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ORIGINAL ARTICLE

Psychiatric symptomatology and health-related quality of life in children and adolescents with alopecia areata

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Abstracts

Background There is a very limited amount of data available regarding the relationship between alopecia areata (AA) and psychiatric morbidity and quality of life (QoL) in children and adolescents.

Objectives The aim of this study was to determine the psychiatric state and health-related quality of life (HRQL) of children and adolescents with AA, as well as their relationships with clinical parameters.

Methods The sample consisted of 74 children with AA aged 8–18 years. Questionnaires were used to evaluate the psychiatric status and HRQL of the patients. The study and control groups were divided into child and adolescent groups to exclude the effect of puberty on psychological condition.

Results In the child group, patients had higher state anxiety and trait anxiety scores; they also had lower parent-rated psychosocial and total area HRQL scores than the controls did. In addition, the depression score was prone to show a positive relationship with having AA in the children. In the adolescent group, however, only the state anxiety score had a significant association with AA. All of the parent-rated HRQL scores were also prone to being lower compared with controls in this age group. Regarding determinants of HRQL, prolonged disease duration and later disease onset had positive effects, whereas severity of scalp involvement, trait anxiety and depression had negative effects, for the sample as a whole.

Conclusions Alopecia areata is associated with poor psychiatric status and QoL, especially in childhood. The impact of the disease on QoL occurs through both clinical and psychiatric parameters.

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Conflicts of interest

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Introduction

The disfiguring nature of alopecia areata (AA) may have profound psychological and social effects on sufferers.[1–9] Although there are conflicting results, adult studies have generally reported that psychological stress, frequency of psychiatric disease and levels of psychiatric symptoms are higher among patients with AA compared with the general population.[1–4] AA also has been shown to have a negative impact on quality of life (QoL) in adulthood.[5,6] However, despite the majority of cases first appearing prior to age 20, there is very little documentation about the psychological status and QoL of children and adolescents with AA.[7–12]

Different studies, conducted on small clinical samples, have reported a higher rate of anxiety and depressive disorders in children and adolescents with AA.[7–9] A retrospective epidemiologic study also observed an increasing risk for depression in patients with AA younger than 20 years.[3] However, studies used self-report rating scales to measure anxiety and depression scores yielded conflicting results.[7,9,10] There are also a few studies examining the impact of the disease on QoL in these age groups that did not include healthy controls.[11,12]

The objectives of the study were to assess the depression, anxiety and QoL levels of children and adolescents with AA. We also examined the association between psychological functioning and

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clinical variables related to AA, and tested the determinants of QoL in these patients.

Materials and methods

The sample consisted of 74 children and adolescents with AA who applied to three different dermatology outpatient clinics in Turkey. All participants were outpatients, and their diagnosis of AA was made by dermatologists. The inclusion criteria were as follows: 8–18 years of age, at least 1-month duration of illness, no systemic treatments (e.g. systemic steroids, cyclosporine and/or psychotropic drugs) for at least 3 months prior to the study and no other chronic disease. The study protocol was reviewed and approved by the institutional ethical committee. The patients, control subjects and their parents who agreed to take part read a patient information sheet and provided written informed consent. The control group was composed of healthy children from the local community, matched for age, gender and education level of the parents. The same inclusion criteria applied to the controls. Both the study and control groups were divided into two age groups – child (8–12 years, $n = 40$ and $n = 33$ respectively) and adolescent (13–18 years, $n = 34$ and $n = 32$ respectively) – to consider the effects of puberty on psychological functioning.

Demographic variables and clinical severity

A standardized form was used to collect demographic and clinical data. The severity of the AA was measured with the Severity of Alopecia Tool (SALT) score, which was developed by National Alopecia Areata Foundation Working Committee, based on the combination of extent and density of scalp hair loss.[13] The scoring was as follows (S = scalp hair loss): S0 = No hair loss ($n = 0$), S1 = ≤25% hair loss ($n = 64$), S2 = 26–50% hair loss ($n = 5$), S3 = 51–75% hair loss ($n = 2$), S4 = 76–99% hair loss ($n = 1$) and S5 = 100% hair loss ($n = 2$).

