

Clinical trial

Dermatology life quality index scores in children with vitiligo: comparison with atopic dermatitis and healthy control subjects

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Abstract

Vitiligo and atopic dermatitis (AD) are two major cutaneous diseases that affect quality of life (QoL) by causing functional and psychosocial disorders. Our objective was to calculate Children's Dermatology Life Quality Index (CDLQI) scores in children with vitiligo and to compare these values with those in AD patients and healthy control subjects. The CDLQI was completed for 50 vitiligo and 50 AD patients presenting at the dermatology polyclinic, as well as for 50 age- and sex-matched healthy controls. All subgroups in the vitiligo patient group had significantly higher total CDLQI scores than healthy controls. Vitiligo patients were found to have increased scores on all parameters, except itch, clothes/shoes, and sleep, compared with the AD patient group. Scores on itch and sleep were significantly higher in the AD group than in the vitiligo patients. Quality of life in children with vitiligo is substantially lower than in children with AD. This decline in QoL is critical in the psychosocial development of the former group.

Introduction

Patients with cutaneous diseases are observed to suffer from a variety of symptoms that range from mild to severe. These symptoms may be directly detrimental to daily life or may affect the individual psychologically. It is important to identify these effects in order to adopt the right approach to managing these patients.

Vitiligo, an acquired idiopathic disease of unknown etiology, progresses with melanocyte destruction and is clinically characterized by depigmented maculae. The onset of disease usually occurs in childhood or young adulthood.¹

Although vitiligo does not cause a physical disorder, its physical manifestation may affect the individual negatively by provoking severe psychosocial problems and undermining self-confidence. When it develops in childhood or adolescence, it has a more significant impact on psychological development and, in this respect, lowers the quality of life (QoL) of the individual.

Atopic dermatitis (AD), which is a cutaneous disease common in childhood, affects 12–15% of all children in early childhood. The onset of disease occurs within the first year of life in 70% of cases and at some point during the first five years of life in 90%.² Pruritus is a common symptom in AD. In some cases, pruritus may be severe enough to cause irritability, sleep disorders, and stress, and may affect the physical abilities, feelings and behavior, social skills, self-confidence, and overall psychological development of children.^{2,3}

The Children's Dermatology Life Quality Index (CDLQI) is a dermatological disease-specific QoL measure for children aged 5–16 years. It was originally created in English by Lewis-Jones and Finlay.⁴ The CDLQI was translated and validated for Turkish children with dermatological diseases by Balci *et al.*⁵

We aimed to determine the extent to which vitiligo affects QoL in children using the CDLQI and to compare the results with those of AD patients and healthy control subjects. Patients with AD were chosen as a reference

group because AD is common and its effect on QoL is well established.

Materials and methods

The study registered 50 pediatric patients diagnosed with vitiligo by clinical and Wood's light examination, 50 pediatric patients with AD diagnosed according to the Hanifin–Rajka criteria,⁶ and 50 age- and sex-matched healthy controls.

Detailed anamneses of all patients, including personal and familial atopy histories, were taken, and physical and dermatological examinations were conducted. We divided the AD group into those with active and inactive disease, respectively, and the vitiligo group into those with acral, generalized, and segmental disease, respectively. Patients with active dermatitis were evaluated as having active disease, and those without were evaluated as having inactive disease. Active-disease patients had dry, scaling erythematous papules, plaques, lichenified plaques, and weeping, crusting, and exudative lesions in the flexural areas.⁷

The CDLQI is used extensively in dermatology and consists of 10 questions that focus on the effects of skin disease on activities of daily life during the preceding week. Answers to individual questions are given on a scale of 0 (=no effect) to 3 (=large effect) according to the level of effect of disease. The CDLQI is calculated by summing the score for each question to result in a maximum score of 30 and a minimum score of 0. Higher scores indicate more substantial impairment of QoL.⁴

Total CDLQI scores are interpreted thus: scores of 0 or 1 indicate no effect on QoL; scores of 2–5 indicate a small effect on QoL; scores of 6–10 indicate a moderate effect on QoL; scores of 11–20 indicate a very large effect on QoL; and scores of 21–30 indicate an extremely large effect on QoL.

The children were given unlimited time to complete the questionnaires. A minority of younger children were helped by their parents as necessary. Parents were able to read the questions out loud but were asked not to influence their children's answers. Informed consent was obtained from all parents. The research protocol was approved by the university hospital ethics committee.

Results

Demographic and clinical characteristics of the patient and control groups are presented in Table 1. The Kaiser–Meyer–Olkin test was used to establish whether the number of patients was sufficient. Values were determined to be 0.737 in the AD group and 0.722 in the vitiligo group; consequently, the number of patients included in the study was considered sufficient. An evaluation using the Bartlett test determined *P*-values of 0.003 in the AD group and <0.001 in the vitiligo group, and a correlation was found between the variables used in the CDLQI.

