Suicidal Ideation in Adult Patients with Atopic Dermatitis: A German Cross-sectional Study

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A cross-sectional study was performed to assess symptoms of suicidality, depression and anxiety in adult patients with atopic dermatitis. The study describes the relationships between these psychiatric symptoms and skin-specific factors, such as atopic dermatitis severity and skin satisfaction. A sample of 181 German patients with atopic dermatitis was compared with a control group of 64 persons with healthy skin with a similar age and sex distribution. Standardized questionnaires were used to assess suicidality (Pöldinger's Scale), depression and anxiety (Hospital Anxiety and Depression Scale; HADS), quality of life (Dermatology Life Quality Index; DLQI), atopic dermatitis severity (Patient-Oriented Scoring Atopic Dermatitis; PO-SCORAD) and skin satisfaction (Skin Satisfaction Questionnaire; SSQ). The prevalence of suicidal ideation among patients with atopic dermatitis was high (21.3%); 3.9% scored above the cut-off that might be an indicator for acute suicidality. Depression symptoms, high severity of atopic dermatitis, lower age, and little touching within the family were identified as significant factors to predict suicidality in atopic dermatitis. Psychiatric screening in dermatological treatment of atopic dermatitis is discussed.

Key words: atopic dermatitis; suicidal ideation; depression; anxiety; skin satisfaction.

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Atopic dermatitis (AD) is a chronic inflammatory skin disease with a wide spectrum of symptoms, such as skin irritation, lichenification, dry skin and distressing pruritus. AD occurs mostly in childhood and remits in adulthood. The prevalence of AD among children in industrialized western countries is estimated to be approximately 10–30%, while the prevalence rate of AD among adults is approximately 1.5–3% (1). Recent data suggest a multifactorial aetiology of AD with a sum of different pathomechanisms, e.g. defects in skin barrier, altered immunological response and environmental factors (2–4). AD is accompanied by a high psychological burden and causes a substantial reduction in quality of life (5–7). Although a strong association between psychopathological conditions and skin diseases is well known, the extent of psychiatric comorbidities in AD has been little investigated (8–10). While many European studies have detected an increased risk of symptoms of depression and anxiety among patients with AD, there is a lack of knowledge regarding suicidal ideation and suicidality in AD (5). This is of considerable relevance because affective disorders might be a strong risk factor for suicide attempts (11–13). Very few recent European studies have reported prevalence rates for suicidal ideation in AD (5, 8, 14–17). In addition, assessment is often limited to single items from various depression scales, which might reduce the validity of the research. There is consensus that the treatment of many patients with skin diseases is insufficient unless their psychological problems are not also recognized and treated (5).

The present article reports a cross-sectional investigation of suicidal ideation and symptoms of depression and anxiety in 181 German patients with AD.

Suicidality was assessed with a specific questionnaire instead of single items concerning suicidality. The study also addresses relationships between skin-related factors (e.g. duration, initial manifestation, severity of symptoms of AD, skin satisfaction and skin-related quality of life) and suicidality. The sample of patients with AD was compared with a control group of 64 participants with healthy skin with a similar age and sex distribution.

The corresponding research questions were: (*i*) Do patients with AD show higher suicidality compared with controls with healthy skin? (*ii*) What are the prevalence rates of suicidal ideation and clinically relevant suicidality among patients with AD? (*iii*) Do skin-specific factors and psychopathological symptoms predict suicidality in patients with AD?

METHODS

Study design, recruitment, setting and participants

This was a retrospective cross-sectional study comparing 2 groups of participants with a similar age and sex distribution, in order to assess the association between exposure (AD) and outcome (suicidality). Participants were asked to rate their previous week's behaviour and beliefs. A total of 248 respondents submitted valuable data. As many patients as possible were recruited in a period of approximately 9 months. A control group was recruited in parallel

