

# Quality of Life in Adolescents with Acne with or Without Other Chronic Disease(s)

Erika Alba-Rojas<sup>1</sup>, Marimar Sáez-de-Ocariz<sup>1</sup>, Alejandro González-Garay<sup>2</sup>, Luz Orozco-Covarrubias<sup>1,\*</sup>

<sup>1</sup>Dermatology Department, National Institute of Pediatrics, Mexico City, Mexico

<sup>2</sup>Methodology of Investigation Department, National Institute of Pediatrics, Mexico City, Mexico

## ABSTRACT

**Background:** Acne is the most common skin disease in adolescence, negatively impacting self-image and self-esteem. **Objectives:** The present study examined if there is any difference in the QoL of patients with acne compared to patients with acne plus another chronic disease(s). **Methods:** Each subject completed a self-administered validated SF-36 instrument. Patients were divided into two groups for further analyses. Ninety-six patients with acne completed the QoL questionnaire. **Results:** Twenty-seven patients (28%) only had acne, while 69 patients (72%) also had other chronic disease(s). Vitality (energy) was lower in female patients. Mean SF-36 PHS (physical health summary), physical role (PR), bodily pain, and social functioning were lower for patients with inflammatory than for patients with non-inflammatory lesions. Patients at their first visit had lower median scores in PHS and PR than patients at their subsequent visit. MHS (mental health summary) scores were lower than PHS scores in both groups. The most affected dimensions of health in both groups were vitality (feels tired and worn out) and general health (feels personal health as poor and believes it likely to get worse). **Conclusions:** Acne itself has a negative impact on quality of life. Acne in adolescents with other chronic diseases of childhood [life-threatening disease(s) or non-life-threatening disease(s)] has so much QoL impairment as in adolescents without other health problem.

**Keywords:** Acne, Quality Of Life, Chronic Diseases, Adolescent

**Abbreviations:** Acne vulgaris (acne); quality of life (QoL); The Short Form-36 questionnaire (SF-36); Physical health (PH); mental health (MH) physical health summary (PHS); mental health summary (MHS); physical health (PH); physical functioning (PF); physical role; bodily pain (BP); general health (GH); vitality (V); social functioning (SF); social role (SR); mental health (MH)

## INTRODUCTION

Acne vulgaris (acne), a chronic inflammatory disease of the pilosebaceous unit, is the most common skin disease in adolescence; affecting up to 90% of adolescents with a peak incidence between 15 and 17 years of age [1]. Acne negatively impacts self-image, self-esteem development, and social interactions, with possible long-term sequelae. Previous studies of the

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### \*Corresponding Author

#### Luz Orozco-Covarrubias

Dermatology Department, National Institute of Pediatrics, INSURGENTES SUR 3700-C, Col. Insurgentes-Cuicuilco 04530 Mexico City, D.F., Mexico; Tel: (52-55)10841372;

Fax: (52-55) 56 69 12 33

**Email:** draorozcoml@gmail.com

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quality of life (QoL) in patients with acne using generic and specific instruments have documented significant negative effects on QoL compared to age-matched controls [2,3]. To our knowledge, the impact on QoL in adolescents with acne vs. adolescent with acne plus other chronic(s) disease(s) has not yet been explored. We hypothesized that adolescents with acne plus other chronic(s) disease(s) have more negative impact on QoL than adolescents with acne.

The use of generic instruments allows comparisons between different diseases (dermatological and non-dermatological) [4-6]. The Short Form-36 questionnaire (SF-36) is a widely used generic instrument for the self-evaluation of health, and one of the most commonly used to determine QoL among patients with acne [7-10]. It is suitable both for self-administration and interview, in individuals aged 14 years or older. The SF-36 questionnaire includes 36 items and evaluates 8 dimensions of health categorized in 2 groups: physical health (PH) and mental health (MH).

## PATIENTS AND METHODS

This was a cross-sectional comparative study in patients of a dermatologic clinic diagnosed with acne or acne plus other chronic disease(s), aged 14 to 18 years, evaluated from July 2017 to June 2018, who assented - under parental consent - to answer the SF-36. Patients with a neurological disorder that prevented them from answering were excluded. This study was approved by the Institutional Review Board (003/17).

