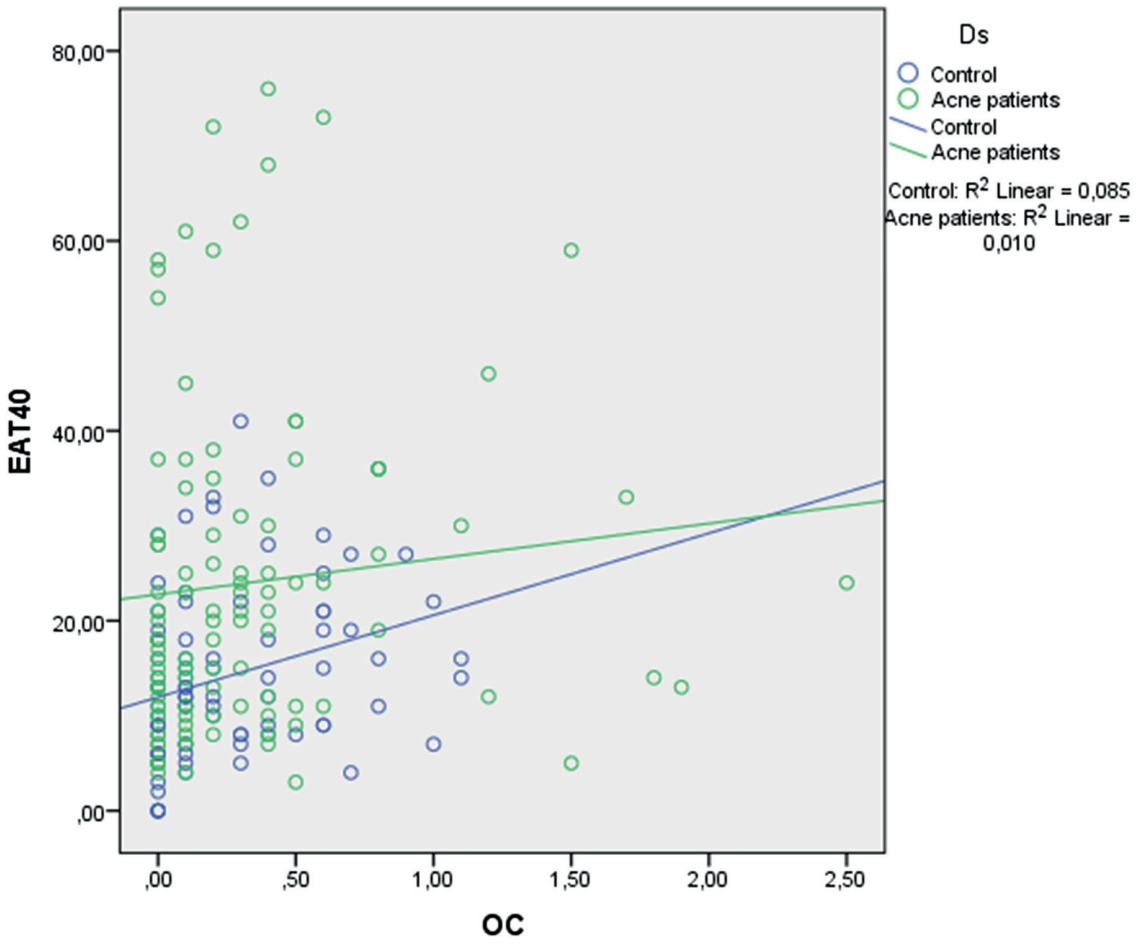

Figure 6. Correlations between Obsessive-Compulsive subscores of Scl-90 and EAT-40 scores among study groups