Table 1 Demographic characteristics and clinical findings in the atopic dermatitis and vitiligo patient groups and the control group

	Atopic dermatitis group	Vitiligo group	Control group
Subjects, <i>n</i>	50	50	50
Gender, F/M, <i>n</i>	29/21	32/18	23/27
Mean age, years	10.26 ± 3.34	11.42 ± 3.23	10.20 ± 3.71
Age range, years	6–16	5–16	5–16
Mean disease duration, years	2.82 ± 1.27	2.99 ± 1.96	
Family history, <i>n</i> (%)	26 (52)	13 (26)	
Involvement, <i>n</i> (%)	Mild, 20 (40) Moderate, 15 (30) Severe, 15 (30)	Acral, 26 (52) Generalized, 18 (36) Segmental, 6 (12)	
Autoantibody positivity, <i>n</i> (%)	0	8 (16)	
Treatment, <i>n</i> (%)	Topical 50 (100)	Topical 36 (72) Phototherapy 14 (28)	

F, female; M, male.

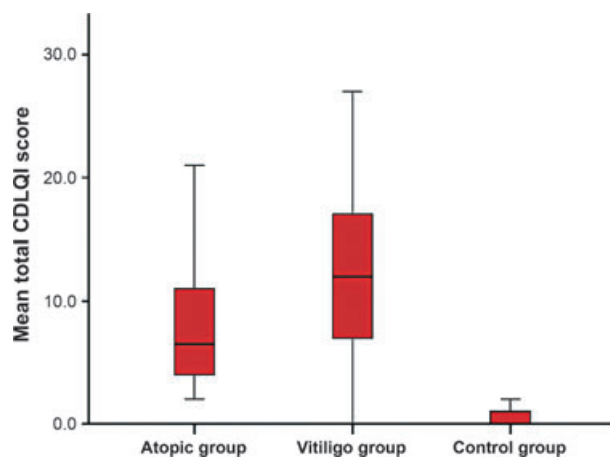
Total CDLQI scores and subscores in the patient and control groups are presented in Table 2. All subscores and total CDLQI scores were found to be significantly elevated in the vitiligo group compared with the healthy control group (Fig. 1). The total CDLQI score and all subscores except those for sports activities and teasing were significantly higher in the AD group than in the control group. Scores for items on embarrassment, friends, school/holidays, leisure, sports activities, being subject to teasing, and treatment (questions 2, 3, 5, 6, 7, 8, 10) and total CDLQI scores were significantly elevated in the vitiligo patient group compared with the AD group. Scores in the AD group were significantly increased for items on symptoms and sleep status (questions 1 and 9) compared with scores in the vitiligo patient group (Table 2).

The distribution of scores on disease severity in the AD group showed that 42% of patients had mild, 32% had moderate, 22% had severe, and 4% had very severe AD. In the vitiligo group, scores on disease severity showed that 6% of patients had minimal disease, 20% had mild, 20% had moderate, 48% had severe, and 6% had very severe vitiligo. In the control group, 43% of subjects were unaffected and 7% were mildly affected. The distribution of severity scores by group revealed the scores to be statistically significantly elevated in the vitiligo group compared with the AD group and the control group (*P* = 0.043 and *P* < 0.001, respectively) and in the AD patients compared with the control group (*P* < 0.001).

Table 2 Distribution of item and overall scores on the Children's Dermatology Life Quality Index in the atopic dermatitis (AD) and vitiligo patient groups and the control group

	AD group (n = 50)	Vitiligo group (n = 50)	Control group (n = 50)	AD group vs. control group (P)	Vitiligo group vs. control group (P)	AD group vs. vitiligo group (P)
	Mean ± SD	Mean ± SD	Mean ± SD			
Q1 Itch	2.08 ± 0.87	0.74 ± 0.82	0.36 ± 0.48	<0.001	0.006	<0.001
Q2 Embarrassment	1.00 ± 1.03	1.56 ± 0.99	0.02 ± 0.14	<0.001	<0.001	0.007
Q3 Friendships	0.58 ± 0.83	1.32 ± 1.09	0.02 ± 0.14	<0.001	<0.001	<0.001
Q4 Clothes/shoes	1.00 ± 0.90	1.26 ± 0.89	0.08 ± 0.27	<0.001	<0.001	>0.05
Q5 Leisure/hobbies	0.56 ± 0.78	1.06 ± 0.99	0.06 ± 0.23	<0.001	<0.001	0.006
Q6 Swimming/sports	0.08 ± 0.34	0.92 ± 1.08	0.00 ± 0.00	>0.05	<0.001	<0.001
Q7 School/holidays	0.84 ± 0.95	1.32 ± 1.18	0.00 ± 0.00	<0.001	<0.001	0.028
Q8 Teasing/bullying	0.16 ± 0.54	1.66 ± 1.15	0.04 ± 0.19	>0.05	<0.001	<0.001
Q9 Sleep	1.10 ± 0.78	0.58 ± 0.70	0.02 ± 0.14	<0.001	<0.001	0.001
Q10 Treatment	0.34 ± 0.62	1.30 ± 0.95	0.00 ± 0.00	<0.001	<0.001	<0.001
Overall CDLQI score	7.74 ± 4.59	11.68 ± 6.54	0.62 ± 0.77	<0.001	<0.001	0.001

SD, standard deviation.