At the end of the regular appointment, a printed copy of the SF-36 instrument - validated for Mexico - was delivered to the patients for self-administration, with staff assistance available, if necessary. It includes 36 items and evaluates 8 dimensions of health categorized in 2 groups: physical health summary (PHS) and mental health summary (MHS). The 4 dimensions of PHS are physical functioning (from very limited in performing all physical activities to performs all types of physical activities), physical role (from problems with work or other daily activities to no problems with work or other daily activities), bodily pain (from very severe and extremely limiting pain to no pain or limitations due to pain) and general health (from evaluates personal health as poor and believes it likely to get worse to evaluates personal health as excellent); whereas MHS includes [vitality (from feels tired and worn out all of the time to feels full of pep and energy all of the time), social functioning (from extreme and frequent interference with normal social activities due to physical and emotional problems to performs normal

social activities without interference due to physical or emotional problems), social role (from problems with work or other daily activities as a result of emotional problem to no problems with work or other daily activities) and mental health (from feelings of nervousness and depression all of the time to feels peaceful, happy, and calm all of the time). For each dimension, a score ranging from 0 to 100 is obtained, higher scores means better QoL9.

Demographic data, clinical features of acne and of other disease(s) if any were obtained from their medical records.

Patients were divided into two groups for further analysis: those with acne as their sole disease (group 1) - and those with acne plus other chronic disease(s) (group 2); the latter was subdivided in life-threatening (any disease from which the likelihood of death was probable such as oncological conditions) or non-life-threatening chronic disease(s) (any disease from which the likelihood of death was no probable such as allergic rhinitis) A database was developed to collect the following data: demographic features, acne location and severity, type of acne lesions, presence or absence of other chronic disease(s), type of chronic disease(s), and quality of life scores. Demographic and clinical features are reported by frequencies and Fisher test was used to determine any difference between them. The QoL test scores are reported by median and minimum and maximum; Mann-Whitney U test was used to compare the scores in both groups. P values <0.05 were considered significant. Statistical calculations were done using STATA v15.1 (StataCorp LLC, College Station, TX)

## RESULTS

Ninety-six patients with acne, with a slight male predominance (52%), and a median age of 15.5 (14 - 18) years completed the QoL questionnaire. Median age at acne diagnosis was 14 (8 -18) years and the median time to diagnosis was 5.5 (1 - 50) months. Twenty-seven patients (28%) only had acne, while 69 patients (72%) also had other chronic disease(s). The latter - group 2 - had one (n=61, 88%) or two chronic diseases. Most common chronic diseases were allergic (7%) - asthma, allergic rhinitis, etc. - followed by immunological (16%) - systemic lupus erythematosus, purpura, autoimmune encephalitis, etc. - and endocrine (14%) - thyroid diseases, polycystic ovarian syndrome, etc. - diseases. Less common diseases included dermatological, genetic, oncological and neurological disorders.

Demographic data, acne location and severity, by groups, are shown in Table 1.

**Table 1:** Demographic data, acne location and severity.

Feature	Acne n= 27	Acne + Other disease(s) n=69	p
Male gender, n (%)	15 (55)	35 (50)	0.82 <sup>z</sup>
Age, median (range)	15 (14 - 18) years	16 (14 -18) years	0.85 <sup>y</sup>
Age at diagnosis of acne, median (range)	14 (11 - 16) years	14 (8 - 18) years	0.82 <sup>y</sup>
Time to diagnosis, median (range)	6 (2 - 24) months	5 (1 - 50) months	0.36 <sup>y</sup>
Age at diagnosis of additional disease, median (range)		12 (0.3 - 17) years	
Time to diagnosis of the additional disease, median (range)		3.8 (0.08 - 14.75) years	
Acne severity, n (%)			
Mild	13 (48)	23 (33)	0.24 <sup>z</sup>
Moderate	10 (37)	44 (64)	0.02 <sup>z</sup>
Severe	4 (15)	2 (3)	0.05 <sup>z</sup>
Acne location, n (%)			
Face	18 (67)	53 (77)	0.31 <sup>z</sup>
Face & trunk	9 (33)	16 (23)	0.31 <sup>z</sup>

<sup>z</sup> Fisher test; <sup>y</sup> Mann-Whitney U test

General mean scores were: 77.92 for SF-36, 82.24 for the physical health summary (PHS) and 73.60 for the mental health summary (MHS). The dimensions of physical health (PH) had the following mean scores: 91.46 for physical functioning (PF), 88.28 for physical role (PR), 82.71 for bodily pain (BP) and 66.52 for general health (GH). The dimensions of MH had the following mean scores: 63.06 for vitality (V), 80.22 for social functioning (SF), 77.95 for social role (SR) and 73.19 for mental health (MH). No differences by gender were found, except for vitality that was lower in female patients [males 70(25-90) vs. females 60(5-100); p<sub>0.023</sub>]. Mean SF-36 (75.78 vs. 81.66 p 0.03), PHS (79.83 vs. 86.45 p 0.01), physical role (84.43 vs. 95 p 0.02), and bodily pain (79.30 vs. 88.64 p 0.01) were lower for patients with inflammatory than for patients with non-inflammatory

lesions. Regarding the type of visit, either first or subsequent, lower median scores were observed in PHS [first visit 78.7 vs. subsequent visit 87.5; p=0.010] and physical role [first visit 75 vs. subsequent visit 100; p=0.015] in patients at the first visit.

