

# Acne Vulgaris and the Quality of Life of Adult Dermatology Patients

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**Objective:** To determine the effects of acne vulgaris on the quality of life of adult dermatology patients.

**Design:** Cross-sectional and longitudinal questionnaire study.

**Patients:** Sixty patients with acne vulgaris attending appointments with their dermatologists.

**Main Outcome Measures:** Findings using Skindex, a validated 29-item instrument to measure the effects of skin disease on patients' quality of life. Results are reported as 3 scale scores (functioning, emotions, and symptoms) and a composite score (average scale score). In addition, dermatologists rated the clinical severity of patients' skin disease, and patients responded to a global question about how they are bothered by acne. Higher Skindex scores indicate greater effects on quality of life.

**Results:** Patients with acne experienced functioning and emotional effects from their skin disease comparable with

those of patients with psoriasis, but experienced fewer symptoms (for patients with acne and psoriasis, respectively, Skindex functioning scores of 14.9 and 22.8 [ $P=.08$ ]; emotion scores, 39.2 and 38.9 [ $P=.95$ ]; and symptoms scores, 29.5 and 42.1 [ $P<.05$ ]). Skindex scores were higher in older patients than in younger patients, and patients aged 40 years or older were less likely to report improvement in their acne after 3 months (43% vs 85%;  $P<.05$ ). Among patients reporting no improvement in their acne, older patients reported greater effects of their acne on their quality of life. Furthermore, in multivariate analyses, older adults reported more effects of acne on their quality of life than younger adults, even after controlling for sex and acne severity as judged by the dermatologist.

**Conclusions:** Acne vulgaris significantly affects patients' quality of life. Regardless of the severity of acne, older adults were more affected by their acne.

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**A**LTHOUGH acne is extremely prevalent,<sup>1-6</sup> few studies have focused on what the patient with acne vulgaris experiences. Furthermore, despite recent advances in the accurate measurement of complex abstract health outcomes such as patients' perceptions,<sup>7</sup> few studies have discussed the effects of acne on discrete aspects of patients' experiences such as their quality of life.

Previous studies have examined the relationship between having acne and various psychological factors, including depression,<sup>8-12</sup> anxiety,<sup>9,11,13-19</sup> personality,<sup>8,20-30</sup> emotions,<sup>12,18,22,31,32</sup> self-concept,<sup>19,33</sup> self-esteem,<sup>11,12,18,34</sup> social isolation,<sup>8,9,28,35,36</sup> social assertiveness,<sup>34</sup> social anxiety,<sup>29</sup> and body dissatisfaction.<sup>12,37</sup> Although a cause and effect relationship between acne and psychological trauma has been debated for decades, only recently has the measurement focus shifted from psychological correlates (eg, personality) and emotional triggers (eg, stress) to mea-

suring the effect of acne on patients' quality of life. This shift occurred as validated instruments for measuring disability and quality of life specifically in patients with skin disease became available.<sup>38-44</sup> Few studies, however, have particularly examined the effect of acne on adults, a topic that is timely and important for 2 reasons: (1) adults are seeking treatment for acne at higher rates than in previous years<sup>4,45,46</sup> and (2) adults may be affected by acne in unique ways (eg, college work, employment, or social functioning).<sup>10,12,34,45,47,48</sup>

In this study we asked adult patients what bothers them the most about having acne and we also used Skindex, a validated measure of skin disease-specific quality of life, to gauge the effects of their experiences. Specifically, we addressed the following research questions: (1) What bothers adult patients most about having acne? (2) How is the experience of the adult patient with acne different from, or similar to, that of patients with other skin diseases, and that of individuals

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## PATIENTS AND METHODS

### PATIENT SAMPLES

This study examined the responses of 60 adults with acne vulgaris who completed Skindex while waiting for appointments with their dermatologists. This sample included all patients with acne vulgaris in a larger population that was a random subset of all adult patients with appointments in 3 private dermatology practices and in the general dermatology clinics of a Veterans Affairs hospital; patient selection, recruitment, and data collection have been described previously.<sup>44</sup> All patients whose primary diagnosis was acne vulgaris were included, except for 3 who were older than 55 years. Responses of these patients were compared with those of a sample of 44 patients with psoriasis, 75 patients with isolated benign skin lesions (such as nevi), and 107 healthy volunteers who denied skin problems (hereafter these subjects are referred to as the normative sample). Our study was approved by the investigative review board of University Hospitals of Cleveland in Cleveland, Ohio.

