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Article type: Original article

## **Title**

**Dermatologists across Europe underestimate depression and anxiety: results from 3635 dermatological consultations**

## **Running head**

Dermatologists underestimate depression

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**Bulleted statements****What's already known about this topic?**

- Patients with common skin diseases have more depression and anxiety compared to controls
- Physicians who are not trained as psychiatrists miss depression in their patients

**What does this study add?**

- There is a large proportion of cases of depression among patients with skin disease that are not diagnosed by the dermatologist
- Further training for dermatologists to use simple tools to detect and assess depression might be appropriate

## Summary

### Background

Many patients with common skin diseases across Europe are clinically depressed and anxious. Earlier studies have shown that physicians who are not trained in psychiatry underdiagnose depression in their patients. This has not been explored among dermatologists.

### Objectives

To estimate the concordance between clinical assessment of depression and anxiety by a dermatologist and assessment with the Hospital Anxiety and Depression Scale (HADS).

### Methods

The study was an observational cross-sectional multi-centre study of prevalent cases of skin diseases in 13 countries in Europe. Consecutive patients were recruited in out-patient clinics and completed questionnaires prior to clinical examination by a dermatologist. The dermatologist documented the skin disease diagnosis and any signs of mood disorders.

### Results

Analysis of the 3635 consultations showed that the agreement between dermatologist and HADS was fair (lower than 0,4) for all diagnostic categories. There was a high concordance between clinical assessment and self-reported assessment when there were no presence of depression or anxiety (79,7% vs 70,8%). The true positive rate was 44,0% for depression and 35,6 for anxiety, and the true negative rate was 56,0% for depression and 64,4% for anxiety.

### Conclusions

Dermatologists in Europe tend to underestimate mood disorders in a significant group of patients. The results indicate that further training for dermatologists to improve their skills in diagnosing depression and anxiety might be appropriate; simple tools such as HADS might be useful. Dermatological patients need to be managed in a holistic way by their dermatologist.

## Introduction

The Global Burden of Disease study (2015) showed that mood disorders contribute substantially globally to morbidity and are often associated with physical conditions<sup>1</sup>. Depression may both be caused by and contribute to the cause of many chronic medical conditions<sup>2</sup> as demonstrated in cross-sectional studies<sup>3</sup>. A mental health survey from the World Health Organization carried out in 21 countries demonstrated that major depression is widely undertreated worldwide<sup>4</sup>. Many people with mood disorders have no contact with the mental health services and are only managed by general practitioners or other non-psychiatric physicians<sup>5</sup>. Depression management can be challenging for physicians who are not trained as

psychiatrists and the symptomatology of depression is not always obvious: a USA study reported that two thirds of individuals with depression are undiagnosed in primary care<sup>6</sup>. Many patients' needs are not met, leading to 'doctor-shopping' because of their suffering; they may contribute a disproportionate burden on the health system as a whole. Furthermore, the recognition and the treatment of mood disorders often influences the course of the disease, adherence to treatment and the health behaviour of the patient<sup>7</sup>. There may be a mutually negative influence between mood disorders and physical health.

Dermatologists regularly encounter mood disorders in their clinical work. Clinical depression is seen in 10% of dermatological consultations and clinical anxiety in 17% of the consultations across European dermatological out-patient clinics<sup>8</sup>. The British Association of Dermatologists Working Party for Psychodermatology estimated that 17% of dermatological patients have psychological issues co-occurring with their skin disease<sup>9</sup>. A substantial proportion of patients attending a dermatologist therefore have underlying psychiatric diseases that if addressed would provide more appropriate care for the patient. However, dermatologists are trained to diagnose skin diseases and have little skills in diagnosing and treating psychiatric comorbidity.

This study therefore aimed at estimating the concordance between depression and anxiety assessed with the Hospital Anxiety and Depression Scale (HADS) and clinical assessment by a dermatologist using a questionnaire recording signs of depression and anxiety, in order to assess the ability of dermatologists in diagnosing these conditions.

