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CLINICAL REPORT

Are Common Skin Diseases among Norwegian Dermatological Outpatients Associated with Psychological Problems Compared with Controls? An Observational Study

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Dermatological disease has been shown to be associated with psychological comorbidity. The aim of this observational study is to describe the distribution of skin disease and the prevalence of depression, anxiety and stress among Norwegian dermatological outpatients. Thirteen percent of outpatients had clinical anxiety compared with 3.7% of healthy controls, and 5.8% had clinical depression compared with 0.9% of controls. Adjusted odds ratio for clinical anxiety was 4.53 in patients compared with controls, and for clinical depression 6.25, which is much higher than previously described in a larger European study. Patients with tumours had less depression. Chronic inflammatory skin conditions had an especially high impact on patient's psychological wellbeing and should not be undervalued relative to, for instance, skin cancer in health strategies. These results argue strongly for including skin disease prevention and treatment in future health strategies. ***Key words: depression; anxiety; psychiatric comorbidity; distribution of dermatological disease; skin cancer; chronic skin diseases.***

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Skin conditions are common in the community (1), but their distribution and association with psychological problems are not fully known. There are studies on the prevalence of the separate dermatological diseases, but few on the distribution of common skin diseases among dermatological outpatients (1, 2).

The most prevalent conditions in dermatology are the chronic inflammatory diseases. Psoriasis, eczemas, acne and hand eczema have a combined prevalence of approximately 25% in developed countries, followed by non-melanoma skin cancer and precancerous conditions (3).

From community studies in Norway (4, 5) and other countries (6–8), we know that individuals with itchy skin, eczema and psoriasis are twice as likely to be depressed as the general population (9). Our group has recently shown that comorbid depression, anxiety and suicidal ideation are common in patients with skin conditions (10).

Depression, anxiety, stress and negative life events have been demonstrated to trigger chronic skin disease and can further worsen the skin condition through low compliance and lack of adherence to the treatment regimen (11, 12). Suicidal ideation is more common in patients with depression, which may be pre-existing, appear as a complication to the skin condition or be triggered by the dermatological medication (13–15). Overall mortality is relatively low for skin diseases, but further research is needed into suicide related to dermatological disease.

The aim of this study is to describe the distribution of skin diseases, specifically among Norwegian outpatients, and to study the association between depression, anxiety and stress for different skin conditions, especially benign tumours, cancer, precancerous lesions and chronic recurrent skin diseases compared with healthy controls.

METHODS

This is an observational case-controlled study. Patients were recruited from 2 Norwegian dermatological outpatient clinics: Stavanger University Hospital and Oslo University Hospital, Department of Dermatology during the period November 2011 to February 2013. This present study is part of a larger European multi-centre study (10).

The study protocol was approved by the Regional Committee for Medical Research Ethics in Norway in August 2011 and the study was performed in full accordance with the World Medical Association's Declaration of Helsinki.

Consecutive patients were invited to participate on random days at each centre. The patients were informed about the study by a research assistant just before their consultation and provided written consent. Inclusion criteria were: age over 18 years; able to read and write Norwegian; and not having a diagnosed severe mental disease. Each participant in the patient group was handed 5 questionnaires, which they returned to the consultant on entering the consultation room. The first part of the questionnaire included socio-demographic variables, such as sex, age, ethnicity, education, self-reported socio-economic status, economic difficulties during the last 5 years and stressful life events during the last 6 months.

Symptoms of depression and anxiety were assessed with the Hospital Anxiety and Depression Scale (HADS). This scale is widely used among patients in hospital settings (16); it includes

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7 items for assessing anxiety and 7 items for depression with 4 possible answers each. For each dimension of anxiety and depression, a score of 0–7 is considered normal, 8–10 marginal, and 11–21 clinical depression or clinical anxiety.

A clinical examination was performed by the dermatologist for each patient and an objective assessment sheet was completed after the examination including the dermatological diagnosis. Physical co-morbidities were registered by the clinician if the patient had treatment for any of the following conditions: cardiovascular disease, chronic respiratory disease, diabetes mellitus, rheumatological disease, or other. In the control group, information on treated comorbidities was self-reported.

The control group was recruited on a voluntary basis at each centre from among employees of the service division of the hospital. They returned the completed questionnaires to the researcher. The controls were not examined clinically.