### MEASURES

Skin disease-specific quality of life was measured using Skindex, a self-administered 29-item questionnaire that is a refined version of a validated instrument.<sup>43,44</sup> Sociodemographic and clinical information was obtained from patients and patients' charts. Responses to global questions about health, overall quality of life, and the importance of skin condition to one's quality of life were made on a 5-point categorical scale, in which higher scores indicate better health or greater importance. Patients also responded to an open-ended question, "What is it about your skin problem that bothers you the most?"

Three months after the initial testing, 34 (57%) of the patients with acne responded to a mail survey in which they

again completed Skindex and also answered a global question inquiring about whether their skin condition had improved, remained the same, or become worse.

Physicians' judgments of acne severity were measured by their responses to the question, "How severe is this patient's main skin problem today (compared to others with the same skin problem)?" Acne severity was rated on a scale of 1 to 5 as not present, minimal, mild, severe, or extremely severe, respectively.

### SCORING AND STATISTICAL ANALYSIS

Scoring of Skindex scales was performed as previously described.<sup>44</sup> Results of Skindex are reported as 3 scale scores representing 3 specific aspects of quality of life (ie, effects of skin disease on functioning and emotions and physical symptoms from skin disease). Scale scores are the mean of responses to the items included in the scale. A composite score was also calculated as the average of the 3 scale scores. Scores are transformed to percentage, and higher scores indicate greater effect of skin disease on quality of life. Cronbach coefficient  $\alpha$  values<sup>49</sup> for the subsample of patients with acne were .93, .90, .94, and .84 for the functioning, emotion, symptom, and composite scales, respectively.

Qualitative responses to the open-ended question regarding how patients are bothered by their acne were assessed and categorized by one of us (R.J.L.). Categorized responses were ordered by frequency of occurrence.<sup>50</sup>

Scale scores of patients in different sociodemographic and clinical groups were compared using independent *t* tests and analysis of variance. The  $\chi^2$  test and Spearman and Pearson correlation coefficients were used to compare patients' self-ratings on other specific survey questions with Skindex scores and clinical severity ratings. Multiple linear regression was used to analyze Skindex composite scores while controlling for sex, age, and acne severity as judged by the dermatologist.

without skin disease? (3) How does the quality of life of adult patients with acne relate to their sex, age, and the clinical severity of their acne? and (4) How do the experiences of adult patients with acne change with therapy?

## RESULTS

### SAMPLE CHARACTERISTICS

The 60 patients with acne vulgaris ranged in age from 17 to 53 years; mean ( $\pm$  SD) age was  $31 \pm 10.1$  years (**Table 1**). Most patients were female, white, and had been seen in a private practice (92%). Patients were generally healthy, with a large majority reporting very good or excellent health. In the majority of patients, acne had been present for at least 2 years, and most patients (97%) were bothered primarily by facial involvement. Physicians judged the clinical severity of the acne of most patients to be mild or moderate (mean  $\pm$  SD rating,  $3.6 \pm 0.9$ ) compared with all other patients with acne. The clinical severity of acne was similar in women and men

(mean rating, 3.6 vs 3.6, respectively;  $P=.88$ ), and there was no relationship between clinical severity and patient age ( $r = -0.09$ ;  $P=.49$ ).

