

Report

Correlation and agreement of self-assessed and objective skin disease severity in a cross-sectional study of patients with acne, psoriasis, and atopic eczema

Parker J. Magin¹, PhD, DipPDerm, FRACGP, C. Dimity Pond¹, PhD, FRACGP, Wayne T. Smith², PhD, MPH, FAFPHM, Alan B. Watson³, DDM, FACD, and Susan M. Goode¹, BSc

¹School of Medicine and Public Health and ²Centre for Clinical Epidemiology and Biostatistics, University of Newcastle, NSW, Australia, and ³Royal Newcastle Centre, New Lambton, NSW, Australia

Correspondence

Parker Magin, PhD, DipPDerm, FRACGP
Newbolds Building
University of Newcastle
University Drive
Callaghan
NSW 2308
Australia
E-mail: parker.magin@newcastle.edu.au

Conflicts of interest: None.

Abstract

Background Previous studies have shown variable correlation of patients' self-assessed skin severity measures and clinician-assessed objective measures of severity. But, generally, correlation has not been as good as might be expected for conditions in which the objective physical extent of skin disease is apparent to the sufferer to an extent that is not applicable in many other diseases.

Methods This paper reports agreement and correlation of self-assessed and objective severity measures in a study of 108 subjects with acne, psoriasis, or atopic eczema. The study was a cross-sectional study examining psychological associations of these skin diseases. Objective severity was assessed with the Leeds technique (acne), the Psoriasis Area and Severity Index, and Six Area Six Sign Atopic Dermatitis instruments. Agreement is a more appropriate measure than correlation in this situation and was measured with weighted kappa, while correlation was measured with Spearman's rank correlation.

Results There was a modest correlation of $\rho = 0.46$ and similarly very modest agreement of 0.35 (weighted kappa) of self-assessed and clinician-assessed disease severity. Furthermore, self-assessed (but not clinician-assessed) severity was statistically associated with psychological morbidity in this study; i.e. – depression, anxiety, and overall psychological morbidity.

Conclusions Clinicians should consider psychological sequelae of skin disease, not only in those with objectively more severe disease but in patients across the severity spectrum. Both observational and interventional studies of skin disease should include both clinician-assessed and self-assessed measures of severity among assessed variables.

Introduction

Psychological morbidity has not always correlated well with disease severity in studies of skin disease.^{1,2} This may reflect patients' subjective perceptions of the severity of their skin disease not necessarily aligning with the perceptions of their doctors or with objective measures of disease severity. Lack of congruence of physician and clinician perceptions of disease severity is a potential barrier to patient-centered practice and a central consideration in psychodermatology: "the psychoemotional impact of acne is most effectively studied in the context of the patient's perception of severity."³

The context of this statement is that skin diseases may be associated with significant psychological morbidity.^{4–6} Furthermore, it has been demonstrated that in many

dermatological conditions, dermatologists underestimate the prevalence of psychiatric morbidity^{7,8} and that a mismatch of patients' and doctors' perceptions of the seriousness of their illness causes patients' distress and impairs the doctor–patient relationship.⁹ The level of congruence of doctors' assessments of patients' skin disease severity is of considerable clinical importance as even objectively mild skin disease may precipitate significant psychological morbidity.

In previous studies,^{10–20} the correlation of clinician-assessed and patient-assessed disease severity has ranged from very good (correlation coefficient 0.77^{14,17}) to very poor¹¹ but has generally been surprisingly modest. The most appropriate means of examining the relationship of subjects' assessments and objective measures, however, is not correlation (as has been consistently utilized in

previous studies) but is agreement.²¹ Previous studies that assessed agreement of self assessments and clinician assessments of acne severity^{10,15} found a level of agreement of kappas of 0.35–0.40. Weighted kappa (which makes use of the additional information available with multiple levels of parameter values and can take into account the degree of disagreement)²¹ rather than kappa (which is appropriate for dichotomous data) is, however, a more appropriate statistic to employ to assess agreement in this situation.²¹