Psychological measures

The Child Depression Inventory (CDI), a self-report depression scale for children 6–18 years old, was used to measure depressive symptoms for the previous 2 weeks.[14] The reliability study of the Turkish version was conducted.[15]

The State-Trait Anxiety Inventories for Children (STAIc) is a Likert-type scale with two subscales – state and trait anxiety.[16] State anxiety defines the anxiety experienced under certain conditions, at a certain time, and it changes with changes in external factors. On the other hand, trait anxiety defines the general feelings of the individual and reflects the individual's general predisposition to anxiety. The inventories were adapted to Turkish by Özusta.[17]

The Pediatric Quality of Life Inventory Parent and Child versions (PedsQL-P and -C), developed to evaluate the health-related quality of life (HRQL) in children, were also completed by participants.[18] Although this scale is not specific for skin diseases, it has been used in children with many different disorders. It contains two subscale scores – psychosocial and physical health – and a total score. The scale contains both parent and child versions for physical and psychosocial functioning; a higher PedsQL total score indicates better HRQL. In this study, the PedsQL-P scale was administered to the mother. If the mother was unavailable to complete the questionnaires, other caregivers were asked to do so. We used the validated Turkish versions of the questionnaires in this study.[19,20]

Statistical methods

The analysis of the data was performed by SPSS 20.0-AMOS statistical software (Chicago, IL, USA). While normality of the distribution of variables was acceptable, the Student's *t*-test, in other cases, the Mann–Whitney *U*-test were used to analyse differences between the patient and control groups. Pearson or Spearman correlation coefficients were calculated to examine the relationship between psychological test scores and clinical variables. Taking into account the risk of type I error due to a multiple testing effect, only findings with a P value <0.01 (two-tailed) were considered significant (and those with $P < 0.05$ as trends) for these analyses.

To detect the clinical and psychiatric determinants of QOL scores, we used the structural equation modelling (SEM). SEM allows both confirmatory and exploratory modelling, therefore being suited to both testing and development of theories. One of the most important steps in SEM is conducting a confirmatory factor analysis to examine whether the measurement model is acceptable.[21] To evaluate the goodness of fit of a model the relative/normed chi-square (χ^2/df), the root mean square error of approximation (RMSEA) statistic, the goodness-of-fit statistic (GFI) and the comparative fit index (CFI) are used. Although there is no consensus regarding an acceptable ratio for χ^2/df, authors usually recommend it to be under 2.0.[22] For RMSEA, the lower limit is close to 0 whereas the upper limit should be <0.08 for a well-designed model. For GFI and CFI, a cut-off criterion of ≥0.95 have been recommended, but ≥0.90 have been also considered as acceptable.[22,23] Because CFI is being one of measures least effected by sample size, this index is especially regarded as important for observing the model fit.[24] All of those parameters would be fulfilled for an acceptable model. Because there is no risk of type I error for SEM analysis, the significance was set at a level of 0.05 (two-tailed) in this analysis.

Results

The mean age of the sample was 12.1 ± 2.8 years (range 8–18 years), which consisted of 41 (55.4%) boys and 33 (44.6%) girls. No significant differences were found between the patient and control groups in terms of age, gender and parental education. The most frequently involved area was the scalp (97.3%), followed by nail (23.0%) and body (12.2%). The sociodemographic

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Table 1 Clinical and demographic features of children and adolescents with AA and control subjects