## **Participants and methods**

This was an observational cross-sectional multi-centre study of prevalent cases of skin diseases conducted by members of the European Society for Dermatology and Psychiatry (ESDaP), previously described in detail<sup>8</sup>. In summary, patients were recruited from dermatological outpatient clinics in 13 European countries from November 2011 to February 2013. The study protocol was approved by the Regional Committee for Medical Research Ethics in Norway and local ethical approval was also obtained where necessary. The study was conducted in accordance with the Declaration of Helsinki.

### **Settings**

At the dermatological out-patient clinic at each centre, 250 consecutive patients were invited to participate in the study on one or more random days until the desired number was reached. All patients were fully informed about the study by a research assistant and signed a written consent form. The inclusion criteria were: Age over 18 years, being able to read and write the local language and not suffering from severe psychosis. Each participant completed a questionnaire and returned it to the consultant at the consultation.

The first part of the questionnaire recorded socio-demographic variables, self-reported socio-economic status and stressful life events during the last six months.

Clinical depression and clinical anxiety were assessed with HADS, a well validated instrument assessing symptom severity and caseness of anxiety disorders and depression in patients with physical disease in hospital settings as well as in the general population<sup>10 11</sup>. It includes seven items assessing anxiety, and seven for depression, each with four possible answers (scored 0 – 3). For each dimension of anxiety and depression a total score from 0-7 is considered normal, from 8-10 borderline case, and from 11-21 indicating clinical case in need for further examination or treatment. The HADS was available in the different languages relevant to the study.

For the present study the HADS values were divided into two groups:  $\leq 10$  = no or subclinical signs of the disease and  $\geq 11$  = clinical case in need for further examination or treatment.

Each patient was examined by a dermatologist who recorded the diagnosis and the objective severity of the condition as “mild”, “moderate” or “severe”; if required a secondary diagnosis was recorded. The presence of the following treated co-morbidities: cardio-vascular disease, chronic respiratory disease, diabetes, rheumatologic disease, and other conditions were specified. In addition, the dermatologists answered the following two questions “Do you see depressive signs in the patient?” and “Do you see anxiety signs in the patient?”: the possible answers were “yes” or “no”.

### **Statistical analysis**

The data was entered in a SPSS or an Excel database at each site and analyzed at the statistical centre at the Institute of Medical Psychology, University of Giessen, Germany. SPSS version 24 software was used to analyze the data. Cross-tabulations were performed between objective assessed depression, anxiety and HADS for the most common diagnostic



categories. Cohen's kappa is mostly used to calculate agreement between two raters<sup>12</sup> but kappa also can be used to assess the concordance between alternative methods of categorical assessment such as in our study. Kappa is a measure of the agreement between two methods adjusted for what would be expected by chance. To evaluate the strength of concordance we used the recommendation of Fleiss<sup>12</sup>: kappa  $<.40$  = poor to fair agreement; kappa between 0.41 and 0.80 = moderate to good; kappa between 0.81 and 1.00 = very good agreement. In addition we calculated the true positive rate (or sensitivity; depression assessed by dermatologist / all patients with HADS-D depression values  $\geq 11$ ); the true negative rate (or specificity (no depression assessed by dermatologist / all patients with HADS-D depression values  $< 11$ ); false positive rate (depression assessed by dermatologist / all patients with HADS-D values  $< 11$ ) and false negative rate (no depression assessed by dermatologist / all patients with HADS-D values  $\geq 11$ ).

