



# Impact of Pediatric Alopecia Areata on Quality of Life of Patients and Their Family Members: A Nationwide Multicenter Questionnaire Study

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**Background:** Pediatric alopecia areata (AA) can affect the quality of life (QoL) of patients and their family members. Research on the QoL and burden on family members in pediatric AA is limited.

**Objective:** This nationwide multicenter questionnaire study described the QoL and burden of the family members of patients with pediatric AA.

**Methods:** This nationwide multicenter questionnaire study enrolled AA patients between the ages of 5 and 18 years from March 1, 2017 to February 28, 2018. Enrolled patients and their parents completed the modified Children's Dermatology Life Quality Index (CDLQI) and the modified Dermatitis Family Impact (mDFI). The disease severity was measured using the Severity of Alopecia Tool (SALT) survey scores.

**Results:** A total of 268 patients with AA from 22 hospitals participated in this study. Our study found that the efficacy and satisfaction of previous treatments of AA decreased as the severity of the disease increased. The use of home-based therapies and traditional medicines increased with the increasing severity of the disease, but the efficacy felt by patients was limited. CDLQI and mDFI scores were higher in patients with extensive AA than those with mild to moderate AA. The economic and time burden of the family members also increased as the severity of the disease increased.

**Conclusion:** The severity of the AA is indirectly proportional to the QoL of patients and their family members and directly proportional to the burden. Physicians need to understand these characteristics of pediatric AA and provide appropriate intervention to patients and their family members.

**Keywords:** Pediatric alopecia areata, Quality of life



## INTRODUCTION

Alopecia areata (AA) is an immunologic hair loss disorder that results in non-scarring hair loss<sup>1</sup>. The severity of AA is divided according to the extent of hair loss of the scalp<sup>2</sup>. Although not a life-threatening condition, moderate to severe AA reduces health-related quality of life (QoL) and is also associated with psychological disorders such as depression and anxiety<sup>3,4</sup>.

Pediatric AA is one of the most common forms of hair loss in children, but the treatment of pediatric AA remains challenging. Mild pediatric AA has a good prognosis, but extensive pediatric AA, including alopecia totalis, and alopecia universalis, does not respond well to conventional treatment and has a significant impact on patients' QoL<sup>5</sup>. While previous studies assess the impact of childhood atopic dermatitis and childhood asthma on QoL of children, few studies have reported the effects of pediatric AA on the QoL of children and their family members<sup>6,7</sup>.

This is a multicenter, prospective study conducted through the Korean Society of Hair Research to determine QoL in pediatric patients and their family members with AA. We also investigated the efficacy and satisfaction of previous treatment for AA and the treatment-related economic and time burden on patients and their family members. In addition, we evaluated the accompanied disease with pediatric AA and their impact on QoL.

## MATERIALS AND METHODS

The study was conducted between March 1, 2017 and February 28, 2018. We enrolled patients aged between 5 and 18 years, diagnosed with AA by a dermatologist during the study period. Emails were sent to all Korean dermatologists to encourage participation in the study, and dermatologists from 22 general hospitals decided to join. We excluded patients with AA who had severe scalp disorders such as seborrheic dermatitis and psoriasis. Patients with causes of hair loss other than AA and those deemed inappropriate because of any other illness that could interfere with study results were also excluded. The study design was reviewed and approved by the institutional review board of Inha University Hospital (IUH-IRB 2017-03-017), along with all other approvals by the participating institutes where necessary.

## Participants

We recorded demographic characteristics and the economic and time burden among patients and their family members and determined the Children's Dermatology Life Quality Index (CDLQI) and modified Dermatitis Family Impact (mDFI) scores<sup>8,9</sup>. Demographic data included age, sex, age of onset, disease duration, previous treatment profiles (i.e., duration of treatment, degree of improvement, recurrence, side effects, and satisfaction), and past medical history.

## Classification of the disease severity

The severity of AA was assessed using the Severity of Alopecia Tool (SALT)<sup>2</sup>. In SALT scoring, the temporal region accounts for 36% of the total scalp area, the occiput for 24%, and other areas for 40%. Based on the percentage of the involved scalp area, we divided patients into three groups: mild (0%~25%), moderate (26%~75%), and severe (76%~100%), as classified previously by Janković et al<sup>10</sup>.