We assessed agreement (employing weighted kappa) of patients' self-assessed and clinician-assessed skin disease severity in a cross-sectional study, conducted in general practice as well as specialist dermatology practice, of the psychological associations of acne, psoriasis, and atopic eczema. We chose to study these three diseases because of their high prevalence and previous association with psychological morbidity in studies conducted in specialist dermatology settings. The main results of this study have been reported previously.²²

Materials and methods

The methodology of the overall study has been described previously.²² Briefly, 108 patients from general and specialist dermatology practices with acne ($n = 41$), psoriasis ($n = 47$), and atopic eczema ($n = 20$) had disease severity assessed by their attending clinicians and completed measures of psychological morbidity (depression, anxiety, self-consciousness, overall psychiatric morbidity, neuroticism, and introversion/extroversion). Demographic data were also collected, along with self ratings of disease severity.

Objective disease severity was measured with the Leeds method,²³ Psoriasis Area and Severity Index (PASI),²⁴ and Six Area Six Sign Atopic Dermatitis instrument (SASSAD),²⁵ for acne, psoriasis, and eczema, respectively. The PASI scores erythema, infiltration, and scaling as well as surface area involvement. The Leeds employs a scoring system of photographs and descriptions. The SASSAD involves scoring of six signs (erythema, exudation, excoriation, dryness, cracking, and lichenification) in six body regions. The Leeds method and PASI are the disease severity instruments most often employed in studies of acne and psoriasis, and the SASSAD has also been found to be a valid measure of atopic eczema severity.²⁵

Assessment was by the patients' treating clinician. Treating clinicians were specialist dermatologists in private practice or general practitioners (family physicians). These clinicians were trained in the standardized use of the Leeds, PASI, and SASSAD instruments during detailed visits by the study's chief investigator.

Continuous scores were employed to calculate correlation. For the purposes of calculating agreement, continuous scores

on these instruments were converted to categorical data using accepted cut-points (three levels: "mild," "moderate," and "severe"). Subjects self assessed their disease severity as "mild," "moderate," or "severe."

Even though it was more appropriate to measure agreement than correlation, correlation was calculated to allow comparison with previous studies. Correlation was analyzed by Spearman's rank correlation and agreement by weighted kappa.

For the 108 subjects with skin disease in this study, eight linear or logistic regression models were constructed (employing a forward stepwise procedure) with measures of eight separate psychological outcomes as dependent variables and self-assessed severity and clinician-assessed severity among the independent variables entered. The dependent psychological variables were depression (measured with the Hospital Anxiety and Depression Scale – HADS – depression subscale), anxiety (HADS anxiety subscale), overall psychological morbidity (assessed with two measures: the total HADS score, and the General Health Questionnaire-12 – GHQ-12), public self-consciousness (Fennigstein Self-Consciousness Scale – FSCS), social anxiety (Fennigstein Self-Consciousness Scale), neuroticism (Eysenck Personality Inventory – EPI), and extraversion/introversion (EPI). The regression procedure has been described previously.²²

The HADS²⁶ is a reliable screening instrument for clinically significant anxiety and depression.^{26–28} It has been found to be sensitive and specific in diagnosing depression and anxiety in dermatology outpatient settings.²⁹ The total score on the HADS is a valid measure of "emotional distress" or "psychological distress," so that the HADS can be used as a measure of overall psychiatric morbidity.³⁰

The GHQ-12 is the most commonly used international scale of general psychiatric morbidity.²⁷ A study in dermatology outpatients²⁹ found it to have sensitivity and specificity of 79 and 78%, respectively, in detecting "minor psychiatric disorder", and it has been deemed to have "extraordinary clinical utility" in screening for psychiatric morbidity in dermatology patients.³¹

The FSCS³² is currently the most-used measure for the assessment of self-consciousness/self-awareness³³ and has been found to be valid and reliable.^{32,34} The FSCS comprises three subscales: private self-consciousness, public self-consciousness, and social anxiety. The public self-consciousness and social anxiety subscales were used in this study to assess the self-consciousness and anxiety in social settings reported by patients with skin disease in the qualitative phase of this project.^{4,35}

A short-form version of the EPI measuring neuroticism and introversion/extraversion³⁶ was used in this study to measure personality traits that, it was hypothesized, could be influenced by the experience of having skin disease. It has been used as an outcome factor in previous skin disease studies.^{37–39}

The study had ethical approval from the Human Research Ethics Committee, University of Newcastle.

