

# IL-17A in the Psoriatic Patients' Serum and Plaque Scales as Potential Marker of the Diseases Severity and Obesity

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## Abstract

**Background:** Psoriasis is a chronic inflammatory skin disorder often associated with systemic inflammation and metabolic comorbidities, including obesity. Interleukin-17A (IL-17A) plays a key role in the pathogenesis of psoriasis by promoting keratinocyte proliferation and inflammatory responses. Its correlation with disease severity and obesity remains under investigation. This aims to evaluate the levels of IL-17A in the serum and plaque scales of psoriatic patients and assess its potential as a biomarker for disease severity and obesity. **Material and Methods:** A cross-sectional study was conducted on psoriatic patients of varying severity and body mass index (BMI). IL-17A levels were measured in serum and plaque scales using ELISA. Disease severity was assessed using the Psoriasis Area and Severity Index (PASI), and obesity was evaluated based on BMI. Statistical correlations between IL-17A levels, PASI scores, and BMI were analyzed. **Results:** According to psoriasis severity, patients with mild disease (n = 30) had the lowest serum IL-17A levels (34.5 ± 7.6 pg/mL) and plaque IL-17A levels (92.3 ± 18.4 pg/mg). Those with moderate disease (n = 45) showed higher serum IL-17A (44.1 ± 9.8 pg/mL) and plaque IL-17A (118.7 ± 25.3 pg/mg) levels. Patients with severe psoriasis (n = 25) had the highest IL-17A concentrations, with serum levels of 58.4 ± 10.2 pg/mL and plaque levels of 158.6 ± 28.5 pg/mg. The differences in IL-17A levels between mild, moderate, and severe groups were statistically significant (p < 0.001 for both serum and plaque measurements). **Conclusion:** IL-17A levels in serum and plaque scales may serve as a potential biomarker for psoriasis severity and are associated with obesity. Monitoring IL-17A could aid in assessing disease progression and guiding targeted therapeutic strategies.

**Keywords:** Psoriasis, IL-17A, Serum, Plaque scales, Disease severity, Obesity, Biomarker, Inflammation.

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## INTRODUCTION

Psoriasis is a chronic, immune mediated inflammatory skin disease characterized by well-defined erythematous plaques with silvery scales and a relapsing–remitting clinical course. Its prevalence ranges from approximately 0.9% in the United States to as high as 8.5% in some Scandinavian countries, highlighting substantial geographic variation in disease burden worldwide.<sup>[1]</sup> Historically, psoriasis was considered primarily a keratinocyte hyperproliferative disorder; however, advances in molecular immunology have reestablished it as a complex systemic inflammatory condition driven by interaction among immune cells, keratinocytes, and cytokines.<sup>[2]</sup> Among the cytokines implicated, interleukin 17A (IL 17A), predominantly produced by T helper 17 (Th17) cells, has emerged as a central mediator in disease pathogenesis and progression.<sup>[3]</sup> IL 17A drives keratinocyte activation, proliferation, and the expression of proinflammatory genes, establishing and amplifying the inflammatory milieu characteristic of psoriatic plaques.

IL 17A exerts its effect by binding to IL 17 receptors on keratinocytes and other resident skin cells, triggering transcriptional programs that upregulate chemokines,

cytokines, and antimicrobial peptides. These downstream molecules enhance recruitment of neutrophils and other immune cells, thus perpetuating inflammation and epidermal hyperplasia. Blockade of IL 17A with monoclonal antibodies has demonstrated remarkable clinical efficacy in reducing psoriatic lesion severity, supporting the mechanistic importance of this cytokine in disease activity. In addition to local skin effects, IL 17A contributes to systemic inflammation and is implicated in psoriatic comorbidities such as cardiovascular disease and metabolic dysregulation.<sup>[4]</sup>

Obesity, defined by an abnormal increase in body fat often measured by body mass index (BMI), is a frequent comorbidity in psoriasis patients and contributes to disease severity and treatment response. Epidemiological evidence suggests that