## Children's Dermatology Life Quality Index questionnaire

We used CDLQI to measure the QoL of hair loss patients. CDLQI is the most widely used instrument for measuring the impact of skin disease on QoL in children<sup>11</sup>. All questions were translated into Korean by a professional translator and the questionnaire was finally confirmed by an experienced dermatologist (G.S. Choi). The questionnaire was completed by patients and/or their parents during their visit to the clinic. The questionnaire consisted of 10 items, including symptoms, personal relationships, school work-holiday time, leisure activities, the burden of treatment, sleep disorders, and daily activities. A 4-point scale was used for scoring: 0 (never), 1 (sometimes), 2 (often), and 3 (almost always). The overall score was calculated by adding all the points in each question (0~30). The total score was used as the standard for grouping: ≤1 (no effect at all on patient's life), 2~6 (small effect on patient's life), 7~12 (moderate effect on patient's life), 13~18 (very large effect on patient's life), and 19~30 (extremely large effect on patient's life).

## Modified Dermatitis Family Impact questionnaire

The DFI questionnaire reveals the major impact of atopic eczema on the QoL of families and affected children in various studies<sup>12</sup>. The QoL of family members was assessed using the

mDFI questionnaire by changing the word “eczema” to “skin disease.” We used the translated version of the DFI questionnaire because it was used in another study<sup>13</sup>. The questionnaire was completed by family members of patients during their visit to the clinic. It consisted of 10 items. The items are composed of the impact of daily life such as housework, food, sleep, family leisure activities, time for shopping, and expenditure; moreover, feelings such as tiredness, emotional distress, and relationships were included. A 4-point scale was used for scoring: 0 (never), 1 (sometimes), 2 (often), and 3 (almost always). The overall score was calculated by adding all the points in each question (0~30). The score-banding system of the CDLQI questionnaire was used because their structures are similar, and the number of items and scales are the same (no validated score-banding system exists for the DFI questionnaire).

### Burden of the disease

A questionnaire analysis was performed to estimate the financial and family burden associated with pediatric AA treatment. Details on the perceived financial burden, time spent in AA treatment, and the number of hospital visits for the treatment of AA were included in the questionnaire.

### Statistical analyses

Descriptive statistics were used to summarize the characteristics of the study population. Proportions and frequencies for categorical variables were calculated, and Fisher's exact test was used to compare the groups. Overall *p*-values reflecting trends between groups were also analyzed using Jonckheere's trend test or the linear-by-linear association test according to dependent variables. Notable results were presented in figures and tables with more detailed numerical values. A *p*-value of <0.05 was considered significant. All calculations were made with the Statistical Package for the Social Sciences version 22.0 for Windows (IBM Corp., Armonk, NY, USA).

## RESULTS

### Patient characteristics

A total of 268 patients with pediatric AA from 22 hospitals participated in the study (Table 1). The participants consisted of 144 boys (53.7%) and 124 girls (46.3%), with

mean age  $12.2 \pm 3.6$  years (range, 5~18 years). The median age of onset was 10 years, and the median duration of AA was 1.4 years. More than 60% of the patients had a disease duration longer than a year. Patients with a mild area of scalp affected were 145 (54.1%), moderate 61 (22.8%), and severe 62 (23.1%). About 46% of the patients had hair loss involving more than 25% of the total scalp area, whereas 21.3% had atopic dermatitis. Severe hair loss was generally accompanied by atopic dermatitis, especially for severe AA (mild AA, 13.8%; moderate AA, 23.0%; and severe AA, 37.1%; *p*<0.001).

**Table 1.** Demographic and clinical characteristics of the study population

| Characteristic           | Value      |
|--------------------------|------------|
| Case no.                 | 268        |
| Sex                      |            |
| Boy                      | 144 (53.7) |
| Girl                     | 124 (46.3) |
| Age distribution (yr)    |            |
| 5~9                      | 72 (26.9)  |
| 10~14                    | 110 (41.0) |
| 15~18                    | 86 (32.1)  |
| Age of onset (yr)        |            |
| 0~4                      | 26 (9.7)   |
| 5~9                      | 106 (39.6) |
| 10~14                    | 102 (38.1) |
| ≥15                      | 34 (12.6)  |
| Disease duration in year |            |
| <1                       | 101 (37.7) |
| 1~3                      | 69 (25.7)  |
| 3~5                      | 44 (16.5)  |
| ≥5                       | 54 (20.1)  |
| Severity of AA*          |            |
| Mild                     | 145 (54.1) |
| Moderate                 | 61 (22.8)  |
| Severe                   | 62 (23.1)  |
| Concurrent AD            | 57 (21.3)  |

Values are presented as number (%). AA: alopecia areata, AD: atopic dermatitis. \*The severity was assessed by the percentage of hair loss: mild, 0%~25%; moderate, 26%~75%; severe, 76%~100%.