### QUALITATIVE RESPONSES OF PATIENTS ABOUT HOW THEY ARE BOTHERED BY THEIR ACNE

There were 70 mentions made by 52 patients (87%) regarding how they are bothered by their acne (**Table 2**). The most common mention, made by half of responding patients, was "appearance." Women and men were equally likely to respond that appearance was the most bothersome aspect of their skin disease ( $P=.50$ ). Seventy percent of responding patients aged 30 to 39 years wrote appearance, compared with 33%, 33%, 17%, and 33% of patients aged 17 to 19 years, 20 to 29 years, 40 to 49 years, and 50 to 53 years, respectively. Five patients responded that "acne as an adult" bothered them the most. There was no association between the likelihood of a patient reporting that he or she were bothered by acne appearance and the clinical severity of the acne as judged by the dermatologist.

**Table 1. Sociodemographic and Clinical Characteristics of 60 Patients With Acne Vulgaris Responding to Skindex\***

Characteristic	No. (%)
Sex	
Female	43 (72)
Male	17 (28)
Age categories, y	
17-19	12 (20)
20-29	17 (28)
30-39	20 (33)
40-49	8 (13)
50-53	3 (5)
Race	
White	56 (93)
Black	3 (5)
Other	1 (2)
Self-rating of general health	
Poor	0 (0)
Fair	5 (8)
Good	7 (12)
Very good	27 (45)
Excellent	21 (35)
Duration of acne†	
<1 mo	1 (2)
1-3 mo	5 (9)
4-11 mo	10 (17)
1-2 y	6 (10)
>2 y	36 (62)
Dermatologist's severity score‡	
No skin disease present	0 (0)
Minimal	7 (12)
Mild	21 (37)
Moderate	19 (33)
Severe	10 (18)
Extremely severe	0 (0)

\*Skindex is a validated 29-item instrument to measure the effects of skin disease on patients' quality of life.

†Data on fewer than 60 patients were available for duration of acne and dermatologist's severity score (58 and 57 patients, respectively).

### QUALITY OF LIFE OF PATIENTS WITH ACNE VULGARIS COMPARED WITH OTHER DERMATOLOGY PATIENTS AND A NORMATIVE SAMPLE

Patients in all diagnostic groups and the normative sample were similar in their self-ratings of overall quality of life and in the importance of their skin to their quality of life. Patients with acne reported more effects of their skin condition on their functioning, emotions, and symptoms than did patients with isolated benign skin lesions or those in the normative sample (**Figure**). Compared with patients with psoriasis, however, patients with acne reported fewer effects related to functioning ( $P=.08$ ) and physical symptoms ( $P<.05$ ), but statistically similar emotional effects ( $P=.95$ ) (**Figure**).

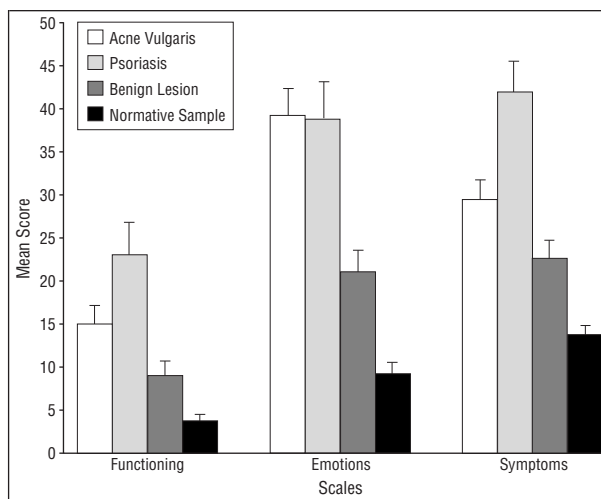
### RELATIONSHIPS BETWEEN QUALITY OF LIFE AND PATIENTS' SEX, AGE, AND SEVERITY OF ACNE

The effects of acne on quality of life were similar for men and women, and were somewhat greater in older patients (**Table 3**), although the difference did not reach statisti-

**Table 2. Responses of Patients With Acne Vulgaris to the Question, "What Is It About Your Skin Problem That Bothers You the Most?"**

Categorized Responses	No. (%) of Mentions*
Appearance	26 (50)
Symptoms	11 (21)
Recurrence	10 (19)
Acne in general	7 (13)
Acne as an adult	5 (10)
Effect on image	2 (4)
Annoying	2 (4)
Treatment	2 (4)
Other	5 (10)

\*Based on 70 mentions from 52 patients.