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psoriasis patients, especially those with severe disease manifestations, are at significantly higher risk of obesity than the general population. The chronic low grade inflammatory state associated with obesity may interact with psoriatic inflammation through shared cytokine pathways, potentially creating a self-reinforcing cycle of immune activation. Visceral adipose tissue releases proinflammatory adipokines and cytokines such as IL 6, which can promote Th17 cell differentiation and enhance IL 17A production, linking metabolic dysregulation with amplified psoriatic inflammation.<sup>[5]</sup> Conversely, IL 17A itself may influence lipid metabolism and adipose tissue inflammation, although these mechanisms remain incompletely understood .

Despite IL 17A’s established pathogenic role, few studies have simultaneously examined its levels in both serum and in plaque scales of psoriatic patients and correlated these parameters with disease severity and obesity. A study by Michalak Stoma and colleagues reported significantly elevated serum and scale IL 17A levels in psoriatic patients and noted a positive correlation with disease severity scores such as the Psoriasis Area and Severity Index (PASI). These findings support the hypothesis that IL 17A not only reflects local inflammatory activity but may also serve as a systemic biomarker of disease severity. Understanding the relationship between IL 17A, clinical severity indices, and obesity may therefore enhance insights into disease mechanisms and inform therapeutic monitoring.

The aim of this study is to evaluate the levels of Interleukin-17A (IL-17A) in both the serum and plaque scales of patients with psoriasis and to investigate its potential role as a biomarker for disease severity and obesity. The objectives include measuring and comparing IL-17A concentrations in serum and plaque scales, assessing the correlation between IL-17A levels and psoriasis severity using the Psoriasis Area and Severity Index (PASI), and examining the association between IL-17A levels and obesity as determined by body mass index (BMI). Additionally, the study seeks to explore

the potential of IL-17A as a reliable biomarker for monitoring disease progression and guiding therapeutic strategies in psoriatic patients.

**MATERIALS AND METHODS**

**Study Type:** This was a cross-sectional observational study

**Study Duration:** 1 year

**Study Population:** Patients attending the Dermatology Outpatient Department with clinically diagnosed chronic plaque psoriasis were considered for the study. A total of 100 patients were enrolled after obtaining written informed consent.

**Sample size:** 100 patients with chronic plaque psoriasis were enrolled to assess IL-17A levels in serum and plaque scales.

**Inclusion Criteria:**

1. Patients aged 18–65 years.
2. Clinically diagnosed chronic plaque psoriasis with active lesions.
3. Patients willing to participate and provide informed consent.

**Exclusion Criteria:**

1. Patients with other autoimmune or systemic inflammatory diseases.
2. Patients with acute or chronic infections.
3. Patients with malignancies.
4. Patients who received systemic immunosuppressive or biologic therapy within the last 3 months.
5. Pregnant or lactating women.

**Statistical Analysis:** Data were analyzed using SPSS version 25.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation (SD), and categorical variables as percentages. Comparisons between groups were made using Student’s t-test or one-way ANOVA. Correlations between IL-17A levels, PASI scores, and BMI were assessed using Pearson or Spearman correlation coefficients. A p-value <0.05 was considered statistically significant.

**RESULTS**

**Table 1: Demographic Characteristics of Study Participants (n = 100)**

	Parameter	Number of Patients	Percentage (%)
Age (years)	18–30	25	25
	31–45	40	40
	46–60	30	30
	>60	5	5
Gender	Male	60	60
	Female	40	40

**Table 2: Distribution of Psoriasis Severity (PASI Score) (n = 100)**

Severity	Number of Patients	Percentage (%)
Mild	30	30
Moderate	45	45
Severe	25	25