(ratio 3:1). The patient sample consisted of 181 patients with AD. All patients were recruited in the psychodermatological section of the Clinic for Psychosomatic Medicine and Psychotherapy, University of Giessen ($n=22$), in dermatological practices ($n=11$) and by advertisement in AD-specific Internet forums ($n=148$). Inclusion criteria for patients with AD were: (*i*) adequate understanding of German; (*ii*) age 18–65 years; (*iii*) diagnosis of AD according to Hanifin & Rajka criteria (18). Patients were excluded if they experienced psychosis, dementia or personality disorder. None of the patients with AD had to be excluded according to these criteria. The control group included 67 subjects and was recruited by advertisement in the vicinity of the University of Giessen. The recruitment criteria for the controls were: (*i*) adequate understanding of German; (*ii*) participants aged 18–65 years; (*iii*) absence of any skin disease. Individuals were excluded if they experienced any skin disease, psychosis, dementia or personality disorder. Three individuals in the control group had to be excluded because they indicated various skin diseases. As a result, 64 participants in the control group were included in the evaluation. All data were collected by self-assessment questionnaires that were either sent by post with pre-paid, self-addressed envelopes, or delivered by hand. The study was endorsed by the ethics committee of the Human Medicine Faculty of the Justus-Liebig-University in Giessen, Germany. All participants gave written informed consent. Individuals with high scores for suicidal ideations that might indicate clinical suicidality were contacted by post and were offered a prompt diagnostic interview with an experienced psychiatrist. The report follows the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guideline for observational studies (19).

Variables and measurements

Socio-demographic and descriptive data. Participants' characteristics were assessed including sex, age, marital status, number of children, employment status and level of education. In addition, participants were asked if they had a current or former somatic or mental disorder ("Do you suffer from a mental disorder? If yes, which?").

Characteristics of patients with AD. Duration, initial manifestation, and severity of AD symptoms were measured using the Patient-Oriented Scoring Atopic Dermatitis (PO-SCORAD) index (20). This index contains a plain language translation of the well-established SCORAD index, a validated AD severity clinical assessment tool (21). Patients were divided into 3 severity groups (mild 0–25, moderate 26–50, severe >50) based on the total score (22). The PO-SCORAD showed a good consistency with strong linear correlation between PO-SCORAD and SCORAD in a large European population (23).

Suicidality. The German Pöldinger's scale (24) contains 16 dichotomous items, which assess suicidal ideation and its risk factors. The total score ranges between 0 and 16, in which high scores indicate a high risk of suicidality. A total score >8 is a sign of possible acute suicidality (25). The internal consistency in our study was Cronbach's $\alpha=0.64$.

Depression and anxiety. The Hospital Anxiety and Depression Scale (HADS) (26) is commonly used to determine anxiety and depression, especially in patients with somatic diseases. The HADS contains a 14-item scale. Seven of the items relate to anxiety and 7 to depression. Each item is scored from 0 to 3. A total score ≥ 11 for each scale indicates cases of anxiety or depression. The German version (27) was validated in a representative sample of 6,200 participants and showed good reliability (Cronbach's $\alpha=0.80$–0.81).

Skin-specific quality of life. Quality of life (QoL) was investigated using the Dermatology Life Quality Index (DLQI) (28). It contains 10 items, from which a total score is calculated (0–30). A high DLQI-value indicates high impairment of QoL with regard to the skin disease. Reliability analyses in representative samples measured good reliability (Cronbach's $\alpha=0.83$–0.93) (29).

Skin satisfaction. The Skin Satisfaction Questionnaire (SSQ) (30) was constructed to assess satisfaction with attitudes towards one's skin from a psychological point of view. It can be used among dermatological patients as well as persons with healthy skin. It contains 32 items, which are assigned to 5 scales: touching in a partnership, shame, memory of physical contact within the family, disgust and self-touching. All scales showed good internal consistency and reliability (Cronbach's $\alpha=0.72$–0.81) (30).

Study size

Concerning the study size a *post-hoc* power analysis was performed for the independent sample *t*-test with G*Power V3.1 (31). The corrected effect size $d_s=0.618$ (95% confidence interval (95% CI): 0.328–0.908) was calculated regarding the primary outcome Pöldinger suicidality scale with a group size of $n_1=64$ and $n_2=181$ participants. Using the alpha error probability (α err prob.)= 0.05, a Power (1–β err prob.)=0.93 was calculated (2-sided).

