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Assessment of dermatological quality of life in patients with childhood atopic dermatitis and their families

Çocukluk çağı atopik dermatitli hastalarda ve ailelerinde dermatolojik yaşam kalitesi değerlendirilmesi

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The known about this topic

Increasing quality of life to ideal standards is among universal values targeted by all communities. Different scales have been used to evaluate quality of life, especially in patients with chronic diseases. Many studies have evaluated quality of life in individuals with atopic dermatitis, which is a chronic dermatologic disease, and the importance of a multidisciplinary approach in disease management has been identified.

Contribution of the study

Quality of life was affected to a greater extent in individuals whose atopic dermatitis was active and severe. Impaired quality of life could increase disease severity by negative feedback predominantly in the exacerbation period.

Abstract

Aim: Atopic dermatitis is a chronic, itchy, inflammatory skin disease that progresses with exacerbations. This study was planned to determine how atopic dermatitis affects the quality of life of patients and their families.

Material and Methods: One hundred twenty patients with atopic dermatitis, as diagnosed using the Hanifin Rajka diagnostic criteria, and their families were included in the study. The patients were divided into two groups as active and remission. Disease severity was classified as mild, moderate, and severe according to the SCORAD index. Total IgE, peripheral eosinophil counts, and allergy skin tests were performed. Literate patients completed the Childrens' Dermatology Life Quality Index by themselves. The Infants' Dermatology Life Quality Index was completed by their families. Also, the Family Dermatological Quality of Life Index was completed by one of the parents for each patient.

Results: Among the 120 patients who participated in the study, 76 (63.33%) were male and 44 (36.66%) were female. The mean age was 4.36±3.52 years. The quality of life survey scores were statistically significantly lower in the remission group compared with the active group ($p<0.05$). The quality of life questionnaire scores were higher in the group with a severe SCORAD index ($p<0.05$). There was no significant correlation

Öz

Amaç: Atopik dermatit; alevlenmelerle seyreden kronik, kaşıntılı, enflamatuvar bir deri hastalığıdır. Bu çalışma, atopik dermatit tanısı almış hasta ve ailelerinin yaşam kalitelerinin nasıl etkilendiğini belirlemek amacıyla planlandı.

Gereç ve Yöntemler: Hanifin Rajka tanı ölçütleriyle atopik dermatit tanısı koyulan 120 hasta çocuk ve ailesi çalışmaya alındı. Hastalar aktif ve remisyon olarak iki gruba ayrıldı. SCORAD indeksi ile hastalık şiddeti hafif, orta ve ağır olarak sınıflandırıldı. Total IgE, periferik eozinofil sayısı, alerji deri testi tetkikleri yapıldı. Hastaların okuma yazma bilenleri "Çocuk Dermatoloji Yaşam Kalite İndeksi" isimli anketi kendileri doldurdu." Bebeklerin Dermatolojik Yaşam Kalite İndeksi" isimli anket aileleri tarafından doldurudu. Ayrıca her hasta için, "Aile Dermatolojik Yaşam Kalitesi İndeksi" isimli anket ebeveynlerden birisi tarafından doldurudu.

Bulgular: Çalışmaya katılan 120 hastanın 76 tanesi (%63,33) erkek 44 tanesi (%36,66) kız olup yaş ortalaması 4,36±3,52 yıldı. Yaşam kalitesi anket puanları, remisyon grubunda aktif gruba göre istatistiksel olarak anlamlı düşüktü ($p<0,05$). SCORAD indeksi ağır olan grupta yaşam kalitesi anket sonuçları yüksek saptandı ($p<0,05$). Total IgE, periferik eozinofil sayısı ve deri testi sonuçları ile anket puanları arasında anlamlı ilişki görülmedi

Cont. ➡

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between total IgE, peripheral eosinophil count, skin test results, and questionnaire scores (p>0.05). At least one allergen susceptibility was detected in 65% of the patients who underwent allergy skin tests.

Conclusion: Quality of life was affected negatively in patients with atopic dermatitis and their families. In this study, the quality of life survey results were found to be higher in the active group and the group with a high SCORAD index compared with the remission group and the group with a low SCORAD index. Based on this finding, we can conclude that quality of life is negatively affected by high disease activity.

Keywords: Atopic dermatitis, quality of life

(p>0,05). Alerji deri testi yapılan hastaların %65'inde en az bir alerjene duyarlılık saptandı.