**Table 2.** Comparison of previous treatment profiles according to the disease severity

|                             | Severity of AA* |            |            | p-value <sup>†</sup> |
|-----------------------------|-----------------|------------|------------|----------------------|
|                             | Mild            | Moderate   | Severe     |                      |
| Total case                  | 145 (100.0)     | 61 (100.0) | 62 (100.0) |                      |
| Concurrent AD               | 20 (13.8)       | 14 (23.0)  | 23 (37.1)  | <0.001               |
| Any previous treatment      | 111 (76.6)      | 57 (93.4)  | 62 (100.0) | <0.001               |
| Steroid ILI, total case     | 53 (36.6)       | 28 (45.9)  | 24 (38.7)  | 0.453                |
| CR or PR <sup>†</sup>       | 40 (75.5)       | 14 (50.0)  | 11 (45.8)  |                      |
| Recurrence <sup>†</sup>     | 22 (41.5)       | 21 (75.0)  | 10 (41.7)  |                      |
| Adverse events <sup>†</sup> | 5 (9.4)         | 1 (3.6)    | 3 (12.5)   |                      |
| Immunotherapy               | 27 (18.6)       | 28 (45.9)  | 44 (71.0)  | <0.001               |
| CR or PR <sup>†</sup>       | 22 (81.5)       | 23 (82.1)  | 24 (54.5)  |                      |
| Recurrence <sup>†</sup>     | 9 (33.3)        | 18 (64.3)  | 22 (50.0)  |                      |
| Adverse events <sup>†</sup> | 3 (11.1)        | 5 (17.9)   | 8 (18.2)   |                      |
| Topical medication          | 58 (40.0)       | 34 (55.7)  | 40 (64.5)  | 0.004                |
| CR or PR <sup>†</sup>       | 41 (70.7)       | 23 (67.6)  | 18 (45.0)  |                      |
| Recurrence <sup>†</sup>     | 20 (34.5)       | 19 (55.9)  | 15 (37.5)  |                      |
| Adverse events <sup>†</sup> | 2 (3.4)         | 0 (0.0)    | 1 (2.5)    |                      |
| Systemic medication         | 30 (20.7)       | 19 (31.1)  | 32 (51.6)  | <0.001               |
| CR or PR <sup>†</sup>       | 22 (73.3)       | 12 (63.2)  | 15 (46.9)  |                      |
| Recurrence <sup>†</sup>     | 9 (30.0)        | 10 (52.6)  | 12 (37.5)  |                      |
| Adverse events <sup>†</sup> | 2 (6.7)         | 1 (5.3)    | 6 (18.8)   |                      |
| Home-based therapy          | 3 (2.1)         | 3 (4.9)    | 7 (11.3)   | 0.021                |
| CR or PR <sup>†</sup>       | 1 (33.3)        | 1 (33.3)   | 1 (14.3)   |                      |
| Recurrence <sup>†</sup>     | 0 (0.0)         | 1 (33.3)   | 1 (14.3)   |                      |
| Adverse events <sup>†</sup> | 0 (0.0)         | 0 (0.0)    | 0 (0.0)    |                      |
| Traditional medicine        | 3 (2.1)         | 9 (14.8)   | 6 (9.7)    | 0.002                |
| CR or PR <sup>†</sup>       | 1 (33.3)        | 1 (11.1)   | 3 (50.0)   |                      |
| Recurrence <sup>†</sup>     | 1 (33.3)        | 1 (11.1)   | 3 (50.0)   |                      |
| Adverse events <sup>†</sup> | 0 (0.0)         | 0 (0.0)    | 0 (0.0)    |                      |

Values are presented as number (%). AA: alopecia areata, AD: atopic dermatitis, ILI: intralesional injection, CR: complete response, PR: partial response. \*The percentage among patients who received the treatment. The severity was assessed by the percentage of hair loss: mild, 0%~25%; moderate, 26%~75%; severe, 76%~100%. <sup>†</sup>Fisher's exact test or the linear by linear association test was used.

