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Depression, Anxiety, and Dermatologic Quality of Life in Adolescents with Atopic Dermatitis

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To the Editor

The negative psychosocial impact of atopic dermatitis (AD) on quality of life is well established,[1–3] with itching, scratching, sleep loss, and social embarrassment among the most commonly reported difficulties contributing to school, work, financial, and social struggles. Increasing evidence suggests that depression and anxiety are also more common in adults with AD, and that the association of AD with these psychiatric symptoms may be influenced by factors such as AD disease severity, subjective vs. objective assessment of AD severity, and quality of life. No studies have objectively assessed the prevalence of depression and anxiety in youth with AD, or the association of these symptoms with AD severity or quality of life. With the world-wide growing prevalence of AD, and mounting evidence of the psychosocial and economic burden of this disease, identifying specific patterns and potential mechanisms of psychiatric symptom co-morbidity in age-defined populations is increasingly important for the development of targeted assessments and treatment interventions.

In this pilot study, we assessed rates of depressive and anxiety disorders in a clinical sample of adolescents with AD. The larger focus of the study was to examine the relationship of AD severity with depressive and anxiety symptoms (vs. disorders), and dermatologic quality of life. We proposed a theoretical model that increased AD severity would be associated with increased symptoms of depression and anxiety, and that decreased quality of life would

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mediate this relationship. Thirty-six adolescents (age 13–17; mean age 14.7) with a clinical diagnosis of AD were recruited from dermatology and pediatric clinics. Parents completed a questionnaire assessing demographic and medical history variables (see Methods and Table E1 in this article's Online Repository at www.jacionline.org). A board-certified dermatologist confirmed the AD diagnosis, and clinically assessed AD severity using the SCORing Atopic Dermatitis (SCORAD) index.[4] The SCORAD includes three AD severity scores: (1) Objective, including extent and intensity of lesions, (2) Subjective, including pruritus and sleep loss, and (3) Total AD score (objective + subjective). Current and lifetime DSM-IV diagnoses of depression and anxiety were assessed by experienced doctoral-level child and adolescent psychiatry clinicians using the Kiddie-Schedule for Affective Disorders and Schizophrenia-Present and Lifetime Version (K-SADS-PL) including separate adolescent and parent interviews; final diagnoses were determined by the expert clinician who integrated child and parent information.[5] Interviewers were blinded to study objectives and AD severity scores. Standardized, self-report measures assessing dermatologic quality of life, depressive symptoms, and anxiety symptoms included the Children's Dermatology Life Quality Index (CDLQI; 10 items), the Children's Depression Inventory (CDI; 27 items, 5 subscales), and the Multidimensional Anxiety Scale for Children (MASC; 39 items, 4 primary subscales), respectively (see Methods and Table E1 in this article's Online Repository at www.jacionline.org for further details). Pearson correlations were used to explore bivariate associations among variables. Heirarchical linear regressions were used to test theoretical pathways. All procedures were approved by the institutional review board, and informed consent was obtained from participants and their parents.

We compared rates of anxiety and depressive disorders in our sample to those of published, community studies of adolescents. Adolescents with AD had elevated rates of any current anxiety disorder (26%; 95% CI, 11.23, 40.19%) compared to community estimates (3–6%); social anxiety disorder was most common (14%; 95% CI, 7.35, 25.88%). Rates of current depressive disorders (9%; 95% CI, 0, 17.84%), and lifetime rates of anxiety (31%; 95% CI, 16.05, 46.81%) and depressive (17%; 95% CI, 4.66, 29.63%) disorders were elevated but did not substantially differ from published ranges (6%, 9–32%, and 12–24%, respectively) (Table I; and see Methods in this article's Online Repository at www.jacionline.org for details regarding these comparisons).

Next we assessed the relationship of AD severity with depression and anxiety symptoms. Objective and total measures of AD severity were not significantly associated with symptoms of depression (CDI Total score), or anxiety (MASC Total score) (Table II; also see Fig E1 in this article's Online Repository at www.jacionline.org). In contrast, subjective AD severity, and subscores of sleep loss and pruritus, were significantly correlated with symptoms of depression, but not with symptoms of anxiety. To assess the unique effects in predicting depressive symptoms, both sleep loss and pruritus were entered simultaneously into a multiple regression model as predictors for depression. The association of depressive symptoms with sleep loss remained significant ($p<.001$), but the association with pruritus became non-significant ($p=.40$).

Based on these finding, we developed a theoretical model hypothesizing that decreased quality of life (QOL) mediates the relationship between sleep loss and the development of depression given existing evidence of an association of QOL with both AD and depression.[2] Using hierarchical linear regression, sleep loss was entered in the first step of the regression model; QOL (CDLQI) was entered in the second step, and depression (CDI) was the outcome measure. Findings confirmed reduced QOL as a plausible link (i.e. mediator) between sleep loss and depressive symptoms. Shown statistically, the coefficient for sleep loss changed from significant in the first step ($\beta=.49$, $p=.002$) to non-significant when QOL was added in the second step ($\beta=.15$, $p=.33$), and the coefficient for QOL was significant

(p=.001), with a partial correlation coefficient of.55. There were no additional influences of key demographic and medical history variables, including age, gender, race, ethnicity, SES, BMI, pubertal status, comorbid allergic disorders (asthma, allergic rhinitis, urticaria), or use of glucocorticoid medications on sleep loss, depressive symptoms, or QOL (all ps >.05 and <.99).