Çıkarımlar: Atopik dermatit hastalarının ve ailelerinin yaşam kaliteleri olumsuz etkilenmişti. Atopik dermatit tedavisi, multidisipliner olarak planlanmalıdır. Bu çalışmada aktif grupta ve SCORAD indeksi yüksek olan grupta, yaşam kalitesi anket sonuçları, remisyon grubuna ve SCORAD indeksi düşük olan gruba göre daha yüksek bulunmuştur. Bu bulgudan yola çıkarak hastalık aktivitesinin yüksek olması ile yaşam kalitesinin olumsuz yönde etkilendiği sonucunu çıkarabiliriz.

Anahtar sözcükler: Atopik dermatit, yaşam kalitesi

Introduction

Atopic dermatitis (AD) is a chronic, pruritic, inflammatory skin disease involving different regions characterized by typical skin lesions and exacerbations in infancy, early childhood, and adolescence. It is known that AD affects 1–10% of children throughout the world. Although AD may be observed in children in any age group, the disease onset occurs in the first year of life in 60% of the patients and the first five years of life in 85% of the patients (1–5). It is thought that many factors including immunologic, genetic, metabolic, infectious, and environmental factors are involved in the pathogenesis of AD. It is known that epidermal barrier disorders in addition to irregularities in the immune system are also effective. Serum total immunoglobulin (Ig)-E levels are increased, and eosinophilia is present in the peripheral blood in most of the patients with AD. Atopic dermatitis constitutes the first clinical step of the picture of allergic march in children who genetically carry a risk of atopy. An association of asthma and allergic rhinitis is present in 80% of patients. The diagnosis is made with the association of history and morphologic findings (1–5). The disease, which is characterized by recurrence, affects quality of life of patients and their families. In this study, we aimed to investigate how quality of life was affected in the patients who presented to the Pediatric Allergy and Dermatology Outpatient clinics in our hospital and were diagnosed as having AD, and in their families by administering the Dermatology Life Quality Index.

Material and Methods

One hundred twenty patients aged 0–18 years who presented to Bezmialem Foundation University, Faculty of Medicine, Pediatric Allergy and Dermatology Outpatient Clinics and were diagnosed as having AD, were included in the study. Approval was obtained from the local ethics committee for our study (number: 71306642/050-01-04/83, date: 19.03.2014). Our study was conducted in accordance with the Declaration of Helsinki. The patients were enrolled between April 2014 and September 2014. Written consent was obtained from the participants after giving the necessary information. The diagnosis of AD was made according to the Hanifin-Rajka criteria. Medical history was taken from all patients and physical examinations were performed in all patients. Blood tests were performed to specify total IgE values and peripheral eosinophil counts. Allergy skin tests (AST) was performed in patients aged over 2 years. Subjects who had no acute skin lesions and current symptoms were selected as the remission group. The remaining patients constituted the active disease group. In all patients, the SCORAD index, which involved the severity, localization, and subjective symptoms of the findings, was calculated. Literate patients who were able to complete the questionnaire filled in the Childrens' Dermatology Life Quality Index (CDLQI) themselves. For patients who could complete the questionnaire by themselves, the Infants' Dermatology Life Quality Index (IDLQI) was filled in by their families. The first question in the questionnaire was "How severe do you think your child's dermatitis was in the last one week? How red, crusty, inflamed or diffuse?" The families scored a minimum of 0 points and 4 points at the most for this question [very severe (4), severe (3), moderate (2), tolerable (1), none (0)]. These results were coded as IDLQI1. The remaining ten questions were asked to evaluate quality of life. They were coded as IDQLI2. Also, the questionnaire called Family Dermatology Life Quality Index (FDLQI) was completed in by one of the parents for each patient. All questionnaires requested to be answered, consisted of a total of ten questions and a maximum of three points could be obtained for each question. According to the box marked by the patients, scoring was made as follows: none (0 points), only a little (1 point), much (2 points) and very much (3 points). The patients scored a maximum of ten points for each questionnaire they completed. The questionnaire results of each patient were evaluated using this scoring system. The results were interpreted as having active AD or being in remission. The questionnaire forms were obtained from the web site http://www.dermatology.org.uk with an original Turkish translation. Öztürkcan et al. (6) evaluated the Turkish reliability and validity of the quality of life questionnaires we used.