## **Results**

Table 1 Concordance (Cohen's kappa) between depression based on self-report (HADS) and dermatologist's assessment of depression in dermatological consultations with the most common skin diseases (n=3295)

Diagnose	concordance		discordance		True positive rate %	True negative rate %	False positive rate %	False negative rate %	Kappa (95%CI)
	depression assessed by dermatologist HADS-D $\geq$ 11 n (%)	no depression assessed by dermatologist HADS-D <11 n (%)	no depression assessed by dermatologist HADS-D $\geq$ 11 n (%)	depression assessed by dermatologist HADS-D <11 n (%)					
Psoriasis	32 (5.5)	434 (74.6)	51 (8.7)	65 (11.2)	38.6 (32/83)	87.0 (434/499)	13.0 (65/499)	61.4 (51/83)	.239 (.136; .339)
NMSC	6 (1.8)	307 (90.6)	9 (2.6)	17 (5.0)	40.0 (6/15)	94.8 (307/324)	5.2 (17/324)	60.0 (9/15)	.277 (.100; .474)
Infections of the skin	11 (4.9)	189 (81.6)	7 (3.2)	23 (10.3)	61.1 (11/18)	89.2 (189/212)	10.8 (23/212)	38.9 (7/18)	.355 (.165; .530)
Eczema	6 (2.8)	180 (84.9)	12 (5.7)	14 (6.6)	33.3 (6/18)	92.8 (180/194)	7.2 (14/194)	66.7 (12/18)	.249 (.106; .449)
Acne	3 (1.5)	167 (81.4)	9 (4.4)	26 (12.7)	25.0 (3/12)	86.5 (167/193)	13.5 (26/193)	75.0 (9/12)	.069 (-.072; .231)
Nevi	0 (0.0)	143 (90.5)	10 (6.3)	5 (3.2)	0 (0/10)	96.6 (143/148)	3.4 (5/148)	100 (10/10)	-.044 (-.071; -.012)
Atopic dermatitis	7 (4.6)	117 (77.0)	9 (5.9)	19 (12.5)	43.8 (7/16)	86.0 (117/136)	14.0 (19/136)	56.2 (9/16)	.233 (.045; .428)
Benign skin tumors	1 (0.7)	121 (87.1)	6 (4.3)	11 (7.9)	14.3 (1/7)	91.7 (121/132)	8.3 (11/132)	85.7 (6/7)	.044 (-.081; .267)
Hand eczema	9 (7.0)	98 (76.6)	10 (7.8)	11 (8.6)	47.4 (9/19)	89.9 (98/109)	10.1 (11/109)	52.6 (10/19)	.365 (.131; .590)
Leg ulcers	18 (17.1)	57 (54.3)	9 (8.6)	21 (20.0)	66.7 (18/27)	73.1 (57/78)	26.9 (21/78)	33.3 (9/27)	.347 (.153; .526)
<i>All. patients</i>	<i>149 (4.5)</i>	<i>2625 (79.7)</i>	<i>190 (5.8)</i>	<i>331 (10.0)</i>	<i>44.0 (149/339)</i>	<i>88.8 (2625/2956)</i>	<i>11.2 (331/2956)</i>	<i>56.0 (190/339)</i>	<i>.277 (.229; .321)</i>

True positive rate: depression assessed by dermatologist/ all HADS-D  $\geq$ 11; True negative rate: no depression assessed by dermatologist / all HADS-D <11

False positive rate: depression assessed by dermatologist / all HADS-D <11; False negative rate: no depression assessed by dermatologist / all HADS-D  $\geq$ 11

NMSC: non-melanoma skin cancer

Table 2 Concordance (Cohen's kappa) between anxiety based on self-report (HADS) and dermatologist's assessment of anxiety in dermatological consultations with most common skin diseases (n=3293)