### Previous treatment profiles

Steroid intralesional injection (ILI) was used at a similar frequency regardless of the severity of AA; however, the severity of AA was indirectly proportional to the effect felt by the patient, and the side effects increased (Table 2). Severe AA meant higher use of immunotherapy, topical medication, and oral agents. The systemic medication's effectiveness decreased, and the frequency of side-effects increased with increasing severity of AA. In all, 54.5% of patients with severe AA reported that a partial or complete response

was achieved by immunotherapy, and about 45% reported that a partial or complete response was achieved by other treatment modalities (i.e., steroid ILI, topical medication, and systemic medication). Moreover, traditional medicines were tried the most in the moderate AA, whereas home-based therapies were tried the most in the severe AA. However, patients felt that the efficacy of these treatments was inferior to conventional medical treatments. Fig. 1 reveals patient satisfaction with previous treatment for pediatric AA. Although home-based therapies and traditional medi-

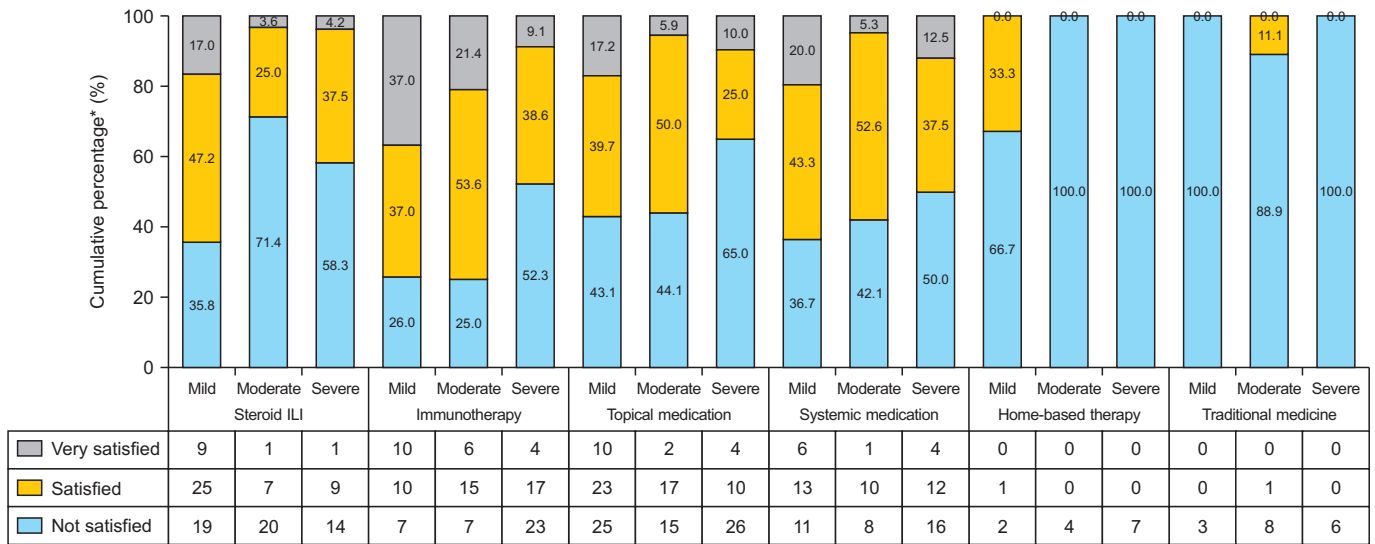


Fig. 1. Patient satisfaction with treatment for alopecia areata. ILI: intralesional injection. \*The percentage among patients who received the treatment.

cines were unsatisfactory, immunotherapy was the most satisfactory treatment, especially in moderate to severe AA patients.