Patients in the current study presented a high variety of diagnoses, arranged into 27 groups. Skin diseases can be generalized, chronic and extensive, need long-term treatments and are perhaps incurable (eczemas, psoriasis, pruritic conditions, connective tissue disease, chronic ulcers, chronic infections and alopecias). Other conditions, however, are solitary, non-extensive, without periods of exacerbation in their course and mostly have radical short-term treatments (benign tumours, naevi, non-melanoma skin cancer (NMSC) and malignant melanoma), or need no treatment at all. For the purpose of regression analysis, we merged the skin conditions into 2 categories: the chronic, recurrent, inflammatory conditions and solitary lesions (tumours, cancers, melanoma and precancerous lesions) (17). In our outpatient population, only a few conditions could not be classified as belonging to either of the 2 groups.

It is important to note that patients with malignant melanoma and skin cancer in our clinics may be quite different from patients seen by dermatologists in other countries. Our patients would be consulted in outpatient clinics mainly for primary diagnostics, primary excisions, and, to a lesser degree, for extensive re-excisions or complex oncological treatments. Metastatic melanoma or metastatic skin cancer were not represented in our study. The data thus truly reflects how patients with solitary, uncomplicated lesions are affected compared with extensive chronic disease, specifically outpatients in Norway.

Statistical analysis

SPSS version 22 software was used. Continuous variables were analysed in terms of difference between the means, using *t*-test and analysis of variance (ANOVA). Dichotomous variables were analysed in terms of difference between proportions, using the χ^2 test. Bivariate and multivariate logistic regression models were tested to study the associations between variables, simultaneously controlling for potential confounding factors. For regression analyses, diagnoses were grouped into 2 large groups, as described above.

RESULTS

The total number of participants was 795, with 577 patients and 218 controls (Table I). The participation rate of the patients was 91.3%. There were more females in both groups. The mean age of the patients was 50.1 years. The distribution according to socio-economic level was comparable in the 2 groups. Compared with controls, patients had a slightly lower education and had more comorbidities regarding cardiological, rheumatological and other diseases, but not respiratory diseases or diabetes mellitus. More than one-third (35.3%) of the patients had at least one comorbidity vs. 15.6% of the controls.

The overall distribution of skin diseases is presented in Table II. The most common diagnosis overall, and for both sex, was psoriasis (21%), followed by NMSC (10.6%) and actinic keratosis (AK) (8.7%). The chronic inflammatory dermatoses accounted for nearly half of our patients' pathology (44.9%). Together with other itchy dermatoses and hand dermatoses the chronic inflammatory skin conditions accounted for more than half (55.6%) of the pathology in our dermatological population. When adding the rest of the chronic conditions to this group (e.g. autoimmune disorders, chronic infections, chronic ulcers, alopecias, hyperhidrosis and monogenetic diseases), we see that 69.3% of the conditions in our Norwegian outpatients are chronic, recurrent and mainly inflammatory diseases.The benign tumours, naevi and actinic keratosis accounted for 14.1% of the skin conditions, while skin cancer and malignant melanoma accounted for 14.2%.

Table SI[1] shows the percentages of depression, anxiety and stress. Significantly more patients were depressed (HADS ≥8) compared with controls (13.3% vs. 5.6%). Among those, significantly more had a clinical depression (5.8% of the patients vs. 0.9% of the controls) defined as HADS ≥11. Anxiety as HADS ≥8 was registered

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Table I. *Population characteristics of the Norwegian sample (n=795)*

	Patients $n=577$	Controls $n=218$	*p*-value
Sex, *n* (%)			<0.05
Female	336 (58.3)	149 (68.7)	
Male	240 (41.7)	68 (31.3)	
Age years, mean (SD) [range]	50.1 (17.7) [18–92]	42.2 (12.5) [19–67]	<0.05
Females	49.2 (17.7)	43.6 (12.8)	<0.05
Males	51.2 (17.8)	39.2 (11.4)	<0.05
Socio-economic status, *n* (%)			
Low	69 (12.8)	29 (13.5)	
Middle	407 (75.5)	168 (78.1)	NS
High	63 (11.7)	18 (8.4)	
Educational level, *n* (%)			
Lower	82 (15.2)	16 (7.5)	<0.05
Higher or university	457 (84.7)	197 (92.5)	
Economic difficulties, *n* (%)			NS
Yes	64 (11.9)	19 (8.8)	
No	472 (88.1)	196 (91.2)	
Physical comorbidities, *n* (%)			
Yes	200 (35.3)	33 (15.6)	<0.05
Cardiovascular, *n* (%)	128 (23.3)	10 (4.7)	<0.05
Respiratory, *n* (%)	39 (7.2)	16 (7.6)	NS
Diabetes, *n* (%)	28 (5)	5 (2.4)	NS
Rheumatological, *n* (%)	68 (12.3)	9 (4.3)	<0.05
Other comorbidities, *n* (%)	141 (25.2)	18 (8.9)	<0.05