comorbidities, body dissatisfaction was reported to be prevalent among acne patients [21]. Thus, high levels of body dissatisfaction may predispose patients to overeat or engage in restrictive eating in an attempt to cope with the psychosocial stressors associated with acne symptoms. In a study conducted among acne patients, 64.4% believed that acne was compromising their self-image [22]. Similarly, in a study investigating the rate of body dysmorphic disorders in patients with acne, the risk increased by two times in severe acne patients, and mirror checking occurred for at least two hours a day [23]. Likewise, perceived self-presentation failures can affect eating behavior, and people may regulate their weight as a self-presentation strategy, since physical attractiveness involves not only facial appearance but also appropriate physical shape. Considering body image disturbances, adolescence, the period in which acne vulgaris is commonly observed, is the most vulnerable life stage because it is a period characterized by physiological, emotional, cognitive, and above all, social changes [24]. During adolescence, the body is experienced as a source of identity, self-concept, and self-esteem. As a result, there is a greater concern for physical appearance. Moreover, the research has shown that eating disorders typically occur during adolescence [20]. Besides sharing the same age as a risk factor, the psychologically delicate nature of acne disease, body dissatisfaction bought on by social norms, negative self-image due to appearance-related criticism from peers, poorer social adjustment than their counterparts, and their impaired quality of life determined by perceived stigma among acne patients can contribute to disordered eating. Furthermore, Sneddon et al. [25] suggested that conditions such as acne excoriee des jeunes filles present with psychological dynamics that are very similar to the dynamics encountered in adolescents with eating disorders in terms of difficulties coping with the emerging developmental tasks of young adulthood. Disturbed eating behaviors have been found to be related to the disturbed experience of one's own body and anxiety towards particular food groups, which is a common trend among acne patients. It is evident that patients frequently implement erroneous dietary regimens as a consequence of their increased awareness of acne and the mounting evidence supporting the role of high-glycemic index diets as a contributing factor to the pathogenesis of acne. This is primarily due to their reliance on inaccurate informational sources. In a study evaluating beliefs of acne patients, 62.3% reported diet as a casual or exacerbating factor of acne [22]. In another study conducted on 852 adolescents, approximately 30%

thought that being overweight worsened their acne [26]. This may explain the considerably higher Restrained Eating (RE) and Weight Concern (WC) subscores of EDE-Q among the patient group in our study. It is imperative to exercise caution when advising patients on the potential implications of high glycemic index diets on acne. An overemphasised warning may be counterproductive, as it could mislead patients towards calorie restriction. Dermatologists, therefore, must assume a pivotal role in providing clear explanations to address these concerns. The fact that participants who had meaningful EAT-40 scores had different SCL90-R subscore distributions in the patient and control groups suggests that acne may affect different psychopathologies while causing disordered eating. We found that the Depression and Obsessive-Compulsive subscores of SCL-90-R were correlated with EAT-40 scores among acne patients. Correspondingly, a study conducted by Karaağaç et al. [27] demonstrated the relationship between depression and emotional and uncontrolled eating behaviors among acne patients. Consistent with the prior literature, in this study the EAT-40 scores correlated with depression. It has been known that depression is considered a risk factor for body dysmorphic disorder and concerns related to eating, and it is the most common comorbid diagnosis, with lifetime rates in eating disorders ranging between 50% and 75% [28]. Furthermore, in a study conducted by Sarkar et al. [29] to investigate personality disorders among acne patients, 13% of participants with severe acne had obsessive-compulsive personality disorder, which is considered a common risk factor for anorexia nervosa [30]. Regarding the hormonal aspect, androgens implicated in binge eating behavior and disordered eating among women with polycystic ovary syndrome (PCOS) have been known to increase, but this relationship seems to be independent from serum androgen levels [31]. In this study, we excluded those acne patients who had a medical history of menstrual irregularity or hirsutism to ensure that our results were not affected by this population, but there may be a similar mechanism between acne and eating disorders in PCOS. When examining the metabolic influence, acne patients were more predisposed to dietary restriction, which is predicted to improve acne lesions by reducing androgenic hormone levels [32]. This subsequently led to overeating via disinhibition mechanisms. Even a single day of high-fat overeating is enough to impair glycemic control and reduce insulin sensitivity in healthy adults; thus, severe binge eating behaviors may have instantaneous metabolic health consequences for individuals [33]. Altered insulin levels may contribute to IGF-1 (insulin-like growth factor-1) level changes and subsequent acne exacerbations. This may lead patients to dietary restriction, thus triggering a vicious cycle. In our study, EAT-40 scores were not related to clinical characteristics of acne patients such as severity of disease, duration, age at disease onset, type of acne, and family history. Similar to our results, Öner et al. [19] reported no significant relationship between patients' acne severity and EAT-40 scores. In another study on acne patients, there was no statistically significant correlation between acne severity and three-factor nutrition questionnaire scores [27]. Our study has methodological limitations due to the use of self-reported questionnaires; we are unable to conduct interviews, which is the gold standard in diagnosing particular eating disorders. Also, the cross-sectional nature of this study makes it difficult to assess the causality. To avoid bidirectional association between acne and eating disorders, we excluded subjects with BMI≤16 kg/m^2, since this is considered a critical value at which skin changes are more frequent in eating disorders [34]. Psychometric parameters which are difficult to calculate, such as personal characteristics, stressful life event effects, psychological developmental period, personality coping styles, family support system, and family history of eating disorders were not included in the analysis. Finally, the small number of participants included in the study is a limitation.

Because of shared comorbidities clinicians should screen acne patients for possible disordered eating psychopathology, with particular attention to those with obsessive-compulsive and depression, hence early referral and intervention can reduce the morbidity associated with eating attitudes and preventing the long-term consequences of acne in terms of physical as well as psychological health.

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