### Impaired QoL and increased disease burden in pediatric AA patients and their family members

CDLQI and mDFI scores were higher in patients with extensive AA than mild to moderate AA (Table 3). Such a trend was statistically significant ( $p < 0.001$ ). The severity of the disease was directly proportional to the impact on the QoL of patients as well as their family members. In addition, nearly 70% of severe AA patients spent more than \$1,000 a year for the treatment. The total time spent on AA treatment increased with the severity of AA ( $p < 0.001$ ). Overall, QoL and disease burden in pediatric AA patients and their family members were obviously dependent on the disease severity.

## DISCUSSION

Among all participants in the study, two-thirds of pediatric AA patients showed chronic courses with a disease duration of more than a year, and one in five patients also had atopic dermatitis. Atopic dermatitis is one of the common comorbidities of AA, which directly affects the QoL of patients due to chronic itching; impaired QoL of patients was expected when atopic dermatitis was accompanied by AA<sup>6,14,15</sup>. We found that the number and types of attempted

treatments and adverse effects increased with the severity of AA, but the satisfaction levels decreased. Among the treatments, immunotherapy was found to be the most effective and satisfactory for extensive pediatric AA. Topical immunotherapy is involved in hair regrowth of AA by modulating T-cell mediated mechanism by inducing allergic contact dermatitis. When atopic dermatitis is accompanied by AA, immunotherapy can worsen atopic dermatitis due to T-cell mediated reactions, making treatment options more limited<sup>16,17</sup>. Therefore, patients of extensive pediatric AA with comorbid conditions are more difficult to treat and might find alternative treatments such as traditional treatments. In our results, about 10% of severe AA tried traditional medicine or home-based treatments; however, the efficacy or satisfaction of traditional treatments was inferior to conventional treatment<sup>18</sup>. Therefore, attention and appropriate consultation are required, especially for extensive pediatric AA patients seeking alternative therapies.

The CDLQI questionnaire completed by patients was positively correlated with the severity of disease, showing a trend similar to atopic dermatitis and psoriasis<sup>19,20</sup>. The mDFI questionnaire completed by family members showed similar results; pediatric AA, like atopic dermatitis, affects the QoL of family members<sup>21</sup>. In particular, since childhood and adolescence are critical periods for self-image, patients may suffer more from AA compared to atopic dermatitis and psoriasis because the hair loss can be recognized immediately. Further-

**Table 3.** Impact of pediatric AA on quality of life according to disease severity

|  | Severity of AA* |            |            | p for trend <sup>†</sup> |
|--|-----------------|------------|------------|--------------------------|
|  | Mild            | Moderate   | Severe     |                          |
| Total case                               | 145 (100.0)     | 61 (100.0) | 62 (100.0) |                          |
| CDLQI                                    |                 |            |            | <0.001                   |
| Median                                   | 3               | 6          | 10         |                          |
| IQR                                      | 6               | 11         | 9          |                          |
| Banding                                  |                 |            |            | <0.001                   |
| No effect at all on patient's life       | 48 (33.1)       | 14 (23.0)  | 5 (8.1)    |                          |
| Small effect on patient's life           | 58 (40.0)       | 17 (27.9)  | 17 (27.4)  |                          |
| Moderate effect on patient's life        | 29 (20.0)       | 14 (23.0)  | 21 (33.9)  |                          |
| Very large effect on patient's life      | 6 (4.1)         | 10 (16.4)  | 12 (19.4)  |                          |
| Extremely large effect on patient's life | 4 (2.8)         | 6 (9.8)    | 7 (11.3)   |                          |
| mDFI score                               |                 |            |            | <0.001                   |
| Median                                   | 6               | 10         | 12         |                          |
| IQR                                      | 8               | 11         | 13         |                          |
| Banding                                  |                 |            |            | <0.001                   |
| No effect at all on family's life        | 20 (13.8)       | 4 (6.6)    | 4 (6.5)    |                          |
| Small effect on family's life            | 59 (40.7)       | 11 (18.0)  | 12 (19.4)  |                          |
| Moderate effect on family's life         | 38 (26.2)       | 22 (36.1)  | 16 (25.8)  |                          |
| Very large effect on family's life       | 20 (13.8)       | 11 (18.0)  | 14 (22.6)  |                          |
| Extremely large effect on family's life  | 8 (5.5)         | 13 (21.3)  | 16 (25.8)  |                          |
| Burden of AA                             |                 |            |            |                          |
| >\$1,000 <sup>‡</sup>                    | 32 (22.1)       | 27 (44.3)  | 43 (69.4)  | <0.001                   |
| >24 hours <sup>§</sup>                   | 22 (15.2)       | 20 (32.8)  | 25 (40.3)  | <0.001                   |
| >30 times <sup>  </sup>                  | 15 (10.3)       | 16 (26.2)  | 28 (45.2)  | <0.001                   |

