Section: DVL



Original Research Article

A CROSS-SECTIONAL STUDY OF COMORBIDITIES IN PATIENTS WITH PSORIASIS ATTENDING A TERTIARY CARE DERMATOLOGY OUTPATIENT DEPARTMENT IN SOUTHERN INDIA

Received : 06/09/2026
Received in revised form : 03/10/2026
Accepted : 15/10/2026

Keywords:
Psoriasis; Comorbidity; Metabolic Syndrome; Severity of Illness Index; Cross-Sectional Studies.

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DOI: 10.47009/jamp.2026.8.5.186

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2026; 8 (5); 1168-1172

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ABSTRACT

Background: Aim: Psoriasis is a chronic immune-mediated inflammatory disease associated with metabolic, cardiovascular and psychological comorbidities, but subtype-specific comorbidity profiling in Indian outpatient populations remains limited. This study aimed to determine the prevalence of comorbidities, aggravating factors and disease severity across clinical subtypes of psoriasis, and to examine whether comorbidity patterns differ by subtype. **Materials and Methods:** A single-centre, hospital-based cross-sectional study was conducted at a tertiary care dermatology outpatient department in southern India. Seventy-seven consecutive adults with a clinical diagnosis of psoriasis were recruited between August 2023 and February 2025. Sociodemographic data, comorbidities, anthropometry, fasting lipid profile and plasma glucose, electrocardiogram, abdominal ultrasonography and Psoriasis Area and Severity Index (PASI) score were recorded. Subtype-comorbidity associations were tested using Pearson chi-square or Fisher exact test, with a two-tailed p-value below 0.05 taken as significant. **Results:** The cohort showed a male predominance (63.6%, n = 49), with 35.1% (n = 27) aged 51 to 60 years. Psoriasis vulgaris was the commonest subtype (27.3%, n = 21). Severe disease (PASI above 10) affected 27.3% (n = 21) and peaked in psoriasis vulgaris (52.4%, n = 11/21). Psychological comorbidity (67.5%, n = 52) and altered lipid profile (63.6%, n = 49) were the most frequent findings, while hypertension (26.0%, n = 20), diabetes mellitus (24.7%, n = 19) and non-alcoholic fatty liver disease (24.7%, n = 19) each affected about a quarter of patients. Subtype differences were significant for hypertension, obesity, diabetes mellitus and electrocardiographic abnormality. Self-reported myocardial infarction concentrated in palmoplantar psoriasis (38.9%, n = 7/18). **Conclusion:** Comorbidities were widespread across all psoriasis subtypes, with subtype-specific gradients in metabolic, cardiovascular and psychological associations. Routine subtype-aware screening at the dermatology outpatient department is justified.

INTRODUCTION

Psoriasis is a chronic, immune-mediated inflammatory skin disease affecting roughly 2% to 3% of the world's population, with the global burden in 2019 estimated at 40.8 million prevalent cases and 3.5 million disability-adjusted life-years.[1] The disease no longer fits the older picture of an isolated cutaneous disorder. Shared inflammatory pathways, particularly those driven by interleukin-17 and interleukin-23, link psoriasis to a recognised cluster

of systemic comorbidities including metabolic syndrome, hypertension, cardiovascular disease, type 2 diabetes mellitus, non-alcoholic fatty liver disease (NAFLD), psoriatic arthritis and depression.[2,3] Sustained low-grade systemic inflammation appears to mediate much of this excess risk, and obesity-driven amplification of cytokine signalling has been proposed as a central pathway.[2]

In Indian and other South Asian populations, plaque psoriasis tends to present with greater severity and lower rates of biologic prescription than in lighter-skinned cohorts, which makes early recognition of associated systemic risks particularly important.[4] A hospital-based cross-sectional study from north India reported a metabolic syndrome prevalence of 39.3% (n = 55) in patients with chronic plaque psoriasis, compared with 17.1% (n = 24) in matched controls, with prevalence rising in step with disease severity and duration.[5] A meta-analysis of 63 observational studies pooled an odds ratio of 2.08 (95% CI, 1.84 to 2.34) for metabolic syndrome in psoriasis versus non-psoriatic controls.[6] Comparative paediatric data from south India confirm that the obesity and metabolic-syndrome signal extends to children as well.[8]

