Alopecia areata is associated with impaired health-related quality of life: A survey of affected adults and children and their families

To the Editor: Alopecia areata (AA) negatively affects health-related quality of life (HRQoL) among adults.[1] AA's effect on HRQoL among children and family members of affected individuals has not been well described, with only 1 study of children with AA.[2]

To further understand the impact of AA on children and adults, we developed an anonymous Qualtrics (Qualtrics, Provo, UT) questionnaire containing the HRQoL instruments Dermatology Life Quality Index (DLQI) for patients with AA ages 17 years and older, Children's Dermatology Life Quality Index (CDLQI) for ages 4 to 16, Family Dermatology Life Quality Index (FDLQI)[3] for adult family members, and depression screens Patient Health Questionnaire-9A for Adolescents ages 12 to 17 years or the Patient Health Questionnaire-9 for adults. This was distributed at a patient conference and online through the associated listserv. Multivariate regression models were constructed by using independent variables that were chosen a priori (Supplemental Table I; available at http://www.jaad.org). Spearman correlations and Wilcoxon rank sum tests were conducted using complete case analysis and in R Statistical Package software.[4] This study was approved by Yale's institutional review board.

A total of 292 adults, 91 children, and 229 family members were included (Table I). Overall, adults tried 2.9 ± 1.4 medical therapies, including medications and procedures, and children tried 2.1 ± 1.4. Additionally, 37.9% of subjects reported trying alternative therapies for AA, most frequently, herbal remedies. In all, 77.1% of adults reported impairment in HRQoL (mean DLQI, 7.7 ± 7.4) (Fig 1). Patients were most commonly and severely affected by feelings of embarrassment and self-consciousness, followed by effects on social/leisure activities. Older age at the time of questionnaire administration was predictive of worse HRQoL ($P = .0148$).

In all, 78.1% of children ages 4 to 16 years with AA reported impairment in HRQoL (CDLQI, 6.3 ± 5.9). Feelings of self-consciousness and skin symptoms were most frequently reported. Respondents reported the most severe impact on their choice of clothing and feelings of self-consciousness. Having a history of ever being seen by a mental health provider, such as a psychiatrist, psychologist, therapist, or counselor, predicted worse HRQoL ($P = .00757$). Poor DLQI/CDLQI scores correlated with poor scores on the depression screen ($r = 0.560$, $P < .001$ and $r = 0.417$, $P = .0196$, respectively).

Overall, family members reported a mean FDLQI of 6.7 ± 6.1. Emotional distress was the most frequently and severely affected. In families of children with AA, burden of care was great, and spending more than $5000 on treatment for AA was predictive of worse HRQoL in families ($P = .00128$). Families of children had worse FDLQI than families of adults (8.5 vs 5.6 [$P = .00028$]). Poor FDLQI in adults and in children correlated with poor scores on the depression screen ($r = 0.465$, $P < .001$ and $r = 0.694$, $P < .001$, respectively). When compared to the results of this study, quality of life among family members of patients with atopic dermatitis has been reported to be more severe (FDLQI, 13.6-17)[5,6] but is similar among family members of patients with psoriaisis (FDLQI, 8.8).[7]

Table I. Demographic information and questionnaire scores for subjects with AA and their family members

Variable	Children with AA (n = 91)	Adults with AA (n = 292)	Family members (n = 229)
Male, n (%)	21 (34.4)	46 (27.9)	93 (40.6)
Female, n (%)	40 (65.6)	119 (72.1)	136 (59.4)
Age, mean (SD), y	10 (2.92)	41 (15.3)	45.7 (12.9)
DLQI/CDLQI, mean (SD)	6.3 (5.9)	7.7 (7.4)	n/a
PHQ-9-A or PHQ-9, mean (SD)	5.1 (5.1)	7.4 (6.8)	n/a
FDLQI overall, mean (SD)	n/a	n/a	6.7 (6.1)
FDLQI (children's family member)	n/a	n/a	8.5 (6.7)
FDLQI (adult's family member)	n/a	n/a	5.6 (5.5)
PHQ-9 (family member), mean (SD)	n/a	n/a	3.7 (5.2)

AA, Alopecia areata; *CDLQI*, Children's Dermatology Life Quality Index; *DLQI*, Dermatology Life Quality Index; *FDLQI*, Family Dermatology Life Quality Index; *n/a*, not applicable; *PHQ-9A*, Patient Health Questionnaire-9A for Adolescents; *SD*, standard deviation.