Results

There was statistically significant correlation ($P = 0.01$) of moderate degree ($\rho = 0.46$) between self-assessed and objective clinician-assessed skin severity measurements. Agreement between objective clinician assessment and self-assessed severity was weighted kappa 0.35 (95% confidence interval 0.1981, 0.5084), representing moderately poor agreement (see Table 1).

The context of this finding was that self-assessed severity was a significant association of psychological morbidity in regression models constructed for four of the eight psychological outcome measures (depression as measured by the HADS depression subscale, anxiety as measured by the HADS anxiety subscale, and both measures of overall psychological morbidity – the HADS-total and the GHQ-12). Objective severity was not significantly associated with any of the psychological outcome variables and was not retained in any of the eight regression models.

Conclusions

It can be argued that the objective physical extent of skin disease is apparent to the sufferer to an extent that is not applicable in many other disease states. Therefore, very good correlation and agreement of subjective and objective measures might be expected. Correlation of 0.46 in our study can be compared with correlation in previous studies,^{10–20} which has ranged from good (0.77)^{14,17} to none.¹¹ Of more importance is the relatively poor agreement (weighted kappa of 0.35) between self-assessed and objective clinician-assessed severity.

This is the most appropriate statistic for use in this situation.^{21,40} Previous studies that assessed agreement of self assessments and clinician assessments of acne severity^{10,15} found a level of agreement (kappas of 0.35–0.40) that is consistent, though not directly comparable, with the weighted kappa found in our study.

It could be proposed that psychological factors, person-

ality traits, and issues of vulnerability and resilience in patients with skin disease might be the substrate for this finding, as was suggested by the findings of the qualitative study that informed the study reported here.³⁵ This is the context for self-assessed, but not objective disease severity, being associated with depression, anxiety, and overall psychological morbidity in this study.

The tendency noted in some previous studies⁴¹ for patients to overestimate the severity of their skin disease compared with the assessment of their clinicians cannot be tested directly in this study, as subjective disease severity assessments of clinicians were not obtained. It is, however, interesting to note that on inspection of Table 1, there is no apparent overall overestimation of disease severity on self-estimation compared with objective clinician-assessed severity employing accepted cut-points.

An important consideration is that subjects were recruited to the current study from both general practice and specialist dermatology practice. Thus, the findings are of particular interest in not reflecting the perceptions only of patients who have been “self-selected” to some extent by referral to specialist or secondary care. Conversely, Leeds, PASI, and SASSAD assessments being performed by multiple assessors is a potential limitation of the study, though the one-to-one training of assessors during detailing visits will have reduced any potential measurement bias. A further limitation of our study is the relatively small sample size, which has resulted in us calculating agreement across three different diseases. This broad-brush approach may fail to detect variation in agreement between particular skin diseases.

The clinical implications of these findings are that psychological and psychiatric sequelae of skin disease should be sought not only in those with objectively more severe disease but in patients across the severity spectrum. Clinicians could be aware of this relationship and explore patients' perception of their disease severity as well as assess objective disease severity. It has also been suggested that clinicians should take patients' perception of disease severity into account when making decisions regarding treatment; for instance, in deciding whether isotretinoin is prescribed in patients with acne.⁴²

Research implications of these findings are that clinical trials of management of skin disease and observational studies of the psychological and quality-of-life sequelae of skin disease should include both clinician-assessed and self-assessed measures of disease severity. Interventional studies may well benefit from assessment of outcomes of self-assessed, as well as objective or clinician-assessed, disease severity, as our findings suggest these may not necessarily be congruent and because self-assessed rather than objective severity is associated with patients' psychological well-being. Similarly, multivariate

Table 1 Comparison of self-assessed severity and clinician-assessed objective severity

		Objective severity score			
		Mild	Moderate	Severe	Total
Self-assessed Severity Score	Mild	18	8	2	28
	Moderate	18	8	12	38
	Severe	3	0	14	17
	Total	39	16	28	83

Weighted kappa 0.3532 (95% confidence interval 0.1981, 0.5084).

models of association with, or causation of, psychological morbidity in patients with skin disease derived in observational studies are likely to be improved by inclusion of self-assessed disease severity.