Statistical Analysis

Statistical assessment of the data was performed using the IBM SPSS Statistics 22.0 program. The Kolmogorov-Smirnov test was used to evaluate if the variables had normal dis-

Table 1. General characteristics, SCORAD index and questionnaire scores in the active and remission groups

n (%)	Active	Remission	Total	p[a]
	70 (58.33%)	50 (41.66%)	120 (100%)	
Age				
Median (minimum–maximum)	2.5 (0–15)	4 (1–13)	3 (0–15)	0.010
AST n				
Positive	29	20	49	0.380
Negative	21	21	42	
Responder n (%)				
Mother	61 (87%)	39 (78%)	100 (83.3%)	0.185
SCORAD n (%)				
Mild	22 (31.4%)	26 (52%)	48 (40%)	
Moderate	27 (38.6%)	21 (42%)	48 (40%)	0.003
Severe	21 (30%)	3 (6%)	25 (20%)	
Total IgE U/mL				
Median (minimum–maximum)	121 (0.17–3000)	147 (2.7–3719)	142 (0.17–3719)	0.740
Peripheral eosinophilia %				
Median (minimum–maximum)	0.05 (0.01–0.22)	0.04 (0–0.19)	0.05 (0–0.22)	0.550
FDLQI				
Median (minimum–maximum)	9 (0–30)	2 (0–21)	5 (0–30)	<0.001
CDLQI				
Median (minimum–maximum)	11 (6–18)	2.5 (0–9)	6 (0–18)	0.001
IDLQI1				
Median (minimum–maximum)	2 (1–4)	0.5 (0–2)	2 (0–4)	<0.001
IDLQI2				
Median (minimum–maximum)	9 (2–26)	3 (0–9)	7 (0–26)	<0.001

a: p<0.05 was considered significant; ADT: Allergy skin test; CDLQI: Childrens' Dermatology Life Quality Index; FDLQI: Family Dermatology Life Quality Index; IDLQI: Infants' Dermatology Life Quality Index

tribution and it was observed that they were not distributed normally distributed (p<0.05). Thus, the Mann-Whitney U test was used for the comparison of the two groups. The Chi-square test was used for the distribution of categorical variables. Median (minimum-maximum), frequency and percentage values are given as descriptive statistics. A p-value of <0.05 was considered statistically significant.

Results

Among the 120 patients included in the study, 76 (63.33%) were male and 44 (36.66%) were female. The mean age was found as 4.36±3.52 years.

AST results of a total of 91 patients aged over 2 years were evaluated. Forty-two (35%) patients had a negative test result. House dust mite sensitivity was found in 36 (30%) patients, cow milk sensitivity was found in four (3.3%) patients, fungus sensitivity was found in one (0.8%) patient, egg white sensitivity was found in two (1.7%) patients, peanut sensitivity was found in one (0.8%) patient, and sensitivity to multiple allergens (house dust, pollens, food etc.) was found in five (4.2%) patients. There was no significant correlation between the positivity of AST results and disease severity (p=0.38) (Table 1). Only eight patients were found to have a sensitivity to any food. All patients who had food allergy were in the active group. Seven of these patients were in the moderate group according to the SCORAD index, and one patient with multiple allergen sensitivity was in the severe group.

When the total IgE levels and SCORAD index levels were compared, no significant correlation was found between disease severity and total IgE levels (p=0.900). There was no significant correlation between peripheral eosinophil counts and disease severity (p=0.583) (Table 1).

Among 120 patients included in our study, 70 (58.3%) patients were classified as having active AD and 50 (41.7%) were classified as patients with AD in remission. There

was no significant correlation between disease severity and assignment to active or remission groups by age (Table 1). The mean age was found to be 2 years in subjects who had a severe SCORAD index, 4 years in subjects who had a moderate SCORAD index, and 3 years in subjects who had a mild SCORAD index.

In the active AD group, the SCORAD index, which is the measurement indicating disease severity, was found to be significantly increased (p=0.003) (Table 1). The Infants' Life Quality Questionnaire was completed by one of the parents. This questionnaire was administered to 53 patients in the active AD group and 28 patients in the remission AD group. In the active AD group, both IDLQI1 and IDLQI2 were found to be significantly increased (p<0.001). According to the parents' responses, quality of life was influenced to a greater extent in the active period of the disease. The results of these two questionnaires were found to be significantly high in the group that had increased disease severity according to the SCORAD index (p<0.001). A total of 39 patients including 17 patients in the active AD group and 22 patients in the remission AD group completed the CDLQI. In the active group, the questionnaire results were found to be significantly higher compared with the remission group (p<0.001). As the SCORAD index became more severe, the questionnaire scores statistically significantly increased (p=0.006). The questionnaires were answered by the mothers of 100 patients and by the fathers of 20 patients. There was no significant correlation between the results by the parent (mother or father) who answered the FDLQI questionnaire (p=0.500). The questionnaire scores of the parents who answered the questions revealed that AD negatively influenced the quality of life of families to a significant extent, especially in the active period. The questionnaire results that measured the quality of life of the family were found to be significantly high in the active AD group (p<0.001).