**Table 3: Obesity Status of Study Participants (n = 100)**

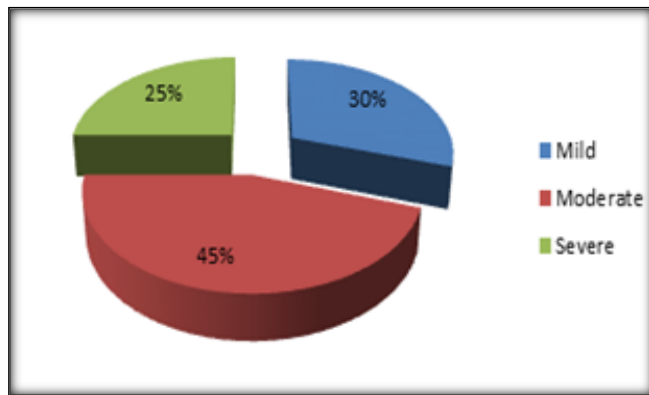
BMI Category	Number of Patients	Percentage (%)
Normal (18.5–24.9 kg/m <sup>2</sup> )	40	40
Overweight (25–29.9 kg/m <sup>2</sup> )	35	35
Obese (≥30 kg/m <sup>2</sup> )	25	25

**Table 4: IL-17A Levels in Serum and Plaque Scales (n = 100)**

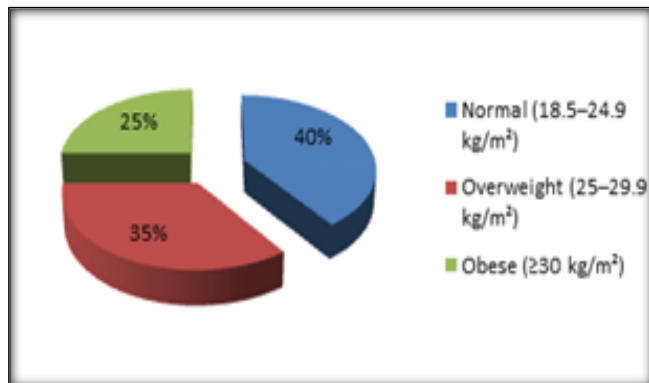
Psoriasis Severity	Number of Patients (n)	Serum IL-17A (pg/mL)	Plaque IL-17A (pg/mg)
Mild	30	34.5 ± 7.6	92.3 ± 18.4
Moderate	45	44.1 ± 9.8	118.7 ± 25.3
Severe	25	58.4 ± 10.2	158.6 ± 28.5

**Table 5: Correlation of IL-17A Levels with PASI and BMI (n = 100)**

Parameter	Serum IL-17A (pg/mL)	Plaque IL-17A (pg/mg)
PASI score	r = 0.68, n = 100, p < 0.001	r = 0.72, n = 100, p < 0.001
BMI	r = 0.45, n = 100, p < 0.001	r = 0.50, n = 100, p < 0.001



**Figure 1: Distribution of Psoriasis Severity (PASI Score) (n = 100).**



**Figure 2: Obesity Status of Study Participants (n = 100).**

A total of 100 patients with chronic plaque psoriasis were included in the study. Among them, 60 (60%) were male and 40 (40%) were female. The age distribution showed that 25 patients (25%) were 18–30 years, 40 patients (40%) were 31–45 years, 30 patients (30%) were 46–60 years, and 5 patients (5%) were above 60 years.

Based on PASI scores, 30 patients (30%) had mild psoriasis, 45 patients (45%) had moderate psoriasis, and 25 patients (25%) had severe psoriasis.

Regarding obesity status, 40 patients (40%) were in the normal BMI range (18.5–24.9 kg/m<sup>2</sup>), 35 patients (35%) were overweight (BMI 25–29.9 kg/m<sup>2</sup>), and 25 patients (25%) were classified as obese (BMI ≥30 kg/m<sup>2</sup>). According to psoriasis severity, patients with mild disease (n = 30) had the lowest serum IL-17A levels (34.5 ± 7.6 pg/mL) and plaque IL-17A levels (92.3 ± 18.4 pg/mg). Those with moderate disease (n = 45) showed higher serum IL-17A (44.1 ± 9.8 pg/mL) and plaque IL-17A (118.7 ± 25.3 pg/mg) levels.