Demographic variables	8–12 years		13–18 years		Total	
	Patients (*n* = 40)	Controls (*n* = 33)	Patients (*n* = 34)	Controls (*n* = 32)	Patients (*n* = 74)	Controls (*n* = 65)
Age, years	10.0 ± 1.6	9.8 ± 1.4	14.6 ± 1.5	14.8 ± 1.6	12.1 ± 2.8	12.3 ± 2.9
Gender, M/F	20/20	13/20	21/13	17/15	41/33	30/35
Age of onset of AA, years	9.4 ± 1.9	–	12.9 ± 3.2	–	11.0 ± 3.1	–
Duration of illness, months	9.4 ± 15.3	–	18.4 ± 35.6	–	13.5 ± 26.8	–
Father's educational level, years	6.8 ± 3.0	7.8 ± 3.3	7.80 ± 3.1	8.1 ± 3.6	7.2 ± 3.1	7.9 ± 3.4
Mother's educational level, years	5.2 ± 3.6	6.3 ± 2.4	5.8 ± 2.6	6.3 ± 2.7	5.5 ± 3.2	6.3 ± 2.5

AA, alopecia areata.

and clinical features of the study population are summarized in Table 1.

In the child group, the mean state and trait anxiety scores were significantly higher, and the parent-rated psychosocial and total HRQL scores were significantly lower for patients than for controls. The depression score was prone to being higher for patients with AA in this age group. In the adolescent group, only the state anxiety score was observed to have a significant association with having AA. There were also trends for lower parent-rated physical health, psychosocial and total HRQL scores in adolescents with AA (Table 2).

The same analysis was also performed for the whole group, and the state anxiety was found to be higher and parent-rated psychosocial and total HRQL scores were found to be lower for patients than for controls. There were also trends for higher depression and trait anxiety scores and lower child-rated total HRQL and parent-rated physical health HRQL scores in the entire sample (Table 2).

Relationships between clinical variables such as age at disease onset, location and severity of the AA and length of the illness and psychological test scores were evaluated in both age groups and in the total subject cohort. No significant associations were found between clinical variables and test scores in the study groups, except for the positive correlation between age at disease onset and parent-rated physical and total HRQL scores ($r_s = 0.46$, $P = 0.007$; $r_s = 0.55$, $P = 0.001$ respectively) in the adolescent group.

We also tested the determinants of HRQL scores in patients with AA. Because sample size is important to establish acceptable models in SEM analyses, the impact of the psychiatric, clinical and sociodemographic variables on QoL were evaluated only for the entire sample. The coefficients and GFIs for the model are presented in Figure 1. The model showed that the severity of scalp involvement had a negative predictive effect, and length of the disease had a positive predictive effect on the child-rated physical HRQL score (Fig. 1). On the other hand, age at AA onset positively predicted the total HRQL score (a total score consisted of all of the PedsQL scores in the SEM). Regarding the relationship between the patients' psychiatric status and QoL, trait anxiety and depression scores negatively predicted the psychosocial HRQL score (a total score consisted of PedsQL-P psychosocial and PedsQL-C psychosocial in the SEM). However, state anxiety did not show any association with HRQL scores.

Discussion

There are very limited data available regarding the relationship between AA and psychiatric symptoms and QoL in childhood and adolescence.[7–12] Existing studies also have not examined children and adolescents as distinct groups for taking into account the possible effects of puberty on psychiatric status. This present study produced data that show clearly that trait anxiety and state anxiety levels of the patients with AA were higher in the children group and both groups respectively. The study also provides preliminary evidence relating AA to depressive mood in children, whereas a similar relationship was not found in adolescents. Regarding the impact of AA on QoL, our findings observed that AA seems to interfere in the daily life of both children and adolescents with AA, especially in the psychosocial area, and both clinical and psychiatric variables have roles in determining the QoL impairment of these patients.

