

Research Article

The Mental Health Burden of Visible Skin Diseases (Severe Acne Vulgaris and Atopic Dermatitis) and its Influence on Behavioural Treatment Compliance: A Prospective Observational Study at a Tertiary Care Teaching Hospital in Maharashtra, India

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ABSTRACT

Background: Visible dermatoses such as severe acne vulgaris and atopic dermatitis (AD) extend beyond cutaneous pathology, inflicting psychological distress that can erode quality of life and, in turn, undermine adherence to prescribed dermatological therapy. This bidirectional “disease-distress-non-adherence cycle is increasingly recognised in psychodermatology but remains understudied in Indian tertiary-care settings.

Objectives: To determine the prevalence and severity of anxiety, depression and quality-of-life impairment among patients with severe acne vulgaris and atopic dermatitis and to examine their association with behavioural treatment compliance.

Methods: A hospital-based prospective observational study was conducted over 18 months in the Department of Dermatology, Venereology and Leprosy, in liaison with the Department of Psychiatry, SSPM Medical College and Lifetime Hospital. Consecutively recruited patients aged 12-60 years with severe acne (Global Acne Grading System, GAGS ≥ 19) or moderate-to-severe AD (SCORAD > 25) were assessed at baseline and scheduled follow-ups using the Dermatology Life Quality Index (DLQI), the Hospital Anxiety and Depression Scale (HADS), and the 8-item Morisky Medication Adherence Scale (MMAS-8). Associations were analysed using correlation and multivariate logistic regression.

Results: Of the projected 390 participants (195 acne, 195 AD), a substantial proportion are expected to screen positive for anxiety and/or depression on HADS, with DLQI impairment correlating positively with HADS scores and negatively with MMAS-8 adherence scores.

Conclusion: Visible dermatoses are expected to carry a significant, often unaddressed, mental health burden that independently predicts poorer treatment compliance, supporting the integration of routine psychological screening and a dermatology-psychiatry liaison pathway into outpatient dermatology care.

Keywords: Acne Vulgaris, Atopic Dermatitis, Psychodermatology, Anxiety, Depression, Quality of Life, Treatment Adherence, Behavioural Compliance.

INTRODUCTION

The skin is the body's most visible organ and its primary interface with the outside world, making it central to self-image, social interaction and psychological wellbeing [1,2]. Disorders that disfigure or alter the appearance of the skin therefore carry a psychosocial burden that is frequently disproportionate to their objective physical severity. Among the spectrum of dermatoses, severe acne vulgaris and atopic dermatitis (AD) are particularly important because both are common, chronic or relapsing, and characteristically affect

cosmetically and socially sensitive sites such as the face, neck, hands and flexures.

Acne vulgaris is widely regarded as a psychosomatic disorder rather than a purely cosmetic concern. In a large cross-sectional study using the Cardiff Acne Disability Index, the Dermatology Life Quality Index (DLQI) and the WHO Quality-of-Life scale, acne severity correlated strongly and positively with depression, anxiety and stress, and acne together with associated psychological distress significantly predicted impaired self-esteem and quality of life [6]. Disease-specific quality-of-life impairment in acne has likewise been shown to

track closely with anxiety and depression scores [7], and dermatology literature has documented suicidal ideation in a meaningful minority of patients with acne and other disfiguring dermatoses [8]. Indian data mirror these global findings: hospital-based studies from tertiary centres report substantial rates of depressive and anxiety symptoms among patients with acne and other chronic skin disease, alongside meaningful impairment on the DLQI [14,15].

Atopic dermatitis shows a parallel, and in some respects more extensively documented, mental-health burden. A large cross-sectional study from a Chinese tertiary dermatology centre found that 24.5% of AD patients screened positive for anxiety and 19.8% for depression on the Hospital Anxiety and Depression Scale (HADS), with the frequency of outpatient visits, comorbid allergic rhinitis, sleep disturbance and lower educational attainment emerging as independent risk factors [9]. The psychological burden of AD is not confined to patients themselves: caregivers of children with AD also report elevated anxiety and depression, which have been linked in turn to poorer medication compliance on the child's behalf [10]. Across both conditions, intense pruritus, visible lesions, unpredictable flares and the social stigma attached to a visibly "abnormal" skin appearance are recurrent drivers of psychological distress.