Missing values: patients 1–41; controls 1–6.

Table II. *Distribution of skin diseases in a Norwegian sample of dermatological outpatients (*n = *577). Distribution of skin disease by sex (*n = *576)*

	Diagnosis[a]	All *n* = 577 *n* (%)	Male *n* = 240 *n* (%)	Female *n* = 336 *n* (%)
1	Psoriasis	121 (21)	65 (27.1)	56 (16.7)
2	Non-melanoma skin cancer	61 (10.6)	24 (10)	37 (11)
3	Actinic keratosis	50 (8.7)	16 (16.7)	34 (10.1)
4	Eczemas and contact allergy	39 (6.8)	13 (5.4)	25 (7.4)
5	Acne	31 (5.4)	13 (5.4)	18 (5.4)
6	Atopic dermatitis	31 (5.4)	13 (5.4)	18 (5.4)
7	Naevi and benign tumours	31 (5.4)	9 (3.8)	21 (6.3)
8	Rosacea, perioral dermatitis, facial erythema	27 (4.7)	5 (2.1)	22 (6.5)
9	Autoimmune diseases[b]	23 (4)	8 (3.3)	15 (4.5)
10	Malignant melanoma	21 (3.6)	8 (3.3)	13 (3.9)
11	Hand eczema	19 (3.3)	11 (4.6)	8 (2.4)
12	Pustulosis palmoplantaris	17 (2.9)	6 (2.5)	11 (3.3)
13	Infections (not venereal)	17 (2.9)	9 (3.8)	8 (2.4)
14	Urticaria	13 (2.3)	6 (2.5)	7 (2.1)
15	Pruritus and prurigo	13 (2.3)	7 (2.9)	6 (1.8)
16	Ulcus cruris, stasis dermatitis and chronic venous insufficiency	10 (1.3)	5 (2.1)	5 (1.5)
17	Genital, not venereal	9 (1.6)	6 (2.5)	3 (0.9)
18	Monogenetic conditions[c]	8 (1.4)	1 (0.4)	7 (2.1)
19	Other[d]	8 (1.4)	2 (0.8)	6 (1.8)
20	Vitiligo	6 (1)	3 (1.3)	3 (0.9)
21	Seborrhoeic dermatitis	5 (0.9)	5 (2.1)	0
22	Hidradenitis suppurativa	4 (0.7)	2 (0.8)	2 (0.6)
23	Sarcoidosis and granuloma	3 (0.5)	1 (0.4)	2 (0.6)
24	Lichen planus	3 (0.5)	1 (0.4)	2 (0.6)
25	Alopecias	3 (0.5)	0	3 (0.9)
26	Pyoderma gangrenosum	2 (0.3)	0	2 (0.6)
27	Hyperhidrosis	2 (0.3)	1 (0.4)	1 (0.3)

[a]Some of the monogenetic and some of the genital conditions were classified as "inflammatory", while other monogenetic and genital were classified as "solitary" for the purpose of regression analysis in order to give more correct values. Numbers in Table II will thus slightly vary from those given for the regression analysis. [b]Autoimmune disease: connective tissue disease, vasculitis, autoimmune blistering. [c]Monogenetic conditions: 2 Hailey-Hailey; 1 tuberous sclerosis; 1 microtia; 1 ichthyosis linearis circumflexa; 1 congenital malformation of face and neck; 1 vascular malformations (male); 1 Morbus Darier. [d]Other: 6 unspecified skin conditions, 1 cheilitis (female), 1 dermatitis artefacta (female).

in 27.1% of the patients and 14.8% of the controls, while 13% of the patients had clinical anxiety (HADS ≥11) vs. 3.7% of the controls. Experienced stress was 30.1% for patients vs. 20.1% for controls. Patients with tumours, cancer and precancerous lesions, however, did not show any significant difference in depression, anxiety and stress compared with the healthy controls. On the other hand, nearly a third of the patients with chronic recurrent dermatoses were anxious or experienced stress.