Values are presented as number (%). AA: alopecia areata, CDLQI: Children's Dermatology Life Quality Index, IQR: interquartile range, mDFI: modified Dermatitis Family Impact. \*The severity was assessed by the percentage of hair loss: mild, 0%~25%; moderate, 26%~75%; severe, 76%~100%. <sup>†</sup>For trend analysis, Jonckheere's trend test or the linear by linear association test was used. <sup>‡</sup>Total money spent on AA treatment for a year. <sup>§</sup>Total time spent on AA treatment during recent three months. <sup>||</sup>Average number of hospital visits per year for the treatment AA.

more, AA is not about "just hair" for adolescents but also impacts their identity and societal connections; therefore, more careful attention is needed by physicians<sup>22</sup>.

In addition to the QoL of the patients and their family members, we also evaluated the treatment-related economics and time burden. Two-thirds of severe AA patients spent more than \$1,000 a year, and the total amount of time spent on the treatment increased proportionally to the disease severity. One study described that the average out-of-pocket cost in AA was \$1,354, similar to psoriasis; this financial distress is considered to have a negative effect on the QoL of family members<sup>23</sup>. There are effective treatments such as biologics for psoriasis, but for

AA, there are currently no effective treatments. Therefore, AA presents lower cost-effectiveness than other skin diseases, which can be one of the major factors affecting the QoL of family members. For the time burden, total time spent on AA treatment and the number of hospital visits increased as the severity of AA increased. In particular, the time burden is higher than for other skin diseases because immunotherapy typically requires a weekly visit to the hospital, which can affect not only the time of children but also the work hours of family members.

Our study has limitations in that it was difficult to reflect the patient's situation at the time of the questionnaire in the results. Only the severity at the time of the survey was re-

flected in the QoL interpretation; the duration of disease or social support was not considered together. Another possible limitation is that the efficacy was not objectively evaluated but subjectively evaluated by the patients and their family members. Despite these limitations, this study is the first, to the best of our knowledge, to describe the QoL felt by the family members in pediatric AA; in particular, the severity of the disease had a significant effect on the QoL of family members. The strength of this study is that we not only evaluated the QoL of family members but also speculated on the factors that affect QoL by examining the efficacy and satisfaction of previous treatment profiles and burden on the family and its associated severity of the disease. In addition, our study is a multicenter nationwide study that has recruited patients from various institutions.

In conclusion, pediatric AA significantly impacts the QoL of patients as well as family members. The treatment responses and the economic and time burden are associated with the severity of the disease and might be a factor that affects the QoL. In particular, this result is related to the severity of the disease. Therefore, physicians should guide their patients and family members with appropriate information and provide emotional support. If necessary, physicians need should suggest psychological interventions to their patients, guided by psychologists and other trained mental health professionals.

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## CONFLICTS OF INTEREST

The authors have nothing to disclose.

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## DATA SHARING STATEMENT

The data that support the findings of this study are available

from the corresponding author upon reasonable request.

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## REFERENCES

1. Simakou T, Butcher JP, Reid S, Henriquez FL. Alopecia areata: a multifactorial autoimmune condition. *J Autoimmun* 2019;98:74-85.
2. Olsen EA, Hordinsky MK, Price VH, Roberts JL, Shapiro J, Canfield D, et al. Alopecia areata investigational assessment guidelines: Part II. National alopecia areata foundation. *J Am Acad Dermatol* 2004;51:440-447.
3. Toussi A, Barton VR, Le ST, Agbai ON, Kiuru M. Psychosocial and psychiatric comorbidities and health-related quality of life in alopecia areata: a systematic review. *J Am Acad Dermatol* 2021;85:162-