*Rows do not add up to total numbers (91, 292, and 229) because of missing values attributed to lack of response to questions, all of which were optional except age. Percentages reported are of the number of applicants who did respond to each question rather than the entire population of the survey. All values noted are for subjects at the time of questionnaire administration.

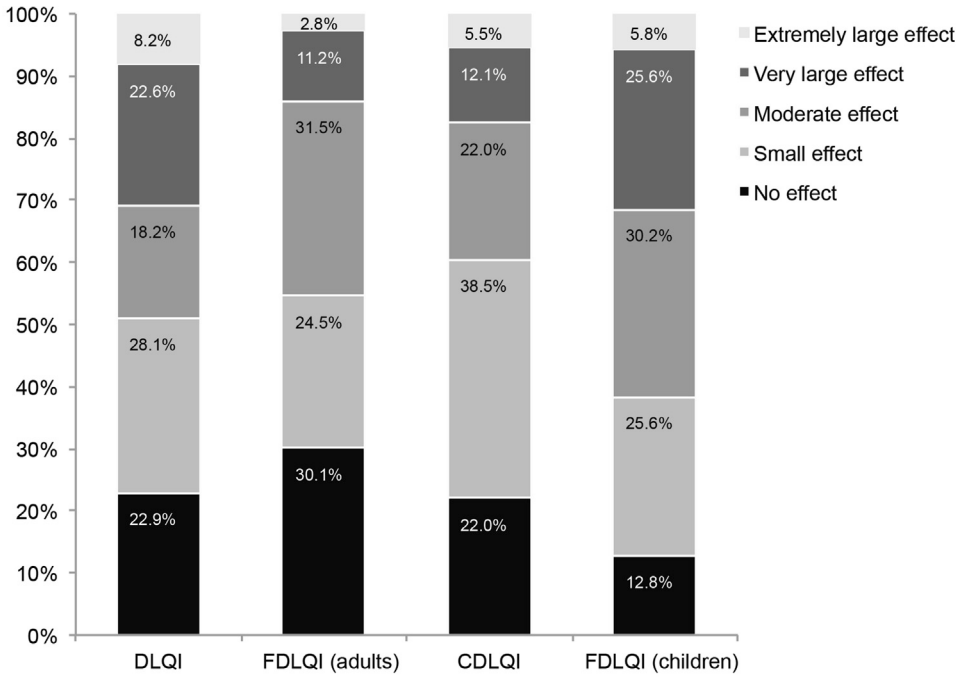

Fig 1. Percentage of each population (adults with alopecia areata [AA] using the Dermatology Life Quality Index [DLQI], family members of adults with AA using the Family Dermatology Life Quality Index [FDLQI], children with AA using Children's Dermatology Life Quality Index [CDLQI], and family members of children with AA using FDLQI) who reported no effect (0-1), a small effect (2-5 for the DLQI/FDLQI and 2-6 for the CDLQI), a moderate effect (6-10 for the DLQI/FDLQI and 7-12 for the CDLQI), a very large effect (11-20 for the DLQI/FDLQI and 13-18 for the CDLQI), or an extremely large effect (21-30 for the DLQI/FDLQI, and 19-30 for the CDLQI) of AA on their HRQoL.