Statistical methods

Most statistical analyses were performed using SPSS 23 for Windows (IBM). A *p*-value less than 0.05 was considered significant. Independent-sample *t*-test was conducted to compare continuous scaled variables. χ^2 analyses for independence were performed to test the relationship between 2 categorical variables. One-way between-groups analysis of variance (ANOVA) with *post-hoc* Turkey HSD (honest significant difference) tests was employed to estimate the differences in continuous variables for 3 or more groups. The Pearson product-moment correlation coefficient r was used to assess the relationship between variables. Multiple linear regression (stepwise) was used to evaluate how much of the variance in the dependent variable (suicidality score) was explained by multiple independent variables. Furthermore, it aimed to detect possible predictors for suicidality in patients with AD. Furthermore, a binary logistic regression model (stepwise) was applied to assess the impact of a number of factors on the likelihood that respondents would report high suicidality (Pöldinger scale total score >8). Appropriate Cohen's effect sizes were calculated for each of the outcome variables (32–34): η^2 in the *t*-test and ANOVA, f^2 in the regression analysis, φ in the χ^2 test.

RESULTS

The main objective was to assess the prevalence of suicidal ideation and its risk factors among patients with AD in comparison with controls with healthy skin. Furthermore, the correlation between suicidality and skin-related factors was examined. Considering suicidality in patients with AD, the study investigated the predictive value of skin-related factors.

Descriptive data

Table I illustrates the socio-demographic data of patients with AD and controls. There were no significant differences either in age or sex. The distribution of education was slightly more right-skewed in the control group (in the direction of higher education). Approximately 22.5%

Table I. Descriptive data: atopic dermatitis (AD) vs. controls

	AD $n=181$	Control $n=64$	p-value
Age, years, mean ± SD	27.6 ± 8.3	29.7 ± 10.0	0.120[b]
Min–Max	18–60	22–65	
Sex, *n* (%)			0.073[a]
Female	137 (75.7)	41 (64.1)	
Male	44 (24.3)	23 (35.9)	
Partnership, *n* (%)			0.082[a]
Yes	108 (59.7)	46 (71.9	
No	73 (40.3)	18 (28.1)	
Education, *n* (%)			0.035[a]
No education	1 (0.6)	0 (0)	
8 years of education	7 (3.9)	3 (4.7)	
9–10 years of education	21 (11.6)	1 (1.6)	
13 years of education	139 (76.8)	48 (75.0)	
University education	12 (6.6)	11 (17.2)	
Other	1 (0.6)		
"Do you suffer from a mental disorder?", *n* (%)			0.070[a]
Yes	38 (22.5)	7 (11.)	
No	131 (77.5)	53 (88.3)	
If YES, which, *n* (%)			
Anxiety disorder	4 (2.2)	0 (0)	
Depression	9 (5.0)	5 (7.8)	
Somatoform disorder	0 (0)	1 (1.6)	
Others	3 (1.7)	0 (0)	
No data	165 (91.2)	58 (90.6)	
HADS score > cut-off 11, *n* (%)			
Depression scale ≥ 11	16 (8.8)	1 (1.6)	0.049[c]
Anxiety scale ≥ 11	47 (26.0)	8 (12.5)	0.026[a]

[a]χ^2-test. [b]*t*-test for independent groups. [c]Fisher's exact test.
HADS: Hospital Anxiety and Depression Scale; SD: standard deviation.

of the patients with AD ($n=38$) reported that they had a mental disorder, but only 9% ($n=16$) named a specific disorder (e.g. depression, anxiety disorder). In comparison, only 11.7% of the control group ($n=7$) reported a mental disorder.

Dermatological data

Dermatological characteristics of patients with AD are summarized in **Table II**. The mean ± standard deviation (SD) total PO-SCORAD was 48.8 ± 16.8, which represents a high level of disease severity. More than half of the patients (51.9%) reported early onset of AD within the first year of life, 76.2% of patients were in dermatological treatment. The mean ± SD degree of skin-specific quality of life (DLQI score 8.3 ± 5.9) was in accordance with previously published AD studies (e.g. (35)).