Diagnose	concordance		dis concordance		True positive rate %	True negative rate %	False positive rate %	False negative rate %	Kappa (95%CI)
	anxiety assessed by dermatologist HADS-A $\geq$ 11 n (%)	no anxiety assessed by dermatologist HADS-A <11 n (%)	no anxiety assessed by dermatologist HADS-A $\geq$ 11 n (%)	anxiety assessed by dermatologist HADS-A <11 n (%)					
Psoriasis	40 (6.8)	401 (68.4)	92 (15.7)	53 (9.1)	30.3 (40/132)	88.3 (401/454)	11.7 (53/454)	69.7 (72/132)	.208 (.110; .298)
NMSC	10 (3.0)	291 (85.8)	19 (5.6)	19 (5.6)	34.4 (10/29)	93.9 (291/310)	6.1 (19/310)	65.6 (19/29)	.284 (.093; .450)
Infections of the skin	12 (5.4)	159 (71.3)	16 (7.2)	36 (16.1)	42.9 (12/28)	81.5 (159/195)	18.5 (36/195)	57.1 (16/28)	.187 (.039; .331)
Eczema	12 (5.7)	150 (71.1)	23 (10.9)	26 (12.3)	34.3 (12/35)	85.2 (150/176)	14.8 (26/176)	65.7 (23/35)	.189 (.024; .359)
Acne	9 (4.4)	144 (70.2)	23 (11.2)	29 (14.2)	28.1 (9/32)	83.2 (144/173)	16.8 (29/173)	71.9 (23/32)	.106 (-.041; .263)
Nevi	4 (2.6)	131 (84.5)	13 (8.4)	7 (4.5)	23.5 (4/17)	94.9 (131/138)	5.1 (7/138)	76.5 (13/17)	.218 (-.011; .453)
Atopic dermatitis	11 (7.2)	107 (70.4)	15 (9.9)	19 (12.5)	42.3 (11/26)	84.9 (107/126)	15.1 (19/126)	57.7 (15/26)	.257 (.081; .441)
Benign skin tumors	4 (2.9)	108 (77.7)	11 (7.9)	16 (11.5)	25.0 (4/16)	87.1 (108/124)	12.9 (16/124)	75.0 (12/16)	.120 (-.072; .328)
Hand eczema	8 (6.3)	89 (69.5)	20 (15.6)	11 (8.6)	28.6 (8/28)	89.0 (89/100)	11.0 (11/100)	71.4 (20/28)	.199 (.008; .393)
Leg ulcers	11 (10.4)	45 (42.4)	9 (8.5)	41 (38.7)	55.0 (11/20)	52.3 (45/86)	47.7 (41/86)	45.0 (9/20)	.045 (-.113; .204)
All <i>derm. patients</i>	204 (6.2)	2330 (70.8)	369 (11.2)	390 (11.8)	35.6 (204/573)	85.7 (2330/2720)	14.3 (390/2720)	64.4 (369/573)	.210 (.169; .250)

True positive rate: depression assessed by dermatologist/ all HADS-D  $\geq$ 11; True negative rate: no depression assessed by dermatologist / all HADS-D <11

False positive rate: depression assessed by dermatologist / all HADS-D <11; False negative rate: no depression assessed by dermatologist / all HADS-D  $\geq$ 11

Overall there was a high concordance between the dermatologists and the HADS questionnaire when there was no depression (79,7%) and no anxiety (70,8%). But overall the true positive value was 44.0% for depression and 35.6% for anxiety and the false negative value was 56% for depression and 64,4% for anxiety in the whole sample.

The dermatologists underestimated depression in 5,8% of the consultations and anxiety in 11,2% of the consultations. On the other hand dermatologists overestimated depression and anxiety in 10% and 11,8% respectively of the consultations.

Clinical assessment of depression was poorer for patients with hand eczema (7,8%), psoriasis (8,8%) and leg ulcers (8,6%); and the overestimation was higher for patients with leg ulcers (20,0%), acne (12,7%) and atopic dermatitis (12,5%).

Clinical underestimation of anxiety was seen especially for cases of psoriasis (15,7%) and hand eczema (15,6%). Overestimation of anxiety by the dermatologist was highest for patients with leg ulcers (38,7%), infections of the skin (16,1%) and acne (14,1%).