The negative effects of AA on HRQoL are far-reaching. Children with AA suffer poor HRQoL, and notably, so do their parents. Similarly, the negative impact of AA on adults is also seen in their spouses. Parents reported worse impairment in HRQoL than did their children with AA. Patients reported seeing multiple physicians for AA and trying multiple therapies, including alternative therapies, suggesting patient dissatisfaction with care. Lack of clinical improvement after multiple providers, failed treatments, and financial expense may exacerbate the emotional burden of disappointment. These results highlight the need not only for effective treatment for AA but also for assessment and acknowledgment of the impact of AA on patients and their families to identify those who may benefit from early psychologic evaluation.

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A technique for more precise distinction between catagen and telogen human hair follicles ex vivo

To the Editor: Identifying human anagen hair follicles (HFs) ex vivo is readily accomplished by stereomicroscopic analysis. However, to reliably distinguish other hair cycle stages, namely late catagen and telogen, by stereomicroscopic analysis alone is difficult, and the gold standard remains histologic analysis, which obviously precludes their use for ex vivo culture.[1,2] In this study, we sought to determine whether methylene blue, a staining that can be applied to living cells,[3] helps to distinguish late catagen from telogen HFs intravitally for subsequent organ culture, thus expanding translational preclinical research into these poorly investigated, but clinically important, human hair cycle stages.

Using follicular unit hair transplantation methodology (by grouping follicular units on the basis of the number of HFs they contain),[4] we recorded the number of anagen, catagen, and telogen follicles found in 800 follicular units from 8 white male patients (100 follicular units/patient) undergoing a standardized follicular unit extraction hair transplant procedure, with informed patient consent. Because anagen VI follicles are easily identifiable,[1] only those follicular units that contained catagen or telogen HFs were further microdissected, photographed, immersed ~5 minutes in 0.02% methylene blue saline solution, fixed, and evaluated.

Intravital methylene blue staining enhanced anatomic HF structures on light microscopy (Fig 1, *A-C*) and permitted correct hair cycle stage classification using accepted, well-defined morphologic criteria,[2] such as the identification of a prominent epithelial strand (Fig 1, *A*), a key feature of late catagen HFs that is absent in telogen HFs. Correct hair cycle stage classification by this method was confirmed by Ki67 and TUNEL (terminal deoxynucleotidyl transferase dUTP nick-end labeling) immunofluorescence microscopy (Fig 1, *D*).

Importantly, methylene blue staining enabled correct identification of the hair stage of 95.63% of cases, compared with 72.02% of nonmethylene blue–stained HFs. Thus, this simple, economical, and fast technique constitutes a significant methodologic advance in human hair research, since it facilitates ex vivo research on human catagen and telogen HFs without having to resort to histology.

Our analyses revealed a higher percentage of catagen than telogen HFs in all patients (89% anagen, 6.7% catagen, and 3.6% telogen). This data support the previous proposal that the percentage of scalp telogen HFs has been overestimated[2] and suggest we should question the accepted standard percentages (80%-89% anagen, 10%-20% telogen, and 1%-5% catagen) in the literature, which were based on transversal histologic sections[5] and phototrichograms, neither of which can definitively distinguish between late catagen and telogen HFs. Although, in our study, the HFs were from patients with androgenetic alopecia (AGA) and the ratio of anagen:catagen:telogen might differ in comparison with individuals without AGA, we believe that our data are unlikely to reflect sampling bias, as HFs were harvested from occipital scalp, generally unaffected by AGA. We propose that hair stage distribution in healthy human scalp needs a more systematic re-evaluation, including comparative studies with histologic sections. This is important when assessing candidate hair growth–modulating agents, considering minor shifts in the percentage of telogen or catagen HFs can result in major changes in the degree of visible effluvium.

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Supplemental Table I. Independent variables used in multivariate regression models

DLQI/CDLQI	FDLQI
Age	Age
Sex	Sex
Clinical diagnosis of severity	Family member's age
Years of disease duration	Family member's sex
Years since significant hair loss	Presence of medical illness
Self-rated severity of hair loss	Income
History of being seen by a mental provider	Marital status
Status of medical insurance	Money spent on treating AA
	Level of education
	Family-rated severity of hair loss

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