References

- Sampogna F, Sera F, Abeni D, Investigators IDIMPRoVE. Measures of clinical severity, quality of life, and psychological distress in patients with psoriasis: a cluster analysis. *J Invest Dermatol* 2004; **122**: 602–607.
- Motley RJ, Finlay AY. How much disability is caused by acne? *Clin Exp Dermatol* 1989; **14**: 194–198.
- Kellett SC, Gawkrödger DJ. The psychological and emotional impact of acne and the effect of treatment with isotretinoin. *Br J Dermatol* 1999; **140**: 273–282.
- Magin P, Adams J, Heading G, et al. Psychological sequelae of acne vulgaris: results of a qualitative study. *Can Fam Physician* 2006; **52**: 978–979.
- Russo PA, Ilchef R, Cooper AJ. Psychiatric morbidity in psoriasis: a review. *Australas J Dermatol* 2004; **45**: 155–159.
- Hughes JE, Barraclough BM, Hamblin LG, White JE. Psychiatric symptoms in dermatology patients. *Br J Psychiatry* 1983; **143**: 51–54.
- Sampogna F, Picardi A, Melchi CF, et al. The impact of skin diseases on patients: comparing dermatologists' opinions with research data collected on their patients. *Br J Dermatol* 2003; **148**: 989–995.
- Poot F, Janne P, Tordeurs D, et al. Psychosomatics and dermatology: comparison between objective data and subjective impressions given by patients and dermatologists. *Dermatol Psychosom* 2001; **1**: 19–25.
- Magin P, Adams J, Heading G, Pond D. Patients with skin disease and their relationship with their doctors: results of a qualitative study of acne, psoriasis and eczema. *Med J Aust* 2009; **190**: 62–64.
- Wu SF, Kinder BN, Trunnell TN, Fulton JE. Role of anxiety and anger in acne patients: a relationship with the severity of the disorder. *J Am Acad Dermatol* 1988; **18**: 325–333.
- Mosam A, Vawda NB, Gordhan AH, et al. Quality of life issues for South Africans with acne vulgaris. *Clin Exp Dermatol* 2005; **30**: 6–9.
- Jenner N, Campbell J, Marks R. Morbidity and cost of atopic eczema in Australia. *Australas J Dermatol* 2004; **45**: 16–22.
- Kupfer J, Niemeier V, Brosig B, et al. Sense of coherence among psoriatics as a predictor of symptom-free time following dermatological inpatient therapy. *Dermatol Psychosom* 2003; **4**: 200–206.
- Hanstock TL, O'Mahony JF. Perfectionism, acne and appearance concerns. *Pers Individ Diff* 2002; **32**: 1317–1325.
- Smithard A, Glazebrook C, Williams HC. Acne prevalence, knowledge about acne and psychological morbidity in mid-adolescence: a community-based study. *Br J Dermatol* 2001; **145**: 274–279.
- Fortune DG, Main CJ, O'Sullivan TM, Griffiths CEM. Assessing illness-related stress in psoriasis: the psychometric properties of the Psoriasis Life Stress Inventory. *J Psychosom Res* 1997; **42**: 467–475.
- Hanstock TL, O'Mahony JF. Treatment seeking in young women with acne. *Dermatol Psychosom* 2003; **4**: 194–199.
- Feldman SR, Fleischer AB Jr, et al. The self-administered psoriasis area and severity index is valid and reliable. *J Invest Dermatol* 1996; **106**: 183–186.
- Jenner N, Campbell J, Plunkett A, Marks R. Cost of psoriasis: a study of the morbidity and financial effects of having psoriasis in Australia. *Australas J Dermatol* 2002; **43**: 255–261.
- Gutgesell C, Heise S, Seubert A, et al. Comparison of different activity parameters in atopic dermatitis: correlation with clinical scores. *Br J Dermatol* 2002; **147**: 914–919.
- Sackett DL, Haynes RB, Guyatt GH, Tugwell P. *Clinical Epidemiology: A Basic Science for Clinical Medicine*, 2nd edn. Boston: Little Brown, 1991.
- Magin PJ, Pond CD, Smith WT, et al. A cross-sectional study of psychological morbidity in patients with acne, psoriasis and atopic dermatitis in specialist dermatology and general practices. *J Eur Acad Dermatol Venereol* 2008; **22**: 1435–1444.
- Burke BM, Cunliffe WJ. The assessment of acne vulgaris – the Leeds technique. *Br J Dermatol* 1984; **111**: 83–92.
- Langley RG, Ellis CN. Evaluating psoriasis with Psoriasis Area and Severity Index, Psoriasis Global Assessment, and Lattice System Physician's Global Assessment. *J Am Acad Dermatol* 2004; **51**: 563–569.
- Berth-Jones J. Six area, six sign atopic dermatitis (SASSAD) severity score: a simple system for monitoring disease activity in atopic dermatitis. *Br J Dermatol* 1996; **135**(Suppl 48): 25–30.
- Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand* 1983; **67**: 361–370.
- Bowling A. *Measuring Disease*. Buckingham: Open University Press, 1995.
- Bjelland I, Dahl AA, Haug TT, Neckelmann D. The validity of the Hospital Anxiety and Depression Scale: An updated literature review. *J Psychosom Res* 2002; **52**: 69–77.
- Lewis G, Wessely S. Comparison of the General Health Questionnaire and the Hospital Anxiety and Depression Scale. *Br J Psychiatry* 1990; **157**: 860–864.
- Martin CR, Tweed AE, Metcalfe MS. A psychometric evaluation of the Hospital Anxiety and Depression Scale in patients diagnosed with end-stage renal disease. *Br J Clin Psychol* 2004; **43**: 51–64.
- Folks DG. Screening for psychiatric disorders in patients with skin diseases. *J Psychosom Res* 2004; **57**: 225–226.