Discussion

Atopic dermatitis is a chronic, itchy, inflammatory skin disease that progresses with exacerbations and is observed frequently in children (7). Especially in developed countries, its prevalence increased from 3–5% to 15–20% in the last 50 years, the reason for which is not fully understood (8). Substances that cause skin irritation, foods, airway allergens, house dust, infections, and the presence of stress may lead to exacerbation of the disease (9). Studies have found that AD is observed slightly more frequently in men with a rate of 58–60% (10, 11). Similar to the literature, 63% of our patients were male.

Although the disease is called AD, atopy can be found in only one-third of patients (3). In our study, a positive result was obtained in 49% of 91 patients in whom AST was performed. Although 29 (58%) of 49 patients with positive allergy skin test were in the active disease group, a significant correlation was not found between AST positivity and the disease being in the active period or in remission and disease severity.

Although the role of eosinophils is not fully understood in the pathogenesis of AD, it has been thought that they contribute to tissue injury by releasing reactive oxygen metabolites and cytotoxic granules (12). Borres et al. (13) reported that eosinophilia in the peripheral blood was associated with the presence of atopic disease or the possibility of atopic disease in the future. In a study conducted by Kagi et al. (14), it was reported that the peripheral eosinophil count was associated with clinical activity of AD. In our study, a significant correlation was not found between peripheral eosinophilia level and the disease being in the active period or remission and disease severity.

Serum total IgE levels, which are generally found to be increased in allergic diseases, are also used in the diagnosis of AD as a non-specific marker (1). Serum total IgE levels show a wide distribution range in allergic and normal populations. Parasitic and viral infections and various environmental stimuli may increase serum total IgE levels (15). In a study conducted by Patrizi et al. (16), it was reported that total IgE levels were higher in children with severe AD compared with children with moderate and mild AD. In our study, no significant correlation was not found between total IgE levels and disease severity or activity.

Various scales are used to determine clinical severity in AD (17). In 1993, the European Task Force defined the SCORAD scale (SCORing Atopic Dermatitis), which is an approved scale in children. As the calculation of the SCORAD score involves subjective criteria (e.g. pruritus, sleeplessness) based on the patient's perspective, controversial and misleading results may be obtained. Therefore, the patient perspective was removed, and new SCORAD calculations were recommended (18). We interpreted the findings as three patients having severe SCORAD index in the remission group and patients with mild SCORAD index were found in the active group, as a probability of error caused by the fact that the scale allowed the evaluation of subjective data.

The World Health Organization (WHO) defines health as a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity. According to the WHO's definition: Impairment: any loss or abnormality of physiologic or anatomic structure. Dis-

ability: any restriction or lack of ability (due to impairment) in performing an activity in a manner or range considered normal. Handicap: the result of an impairment or disability that limits or prevents the fulfilment of one or several roles regarded normal, depending on age, sex and social and cultural factors (19).

The concept of 'quality of life' emerged as a result of a holistic approach to the patient and an attempt to measure the status of physical, mental and social well-being. Recently, attempts to render 'well-being' and 'quality of life' measurable, have increased, and different dimensions of health such as economic, social, and similar dimensions have also been included in the scope of evaluation (20). According to the holistic approach in line with this change, sick children should be evaluated both biomedically and psychosocially (21).

According to Hörnquist, the issues in the evaluation of quality of life in the area of healthcare that must be addressed are as follows (22): Biological area: Body health, various body functions, specific disease/disablement symptoms and pain (frequency, intensity, duration), adverse effects, and wound healing. Psychological area: Informational and practical proficiency such as well-being, perception, interactions, learning, logic, and creative ability. Sociological area: Holistic life, general social interactions, family life, sexual life and social interaction capacity. Behavior activity area: Whole active life, self-care agency, movement, working capacity, basic habits, will to work, eating, drinking, sleep and other habits. Material area: Individual economy, state of sheltering, special supports, income from work. Structural area: Meaning of life, social status, socialness view.