Table II. Characteristics of patients with atopic dermatitis (AD)

	Patients with AD $n=181$
Initial AD manifestation, years, mean ± SD	6.0 ± 10.3
1st year, *n* (%)	94 (51.9)
2nd to 7th year, *n* (%)	47 (28.0)
8th year and older, *n* (%)	40 (22.1)
Duration of AD in years, mean ± SD	19.8 ± 7.4
PO-SCORAD, mean ± SD	48.8 ± 16.8
Mild, *n* (%)	19 (10.5)
Moderate, *n* (%)	73 (40.3)
Severe, *n* (%)	89 (49.2)
DLQI, mean ± SD	8.3 ± 5.9
Currently in dermatological treatment, *n* (%)	138 (76.2)

SD: standard deviation; PO-SCORAD: Patient Oriented Scoring of Atopic Dermatitis; DLQI: Dermatology Quality of Life Index.

Suicidality data

Compared with healthy controls, patients with AD showed significantly higher mean ± SD values for depressive symptoms (AD: 4.88 ± 3.79 vs. Control: 3.12 ± 2.56, $\eta^2= 0.065$), anxiety symptoms (AD: 8.20 ± 4.11 vs. Control: 6.26 ± 3.37, $\eta^2=0.045$) and suicidality (AD: 3.35 ± 2.31 vs. Control: 2.07 ± 1.05, $\eta^2= 0.124$) (**Fig. 1**). Seven of 181 patients with AD (3.9%) presented a high total score > 8 in Pöldinger's suicidality scale that might indicate an acute suicidal crisis (control 0%). Of the patients with AD, 8.8% ($n=16$) had a depression score above the cut-off ≥11 (control: $n=1$ (1.6%)). In addition, 26.0% ($n=47$) of patients with AD presented a total score for anxiety above the cut-off ≥ 11 (control: $n=8$ (12.5%)). A one-way between-groups analysis or variance was conducted to explore the impact of the 3 different types of patient's recruitment (Methods) on suicidality, as measured by the Pöldinger suicidality scale. There were small, but statistically insignificant, differences in the suicidality total scores: psychodermatological/psychosomatic hospital 4.04 ± 3.3, atopic dermatitis internet forums 3.31 ± 2.17, dermatological practices 2.54 ± 1.36; $F(2, 178)=1.69$, $p=0.118$.

A one-way between-group ANOVA was conducted to explore the impact of AD severity on the level of suicidality, as measured by the Pöldinger's suicidality scale (**Fig. 2**). Patients were divided into 3 groups of AD severity (group 1: mild; group 2: moderate; group 3: severe). There was a statistically significant difference at the $p<0.05$ level for the 3 severity groups ($F(2, 178)=6.76$, $p=0.001$) with moderate effect size $\eta^2=0.070$. *Post-hoc* comparisons indicated that the mean ± SD score for group 3 (high severity, 3.91 ± 2.57) was significantly different from group 2 (3.01–1.98) and group 1 (2.05 ± 1.26). In concordance, severity groups also differed in depression and anxiety. High AD severity was also accompanied by higher depression ($\eta^2=0.053$) and anxiety ($\eta^2=0.115$) (Fig. 2). Furthermore, there was a positive correlation between AD severity (PO-SCORAD) and Pöldinger's suicidality score ($r=0.309$, $n=181$, $p<0.0001$) as well

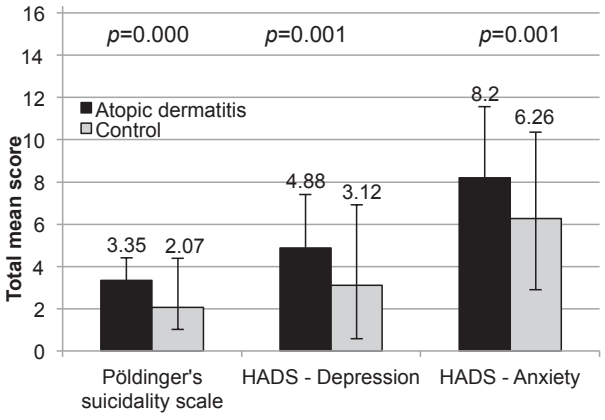

Fig. 1. Suicidality, depression and anxiety: atopic dermatitis vs. control. HADS: Hospital Anxiety and Depression Scale.