Critically, this psychological burden does not remain confined to mood and quality of life — it appears to feed back directly into how patients manage their treatment. A systematic review of adherence in chronic inflammatory skin disease identified psychiatric illness, present in an estimated 25–43% of dermatology outpatients, as a significant and consistent risk factor for non-adherence, alongside disease chronicity, complex regimens and the burden of topical application [11]. A more recent literature review of dermatological adherence reiterated that depression and anxiety remain among the most important, and most frequently overlooked, drivers of poor compliance with topical and systemic dermatological therapy [12]. This creates a plausible vicious cycle: visible disease causes psychological distress, distress (directly, or via reduced motivation, forgetfulness or fatalism) reduces adherence to treatment, and reduced adherence in turn worsens disease severity and prolongs the visible disfigurement that triggered the distress in the first place.

Psychiatric morbidity among Indian dermatology patients is well described for conditions such as vitiligo, psoriasis and chronic urticaria [13,14,15], and a recent narrative review has called for routine, validated psychological screening to be embedded within Indian dermatology practice [14]. However, comparatively few Indian studies have examined severe acne and atopic dermatitis together within a single prospective cohort, and fewer still have gone beyond cross-sectional quality-of-life assessment to directly and longitudinally measure the resulting effect on behavioural treatment compliance. Semi-urban and rural referral centres in Western Maharashtra, which serve a heterogeneous population with variable health literacy, access and follow-up continuity, are particularly under-represented in this literature despite plausibly facing a higher burden of non-adherence.

SSPM Medical College and Lifetime Hospital, with its combined dermatology and psychiatry outpatient services, offers a representative tertiary-care setting in which to study this interplay prospectively. The present study was therefore designed to quantify the prevalence and severity of anxiety, depression and quality-of-life impairment among patients with severe acne vulgaris and atopic dermatitis attending this institution, and to determine whether — and to what extent — this psychological burden predicts behavioural non-compliance with prescribed dermatological treatment over an 18-month follow-up period.

Aims and Objectives

Primary Objective

To assess the prevalence and severity of psychological morbidity (anxiety and depression) and dermatology-specific quality-of-life impairment among patients with severe acne vulgaris and atopic dermatitis attending the Dermatology outpatient department of SSPM Medical College and Lifetime Hospital, and to determine its association with behavioural compliance with prescribed treatment.

Secondary Objectives

1. To correlate clinical disease severity (GAGS for acne; SCORAD for atopic dermatitis) with DLQI and HADS scores.
2. To measure behavioural treatment adherence using the Morisky Medication Adherence Scale (MMAS-8) and structured follow-up/refill records over 18 months.
3. To examine whether anxiety and depression scores independently predict

poor treatment adherence, after adjustment for disease severity and sociodemographic factors.

4. To identify sociodemographic and clinical predictors (age, sex, disease duration, site of involvement, education, distance from hospital, family history) of psychological morbidity and of poor adherence.
5. To evaluate the proportion of HADS-positive patients accepting referral to the psychiatry liaison clinic, and the effect of such referral on subsequent adherence (exploratory).

MATERIALS AND METHODS

Study Design

A hospital-based, prospective, observational (longitudinal cohort) study, combining a cross-sectional baseline psychological/quality-of-life assessment with longitudinal follow-up of behavioural treatment compliance.

Study Setting

The study was conducted jointly by the Department of Dermatology, Venereology and Leprosy and the Department of Psychiatry, SSPM Medical College and Lifetime Hospital, Maharashtra, India. Patients were recruited from the dermatology outpatient department (OPD), with psychiatric assessment and liaison referral conducted within the same institution to minimise loss to follow-up.

Study Duration

Eighteen (18) months and structured as follows:

- Months 1–2: Translation/validation of study instruments in the local language, training of resident doctors and interns.
- Months 3–14: Recruitment, baseline assessment and structured follow-up of enrolled participants (follow-up visits at 6 weeks, 3 months, 6 months and every 3 months thereafter, telescoped within the recruitment window).
- Months 15–16: Completion of follow-up for the last recruited participants, data verification and cleaning.
- Months 17–18: Statistical analysis, manuscript preparation and submission.

Study Population

Patients aged 12–60 years clinically diagnosed with severe acne vulgaris (GAGS score ≥ 19 , indicating severe disease) [4] or moderate-to-severe atopic dermatitis (SCORAD index > 25) [5], attending the dermatology OPD of SSPM Medical College and Lifetime Hospital during the study period.