In a study conducted by Erturan et al. (19), it was shown that self-respect and dermatologic quality of life was influenced negatively in adolescents with AD with no difference between the sexes. The limitations of the study included the fact that it was conducted with only 33 patients and the childrens' dermatology life quality questionnaires were completed by healthy children.

Sang et al. (23) conducted a study to compare individuals' stress status and the severity of symptoms in patients with AD. The dermatology life quality index and anxiety scales were completed, and disease severity was specified according to the SCORAD index. The subjects who had high anxiety scale scores had severe symptoms and proportionally significantly low quality of life scores. In a study conducted by Dertlioğlu et al. (24), the dermatology life quality questionnaire was completed by 50 patients with AD, 50 patients with vitiligo, and 50 children healthy, and the results were found to be significantly higher in patients with vitiligo and AD, respectively, compared with healthy children.

In a study conducted by Linnet et al. (25), 32 adult patients with AD and 22 healthy individuals completed the dermatology life quality index and anxiety scale. In the patient group, the anxiety scores were found to be high and dermatology life quality score was low. The higher the SCORAD index, the lower was the dermatology life quality. No correlation was found between the SCORAD scores and anxiety scale results. In our study, the SCORAD index, which is the measurement of disease severity, was found to be significantly high in the active AD group, and quality of life was found to be significantly low in the group with a severe SCORAD index, similar to the literature.

Although dermatology life quality scales were prepared for patients with skin disease, healthy children who had no skin disease were selected as control groups in many studies in which these scales were used. The fact that the groups compared comprised patients who were in remission and active periods of the same disease, increased the value of our study.

The completion of quality of life questionnaires by the mother or the father did not cause a significant difference in the scores. These results were interpreted such that the scales we used in our study were favorable in terms of obtaining open data. In addition, Öztürkcan et al. (26) evaluated the reliability and validity of the quality of life questionnaires we used.

The fact that dermatologic quality of life was evaluated simultaneously both in patients and families increased the value of the data obtained in our study. As we found in our study, quality of life may also be influenced negatively in families and caregivers, especially in childhood chronic diseases. Throughout the treatment period, quality of life should be evaluated in families, as well as in patients, and the necessary planning directed toward improvement of quality of life should be made.

The finding of this study showing that quality of life was lower in the group with high disease activity indicates that chronic diseases may lower quality of life by negatively influencing individual satisfaction. In individuals with chronic diseases, it is important to use scales evaluating functional proficiency involving daily roles, well-being in social relationships, somatic symptoms, and satisfaction with life (27). In contrast to diseases of different organs, dermatologic diseases mostly do not

threaten life, but they may lead to negative changes in terms of personal relationships, psychosocial environment, and daily activities by influencing the person's external appearance (28).

In conclusion, quality of life was affected negatively in patients with AD and their families, as seen in many chronic diseases. This may lead to increased disease severity and an increase in exacerbations. For treatment compliance and treatment success, it is important to determine quality of life and to be in cooperation with relevant departments according to the results.