The comparison between patients with acne and acne plus other chronic disease(s) are shown in Table 2. MHS scores were lower than PHS scores in both groups. The most affected dimensions of health in both groups were vitality and general health. As shown in Table 2, SF-36 general score, PHS, general health and MHS scores were lower in patients on Group 2, while vitality score was lower in patients on Group 1. However, the difference was not statistically significant for the general score, the summary scores, or any of the dimensions.

**Table 2:** SF-36 scores by Groups.

<b>Health Domain</b>	<b>Group 1 Acne Median (range) N = 27</b>	<b>Group 2 Acne + additional disease(s) Median (range) N = 69</b>	<b>p*</b>
<b>SF-36 general score</b>	84.2 (45 - 95.6)	83.1 (33.1 - 96.5)	0.65
<b>Physical Health summary</b>	87.5 (40 - 98.7)	86.2 (38.1 - 100)	0.89
<b>Physical functioning</b>	100 (60 - 100)	100 (50 - 100)	-
<b>Physical role</b>	100 (25 - 100)	100 (0 - 100)	-
<b>Bodily pain</b>	90 (45 - 100)	90 (22.5 - 100)	0.47
<b>General health</b>	70 (25 - 95)	65 (15 - 100)	0.82
<b>Mental Health summary</b>	83.5 (30.8 - 97.5)	79.2 (21.1 - 97.5)	0.36
<b>Vitality</b>	65 (23 - 100)	70 (5 - 90)	0.74
<b>Social functioning</b>	87.5 (50 - 100)	87.5 (25 - 100)	0.98
<b>Social role</b>	100 (0 - 100)	100 (0 - 100)	-
<b>Mental health</b>	80 (36 - 100)	72 (16 - 100)	0.89

Mann-Whitney U test

\*p&lt;0.05

The comparison between patients with acne vs. acne plus life-threatening additional disease(s) and acne plus non-life-threatening additional disease(s) are shown in Table 3. MHS scores were lower than PHS scores in all groups. The most affected dimensions of health in all groups were vitality

and mental health; physical functioning was more affected in groups with acne plus additional disease. However, the difference was not statistically significant for the general score, the summary scores, or any of the dimensions.

**Table 3:** The comparison between patients with acne vs. acne plus life-threatening additional disease(s) and acne plus non-life-threatening additional disease(s)

Health Domain	Acne	Life-Threatening Additional Disease(s)	Non-Life-Threatening Additional Disease	
	Median (range)	Median (range)	Median (range)	P*
	N = 27	N = 22	N = 47	
	<b>SF-36 General Score</b>	84.2 (45 - 95.6)	80.4 (51.4-94.2)	83.2 (33.1 - 95.6)
<b>Physical Health Summary</b>	87.5 (40 - 98.7)	92.5 (38.1-97.5)	86.25 (39.3-100)	0.87
<b>Physical Functioning</b>	100 (60 - 100)	75.75 (38 -97.5)	79.4 (21-96.5)	0.83
<b>Physical Role</b>	100 (25 - 100)	97.5 (55-100)	100 (50-100)	0.82
<b>Bodily Pain</b>	90 (45 - 100)	100 (25-100)	100 (0-100)	0.59
<b>General Health</b>	70 (25 - 95)	80 (32.5-100)	90 (22.5-100)	0.43
<b>Mental Health Summary</b>	83.5 (30.8 - 97.5)	65 (15-95)	70 (20-100)	0.81
<b>Vitality</b>	65 (23 - 100)	70 (25-90)	65 (5-90)	0.97
<b>Social Functioning</b>	87.5 (50 - 100)	75.5 (25-100)	87.5 (25-100)	0.64
<b>Social Role</b>	100 (0 - 100)	100 (0-100)	100 (0-100)	0.61
<b>Mental Health</b>	80 (36 - 100)	75 (44-100)	72 (16-100)	0.72

## DISCUSSION AND CONCLUSION

Acne is the most prevalent skin disease in adolescence. According to the Global Burden of Disease report, acne is the dermatological disease with the highest burden for patients between 10 and 19 years of age [11]. Beattie and Lewis-Jones found that chronic skin diseases (including acne) negatively affect children's QoL as much as other non-dermatological chronic diseases [12]. Previously published results from SF-36 scores show that acne has negative effects on mental and physical health, and can affect quality of life to a greater extent than other chronic diseases like asthma, epilepsy and arthritis. [2,3,7]. Al Robaee found worse scores in all dimensions of the SF-36 scale in patients with acne and co-morbidities [13], but 52% of the population was 20 years or older and 83% were free of any other associated illness. To our knowledge, the impact on QoL in adolescents with

acne vs. adolescent with acne plus other chronic disease(s) has not yet been explored.