Patients with severe psoriasis (n = 25) had the highest IL-17A concentrations, with serum levels of 58.4 ± 10.2 pg/mL and plaque levels of 158.6 ± 28.5 pg/mg. The differences in IL-17A levels between mild, moderate, and severe groups were statistically significant (p < 0.001 for both serum and plaque measurements). Correlation analysis revealed a strong positive correlation between IL 17A levels and PASI scores (serum: r = 0.68, n = 100, p < 0.001; plaque: r = 0.72, n = 100, p < 0.001 Significant). Similarly, IL 17A levels were positively correlated with BMI (serum: r = 0.45, n = 100, p < 0.001; plaque: r = 0.50, n = 100, p < 0.001 Significant). In this study, we observed that serum and plaque IL-17A levels increased progressively with psoriasis severity, with the highest levels in patients with severe disease. This finding supports the established role of IL-17A as a key proinflammatory cytokine in psoriasis pathogenesis, promoting keratinocyte proliferation, inflammatory mediator release, and recruitment of immune cells to psoriatic lesions.

## DISCUSSION

Our results are consistent with the findings of Michalak-Stoma et al,<sup>[6]</sup> who reported significantly elevated IL-17A levels in both serum and plaque scales of psoriatic patients, with positive correlations to disease severity and obesity. Similarly,<sup>[7]</sup> Fitz L et al. observed that higher baseline serum IL-17A was associated with greater disease severity and that IL-17A levels decreased following effective systemic therapy, suggesting its utility as a marker of disease activity. The relationship between IL-17A and systemic inflammation has also been highlighted by von Stebut et al,<sup>[8]</sup> who noted that IL-17A contributes not only to cutaneous pathology but also to cardiovascular and metabolic comorbidities in psoriasis. This aligns with our observation of a moderate correlation between IL-17A levels and BMI, indicating that obesity may exacerbate systemic inflammation in psoriatic patients. In agreement with our findings,<sup>[9]</sup> Wang Q et al. reported that serum IL-17A levels were higher in patients with more severe disease and were correlated with PASI scores, reinforcing IL-17A's role as a biomarker for disease severity. Likewise,<sup>[10]</sup> Xu L et al. demonstrated that IL-17A levels in serum were elevated in psoriasis patients compared to healthy controls and suggested that IL-17A measurement could help in assessing disease activity and therapeutic response. Taken together, our results corroborate the literature showing that IL-17A levels increase with disease severity and are influenced by obesity, highlighting its potential as a biomarker for monitoring psoriasis progression and systemic inflammation. However,

while IL-17A correlates strongly with disease severity; its association with obesity appears moderate, suggesting that additional factors such as adipokines and metabolic status may modulate systemic IL-17A expression. These findings are supported by Xu et al,<sup>[11]</sup> who reported significantly higher IL-17A levels in psoriasis patients compared to healthy controls, although the correlation with PASI scores was not significant in all subgroups, suggesting variability across populations. In contrast, Oliveira-Ribeiro et al,<sup>[12]</sup> observed increased systemic IL-17A in plaque psoriasis patients but did not find a statistical correlation with disease severity, emphasizing that IL-17A levels may be influenced by additional factors such as disease duration, comorbidities, or individual immune variability.

## CONCLUSION

In this study, serum and plaque IL 17A levels were significantly elevated in patients with psoriasis and showed a positive correlation with disease severity as measured by PASI. Patients with severe psoriasis exhibited the highest IL 17A concentrations, suggesting that IL 17A reflects the inflammatory burden of the disease. A moderate association with obesity was also observed, indicating that adiposity may influence systemic inflammation in psoriatic patients. These findings support the potential use of IL 17A as a biomarker for monitoring disease activity and progression, and they reinforce its role as a therapeutic target in psoriasis management. Further studies with larger cohorts are warranted to validate IL 17A as a reliable clinical biomarker and to explore its relationship with metabolic comorbidities in psoriasis.

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## Conflicts of interest

There are no conflicts of interest.

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