- 32 Fenigstein A, Scheier MF, Buss AH. Public and private self-consciousness: assessment and theory. *J Consult Clin Psychol* 1975; 43: 522-527.
- 33 Ben-Artzi E. Factor structure of the private self-consciousness scale: role of item wording. *J Pers Assess* 2003; 81: 256-264.
- 34 Scheier MF, Carver CS. The self-consciousness scale: a revised version for use in general populations. *J Appl Soc Psychol* 1985; 15: 687-699.
- 35 Magin P, Adams J, Heading G, et al. The psychological sequelae of psoriasis: results of a qualitative study. *Psychol Health Med* 2009; 14: 150-161.
- 36 Duncan-Jones P. *Short Stable Measures of Extraversion and Neuroticism for Australian General Population*. Canberra: Australian National University, 1983.
- 37 Ahmar H, Kurban AK. Psychological profile of patients with atopic dermatitis. *Br J Dermatol* 1976; 95: 373-377.
- 38 Lim CC, Tan TC. Personality, disability and acne in college students. *Clin Exp Dermatol* 1991; 16: 371-373.
- 39 Jordan JM, Whitlock FA. Emotions and the skin: the conditioning of scratch responses in cases of atopic dermatitis. *Br J Dermatol* 1972; 86: 574-585.
- 40 Pagano M, Gauvreau K. *Principles of Biostatistics*, 2nd edn. Pacific Grove: Duxbury, 2000.
- 41 Jemec GB, Wulf HC. Patient-physician consensus on quality of life in dermatology. *Clin Exp Dermatol* 1996; 21: 177-179.
- 42 Haverstock CL, Feldman SR. Prescribing on the basis of subjective disease severity. *J Dermatolog Treat* 2006; 17: 261.