The SF-36 has demonstrated its satisfactory validity and reliability across study settings and populations to determine the QoL in patients with acne, even when certain questionnaires may be more specific [10,14]. Scores of the QoL from our patients compared to previously published results on healthy Mexicans between 18 and 24 years of age were lower. The dimensions with a greater difference (more than 10 points) from healthy controls were general health (GH), vitality and social functioning (MH). On the other hand, when comparing our results with other studies also in patients with acne, we found that our patients' overall scores were higher. One possible explanation is that our patients were younger (14-18 years) compared to other studies [13,16-18]. Because roles in life changed according with age

it is possible that acne in older patients have more negative effects on QoL. Moreover, health (physical and mental) is only one of the many factors that influence a person's QoL, therefore, age, differences in level of education, family support, place of residence, cultural, social and economic other factors - not explored in this study - may influence the degree to which the QoL is affected for each patient with the same disease [13-15,19].

General health determines a self-evaluation of health, and low scores translate a perception of poor health that is likely to get worse. The vitality domain evaluates the patient's energy, and low scores mean that the patient feels tired and worn out [10].

A few studies report same impact on QoL in both sexes, one report a greater impact on QoL on male patients, and most show a greater impact on female patients, [10,13,20] which we also found in our study, but the difference was non-significant.

There is not a well-defined correlation between QoL score and acne severity in previous studies. While some of them, like ours, reported a greater effect on QoL with greater acne severity others reported no such difference; however, treatment strategies to reduce acne lesions may improve the patients QoL [2-3,10,13-14,20].

Al Robaee previously reported better scores on QoL with acne of shorter duration.<sup>13</sup> We found greater effect on QoL on patients with shorter-duration acne compared to patients with longer-duration acne that had received treatment, particularly on their physical health score and physical role dimension. This finding may be related to the myths and misinformation regarding acne, and the improvement in the QoL score after treatment may be explained by a better disease perception [16].

Treatment strategies to reduce the number and size of lesions of acne vulgaris can improve their life quality. Ghaderi's recommendations include further early and effective therapy, patient education, forming consultation, psychotherapy integration, supportive groups, etc. [14].

Out of all mental health scores, vitality was the most affected. However, when comparing scores between both groups, we did not find any significant difference in any dimension; which underscores the burden of the acne by itself on the patient's mental and physical health. Our results suggest that the associated co-morbidity has no influence on the patient's perspective regarding the presence of acne.

To our knowledge, this is the first study to explore the impact on QoL in adolescents with acne vs. adolescent with acne with concurrent chronic disease(s). Our study supports that acne in adolescents has a negative impact on QoL no matter

if they have one or more associated disease [life-threatening disease(s) or non-life-threatening disease(s)]. Acne in adolescents with other chronic diseases of childhood has so much QoL impairment as in adolescents without other health problem. The SF-36 questionnaire should be employed in clinical practice to explore QoL in adolescents with acne.

Comprehensive management of patients with acne is required. Given these findings, it may be of benefit to provide increased clinical support and comprehensive education for adolescents with acne; particularly in the areas of social functioning, vitality, and general health.

This is a small sample size study and a single point was made, therefore more research is necessary to better understand the association of acne with quality of life and the most optimal treatment approaches for this condition.

#### **DATA AVAILABILITY STATEMENT**

The data sets generated and/or analyzed during the current study are not publicly available but are available from the corresponding author on a reasonable request.

#### **ETHICAL STATEMENT**

Ethical approval for the study was obtained from the Institutional Review Board of the National Institute of Pediatrics and patients assented - under parental consent - to answer the SF-36.

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#### **CONFLICT OF INTEREST**

The authors have no conflict of interest to declare.

#### **APPROVAL**

Institutional Review Board Approval (GA/003/17).

#### **AUTHOR CONTRIBUTIONS**

Dr. Alba-Rojas designed the data collection instruments, collected data, carried out the initial analyses and drafted the initial manuscript.

Dr. Sáez-de-Ocariz, designed the study, carried out the final analyses and critically reviewed the manuscript for important intellectual content.

Dr. González-Garay, designed initial and final analyses, carried out the final analyses and critically reviewed the final manuscript.

Dr. Orozco-Covarrubias conceptualized and designed the study, coordinated and supervised the data collection

instrument, data collection, initial analyses and the initial manuscript, and reviewed and revised the manuscript.

Dr. Alba-Rojas, Dr. Sáez-de-Ocariz and Dr. Orozco-Covarrubias contributed to the diagnosis and care of the patients.

All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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