Scores of patients with acne vulgaris, psoriasis, benign lesions, and a normative sample using Skindex, a validated 29-item instrument to measure the effects of skin disease on patients' quality of life.

cal significance (for composite Skindex score,  $r = 0.24$ ;  $P=.07$ ). Patients with more severe acne (as judged by the dermatologist) also reported more effects on their quality of life; correlations of Skindex scale scores with clinical severity were the following: functioning,  $r = 0.31$  ( $P=.02$ ); emotions,  $r = 0.34$  ( $P=.01$ ); and symptoms,  $r = 0.23$  ( $P=.09$ ). In a multiple regression model controlling for sex, age, and acne severity, both patient age and acne severity remained independently associated with the Skindex composite score ( $P\leq.01$ ). On average, in this multivariate model the Skindex composite score increased with age by approximately 20% for each decade of life and with clinical severity by approximately 28% for each grade of severity.

### CHANGE IN QUALITY OF LIFE OVER TIME

Overall, the majority (76%) of the 34 patients who responded to a mail survey 3 months following their initial visit reported that their skin condition had improved. On the other hand, 4 (57%) of the 7 patients aged 40 years or older responded that their skin condition had remained the same or became worse, compared with only a small proportion (15%) of the younger patients ( $P=.02$ ). Of 8 patients who reported that their acne did not improve, those

**Table 3. Skindex Scores of Adults With Acne Vulgaris Categorized by Age\***

Age Category, y	Functioning	Emotions	Symptoms
17-19 (n = 12)	10 ± 14	25 ± 15	16 ± 9
20-29 (n = 17)	12 ± 13	40 ± 28	32 ± 16
30-39 (n = 20)	15 ± 13	45 ± 24	33 ± 16
40-49 (n = 8)	21 ± 17	38 ± 16	29 ± 22
50-53 (n = 3)	32 ± 42	58 ± 41	48 ± 36

\*All values are means ± SDs. Skindex is a validated 29-item instrument to measure the effects of skin disease on patients' quality of life.

aged 40 years or older reported more effects on their quality of life in all 3 domains than did younger patients who did not see improvement (**Table 4**), although the differences between groups did not reach statistical significance ( $P=.23$ , for composite score).

#### COMMENT

More than 20 years ago Plewig and Kligman<sup>51</sup> observed that the very behavior of attending a dermatology appointment implies bother. Only recently, however, have tools become available to measure accurately *how* patients are bothered in terms of their quality of life. In this study we examined skin disease-specific quality of life in a sample of adult patients with acne vulgaris and found that the effects of acne on patients' quality of life are significant. We emphasize 3 findings from our study.

First, patients with acne vulgaris reported emotional effects of their skin condition that were similar in magnitude to those reported by patients with psoriasis, which is traditionally regarded as a skin condition causing significant disability.<sup>52,53</sup> Second, in a multivariate analysis, older adults with acne vulgaris reported significantly greater overall effects on their quality of life than did younger patients, even when controlling for the clinical severity of the acne as judged by the dermatologist. This finding is interesting because of the prevailing perception of younger patients as being more susceptible to the psychosocial effects of acne.<sup>12</sup> Finally, 3 months after treatment, more older ( $\geq 40$  years) than younger patients reported no improvement in their acne and, compared with younger patients who had not seen improvement, older patients reported greater effects on their quality of life. In summary, these findings are consistent with the premise that acne vulgaris is a disease that significantly affects patients' quality of life, particularly that of older patients.