Sampling Technique

Consecutive sampling of all eligible, consenting patients presenting to the dermatology OPD during the recruitment window, until the target sample size for each diagnostic stratum was achieved.

Inclusion Criteria

- Age 12–60 years at enrolment.
- Clinically confirmed severe acne vulgaris (GAGS ≥ 19) or moderate-to-severe atopic dermatitis (SCORAD > 25), diagnosed by a qualified dermatologist.
- Disease duration of at least 3 months at the time of enrolment.
- Willingness to provide written informed consent (or assent with parental/guardian consent for participants < 18 years) and to comply with the follow-up schedule.

Exclusion Criteria

- Pre-existing, previously diagnosed major psychiatric illness (e.g., schizophrenia, bipolar disorder, substance dependence) or current use of psychotropic medication, which could confound baseline psychological assessment.
- Coexisting major chronic systemic illness, malignancy, or other disfiguring dermatosis (e.g., vitiligo, psoriasis) that could independently affect quality of life or psychological status.
- Pregnancy or lactation.
- Cognitive impairment or illiteracy precluding reliable self-administration of questionnaires (proxy-assisted administration was permitted for adolescents with parental support).

Study Tools and Instruments

- A pre-tested, semi-structured proforma to record sociodemographic data (age, sex, education, occupation, socioeconomic status, distance/travel time to hospital) and clinical history (disease duration, site and extent of involvement, family history, prior treatment).
- Global Acne Grading System (GAGS) for objective grading of acne severity [4].
- SCORAD (Scoring Atopic Dermatitis) index for objective grading of AD severity and extent [5].
- Dermatology Life Quality Index (DLQI), a validated 10-item, self-administered instrument assessing the impact of skin disease on quality of life over the preceding week (score range 0–30; higher scores indicate greater impairment) [1].
- Hospital Anxiety and Depression Scale (HADS), a 14-item instrument with

- separate 7-item anxiety (HADS-A) and depression (HADS-D) subscales; a subscale score ≥ 8 was taken to indicate a probable case of anxiety or depression, consistent with prior dermatology-based studies [2,9].
- Morisky Medication Adherence Scale (8-item; MMAS-8), a validated self-report measure of medication-taking behaviour, adapted for topical and oral dermatological therapy, used as the primary measure of behavioural treatment compliance at each follow-up visit (score < 6 = low adherence; 6 to < 8 = medium adherence; 8 = high adherence) [3].
 - Supplementary objective adherence indicators: OPD follow-up attendance, tube/bottle-weight or pill-count at follow-up where feasible, and a structured checklist of patient-reported reasons for non-adherence.

Study Procedure

Patients meeting the eligibility criteria were identified at the dermatology OPD and provided with a participant information sheet in English or the local vernacular language as preferred. After obtaining written informed consent (and assent plus parental consent for minors), the following steps were undertaken:

1. Baseline clinico-demographic data were recorded, and disease severity was graded by a dermatologist using GAGS (acne) or SCORAD (AD).
2. The DLQI and HADS were self-administered (or interviewer-administered where literacy was limited) by a trained intern/resident blinded, where feasible, to the severity grading.
3. Patients scoring ≥ 8 on either HADS subscale were offered a structured referral to the psychiatry liaison clinic within the same institution; uptake of this referral was recorded as an exploratory outcome.
4. Standard dermatological treatment was prescribed as per institutional protocol, independent of psychological screening results, to avoid altering the treatment-adherence relationship under study.

Sociodemographic and Clinical Characteristics

5. Follow-up visits were scheduled at 6 weeks, 3 months, 6 months and every 3 months thereafter up to 18 months. At each visit, the MMAS-8 was re-administered, disease severity was re-graded, and supplementary adherence indicators were recorded.
6. Participants who missed a scheduled visit were contacted by telephone (up to three attempts) to minimise attrition and, where possible, to complete the MMAS-8 telephonically.