Studies have usually reported a higher ratio of psychiatric diagnoses, including depression and anxiety disorders, in AA patients of all ages.[1,3,4,6,8] However, the results of the studies used self-report inventory have been inconsistent, especially in childhood and adolescence.[7,9,10,25] Our study has provided different findings about the relationship between AA and anxiety and depression for child and adolescent groups. We suggest that this observation highlights the importance of considering the effects of puberty on psychiatric status while investigating the association between AA and psychiatric disorders in young patients. Our previous studies regarding the impact of psoriasis and vitiligo on the psychiatric status of children and adolescents provided similar results; these psychodermatoses were related to depression only in the children group.[26,27] Given the previous

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Table 2 Comparison of children and adolescents with alopecia areata and age-matched controls

	8–12 years				13–18 years				Total patients			
	Patients (*n* = 40)	Controls (*n* = 33)	t or z	*P*	Patients (*n* = 34)	Controls (*n* = 32)	t or z	*P*	Patients (*n* = 74)	Controls (*n* = 65)	t or z	*P*
CDI	9.4 ± 6.8	6.0 ± 3.3	2.30†	0.021	11.5 ± 7.0	10.5 ± 7.2	0.72†	0.472	10.4 ± 6.9	8.2 ± 6.1	2.09†	0.036
STAI-C												
State-anxiety	43.5 ± 5.1	38.0 ± 5.82	3.16*	0.003	44.9 ± 4.4	38.4 ± 8.1	4.04*	<0.001	44.2 ± 4.8	38.0 ± 8.4	5.15*	<0.001
Trait-anxiety	37.0 ± 7.1	33.0 ± 4.4	2.95*	0.004	35.6 ± 6.8	35.2 ± 6.0	0.19*	0.847	36.3 ± 6.9	34.0 ± 5.4	2.22*	0.028
PedsQL-C												
Physical health	71.7 ± 16.0	75.6 ± 15.3	−0.99†	0.322	75.5 ± 16.3	80.9 ± 13.0	−1.50*	0.139	73.4 ± 16.1	78.3 ± 14.4	−1.88*	0.062
Psychosocial	72.6 ± 15.9	77.3 ± 11.8	−1.04†	0.299	76.3 ± 11.8	79.7 ± 9.0	−1.33*	0.190	74.3 ± 14.2	78.6 ± 10.5	−1.74†	0.082
Total	72.3 ± 14.5	76.7 ± 10.5	−1.49*	0.141	76.1 ± 11.8	80.1 ± 9.2	−1.57*	0.123	74.0 ± 13.4	78.5 ± 10.0	−1.96†	0.048
PedsQL-P												
Physical health	72.4 ± 17.7	75.5 ± 16.1	−0.79*	0.439	64.1 ± 17.2	74.4 ± 19.1	−2.30*	0.025	68.5 ± 17.8	74.9 ± 17.7	−2.09*	0.039
Psychosocial	70.8 ± 13.9	81.1 ± 10.9	−3.54*	0.001	69.0 ± 14.9	76.6 ± 11.2	−2.54†	0.011	70.0 ± 14.3	79.0 ± 11.3	−4.02†	<0.001
Total	72.1 ± 13.0	79.1 ± 10.4	−2.63†	0.009	68.2 ± 75.9	75.9 ± 13.1	−2.34*	0.022	70.3 ± 13.4	77.6 ± 11.9	−3.38*	0.001

*Student's *t*-test.

†Mann–Whitney *U*-test.

CDI, child depression inventory; STAI-C, state-trait anxiety inventories for children; PedsQL-C, pediatric quality of life inventory child version; PedsQL-P, pediatric quality of life inventory parent version.

and current data regarding the relationship between psychodermatosis and psychiatric conditions, one could suggest that this relationship might be more prominent in preadolescent children. In our previous report, we considered that this might have been related to the immature coping skills of young children with burden of the physical diseases or that the existing scales were not sufficiently sensitive to measure psychiatric problems in adolescents. It also can be suggested that the role of the presence of the psychiatric disorders on the susceptibility to dermatological disease might be stricter in early ages.