In Table III we present odds ratio (OR) with 95% confidence interval (95% CI) for Norwegian outpatients to have depression, anxiety and stress, all adjusted for age, sex, socio-economic status, education and physical comorbidity. Compared to the figures from a European study (10) patients had more than 3 times higher odds to be depressed than healthy controls (OR 3.12), nearly 3 times higher odds for anxiety (OR 2.87) and experienced twice as much stress (OR 2.1). The odds for clinical depression and clinical anxiety were even higher, showing that the odds for patients to be clinically depressed was 6.25, and to have clinical anxiety 4.53. Norwegian dermatological outpatients have odds 2 and 3 times higher for anxiety and depression compared with controls than do patients from other European countries.

Especially high odds for depression were seen among patients with chronic, inflammatory, recurrent skin conditions with OR as high as 7.3, confirming significant psychological suffering in this group. Patients with benign or malignant solitary lesions showed 2-fold higher odds to experience stress (OR 1.95) and anxiety (OR 2.18). The odds for depression were not higher than for controls (OR 1), and only just slightly higher for clinical depression (OR 1.38) (Table III).

DISCUSSION

In this Norwegian study we found that the most common conditions among dermatological outpatients were psoriasis and NMSC, followed by AK. More than two-thirds of the patients had a chronic inflammatory skin condition. The distribution of skin diseases in our study shows prevalence rates similar to these described in other European countries (1). A European multicentre study found the same 2 diseases, psoriasis and NMSC, to be most common among dermatological outpatients in Europe (10). In accordance with the European study, our study showed clinical depression and clinical anxiety to be significantly higher for patients compared

Table III. *Logistic regression analysis with odds ratio (OR) and 95% confidence interval (95% CI) for being an outpatient compared with healthy controls for depression, anxiety and stressful life events. Adjusted for age, sex, education, social status and comorbidities*

Patients and diagnostic group	Any anxiety (HADS ≥8) OR (95% CI)	Clinical anxiety (HADS ≥11) OR (95% CI)	Any depression (HAD S ≥8) OR (95% CI)	Clinical depression (HADS ≥11) OR (95% CI)	Stressful life events last 6 months OR (95% CI)
European study (9) (n=4,994)	1.76 (1.48; 2.09) Missing: 107	2.18 (1.68; 2.82) Missing: 107	2.40 (1.67; 3.47) Missing: 102	2.40 (1.67; 3.47) Missing 102	
All patients Norway (n=577)	2.87 (1.79; 4.62) Missing: 92	4.53 (2.09; 9.81) Missing: 92	3.12 (1.57; 6.2) Missing: 91	6.25 (1.45; 26.96) Missing: 91	2.1 (1.39; 3.18) Missing: 87
Chronic, recurrent skin diseases Norway (n=400)	2.98 (1.83; 4.83) Missing: 61	4.59 (2.09; 10.04) Missing: 61	3.47 (1.74; 6.92) Missing: 60	7.31 (1.69; 31.57) Missing: 60	2.04 (1.34; 3.12) Missing 55
All tumours, benign and malignant and precancerous Norway (n=168)	1.61 (0.81; 3.21) Missing: 30	2.18 (0.75; 6.31) Missing: 30	1 (0.34; 2.91) Missing: 30	1.38 (0.18; 10.63) Missing: 30	1.95 (1.08; 3.5) Missing: 31

Missing controls Norway: anxiety and depression: 8, stress: 11. Missing controls Europe: anxiety: 9, depression: 7.

with the healthy controls, with more than 4-fold higher odds for clinical anxiety and 6-fold higher odds for clinical depression, i.e. higher than for the European study (2.2. and 2.4, respectively). The extent of psychiatric comorbidity may vary between countries, or may reflect differences in patient populations. Further studies addressing this difference may be warranted.