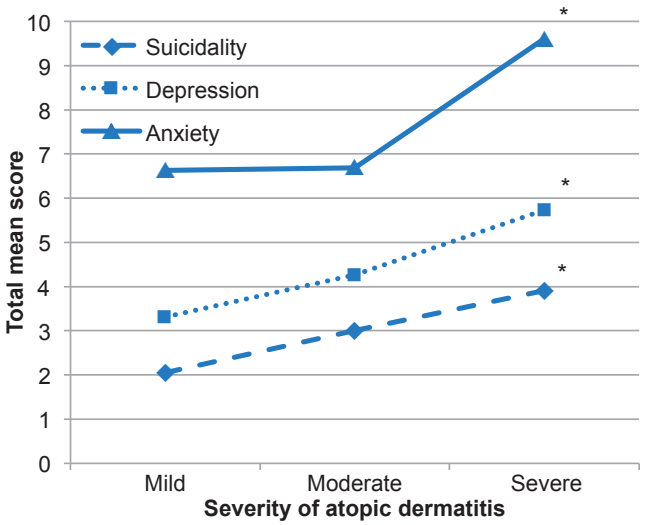

Fig. 2. Suicidality, depression and anxiety in relation to atopic dermatitis severity. *sig. at 0.05 level.

as anxiety symptoms (r=0.346, n=181, p<0.0001) and depression symptoms (r=0.283, n=181, p<0.0001).

As shown in **Table III**, the prevalence of attempted suicide in patients with AD was 6.6% (control: 0%, p=0.035). Of patients with AD, 21.5% indicated recent suicidal ideation (control: 0%, p=0.000), and 12.7% reported intrusive thoughts of suicide (control: 1.6%, p=0.010). The groups did not differ in experience with suicidal attempts in family or friends (37.0% vs. 31.3%, p=0.407). Approximately 40% of participants in both groups indicated that they knew somebody who tried to commit suicide (p=0.971). Almost every participant stated that her/his answers were completely honest (97.2% vs. 100%, p=0.177).

Skin satisfaction

The Skin Satisfaction Questionnaire (SSQ) measures skin-associated satisfaction from a psychological point of view. It asks about the skin-associated shame and disgust, satisfaction with current or past skin touching within a partnership and the family, and self-touching. As might be expected, patients with AD showed significantly lower levels of self-touching (F (243)=12.83, p=0.003) and higher levels of shame (F (243)=3.22, p=0.021). The effect sizes, however, were quite small (η^2=0.053 and 0.021). The groups differed neither in the extent of disgust nor in the level of skin touching within a partnership and the family. Although one might expect a more significant influence on partnership or family-related satisfaction in patients with AD, the small effect sizes presented are in line with previous psychodermatological studies (e.g. 35–37). Nevertheless, it is interesting that significant correlations between the SSQ scales and suicidality were

Table III. Items of Pöldinger's suicidality scale: atopic dermatitis (AD) vs. control