This study shows that parents of children with AA reported significantly worse QoL in psychosocial areas compared with controls. Findings also showed a tendency for adolescents with AA to be associated with worse QoL in both psychosocial and physical areas. Previous studies regarding the impact of AA on QoL have yielded very limited data on childhood and adolescents, and they have not included healthy control groups.[11,12] Although different studies have reported discrepant results, our knowledge about the relation between AA and QoL has relied considerably on adult patients.[5,6,25] Dubois[6] found that QoL was impaired in patients with AA, with the most influenced domains being self-perception, mental health and social life. However, Güleç[25] reported that only the social functioning score was worse in the patient group. Our study observed a marked burden on QoL in children and adolescents, particularly in the psychosocial area, and these results seem to be consistent with previous reports.

In this study, clinical characteristic of the patients including the age at disease onset, location and severity of the AA and length of the illness did not show an association with anxiety and depression scores in both child and adolescent groups. As regards QoL, age at disease onset had a positive effect on parent-rated QoL scores in adolescents. However, no relationship was detected among the QoL and other clinical variables in both age groups. To our knowledge, no data were available regarding the effect of clinical variables on the psychosocial well-being in children with AA. Given the studies related to other psychodermatoses, they reported conflicting results and their findings are also far from to give a definitive result about these issues.[26–29]

We have also evaluated the distribution of possible clinical and psychiatric determinants of QoL and the association between these determinants and QoL in the entire subject group. The data have shown that prolonged disease duration and later disease onset had positive effects on QoL; however, the severity of scalp involvement, trait anxiety and depression had negative effects on QoL. Given the positive predictor effect of disease duration, we have had similar findings in our previous studies regarding children with psoriasis and vitiligo in correlation analyses, and this has led us to consider that the prolonged disease duration might enhance compliance and coping skills in children with chronic dermatological disease.[26,27] The impact of age at disease onset could also be due to

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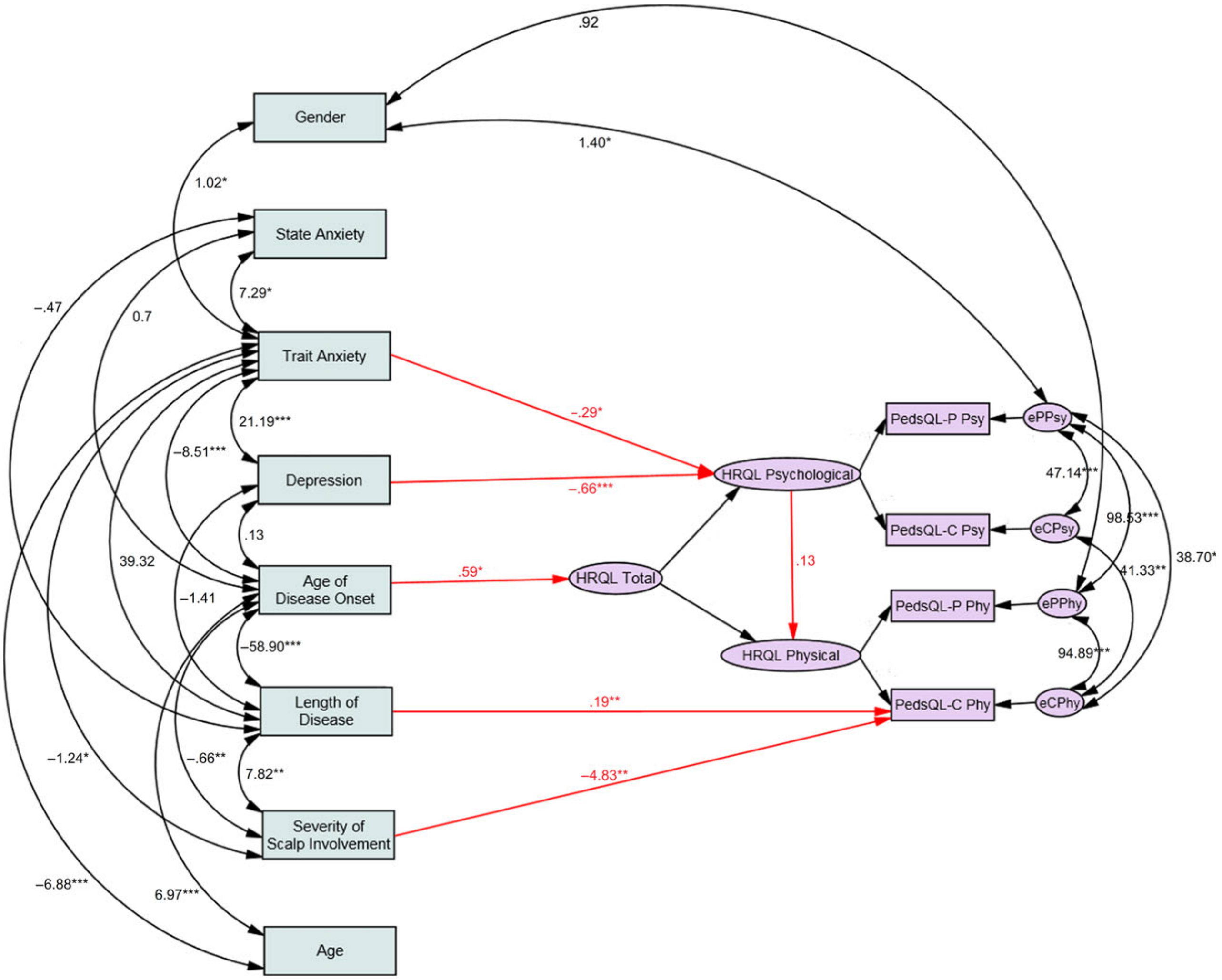