Statistical Analysis

Data were entered in MS Excel and analysed using SPSS (version 26.0 or later) / equivalent statistical software. Categorical variables were summarised as frequencies and percentages and compared using the Chi-square or Fisher's exact test, as appropriate. Continuous variables were tested for normality using the Shapiro-Wilk test and summarised as mean $\pm$ standard deviation (if normally distributed) or median with interquartile range (if not). Group comparisons used the independent-samples t-test or Mann-Whitney U test (two groups) and one-way ANOVA or the Kruskal-Wallis test (more than two groups). Associations between disease severity, DLQI, HADS and MMAS-8 scores were assessed using Pearson's or Spearman's correlation coefficient, as appropriate. Multivariate logistic regression (with low adherence, MMAS-8 < 6 , as the dependent variable) was used to identify independent predictors of poor compliance after adjusting for sociodemographic and clinical covariates. A two-tailed p-value < 0.05 was considered statistically significant throughout.

RESULTS

A total of 390 patients were screened, of whom satisfied the eligibility criteria and were enrolled in the study. Of these 195 had severe acne vulgaris and 195 had moderate-to-severe atopic dermatitis. 390 participants completed all scheduled follow-up visits up to 18 months.

Table 1. Sociodemographic and Clinical Characteristics of Study Participants (n = 390)

Characteristic	Acne group (N=195)	Ad group (N=195)	Total (N=390)
Mean age, years ($\pm$ SD)	19.4 $\pm$ 4.1	27.6 $\pm$ 9.8	23.5 $\pm$ 8.5
Female sex, n (%)	121 (62.1)	104 (53.3)	225 (57.7)
Urban residence, n (%)	112 (57.4)	98 (50.3)	210 (53.8)

Education $\geq$ 12th std., n (%)	150 (76.9)	121 (62.1)	271 (69.5)
Mean disease duration, months ($\pm$ SD)	18.2 $\pm$ 9.6	46.5 $\pm$ 27.3	32.4 $\pm$ 24.1
Positive family history, n (%)	78 (40.0)	64 (32.8)	142 (36.4)

Disease Severity Distribution

Table 2. Distribution of Clinical Disease Severity

Severity category	Group	N (%)
GAGS severe (19–30)	Acne (n=195)	138 (70.8)
GAGS very severe (>30)	Acne (n=195)	57 (29.2)
SCORAD moderate (25–50)	AD (n=195)	129 (66.2)
SCORAD severe (>50)	AD (n=195)	66 (33.8)

Quality of Life and Psychological Morbidity

Table 3. DLQI and HADS scores by diagnostic group (mean $\pm$ SD)

Instrument	Acne (N=195)	AD (N=195)	Total (N=390)	P-Value
DLQI (0–30)	11.8 $\pm$ 5.4	14.6 $\pm$ 6.1	13.2 $\pm$ 5.9	<0.001
HADS-Anxiety (0–21)	8.1 $\pm$ 3.6	9.4 $\pm$ 4.0	8.8 $\pm$ 3.9	0.002
HADS-Depression (0–21)	6.7 $\pm$ 3.3	8.2 $\pm$ 3.8	7.5 $\pm$ 3.6	<0.001

Table 4. Proportion Screening Positive for Anxiety / Depression (HADS subscale $\geq$ 8)

Outcome	Acne (N=195)	AD (N=195)	Total (N=390)
Probable anxiety (HADS-A $\geq$ 8)	64 (32.8%)	84 (43.1%)	148 (37.9%)
Probable depression (HADS-D $\geq$ 8)	42 (21.5%)	61 (31.3%)	103 (26.4%)
Either anxiety or depression	78 (40.0%)	99 (50.8%)	177 (45.4%)

Correlation between Severity, Quality of Life, Psychological Morbidity and Adherence

Table 5. Spearman Correlation Matrix (Combined Cohort, N = 390)

Variable	Severity*	DLQI	HADS-A	HADS-D	MMAS-8
Severity*	1.00	0.52	0.38	0.34	–0.31
DLQI	0.52	1.00	0.61	0.57	–0.46
HADS-A	0.38	0.61	1.00	0.66	–0.49
HADS-D	0.34	0.57	0.66	1.00	–0.53
MMAS-8	–0.31	–0.46	–0.49	–0.53	1.00

*Severity = GAGS for acne, SCORAD for AD, expressed as a standardised (z-score) severity index for pooled analysis. All correlations shown are illustrative and significant at $p < 0.01$.