Item no.		AD n=181 n (%)	Control n=64 n (%)	p[a]	Effect size Φ	Odds ratio	95% CI
1	Have you thought about taking your own life lately?	39 (21.5)	0 (0)	0.000	−0.259	35.75	2.16–590.85
2	Often?	8 (4.4)	0 (0)	0.087	−0.109	6.31	0.36–111.07
3	Were you also forced to think about it, without wanting to? Did thoughts of suicide force themselves upon you?	23 (12.7)	1 (1.6)	0.010	−0.165	9.17	1.21–69.36
4	Do you have concrete ideas about how you would do it?	16 (8.8	5 (7.8)	0.801	−0.016	1.14	0.40–3.26
5	Are you planning it?	2 (1.1)	0 (0	0.398	−0.054	1.79	0.08–37.92
6	Have you ever talked to anyone about your suicidal thoughts?	22 (12.2)	2 (3.1)	0.037	−0.133	4.29	0.97–18.78
7	Have you ever tried to commit suicide?	12 (6.6)	0 (0)	0.035	−0.135	9.51	0.55–163.03
8	Has a family member or a friend taken their own life?	53 (29.3)	22 (34.4)	0.447	0.049	0.79	0.43–1.45
9	Do you think your situation is hopeless?	21 (11.6)	1 (1.6)	0.016	−0.154	8.26	1.08–62.78
10	Is it hard for you to focus on things other than your problems?	55 (30.4)	4 (6.3)	0.000	−0.248	6.54	2.26–18.98
11	Have you had less contact to your friends or family lately?	52 (28.7)	10 (15.6)	0.038	−0.132	2.17	1.03–4.59
12 inv	Have you lost interest in what is happening with your job and your environment? Do your hobbies no longer appeal to you?	13 (7.2)	4 (6.3)	0.801	−0.016	1.16	0.36–3.69
13 inv	Don't you have anybody with whom you can openly discuss your problems?	18 (9.9)	1 (1.6)	0.031	−0.138	6.95	0.90–53.21
14 inv	Don't you live with any family members or friends?	67 (37.0)	20 (31.3)	0.407	−0.053	1.29	0.70–2.37
15 inv	Don't you feel bound by strong obligations to your family or job?	82 (45.3)	31 (48.4)	0.666	0.028	0.88	0.49–1.56
16 inv	Do you no longer play a role in a community that you feel connected to?	124 (68.5)	32 (50)	0.008	−0.169	2.17	1.21–3.89
Additional questions:							
1	Did you know somebody personally who tried to commit suicide?	74 (40.9)	26 (40.6)	0.971	−0.002	1.01	0.56–1.80
2	Please estimate the probability with which you might, at some point in your life, try to commit suicide.			0.438	−0.105		
	0%	82 (45.6)	33 (51.6)				
	<10%	86 (47.8)	30 (46.9)				
	≤50%	11 (6.1)	1 (1.6)				
	Likely	0 (0)	0 (0)				
	Most likely	1 (0.6)	0 (0)				
3	There are many reasons why some people might not be able to answer these questions truthfully. When evaluating your answers, should we see your answers as ...			0.177	−0.087		
	Completely honest?	174 (97.2)	64 (0)				
	To be accepted with reservations?	5 (2.8)	0 (0)				
	Possibly not to be taken into consideration ?	0 (0)	0 (0)				
	Not valid?	0 (0)	0 (0)				

[a]χ^2-test. inv: inverted statement; CI: confidence interval.

Table IV. Pearson's correlation coefficients between suicidality and skin satisfaction

	Pöldinger's suicidality scale	
	AD	Control
Skin Satisfaction Questionnaire – self touching	–0.243**	–0.022
Skin Satisfaction Questionnaire – family touching	–0.241**	–0.014
Skin Satisfaction Questionnaire – partner touching	–0.097	–0.108
Skin Satisfaction Questionnaire – shame	0.318**	0.057
Skin Satisfaction Questionnaire – disgust	0.108	0.068

**Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).
AD: atopic dermatitis.

only found in the group of patients with AD (**Table IV**). This might indicate the relevance of skin satisfaction with regard to suicidality in patients with AD.

Skin-related predictors of suicidality in patients with AD

Stepwise multiple linear regression was used to assess predictors of suicidality in patients with AD. The independent variables included were age, sex, manifestation, duration and severity of AD (PO-SCORAD), quality of life (DLQI), skin satisfaction (SSQ subscales) as well as anxiety and depression scores (HADS subscales). Significant predictors of suicidality in AD were high depression ($\beta = 0.482$, $p \leq 0.001$), severe AD symptoms ($\beta = 0.180$, $p = 0.005$), lower age ($\beta = -0.192$, $p = 0.004$) and little touching within the family ($\beta = -0.160$, $p = 0.019$). The predictors explained 35.3% of the variance of suicidality ($F(4, 179) = 22.83$, $p \leq 0.001$) with a large effect size ($f^2 = 0.545$) (**Table V**). Neither other skin-related factors nor sex were predictors of suicidality.