Despite this established systemic dimension, comorbidity profiling at the level of psoriasis subtype remains patchy in Indian dermatology practice. Most published Indian work concentrates on chronic plaque disease or aggregates subtypes together, and few studies examine palmoplantar, nail, scalp, guttate and erythrodermic disease side by side.[5,7] Whether subtype itself carries discriminatory value for predicting metabolic, cardiovascular or psychological comorbidity in this population is therefore not well characterised. The clinical relevance is direct. Dermatologists in tertiary care outpatient departments are usually the first physicians to see these patients, and a subtype-aware screening approach could push case-finding for diabetes, hypertension, dyslipidaemia and depression earlier into the patient pathway.

This study aimed to assess the prevalence of comorbidities, aggravating factors and disease severity in adult patients with various subtypes of psoriasis attending the dermatology outpatient department of a tertiary care hospital in southern India, and to examine whether comorbidity patterns differ meaningfully by subtype.

MATERIALS AND METHODS

Study design and setting

This was a single-centre, hospital-based cross-sectional study conducted at the Department of Dermatology, Venereology and Leprosy of a tertiary care teaching hospital in southern India. Recruitment ran for 18 months, from August 2023 to February 2025. The Institutional Ethics Committee of the participating institution approved the protocol. Written informed consent was obtained from every participant. Data confidentiality was maintained by anonymising study records.

Participants

Adult patients (≥ 18 years) of either sex attending the dermatology outpatient department with a clinical diagnosis of psoriasis were eligible. All clinical subtypes were included. Patients already known to have a comorbid condition were retained and additionally screened for further coexisting conditions. Patients receiving systemic immunosuppressive therapy, pregnant or lactating women, and those who declined consent were excluded.

Sample size

The sample size was calculated using the formula $N = Z^2_{1-\alpha/2} \times p \times (1 - p) / d^2$, taking the prevalence of metabolic syndrome in psoriasis as 15% on the basis of a previously published Indian cohort, with 8% absolute precision and 95% confidence ($Z_{1-\alpha/2} = 1.96$). The required sample size was 76.5, rounded to 77. Consecutive sampling was used to recruit eligible patients until this target was reached.

Data collection and clinical assessment

A structured, validated questionnaire was used to record sociodemographic details (age, sex), medical history (age at onset, disease duration, family history of psoriasis) and any pre-existing diagnoses of hypertension, diabetes mellitus, cardiovascular disease, dyslipidaemia, NAFLD, psychiatric disorders, sleeping disorders and autoimmune disease. A complete general and dermatological examination was performed for every participant. The clinical subtype of psoriasis was assigned on the basis of morphology and distribution into one of six categories: psoriasis vulgaris, palmoplantar psoriasis, erythrodermic psoriasis, scalp psoriasis, nail psoriasis and guttate psoriasis. Aggravating factors were elicited by direct interview and included infections, physical or mental stress, skin injury, medications (β-blockers, non-steroidal anti-inflammatory drugs, angiotensin-converting enzyme inhibitors), obesity, smoking and alcohol consumption.

Anthropometric and laboratory parameters

Body mass index (BMI) was calculated as weight (kg) divided by height squared (m^2) and categorised by World Health Organization criteria as normal, pre-obese or obese. Waist circumference was measured midway between the lowest rib and the iliac crest. Investigations included complete blood count, fasting plasma glucose, fasting lipid profile (total cholesterol, low-density lipoprotein cholesterol, high-density lipoprotein cholesterol, triglycerides), liver function tests and renal function tests. A 12-lead electrocardiogram was performed in all patients, and abdominal ultrasonography was used to assess hepatic fluid accumulation and liver echotexture.