Chronic, recurrent and more extensive skin conditions would be expected to affect a patient's wellbeing differently from solitary lesions (17–20). According to multiple studies (5, 7, 8, 14, 15, 21–27), patients with chronic inflammatory and pruritic generalized dermatoses score highest for depression and anxiety. Other studies show that patients with cancer, tumours and pre-cancerous lesions experience less psychiatric comorbidity from their skin disease (18, 19), surprisingly, even for serious conditions such as malignant melanoma, especially in the early stages (28, 29). In an older study by Cassileth et al. (20) patients with malignant melanoma were strikingly superior to other dermatology patients in terms of emotional well-being, perhaps because of the better support they receive. Shah & Coates (17) found that older patients with rashes suffered significantly more than did older patients with solitary lesions, even when the lesion was malignant. When grouping our patients in the same 2 categories we found a significant difference in psychiatric comorbidity compared to healthy control with each of these 2 categories.

Odds for depression in patients with chronic recurrent skin diseases were more than 3-fold higher compared with healthy controls, nearly as much for anxiety and 2-fold for stress. Odds for clinical depression and clinical anxiety in the same patient group showed even higher values. Especially high were odds for clinical depression, 7 times higher (OR 7.31) than for the healthy controls, confirming a significant impact on dermatological patients' mental health. This finding may be of significance as dermatological units increase their focus on prioritizing cancer, thus generating longer waiting times for patients with other skin conditions.

The group of patients with tumours, NMSC, malignant melanoma and pre-cancerous lesions in our study showed no difference in odds for depression. Few studies have evaluated psychiatric comorbidity in patients with benign tumours, NMSC and AK, but our study shows results in accordance with other existing studies (17). Less psychiatric comorbidity in patients with solitary lesions compared with our other patients might reflect the more radical, surgical treatment options for skin cancer, AK, malignant melanoma and other tumours. Patients who were newly referred might not have been aware of the seriousness of their diagnosis. Their answers to the questionnaires reflect the true extent of discomfort solitary lesions present, usually not being itchy, painful or generalized.

There was no difference in depression, anxiety and stress even when analysing separately for malignant and benign tumours (data not shown). Malignant melanoma may be regarded as a more distinct condition because of its serious prognosis, but besides higher experienced stress, patients with malignant melanoma did not show more depression. We therefore included them in the group of solitary lesions, precisely to show that solitary lesions with more radical treatment and shorter course, even when serious, have a lower impact on a patient's mental state, at least in the initial stages.

Study limitations and strengths[2]

In conclusion, the most common skin conditions among dermatological outpatients in Norway are psoriasis and NMSC. Overall, dermatological patients have significantly more psychiatric comorbidities, but this is not the case for patients with benign tumours, skin cancer and precancerous lesions. Chronic skin conditions have a high impact on patients' psychological wellbeing and should not be undervalued relative to skin cancer in health strategies and waiting lists. These findings have implications for care management and prioritizing dermatological patients.

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The authors declare no conflicts of interest.

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[2]*Limitations:* The patient and control groups were not case-matched. Still, there was no significant difference in socio-economic status and economic difficulties between the 2 groups. The staff at the hospital was over-represented by females and younger individuals. Employed personnel would be expected to be healthier than patients, but we intentionally aimed to have a control group, which would best match the World Health Organization (WHO)'s definition of health (30). The results for psychiatric comorbidity in the group with solitary lesions are precisely valid for Norwegian dermatological outpatients, since we would consult patients with malignant melanoma or skin cancer only in the initial phase of their disease. We cannot conclude that those patients will not develop more significant psychiatric symptoms during the course of their disease; a depression may need time to evolve. The results may be less applicable to other countries, but do pose interesting questions that may warrant further studies.
Strengths: There are few recent studies on the distribution of skin diseases in dermatological outpatients. We present here data on a patient population from 2 large dermatological clinics in Norway. This is the first study on depression, anxiety and stress among outpatients with common skin conditions compared with controls.
We further evaluated psychiatric comorbidity according to the 2 main diagnostic categories; chronic, recurrent skin conditions and solitary lesions, showing the large psychological impact chronic skin conditions have. There are few other studies comparing those 2 very different categories. The significant higher psychiatric comorbidity in the former group may open for better prioritizing, support and resource allocation for all dermatological patients, not only those with a malignant disease.
We have the opportunity to compare our results with the European study as a whole. Depression and anxiety are higher for dermatological outpatients in Norway, warranting further studies on depression and anxiety in Norwegian dermatological outpatients. We encourage other European countries to evaluate these issues, as numbers may vary widely from country to country.