Likelihood of high suicidality

Binary logistic regression (stepwise) was performed to assess the impact of a number of factors on the likelihood that patients with AD would report high suicidality (Pöldinger scale total score > 8). Same independent variables as in the multiple regression model were used. The best model containing 2 predictors was statistically significant (χ^2 (2, $n = 180$) = 24.30, $p < 0.001$). The best model as a whole explained between 12.6% (Cox and Snell R^2) and 45.1% (Nagelkerke R^2) of the variance in high suicidality status, and correctly classified 96.7% of cases. Two independent variables (HADS anxiety score and physical contact within the family (SSQ subscale)) made a statistically significant contribution to the best model (**Table VI**). The strongest predictor of reporting high suicidality was anxiety symptoms, recording an odds ratio of 1.49 (95% CI: 1.14–1.98). The second predictor, physical contact within the family, reports an odds ratio of 0.81 (95% CI: 0.69–0.97). This indicated that patients with AD with high physical contact within their family were less likely to report a high suicidality total score > 8.

Table V. Multivariate regression analyses of the variables predicting suicidality in patients with atopic dermatitis (stepwise)

Predictors	B	SE	β	t	*p*	R	R^2
Model	2.981	0.805		3.704	< 0.001	0.594	0.353
Constant	0.295	0.041	0.482	7.131	< 0.001		
HADS-D	0.025	0.009	0.180	2.819	0.005		
PO-SCORAD	–0.054	0.018	–0.192	–2.907	0.004		
Age	–0.058	0.024	–0.160	–2.358	0.019		
SSQ – family touching	2.981	0.805		3.704	< 0.001		

HADS-D: Hospital Anxiety and Depression Scale – Depression; SSQ: Skin Satisfaction Questionnaire; PO-SCORAD: Patient-Oriented SCoring Atopic Dermatitis; SE: standard error; B: regression coefficient; β: Beta, standardized version of B-value; R: multiple correlation coefficient; R^2: coefficient of determination; t: *t*-test value.

Table VI. Logistic regression predicting likelihood of reporting high suicidality (Pöldinger scale total score > 8) in patients with atopic dermatitis

							95% CI for OR	
Model	B	SE	Wald	df	*p*	OR	Lower	Upper
SSQ-FB	–0.206	0.087	5.555	1	0.018	0.814	0.686	0.966
HADS-A	0.405	0.141	8.187	1	0.004	1.499	1.136	1.977
Constant	–5.745	2.005	8.210	1	0.004	0.003		

HADS-A: Hospital Anxiety and Depression Scale – Anxiety; SSQ-FB = physical contact within the family. OR: odds ratio; 95% CI: 95% confidence interval; SE: standard error; B: regression coefficient; Wald: Wald-test value; df: degrees of freedom.

DISCUSSION

Key results and interpretation

Previous studies identified a high psychological burden and symptoms of depression and anxiety in patients with AD (5, 6). Only a few studies investigated suicidal ideation in AD, although suicidality represents one of the most important psychopathological symptoms in psychiatry. Moreover, most of those studies used only single items from various depression scales to detect suicidal ideation. The aim of the current study was to assess the prevalence of suicidality and suicidal ideation in patients with AD using a specific suicidality scale, and to explore the relationship between skin-related factors and suicidal ideation. As shown before in a Canadian pioneer study (8), assessing patients with AD with only mild AD symptoms might underestimate the relevance of suicidality. The sample of our study therefore consisted of patients with AD who had sufficiently severe AD to make a valid statement about suicidal behaviour. Consistent with previous studies, patients with AD in our cross-sectional study showed higher symptoms of depression and anxiety, as well as a high extent of suicidality with medium to large effect sizes (12, 38, 39). The mean values for depression and anxiety symptoms among patients with AD were below the cut-offs for indicating a mental disorder. However, the percentage of patients with AD with a total score above the cut-off (depression 8.8%, anxiety 26.0%) was significantly higher compared with the control group (depression 1.6%, anxiety 12.5%). Furthermore, a noticeably high percentage of patients with AD (21.5%) indicated suicidal ideation, and 6.6% reported at least one attempted suicide in the past. In addition, 3.9% of patients with AD scored higher than the suicidality scale's cut-off indicating acute suicidality. The prevalence of suicidal ideation in our study is comparable with previous data