Severity assessment

Psoriasis severity was assessed using the Psoriasis Area and Severity Index (PASI), which scores erythema, induration and scaling on a 0 to 4 scale across four body regions (head, upper limbs, trunk,

ISSN (O): 2687-5365; ISSN (P): 2753-6556

lower limbs), weighted by area. PASI scores of 5 to 10 were classified as moderate disease, and scores above 10 as severe disease; for analysis, the mild and moderate categories were combined. Subclinical cardiovascular involvement was inferred from electrocardiogram abnormalities and self-reported history of myocardial infarction.

Statistical Analysis

Data were entered in Microsoft Excel and analysed using IBM SPSS Statistics version 21.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were summarised as frequencies and percentages for categorical variables and as mean ± standard deviation or median (range) for continuous variables. Associations between psoriasis subtype and categorical comorbidities were tested using Pearson chi-square test or Fisher exact test where cell counts were small. Continuous variables were compared using independent-samples t-tests where appropriate. A two-tailed p-value below 0.05 was considered statistically significant.

RESULTS

A total of 77 patients with psoriasis were recruited and analysed. Demographic and clinical characteristics are summarised in Table 1. The 51 to 60-year age group was the largest (35.1%, n = 27), followed by the 21 to 30 and 31 to 40 year groups (each 20.8%, n = 16). Males predominated (63.6%, n = 49). Disease duration was 0 to 5 years in 44.2% (n = 34), 6 to 11 years in 36.4% (n = 28), and 12 years or more in 19.5% (n = 15). A positive family history was reported by 23.4% (n = 18), and 24.7% (n = 19) had clinically apparent psoriatic arthritis.

Subtype distribution is shown in Figure 1. Psoriasis vulgaris was commonest (27.3%, n = 21), followed by palmoplantar (23.4%, n = 18), erythrodermic (19.5%, n = 15), scalp (13.0%, n = 10), nail (11.6%, n = 9) and guttate (5.2%, n = 4). PASI placed 72.7% (n = 56) in the mild-to-moderate band and 27.3% (n = 21) in the severe band. Psoriasis vulgaris had the highest severe proportion (52.4%, n = 11/21), followed by nail psoriasis (44.4%, n = 4/9). All scalp psoriasis patients (100%, n = 10) were mild-to-moderate (Figure 3). The subtype-severity association was significant (p = 0.001).

Comorbidity prevalence

The overall comorbidity profile is summarised in Table 2 and Figure 2. Psychological comorbidities (anxiety, depression or both) were reported in 67.5% (n = 52) of patients, and an altered lipid profile in 63.6% (n = 49). Sleeping disorders were noted in 29.8% (n = 23). Hypertension was present in 26.0% (n = 20), diabetes mellitus in 24.7% (n = 19), combined hypertension and diabetes in 24.7% (n = 19), and NAFLD on ultrasound in 24.7% (n = 19). Other coincidental dermatological infections (dermatophytosis, herpes zoster, onychomycosis) affected 20.7% (n = 16), and autoimmune comorbidity (rheumatoid arthritis, alopecia areata, thyroid disease) 9.1% (n = 7). Sixteen patients (20.8%) had no recorded comorbidity.

Anthropometric and metabolic parameters confirmed a high cardiometabolic burden. Obesity (BMI ≥ 30) was present in 35.1% (n = 27), with a further 5.2% (n = 4) pre-obese. Elevated low-density lipoprotein cholesterol was found in 35.1% (n = 27), elevated triglycerides in 40.3% (n = 31), and decreased high-density lipoprotein cholesterol in 40.3% (n = 31). Mean disease duration of associated diabetes was 10.23 ± 7.45 years, the longest of any comorbidity group; psychological comorbidity had a mean duration of 5.58 ± 1.29 years.

Subtype-specific associations

Significant subtype-comorbidity associations are summarised in Table 3. Hypertension prevalence varied widely (p < 0.001), highest in nail psoriasis (77.8%, n = 7/9) and scalp psoriasis (70.0%, n = 7/10), and absent in guttate disease. Diabetes mellitus showed a similar gradient (p = 0.021), peaking in erythrodermic psoriasis (73.3%, n = 11/15) and palmoplantar psoriasis (61.1%, n = 11/18). Obesity differed across subtypes (p < 0.001), highest in palmoplantar psoriasis (61.1%, n = 11/18) and absent in erythrodermic and guttate disease.