One methodological consideration of this study is that the sample size of 60 patients limits the generalizability of our conclusions as well as our power to detect differences in important subgroups. On the other hand, the broad age range of our subjects makes it likely that any conclusions about age are valid. Also, to facilitate comparisons, we averaged the individual Skindex scales to create a composite score. Although the composite score does not reflect the magnitude of specific physical and psychosocial effects of skin disease because the different scales are given equal weights, similar techniques have been used with other instruments.<sup>54</sup> Finally, to assess the clinical severity of acne we used dermatologists' ratings

**Table 4. Skindex Scores of Younger and Older Adults Who Reported No Improvement in Their Acne After 3 Months\***

Age, y	Functioning	Emotions	Symptoms
<40 (n = 4)	10 ± 6	33 ± 25	33 ± 21
$\geq 40$ (n = 4)	27 ± 37	45 ± 39	41 ± 40

\*All values are means ± SDs. Skindex is a validated 29-item instrument to measure the effects of skin disease on patients' quality of life.

on a 5-point scale that has not been independently validated. Further studies with larger samples of patients should test our conclusions.

Previous studies have suggested that acne affects the lives of adults in various ways, including their employment, social behavior, and body dissatisfaction. For example, in a sample of 1250 subjects, Cunliffe<sup>47</sup> found that the unemployment rate was 7% higher for adults with acne. Furthermore, acne's effects on patients' lives may be related to patient age. In one study,<sup>34</sup> adults with acne (age,  $\geq 21$  years) were less likely than younger patients to improve on measures of social appraisal and social assertiveness following treatment with isotretinoin. Conversely, in a study of acne and quality of life among patients aged 15 to 45 years, Salek et al<sup>41</sup> found no relationship between age and quality of life as measured by the Acne Disability Index. Although Skindex and the Acne Disability Index share some features, the 2 instruments vary considerably. For example, the Acne Disability Index measures experiences related to skin care and to the financial aspects of treating acne.

Because the richest insights into the effects of disease may come from asking patients directly,<sup>55</sup> we asked adults what bothered them the most about having acne and stratified their answers by age. Based on previous observations of, and reports from, acne sufferers,<sup>10,12,16,42,56</sup> it is not surprising that most patients in our study responded that they were bothered by acne's appearance. Interestingly, appearance was most troublesome to patients aged 30 to 39 years. One explanation for this difference among age groups is that patients younger than 30 years are closer to adolescence and feel that acne is accepted by their peers,<sup>16</sup> whereas those aged 40 years and older may have themselves accepted acne. Overall, these findings support the premise that patients are affected differently by acne during different stages in their lives.

Previous qualitative work<sup>10</sup> suggests that the effects of acne on patients' lives may be comparable with those of other skin diseases conventionally believed to be debilitating. In a study<sup>33</sup> of the effects of skin disease on self-image, researchers found that acne may be more psychosocially damaging to patients than both eczema and psoriasis. Our use of Skindex, a measure for patients with skin diseases of all types, permitted us to compare the quality of life among different diagnostic groups. We found that patients with acne reported similar effects on their emotions and somewhat different effects on their physical and social functioning than patients with psoriasis, even though patients with acne experienced fewer symptoms and reported better general health. Furthermore, patients with acne and with psoriasis were similar in how they rated their general quality of life and the importance of the condition

of their skin to their quality of life, indicating that those with acne were not necessarily unique in terms of their general well-being or preoccupation with their skin. These comparisons highlight the degree of the effect of acne on quality of life, which may be heightened by acne's typical involvement of the face.<sup>16</sup>

Finally, our study confirms other research suggesting that more severe acne (as judged by the dermatologist) is more likely to be associated with psychological factors such as anxiety, and with greater effects on patients' lives.\* However, as our multivariate model demonstrated, factors other than severity contribute to the effects of acne on patients' quality of life, including patient age. In fact, in a previous study,<sup>42</sup> the psychosocial effects of acne on quality of life were found to be influenced more by patients' self-perception of their acne's severity than by the objective severity of the disease. As with other diseases, measures of quality of life in patients with acne can supplement measures of clinical severity in assessing comprehensively the outcomes of disease and treatment.

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