from Denmark (16.1%) (7) and Japan (19.6%) (16), and is even higher compared with a multicentre European study (15%) (5). Furthermore, a recent population-based study from Norway reported a prevalence of 15.5% for suicidal ideation in adolescents with eczema (17). Our study suggests a positive association between high AD severity and suicidality, as reported by a Japanese study (16). This also goes along with the reported association between severe itch and high suicidal ideations in adolescents (40). Apart from depressive and anxiety symptoms, some skin-related factors (severity of AD and little physical contact within the family) were significant predictors for suicidality. In other words, a high level of physical contact within the family might be a protective factor regarding suicidality. In contrast to the control sample, skin-related factors, such as shame and little self-touching, were particularly associated with suicidality in patients with AD. Longitudinal studies are now necessary to conclude causality and chronological development of suicidality in dermatological disease. Nevertheless, this study enhances the evidence that the inclusion of psychological diagnosis and screening might have relevance in the dermatological treatment of patients with AD. In particular, patients with severe AD should be offered low-threshold psychological support or psychodermatological treatment. In the case of psychopathology, additional psychotherapy might be indicated. When planning and conducting psychotherapy, specific AD-related topics and foci might be helpful. We have observed a significantly lower extent of self-touching and higher feelings of shame in the group of patients with AD. In addition, patients with AD showed higher symptoms of depression and anxiety. From a psychosomatic point of view these results might indicate problems in the regulation and expression of feelings and emotions in patients with AD, which is in line with results from previous studies (41, 42). Individual ability for regulation of feelings is essentially shaped and learned in the early mother-child-interaction during the first years of life, and is considerably mediated by skin contact and touching (43). This early ability to regulate feelings coincides with the first occurrence of AD in childhood and might cause problems in attachment attitudes (44). The skin plays an important role in the expression and regulation of feelings in adults. Self-touching, for example, acts as self-pacification and regulation in stressful moments. Hence, psychotherapy in patients with AD with high symptoms of depression and suicidal ideation might benefit from encouragement in the regulation of emotions.

Study limitations

There are several limitations to this study. First, it has a cross-sectional design that cannot show causality. In addition, AD mostly shows a batch-wise course of disease that might influence the level of mental burden, depending on the current stage of disease. Secondly, clinical diagnosis and severity of AD was mostly assessed by self-evaluation. However, high correlation between doctor- and patient-oriented assessment of severity of AD has been shown previously (23). Furthermore, data about mental disorders and comorbidities were only collected by questionnaire (self-assessment). Future studies should use standardized clinical interviews to assess the psychiatric comorbidity more accurately. Thirdly, it should be noted that patients with AD were collected in different sectors (patients with and without treatment, in-patients and out-patients, face-to-face and Internet recruitment), which might be a possible source of error, although it represents a natural cross-section. Unfortunately, the allocation of questionnaires was inconsistently documented. Calculation of the response rate was therefore not possible. Fourthly, possible bias in the choice of controls should be considered. Since the controls were recruited on a voluntary basis, they may not be representative of the general population (e.g. they may be less depressed). Fifthly, suicidality was measured with a self-evaluation scale rather than a clinical interview. Furthermore, a recent systematic review of measurement scales regarding suicidal ideation and attitudes identified 29 different research scales for assessing suicidal ideation, and concluded that there is currently no gold standard (45).

Conclusion and generalizability

The cross-sectional study assessing a German group of 181 patients with AD confirms the currently existing data from other European observational studies about suicidality in AD. In particular, patients with a high level of severity of AD have increased risk of suicidal ideation and depression symptoms. Summing up the existing knowledge about suicidality and depression symptoms in AD, we strongly recommend psychiatric screening in dermatological AD treatment to recognize and assess the existence of suicidal ideations and symptoms of depression. From a psychiatric point of view, patients usually appreciate a face-to-face conversation with straight-forward questions about their psychological burden, including suicidality. A candid conversation between patient and doctor may provide a good indication of suicidal tendencies, impulses or plans, and may enhance the doctor–patient relationship. Short, well-established scales (for example the 5-item WHO-5 Well-Being-Index (46); available from: www.who-5.org) for assessing well-being and loss of quality of life can help to evaluate depression risks, especially in patients with AD who have severe skin symptoms and long duration of disease. If psychopathology is observed, psychotherapy or psychodermatological support should be offered.

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