Lipid abnormalities also tracked subtype. Total cholesterol, low-density lipoprotein cholesterol and high-density lipoprotein cholesterol all showed significant subtype-level variation (p = 0.022, 0.038 and 0.035 respectively); guttate psoriasis stood out with universally raised cholesterol and low-density lipoprotein cholesterol (4/4) and uniformly decreased high-density lipoprotein cholesterol (4/4). Triglyceride elevation did not differ across subtypes (p = 0.142). Subclinical cardiovascular markers showed a palmoplantar predominance: self-reported myocardial infarction (38.9%, n = 7/18; p = 0.037), electrocardiographic abnormalities (61.1%, n = 11/18; p = 0.009) and ultrasonographic intra-abdominal fluid (44.4%, n = 8/18; p = 0.009) were all most frequent in this subtype.

Aggravating factors and nail involvement

Infection was the most frequently reported trigger (35.1%, n = 27), followed by stress (24.7%, n = 19), skin injury (18.2%, n = 14) and alcohol (18.1%, n = 14). The trigger distribution differed significantly by subtype (p = 0.004), with infection ranking highest in scalp psoriasis (40.0%, n = 4/10). Nail changes affected 50.6% (n = 39) of the cohort overall: pitting (29.9%, n = 23) and nail plate discolouration (28.6%, n = 22) were the commonest, with subungual hyperkeratosis (14.3%, n = 11), splinter haemorrhages (16.9%, n = 13) and onycholysis (10.4%, n = 8) also seen.

DISCUSSION

This single-centre cross-sectional study of 77 patients with psoriasis attending an outpatient dermatology service in southern India found a substantial systemic comorbidity burden across all subtypes, alongside

ISSN (O): 2687-5365; ISSN (P): 2753-6556

clinically meaningful subtype-level differences in metabolic, cardiovascular and psychological associations. Three findings stand out: a near-uniform pattern of psychological comorbidity (67.5%, n = 52) and dyslipidaemia (63.6%, n = 49); a marked subtype-specific gradient in hypertension, diabetes and obesity; and a palmoplantar predominance for self-reported myocardial infarction and electrocardiographic abnormality.

The overall psoriasis vulgaris predominance (27.3%, n = 21) and male preponderance (63.6%, n = 49), with a peak in the 51 to 60 year group (35.1%, n = 27), are consistent with patterns reported in the global burden of disease analysis, in which the highest psoriasis incidence occurs in adults aged 40 to 64 years.[1] A south Asian comparative study by Joseph et al. likewise documented a high comorbidity-screening yield in paediatric psoriasis populations from the same region, supporting the view that systemic involvement is not confined to older patients.[8]

The 39.3% prevalence of metabolic syndrome reported by Kothiwala et al. in chronic plaque psoriasis in north India is broadly mirrored here. Although this study did not aggregate components into a formal metabolic syndrome diagnosis, the individual prevalences of obesity (35.1%, n = 27), elevated triglycerides (40.3%, n = 31), decreased high-density lipoprotein cholesterol (40.3%, n = 31) and either hypertension or diabetes (approximately 25% each) suggest a similar metabolic dysregulation in this cohort.[5] The pooled meta-analytic odds ratio of 2.08 for metabolic syndrome in psoriasis lends biological plausibility to these single-centre numbers 6. A separate cross-sectional analysis from Burla, India, reported significantly raised serum interleukin-6 and total cholesterol in psoriatic arthritis compared with skin-only psoriasis, with a positive correlation between interleukin-6 and PASI score, which fits the inflammation-driven dyslipidaemia model.[10]