- 175.
4. Jun M, Keum DI, Lee S, Kim BJ, Lee WS. Quality of life with alopecia areata versus androgenetic alopecia assessed using hair specific Skindex-29. *Ann Dermatol* 2018;30:388-391.
  5. Putterman E, Patel DP, Andrade G, Harfmann KL, Hogeling M, Cheng CE, et al. Severity of disease and quality of life in parents of children with alopecia areata, totalis, and universalis: a prospective, cross-sectional study. *J Am Acad Dermatol* 2019;80:1389-1394.
  6. Pustišek N, Vurnek Živković M, Šitum M. Quality of life in families with children with atopic dermatitis. *Pediatr Dermatol* 2016;33:28-32.
  7. Poachanukoon O, Visitsunthorn N, Leurmarkul W, Vichyanond P. Pediatric Asthma Quality of Life Questionnaire (PAQLQ): validation among asthmatic children in Thailand. *Pediatr Allergy Immunol* 2006;17:207-212.
  8. Lewis-Jones MS, Finlay AY. The Children's Dermatology Life Quality Index (CDLQI): initial validation and practical use. *Br J Dermatol* 1995;132:942-949.
  9. Lawson V, Lewis-Jones MS, Finlay AY, Reid P, Owens RG. The family impact of childhood atopic dermatitis: the dermatitis family impact questionnaire. *Br J Dermatol* 1998;138:107-113.
  10. Janković S, Perić J, Maksimović N, Ćirković A, Marinković J, Janković J, et al. Quality of life in patients with alopecia areata: a hospital-based cross-sectional study. *J Eur Acad Dermatol Venereol* 2016;30:840-846.
  11. Olsen JR, Gallacher J, Finlay AY, Piguet V, Francis NA. Quality of life impact of childhood skin conditions measured using the Children's Dermatology Life Quality Index (CDLQI): a meta-analysis. *Br J Dermatol* 2016;174:853-861.
  12. Dodington SR, Basra MK, Finlay AY, Salek MS. The Dermatitis Family Impact questionnaire: a review of its measurement properties and clinical application. *Br J Dermatol* 2013;169:31-46.
  13. Park CK, Park CW, Lee CH. Quality of life and the family impact of atopic dermatitis in children. *Korean J Dermatol* 2007;45:429-438.
  14. Conic RZ, Tamashunas NL, Damiani G, Fabbrocini G, Cantelli M; Young Dermatologists Italian Network, Bergfeld WF. Comorbidities in pediatric alopecia areata. *J Eur Acad Dermatol Venereol* 2020;34:2898-2901.
  15. Paller A, Jaworski JC, Simpson EL, Boguniewicz M, Russell JJ, Block JK, et al. Major comorbidities of atopic dermatitis: beyond allergic disorders. *Am J Clin Dermatol* 2018;19:821-838.
  16. Hoffmann R, Happle R. Topical immunotherapy in alopecia areata. What, how, and why? *Dermatol Clin* 1996;14:739-744.
  17. Auriemma M, Vianale G, Amerio P, Reale M. Cytokines and T cells in atopic dermatitis. *Eur Cytokine Netw* 2013;24:37-44.
  18. You HR, Kim SJ. Factors associated with severity of alopecia areata. *Ann Dermatol* 2017;29:565-570.
  19. Ražnatović Đurović M, Janković J, Ćirković A, Sojević Timotijević Z, et al. Impact of atopic dermatitis on the quality of life of children and their families. *Ital J Dermatol Venerol* 2021;156:29-35.
  20. de Jager ME, van de Kerkhof PC, de Jong EM, Seyger MM. A cross-sectional study using the Children's Dermatology Life Quality Index (CDLQI) in childhood psoriasis: negative effect on quality of life and moderate correlation of CDLQI with severity scores. *Br J Dermatol* 2010;163:1099-1101.
  21. Beattie PE, Lewis-Jones MS. An audit of the impact of a consultation with a paediatric dermatology team on quality of life in infants with atopic eczema and their families: further validation of the infants' dermatitis quality of life index and dermatitis family impact score. *Br J Dermatol* 2006;155:1249-1255.
  22. de Vere Hunt I, McNiven A, McPherson T. A qualitative exploration of the experiences of adolescents with alopecia areata and their messages for healthcare professionals. *Br J Dermatol* 2021;184:557-559.
  23. Li SJ, Mostaghimi A, Tkachenko E, Huang KP. Association of out-of-pocket health care costs and financial burden for patients with alopecia areata. *JAMA Dermatol* 2019;155:493-494.