**Figure 1** Distribution of total mean Children's Dermatology Life Quality Index (CDLQI) values by group

Vitiligo patients with generalized involvement had significantly increased scores on questions 3, 7, and 8, as well as total CDLQI scores, compared with those with segmental involvement. Vitiligo patients with acral involvement showed an increase in scores on questions 3 and 8 compared with those with segmental involvement. Additionally, vitiligo patients with lesions on the face and hands were found to have a significantly elevated total CDLQI score, question 7 subscore, and severity score compared with patients with lesions on the hands only ($P = 0.015$, $P = 0.04$, and $P = 0.02$, respectively).

A comparison between the active AD and inactive AD groups revealed that scores on items 1, 2, 3, and 5, as well as total CDLQI scores, were significantly higher in the group with active AD ($P < 0.05$).

In the AD group, the severity of disease was classified as mild, moderate, or severe. Patients with moderate involvement were found to have a significant increase in scores on questions 1, 3, 5, and 7, and in total CDLQI scores, compared with those with mild involvement ($P < 0.005$). Patients with severe involvement had significantly higher scores on questions 1, 2, and 3 and significantly higher total CDLQI scores compared with patients with moderate involvement ($P < 0.005$), and significantly higher total CDLQI scores and subscores on questions 1, 2, 3, 5, and 9 compared with those with mild involvement ($P < 0.005$). No correlation was found between age, sex, or disease duration and CDLQI scores ($P > 0.005$).

There was no statistically significant relationship between the method of treatment administered to patients (topical vs. ultraviolet B treatment) and CDLQI scores ($P > 0.05$).

In the factor analysis carried out to test the structural validity of the CDLQI, two factors were obtained in the AD group. The first factor (for questions 4, 6, 7, 8, and 10) explains 33.981% of the variance, and the second factor (for questions 1 and 9) explains 17.257% of the total variance. Together, the two factors account for 51.238% of the total variance. Table 3 demonstrates the effect of each question on the factors.

Factor analysis conducted in the vitiligo patient group produced two factors (Table 4). The first factor (for questions 4, 5, 6, 8, 9, and 10) explains 38.639% of the variance, whereas the second factor (for questions 1, 5, and 10) explains 15.969% of the variance. Together, these two factors account for 54.608% of the total variance. Table 5 shows the effects of each question on the factors.

Table 3 Effects of questions on the factors in the atopic dermatitis patient group

Total variance explained ^a									
Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	Variance (%)	Cumulative (%)	Total	Variance (%)	Cumulative (%)	Total	Variance (%)	Cumulative (%)
1	2.379	33.981	33.981	2.379	33.981	33.981	2.214	31.630	31.630
2	1.208	17.257	51.238	1.208	17.257	51.238	1.373	19.608	51.238
3	0.905	12.936	64.174						
4	0.735	10.503	74.677						
5	0.668	9.540	84.217						
6	0.570	8.145	92.362						
7	0.535	7.638	100.000						

Extraction method: principal component analysis.

^aOnly cases for which group = atopic were used in the analysis phase.

Table 4 Effects of questions on the factors in the vitiligo patient group

Total variance explained ^a									
Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	Variance, %	Cumulative, %	Total	Variance, %	Cumulative, %	Total	Variance, %	Cumulative, %
1	2.705	38.639	38.639	2.705	38.639	38.639	2.526	36.082	36.082
2	1.118	15.969	54.608	1.118	15.969	54.608	1.297	18.526	54.608
3	0.943	13.477	68.085						
4	0.791	11.293	79.378						
5	0.599	8.554	87.932						
6	0.453	6.471	94.404						
7	0.392	5.596	100.000						

Extraction method: principal component analysis.

^aOnly cases for which group = vitiligo were used in the analysis phase.

Discussion

Vitiligo, a chronic skin pigmentation disorder, rarely causes physical symptoms other than in appearance. However, it lowers a pediatric patient's QoL by unfavorably influencing social relations, participation in games, sports activities, and school life, and normal psychological developmental processes as a result of its effects on the child's physical appearance.

Atopic dermatitis is a chronic cutaneous disease seen in children and adults. Although it is not detrimental to physical appearance, the itch associated with the condition may affect the QoL of the individual and his or her parents to a substantial degree.