Subtype-specific findings warrant comment. Nail psoriasis carried the highest hypertension prevalence (77.8%, n = 7/9), and erythrodermic psoriasis the highest diabetes prevalence (73.3%, n = 11/15). The nail psoriasis signal is consistent with the broader literature, in which nail involvement is recognised as a marker of greater systemic disease activity and a predictor of progression to psoriatic arthritis.[13] The 24.7% (n = 19) prevalence of associated arthritis in this cohort sits within the range reported by Alajmi et al., who found that 41.2% (n = 7/17) of psoriatic arthritis patients carried two or more comorbidities 7. The palmoplantar predominance for electrocardiographic abnormality (61.1%, n = 11/18) and self-reported myocardial infarction (38.9%, n = 7/18) is less commonly reported in Indian series and merits replication; the inflammation-cardiometabolic axis might plausibly be more pronounced in this subtype because palmoplantar involvement is often associated with smoking and chronic mechanical aggravation.

NAFLD prevalence in this cohort (24.7%, n = 19) is consistent with the elevated odds reported in the National Health and Nutrition Examination Survey analysis by Ruan et al., who found a 1.67-fold odds of NAFLD in adults with psoriasis after adjustment for metabolic confounders.[9] Psychological comorbidity at 67.5% (n = 52) is at the upper end of published estimates, but the link is biologically supported. Shared cytokine pathways involving interleukin-6, interleukin-17 and tumour necrosis factor-α act on both the skin and the hypothalamic-pituitary-adrenal axis, and psoriasis-related stigma compounds depressive risk through psychosocial channels.[11,12] This convergence supports routine mental-health screening in all psoriasis subtypes rather than only in severe disease.

Aggravating factors followed expected patterns. Infections, stress and skin trauma headed the list, with the trauma signal explained mechanistically by the Koebner phenomenon, in which keratinocyte mechanotransduction translates physical injury into a psoriatic plaque in genetically susceptible patients.[14] Patients with skin of colour have additional epidemiological context that bears on these findings: psoriasis tends to present at higher severity and with greater quality-of-life burden in this group, which strengthens the case for systematic comorbidity screening at every outpatient visit.[4]

Limitations

Several limitations should be acknowledged. The study was conducted at a single tertiary care centre, which limits external validity. The cross-sectional design precludes causal inference between psoriasis subtype and comorbidity. The sample size of 77, although adequate for the primary prevalence estimate, generated some small subgroup cell counts (notably n = 4 for guttate psoriasis), which inflates uncertainty around subtype-specific percentage estimates. There was no contemporaneous non-psoriatic control group, so background population rates of hypertension, diabetes and dyslipidaemia in the referral catchment cannot be directly subtracted. Psychological comorbidity was captured by self-report and clinician interview rather than a validated instrument such as the Patient Health Questionnaire-9 or the Hospital Anxiety and Depression Scale. The absence of longitudinal follow-up means treatment response and incident comorbidity over time were not assessed.

These findings argue for routine, subtype-aware metabolic and psychological screening at every psoriasis outpatient visit, with a particularly low threshold for cardiovascular workup in palmoplantar disease and for arthritis screening when nail involvement is present.

CONCLUSION

In this 77-patient outpatient cohort from southern India, comorbidities were the rule rather than the exception. Psychological symptoms and dyslipidaemia were the dominant single findings, while hypertension, diabetes and metabolic

ISSN (O): 2687-5365; ISSN (P): 2753-6556

dysregulation tracked subtype, with a clear cardiovascular signal in palmoplantar disease and a hypertension-diabetes-NAFLD cluster in nail psoriasis. A simple, subtype-aware screening checklist at the dermatology outpatient department, covering blood pressure, fasting glucose, fasting lipids, abdominal ultrasonography when indicated and a brief mental-health enquiry, is likely to yield a meaningful diagnostic harvest in this population.

Acknowledgments

The authors thank the participants who consented to take part in this study. The study protocol was approved by the Institutional Ethics Committee of the participating institution and written informed consent was obtained from all participants. No funding was received for this work. The de-identified dataset supporting the findings is available from the corresponding author on reasonable request.

Conflicts of Interest Statement

The authors declare that they have no financial interests or personal conflicts that may affect the study reported in this article.

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ISSN (O): 2687-5365; ISSN (P): 2753-6556