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References

1. Sapan N. Atopik dermatit. In: Hasanoğlu E, Bideci A, Düşünsel R, editors. Türkiye Milli Pediatri Derneği, Temel Pediatri kitabı; 2010.p.1446–9.
2. Arnold, HL, Odom RB, James WD. Atopic dermatitis, eczema, noninfectious immunodeficiency disorders. In: James W, Berger T, Elston D. Andrews' diseases of the skin. 8th edition. Philadelphia: WB Saunders Company; 1990.p.68–74.
3. Leung DYM, Tharp M, Boguniewicz M. Atopic dermatitis. In: Freedberg IM, Eisen AZ, Wolff K, editors. Fitzpatrick's dermatology in general medicine, 5th edition. New York: Mc Graw-Hill 1999.p.1464–80.
4. Hanifin JM. Atopic dermatitis. In: Moschella SL, Hurley HJ, editors. Dermatology, Thirded. Philadelphia: WB. Saunders Company;1992.p.441–64.
5. Savaskan H. Atopik dermatit. In: Tüzün Y, Kotagyan A, Aydemir EH, Baransu, editors. Dermatoloji. 2nd edition. Nobel Tıp Kitapevleri;1994.p.257–65.
6. Oztürkcan S, Ermertcan AT, Eser E, Sahin MT. Cross validation of the Turkish version of dermatology life quality index. Int J Dermatol 2006; 45: 1300–7. [CrossRef]
7. Weidinger S, Novak N. Atopic dermatitis. Lancet 2016; 387: 1109–22. [CrossRef]
8. Williams H, Stewart A, von Mutius E, Cookson W, Anderson HR; International Study of Asthma and Allergies in Childhood (ISAAC) Phase One and Three Study Groups. Is eczema really on the increase worldwide?. J Allergy Clin Immunol 2008; 121: 947–54.e15. [CrossRef]
9. Ben-Gashir MA, Seed PT, Hay RJ. Predictors of atopic dermatitis severity over time. J Am Acad Dermatol 2004; 50: 349–56. [CrossRef]
10. Rottem M, Darawsha J, Zarfin J. Atopic dermatits in infants and children in Israel: clinical presentation, allergies and outcome. Isr Med Assoc J 2004; 6: 209–12.
11. Seyhan M, Kandi Coşkun B, Karıncaoğlu Y, Özcan H, Kalaycı B. Atopic dermatitis: evaluation of sociodemographical and clinical characteristics in childhood and adolescence. Türkiye Klinikleri J Dermatol 2005; 15: 11–4.
12. Arıkan Ç, Bahçeciler NN. Atopik dermatit. T Klin Allerji-Astım 2001; 3: 86–93.
13. Borres MP, Odelram H, Irander K, Kjellman NI, Björkstén B. Peripheral blood eosinophilia in infants at 3 months of age is associated with subsequent development of atopic disease in early childhood. J Allergy Clin Immunol 1995; 95: 694–8. [CrossRef]
14. Kägi MK, Joller-Jemelka H, Wüthrich B. Correlation of eosinophils, eosinophil cationic protein and soluble interleukin-2 receptor with the clinical activity of atopic dermatitis. Dermatology 1992; 185: 88–92. [CrossRef]
15. Yoshizawa Y, Nomaguchi H, Izaki S, Kitamura K. Serum cytokine levels in atopic dermatitis. Clin Exp Dermatol 2002; 27: 225–9. [CrossRef]

16. Patrizi A, Guerrini V, Ricci G, Neri I, Specchia F, Masi M. The natural history of sensitizations to food and aeroallergens in atopic dermatitis: a 4-year follow-Up. Pediatr Dermatol 2000; 17: 261–5. [CrossRef]
17. Ricci G, Dondi A, Patrizi A. Useful tools for the management of atopic dermatitis. Am J Clin Dermatol 2009; 10: 287–300. [CrossRef]
18. Oranje AP, Glazenburg EJ, Wolkerstorfer A, de Waard-van der Spek FB. Practical issues on interpretation of scoring atopic dermatitis: the SCORAD index, objective SCORAD and the three-item severity score. Br J Dermatol 2007; 157: 645–8. [CrossRef]
19. Erturan İ, Aktepe E, Didar Balcı D, Yıldırım M, Sönmez Y, Ceyhan AM. Evaluation of self-esteem and dermatological quality of life in adolescents with atopic dermatitis. Turkderm 2013; 47: 39–44. [CrossRef]
20. Basra MK, Fenech R, Gatt RM, Salek MS, Finlay AY. The Dermatology Life Quality Index 1994-2007: a comprehensive review of validation data and clinical results. Br J Dermatol 2008; 159: 997–1035. [CrossRef]
21. Mollaoğlu M. Kronik hastalıklarda yaşam kalitesi ve hemşirelik. 2. Sağlıkta Yaşam Kalitesi Kongre Özet Kitabı 2007.p.9–10.
22. Pınar R. Sağlıkla ilgili yaşam kalitesi. Sendrom 1997; 9: 117–24.
23. Oh SH, Bae BG, Park CO, et al. Association of stress with symptoms of atopic dermatitis. Acta Derm Venereol 2010; 90: 582–8. [CrossRef]
24. Dertlioğlu SB, Cicek D, Balci DD, Halisdemir N. Dermatology life quality index scores in children with vitiligo: comparison with atopic dermatitis and healthy control subjects. Int J Dermatol 2013; 52: 96–101. [CrossRef]
25. Linnet J, Jemec GB. An assessment of anxiety and dermatology life quality in patients with atopic dermatitis. Br J Dermatol 1999; 140: 268–72. [CrossRef]
26. Öztürkcan S, Aydemir Ö, İnanır I. Akne vulgarisli hastalarda yaşam kalitesi. T Klin Dermatol 2002; 12: 131–4.
27. Morgan M, McCreedy R, Simpson J, Hay RJ. Dermatology quality of life scales--a measure of the impact of skin diseases. Br J Dermatol 1997; 136: 202–6. [CrossRef]