Figure 1 Structural model for the determinants of the health related quality of life in children and adolescent with alopecia areata. HRQL, health related quality of life; PedsQL-P Psy, pediatric quality of life inventory parent version-psychosocial; PedsQL-P Phy, pediatric quality of life inventory parent version-physical health; PedsQL-C Psy, pediatric quality of life inventory child version-psychosocial; PedsQL-C Phy, pediatric quality of life inventory child version-physical health; e, error. $\chi^2 = 50.34$; DF = 35 $\chi^2/df = 1.438$ goodness-of-fit index = 0.901; comparative fit index = 0.960; root-mean-square error of approximation = 0.078; $P = 0.045$. $^*P < 0.05$; $^{**}P < 0.01$; $^{***}P < 0.001$.

increasing coping skills of the patients. Therefore, the findings of this study regarding positive predictors of QoL in children and adolescents with AA are in accordance with the results of previous psychodermatosis studies. Our results regarding negative predictors of QoL also might be considered as comparable with the literature. It has been shown that depressive symptoms are related to poor QoL in adults with AA.[5] A correlation between severity of scalp involvement and QoL impairment has been reported, as well.[5] However, in a recent study, Reid reported that clinical assessment of hair loss severity did not predict the patient's QoL.[30]

There are some limitations that should be taken into consideration when interpreting the results. First, we selected study samples from patients attending outpatient clinics, implying that the majority were probably evaluated during disease exacerbations. Second, a structured psychiatric interview was not performed in the study and control groups, which might have prevented obtaining a broader view about the psychiatric status of the patients. Third, parents' education levels of our samples were relatively low and therefore this might have potentially influenced the sensitive interpretation of the PedsQL-P by parents. Finally, especially when taking into account that we wanted

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to assess children and adolescents as separate groups, the sample sizes of our study group were moderate, which might have prevented us from determining small group variances. Therefore, the possibility of a type II error should be considered. Because sample size is important to establish an acceptable model for SEM analyses, the small sample sizes also prevented detection of the determinants of QoL in the children and adolescents groups, separately.

In conclusion, this study shows that AA is related to poor psychiatric status and QoL in young patients, especially in the early ages. We showed in the SEM analysis that both clinical and psychiatric factors are determinants of the QoL impairments of the patients. Our study will be followed by further studies using prospective design to better identify the relationship between AA and psychological status and QoL in children and adolescents.

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