In the literature, various scales for measuring levels of depression and anxiety have been employed to determine the psychological condition of pediatric vitiligo

patients in order to assess their QoL. These studies found children with vitiligo recorded significantly higher scores for depression than did healthy controls.⁸ The literature includes only a few studies exploring the dermatology life quality index in children with vitiligo.^{4,9} A study in which the CDLQI of children with vitiligo on ultraviolet B treatment was evaluated before and after treatment found the mean pretreatment score to be 4.6 ± 4.2 and the mean post-treatment score to be 3.0 ± 2.5 .⁹ The study concluded that vitiligo had negative effects on the QoL of children, and these negative effects could be partially reduced by treatment.⁹ Furthermore, Lewis-Jones and Finlay⁴ compared CDLQI scores in pediatric patients with childhood cutaneous diseases and found mean overall CDLQI scores to be 5.4 ± 5.0 in psoriasis patients, 7.7 ± 5.6 in AD patients, and 5.6 ± 3.8 in vitiligo patients.

Table 5 Effects of questions on the factors in the atopic dermatitis and vitiligo patient groups

Atopic dermatitis patient group Rotated component matrix ^{ab}			Vitiligo patient group Rotated component matrix ^{cd}		
	Component			Component	
	1	2		1	2
Question 1		0.785	Question 1		0.874
Question 4	0.412		Question 4	0.747	
Question 6	0.677		Question 5	0.564	0.468
Question 7	0.708		Question 6	0.727	
Question 8	0.727		Question 8	0.665	
Question 9		0.831	Question 9	0.683	
Question 10	0.730		Question 10	0.438	0.436

Extraction method: principal component analysis.

Rotation method: varimax with Kaiser normalization.

^aRotation converged in three iterations.

^bOnly cases for which group = atopic were used in the analysis phase.

^cRotation converged in three iterations.

^dOnly cases for which group = vitiligo were used in the analysis phase.

Chuh¹⁰ evaluated CDLQI scores in 10 child patients with pityriasis rosea, comparing these with scores in AD patients and healthy controls, and established mean CDLQI scores of 3.50 in pityriasis rosea and 7.70 in AD, both of which were statistically significantly higher than scores in healthy controls. The author noted that the pruritus symptom in AD impaired sleep, affected the social and school lives of children, and thereby reduced their QoL.¹⁰

Beattie and Lewis-Jones¹¹ evaluated CDLQI results in 379 children with cutaneous disease. They found the highest scores, of 9.17 and 9.14, applied to children with psoriasis and AD, respectively.¹¹ The highest score in CDLQI results in children with chronic diseases applied to children with cerebral palsy (13.8) followed by children with generalized AD (11.9).¹¹

Numerous studies of QoL in AD are available in the literature.^{12–16} Hon *et al.*¹⁵ established mean CDLQI values of 9.0 in girls and 7.0 in boys with AD. Not all parameters of QoL are equally affected, and itch and sleep are the most commonly affected. Girls found dressing important, whereas itch and sleep had greater influence in children aged >10 years. Surprisingly, relationships with friends were affected in only 10% of children. Another study reported mean CDLQI values of 16.5.¹³ This study identified school and sleep as the most greatly affected and itch as the least affected parameter. The low itch score was associated with the higher mean age of the children included in the study.¹⁷ A study using the Cantonese version of the CDLQI found a mean CDLQI value of 7.5 for AD, whereas another study reported this value at 7.7.^{4,14}

In the present study, mean CDLQI values were 11.68 ± 6.54 in the vitiligo group, 7.74 ± 4.59 in the AD group, and 0.62 ± 0.77 in the control group. In the AD group, scores on all parameters except swimming/sports and teasing/bullying were significantly elevated relative to scores in the control group, and scores for itch and sleep were significantly higher than those of children with vitiligo. In the vitiligo group, scores on all parameters were significantly increased compared with those in the control group, and scores on all parameters other than itch, clothes/shoes, and sleep were significantly higher than those in the AD group. In AD patients, sleep was affected by itch.

Of similar studies reported in the literature, one reported a mean CDLQI value of 4.6 ± 4.2 in 51 patients with generalized vitiligo with 15.9% depigmentation, and another reported a mean CDLQI value of 5.6 ± 3.8 in 51 children with vitiligo.^{4,9} The mean CDLQI values obtained in the present study are quite high in comparison with the values found in these studies. We believe this can be attributed to the greater degree of acral and generalized involvement in our patients.

Despite the lack of other physical symptoms, vitiligo patients are negatively affected by the effects of the disease on their appearance, which are particularly pertinent to the psychosocial development of children. Nine of the children in the present study had dropped out of school.

In conclusion, physicians who follow these children should be sensitive to their individual needs, schooling, and psychosocial development, and should be careful in their choice of treatments.

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