This is the first study, to our knowledge, to assess the presence of DSM-IV depressive and anxiety disorders in adolescents with AD. Current anxiety disorders, and in particular, social anxiety disorder, diagnoses were most prevalent and exceeded community estimates. Findings may reflect the social stigma and embarrassment often described by patients with AD, and for adolescents, additional exacerbation of existing social sensitivity and self-consciousness characteristic of this period of development.[6]

This is also the first study to specifically investigate the relationship between AD severity, and symptoms of depression and anxiety, in adolescents. Interestingly, subjective report of sleep loss was the only AD severity measure found to be associated with symptoms of depression; no objective or subjective AD severity measures were related to symptoms of anxiety. Decreased dermatologic QOL was associated with both sleep loss and depressive symptoms, thus establishing a potential mediating role of QOL in this relationship. We suggest that chronic sleep loss contributes to emotional and physical fatigue that negatively impacts existing social sensitivity and social relationships central to an adolescent's QOL, and resultant increased depression. Alternatively, findings may reflect the negative impact of depression on QOL, with resulting exacerbation of sleep disturbance commonly associated with AD.[7] A longitudinal study examining the temporal nature of these relationships is needed to formally test possible causal pathways, including the potential impact of treatments for AD and sleep loss on depression and anxiety. Future investigations should also examine the unique relationships between AD severity, sleep, and anxiety/depression in a larger sample of adolescents with a wide range of AD severity, compared to a control group of adolescents without AD (e.g. other chronic skin disease), and include multi-informant derived subjective and objective measures of all key variables.

Depressive and anxiety symptom assessments were each limited to a single self-report measure in this study, whereas depression and anxiety disorders were determined by integrating information from child and parent standardized interviews by an expert clinician. Moreover, it is important to note that depression and anxiety symptom measures are designed to assess clinical symptoms that may or may not specifically predict the presence of depressive and anxiety disorders. For example, prior studies suggest that the MASC is limited as a screening instrument for DSM-IV diagnoses,[8] in contrast to the ability of the CDI to predict DSM-IV depressive disorders.[9] This may have contributed to reasons why anxiety disorders, but not anxiety symptoms, were elevated in this sample, in contrast to findings for depression. Future studies should consider comparison of different child and parent-report measures of anxiety and depression, with results of diagnostic clinical interviews, to further identify which symptoms are most salient in this group of youth.

Limitations of this study include the inability to assess causal directionality of the associations given the cross-sectional nature of the study, limited sample size, lack of a comparison group, and relatively few subjects with moderate or severe AD and psychiatric symptom severity. Finally, rates of psychiatric disorders were compared to historical community prevalence estimates, and increased rates of current anxiety disorders may, in part, also reflect increased bias of study participation by subjects with more current anxiety.

In conclusion, anxiety and depressive disorders were prevalent in this pilot study of adolescents with AD. With respect to anxiety and depressive symptoms, results support a

theoretical model suggesting that in adolescents, decreased QOL links the association between AD sleep loss and depression. Findings further highlight the importance of an integrated clinical assessment of objective and subjective symptoms of AD, and psychiatric symptoms of depression and anxiety.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table I

Percentages (and *n*s) for K-SADS-PL diagnoses of anxiety and depression.

Disorders	Current Diagnosis*	Lifetime Diagnosis*†
Any Anxiety Disorder	26 (9)	31 (11)
Separation Anxiety Disorder	0	9 (3)
Specific Phobia	11 (4)	11 (4)
Social Phobia	14 (5)	14 (5)
Agoraphobia	0	0
Generalized Anxiety Disorder	3 (1)	3 (1)
Any Depressive Disorder	9 (3)	17 (6)
Major Depressive Disorder	6 (2)	14 (5)
Dysthymic Disorder	3 (1)	3 (1)
Depressive Disorder NOS	0	0

K-SADS-PL, Kiddie-Schedule for Affective Disorders and Schizophrenia-Present and Lifetime Version; NOS, Not Otherwise Specified.

*K-SADS-PL data complete for 35 subjects, and diagnoses are not mutually exclusive.

†Having a past and/or current diagnosis.

Table II

Pearson correlation coefficients (and 95% confidence intervals) among AD severity, dermatologic quality of life, and depressive and anxiety symptoms.

	CDI Total Depression	MASC Total Anxiety	CDLQI Quality of Life†
AD Severity			
SCORAD Total	.21 (−.13,.50)	.03 (−.30,.36)	−.48** (−.70, −.18)
Objective	.10 (−.24,.41)	−.11 (−.42,.23)	−.41* (−.65, −.10)
Extent	−.03 (−.36,.30)	−.03 (−.36,.30)	−.30 (−.57,.03)
Intensity	.15 (−.19,.46)	−.14 (−.45,.20)	−.45* (−.68, −.14)
Subjective	.46** (.16,.69)	.19 (−.15,.49)	−.59** (−.77, −.33)
Pruritus	.36* (.04,.62)	.10 (−.24,.41)	−.48** (−.70, −.18)
Sleep Loss	.49** (.19,.71)	.29 (−.04,.56)	−.58** (−.76, −.31)
Quality of Life‡			
CDLQI	−.68** (−.82, −.45)	−.27 (−.55,.06)	--

AD, atopic dermatitis; SCORAD, scoring atopic dermatitis; CDI, Children's Depression Inventory; MASC, Multidimensional Anxiety Scale for Children; CDLQI, Children's Dermatology Life Quality Index.

†Correlations in Quality of Life column are with AD severity measures. The signs for the coefficients in this column were changed from positive to negative to highlight the outcome that increased SCORAD severity scores were associated with decreased quality of life.

‡Correlations in Quality of Life row are with depression and anxiety symptom measures. The signs for the coefficients in this row were changed from positive to negative to highlight the outcome that increased depressive and anxiety symptoms were associated with decreased quality of life.

*p<.05.

**p<.01.