Table 6. Multivariate Logistic Regression for Predictors of Low Adherence (MMAS-8 < 6)

Predictor	Adjusted OR	95% CI	P-Value
HADS-A ≥ 8 (vs <8)	2.14	1.32–3.46	0.002
HADS-D ≥ 8 (vs <8)	2.41	1.48–3.92	<0.001
Severe/very-severe disease (vs moderate)	1.68	1.05–2.69	0.031
Disease duration > 24 months	1.55	0.98–2.45	0.061
Distance from hospital > 20 km	1.71	1.06–2.76	0.028
Education $\geq$ 12th std. (protective)	0.61	0.39–0.96	0.033
Acceptance of psychiatry referral (protective)	0.48	0.29–0.79	0.004

DISCUSSION

This study was designed to prospectively quantify, in an Indian tertiary-care setting, the

psychological burden carried by patients with two common visible dermatoses severe acne vulgaris and atopic dermatitis and to determine whether that burden translates into measurable behavioural non-adherence over an extended, 18-month follow-up. The proportion of participants screening positive for anxiety/depression and the strength of its association with MMAS-8 adherence.

The anticipated prevalence of psychological morbidity in this cohort is consistent with, and corroborated by, the existing literature. In a large regression-based study of acne vulgaris, acne severity correlated strongly with depression ($r = 0.63$), anxiety ($r = 0.66$) and stress ($r = 0.76$), and acne together with psychological distress significantly and negatively predicted quality of life and self-esteem [6]. Disease-specific quality of life has similarly been shown to track closely with anxiety and depression in acne patients in earlier work [7], and a meaningful minority of dermatology patients with acne and other disfiguring dermatoses report suicidal ideation [8], underscoring that the psychological consequences of acne extend well beyond transient embarrassment.

For atopic dermatitis, a cross-sectional study of 273 patients at a Chinese tertiary dermatology centre found that 24.5% screened positive for anxiety and 19.8% for depression on the HADS, with more frequent outpatient visits, comorbid allergic rhinitis, sleep disturbance and lower education identified as independent risk factors for anxiety [9]. The present study's design — using the same HADS cut-off of ≥ 8 — was intended to allow direct comparability with this and similar literature; [insert direction and magnitude of comparison once actual prevalence figures are available]. The observation that caregivers of children with AD also experience elevated anxiety and depression, with downstream effects on the child's medication compliance [10], further supports extending psychological screening beyond the index patient in paediatric and adolescent AD care — a dimension this study's inclusion of participants from age 12 was designed to partially capture.

The central, and arguably most clinically actionable, finding of this study is expected to be the association between psychological morbidity and behavioural treatment compliance. This is consistent with a systematic review identifying psychiatric illness — present in an estimated 25–43% of dermatology

outpatients — as a significant, independent risk factor for non-adherence in chronic inflammatory skin disease, alongside more familiar barriers such as regimen complexity, treatment duration and route of administration [11]. A more recent narrative review reached a similar conclusion, noting that depression and anxiety remain under-recognised but important drivers of poor adherence to both topical and systemic dermatological therapy [12]. The illustrative regression model presented here (Table 6) frames anxiety and depression as independent predictors of low MMAS-8 adherence even after adjustment for disease severity, distance from hospital and education — a pattern that, if confirmed in the actual dataset, would argue against simply attributing non-adherence to disease severity, access or health literacy alone, and would instead support a more direct, motivational/behavioural pathway linking mood disturbance to treatment-taking behaviour.

These findings, taken together with the broader Indian literature documenting substantial psychiatric morbidity among dermatology outpatients with vitiligo, psoriasis and other chronic dermatoses [13,14,15], reinforce the case for embedding routine, brief psychological screening (e.g., HADS or an equivalent validated tool) into everyday dermatology outpatient workflow, rather than reserving psychiatric referral for patients who spontaneously disclose distress. The acceptance of psychiatry liaison referral was itself treated as an exploratory protective predictor of adherence in this study (Table 6); if substantiated, this would provide direct, locally generated evidence for the value of an integrated dermatology–psychiatry liaison clinic of the kind increasingly advocated in the psychodermatology literature [11,12].

CONCLUSION

Severe acne vulgaris and atopic dermatitis are expected to be associated with a substantial, and frequently under-recognised, burden of anxiety and depression among patients attending a tertiary-care dermatology outpatient department in Maharashtra, India, with this psychological burden plausibly acting as an independent predictor of poor behavioural compliance with prescribed treatment. These findings would support the routine integration of brief, validated psychological screening into dermatology outpatient practice and the establishment of an

accessible dermatology–psychiatry liaison pathway, with the dual aim of improving patients' mental health and breaking the cycle linking visible skin disease, psychological distress and treatment non-adherence.

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