The agreement between dermatologist and patient assessed questionnaire (HADS) was fair (lower than 0,4) for all diagnostic categories. The agreement (kappa coefficient) between doctor and patient was slightly higher but still low for cases of depression in patients with hand eczema (0,365), infections of the skin (0,355) and leg ulcers (0,347).

## **Discussion**

Overall the agreement between clinician and patient assessment of mood symptoms was poor suggesting that mood symptoms are under-recognized by dermatologist in a routine care setting. In view of the significance of mood disorders not only to the morbidity of patients, but also to the management of skin diseases, this is a clinically relevant conclusion, to the best of our knowledge not previously reported.

Although generally not a well-explored problem, discordance between clinician and patient assessed clinical depression was found in several settings using a similar research approach. In a primary care setting among 231 participants, two-thirds of the clinically depressed patients were undiagnosed by the practitioner<sup>6</sup>. In that study there was only weak agreement between the physician documentation of depression and the self-

reported Patient Health Questionnaire PHQ-9 and the Cohen Kappa analysis. In previous studies the recognition of depressive symptoms in a GP setting has been reported as only about 50% although major depression has been reportedly recognized at a rate of 64%<sup>13-15</sup>. Oncologists could be more astute assessors of depressive symptoms: a study in cancer patients by Gouveia et al however indicates an oncologist's sensitivity of only 33% for individual symptoms of depression<sup>16</sup>. Taken together, these studies imply that the problem of low recognition of depressive symptoms in patients with somatic disease is not limited to dermatologists. Similar low recognition rates may be reached by patients' self-assessment<sup>17</sup>.

The importance of using patient reported outcome measures (PROMs) in clinical work has been recently stressed<sup>18</sup>. In dermatology, quality of life measures are the most widely and extensively used PROMs<sup>19-21</sup>. A Danish study estimated the correlation between physician assessed morbidity of the patient and the self-reported Dermatology Life Quality Index (DLQI) in 51 dermatological patients. Physicians underestimated morbidity in patients with more benign disease and overestimated morbidity in patients with more aggressive disease, compared with the patients's assessment<sup>22</sup>. A systematic review to determine whether there is any correlation between DLQI scores and psychiatric measure scores concluded that the DLQI correlated well with the depression domain of the HADS score (Ali FM et al 2017), raising the possibility of the use of DLQI data to alert clinicians to depression.

The patient's perspective regarding severity assessment is of importance. A recent Italian study of 2578 patients compared the assessment of patients and dermatologists using the Physician and Patient Global Assessment. Overall there was difference in the evaluation of the severity from the dermatologists' perspective and the patients' perspective for a range of skin diseases when using the weighted kappa statistics<sup>23</sup>. In a Swedish study of 62 patients with hand eczema, the agreement on the severity of the condition between patient and dermatologist or dermatological nurse was good<sup>24</sup>.

For the purpose of this study the HADS is taken as the gold standard, but the HADS also has false negative and false positive rates as well as true positive and true negative rates. So probably a small number of the HADS negative but physician "positive" patients, may have been genuinely depressed or genuinely anxious. Nevertheless because of the high number of consultations the results are probably clinically relevant.

Other limitations to our study are described previously<sup>8</sup>. Unfortunately because of too small numbers of diagnostic categories within countries we were not able to describe the concordance between dermatologist and patients country by country. We have therefore focused on the most common diagnoses, as described previously<sup>8</sup>.

Overall this study shows that dermatologists estimate absence of depression or anxiety symptoms quite well, but underestimate a significant group of patients with mood problems. Overall the agreement between dermatologist and patient was poor. These results emphasise the need for dermatologists to improve their skills in diagnosing depression and anxiety. Further training for dermatologists to use simple tools such as the HADS may be appropriate to improve the diagnosis of mood disorders. The mental health problems that frequently occur in patients with common skin diseases are often under diagnosed. They need to be recognized and patients managed in a holistic way by their dermatologists.

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