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ISSN: 2663-9491 e-ISSN: 2789-6897

ORIGINAL ARTICLE

Neutrophil to Lymphocyte Ratio on Patients with Psoriasis: A Cross Sectional Study

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Received: 7 November 2026
Accepted: 16 November 2026
Published Online: 18 November 2026

Published by:
Gopalganj Medical College, Gopalganj, Bangladesh

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DOI: 10.5281/zenodo.24346865

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ABSTRACT

Background: *Psoriasis is a long-term inflammatory condition that impacts the skin and joints, caused by immune processes and systemic inflammation. The neutrophil-to-lymphocyte ratio (NLR) is a straightforward blood indicator that has been researched for its connection to disease severity, yet results remain inconsistent, particularly in Bangladesh. This research assesses how NLR relates to psoriasis severity, body surface area, duration, and additional markers of inflammation.* ***Methods & Materials:*** *This cross-sectional study enrolled 110 clinically diagnosed psoriasis patients and was carried out in 2025 at the Dermatology Department of Medical College for Women and Hospital, Dhaka, Bangladesh. Information was gathered on demographics, clinical features, and disease severity (PASI, BSA). Complete blood counts, ESR, CRP, and neutrophil-to-lymphocyte ratio (NLR) were measured from blood samples. To evaluate the relationships between NLR and markers of disease severity, statistical analyses comprised ANOVA and correlation tests. Ethical approval and informed consent were secured.* ***Results:*** *The majority of psoriasis patients were middle-aged (83.6%), male (56.4%), and lived in urban areas (65.5%), while 62.7% were overweight or obese. Chronic plaque psoriasis was the most common form (81.8%), and 45.5% of cases were of moderate severity. Blood counts fell within normal limits, yet the neutrophil-to-lymphocyte ratio (2.75 ± 1.10) and inflammatory markers (ESR, CRP) were elevated, rising notably as disease severity increased. NLR showed a positive correlation with PASI score, body surface area, disease duration, ESR, and CRP, suggesting a link to systemic inflammation and psoriasis severity.* ***Conclusion:*** *NLR rose in line with psoriasis severity and showed correlation with PASI, BSA, ESR, and CRP, suggesting it could serve as a simple and cost-effective marker of inflammation. Additional large-scale studies are required to confirm this.*

Keywords: *Psoriasis, Neutrophil-to-lymphocyte ratio, Psoriasis Area and Severity Index, Body surface area, Systemic inflammation, C-reactive protein, Erythrocyte sedimentation rate.*

(The Insight 2026; 9(3): 1074-1078)

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INTRODUCTION

Psoriasis is a chronic inflammatory disease mediated by the immune system that mainly affects the skin and can also involve the joints, impacting roughly 1–2% of people worldwide. It manifests in multiple clinical forms, such as plaque psoriasis, pustular psoriasis, erythrodermic psoriasis, and psoriatic arthritis. The Psoriasis Area and Severity Index (PASI) is commonly used to evaluate disease severity by assessing erythema, induration, and scaling [1–3].

Psoriasis may significantly reduce quality of life due to symptoms like itching, bleeding, and persistent plaques. It is additionally linked to various comorbidities, such as psoriatic arthritis, metabolic syndrome, and inflammatory bowel disease [2]. Psoriasis and psoriatic arthritis share underlying immunological mechanisms marked by lymphocyte infiltration and inflammatory cytokine activity. These processes lead to systemic inflammation and have driven research into peripheral blood biomarkers for evaluating disease activity and severity [4,5].

Proinflammatory cytokines, such as interferon-gamma (IFN-γ), interleukin (IL)-17A, IL-17F, IL-22, and tumor necrosis factor (TNF), drive keratinocyte hyperproliferation and the formation of typical psoriatic lesions. Interactions between T cells, keratinocytes, and neutrophils further intensify and maintain the inflammatory response [6,7]. As a result, easily accessible and inexpensive inflammatory markers could supplement clinical evaluations of psoriasis.

The neutrophil-to-lymphocyte ratio (NLR) and platelet-to-lymphocyte ratio (PLR) are straightforward hematological indicators of systemic inflammation. NLR mirrors the balance between innate and adaptive immune responses, while PLR reflects shifts in platelet activity relative to lymphocyte counts. Both markers have been studied in a range of inflammatory diseases, infections, and malignancies [8–10].

Research from around the world has found higher NLR and PLR levels in psoriasis patients than in healthy controls, with decreases in these markers noted after biological treatment. Nevertheless, results concerning their link to psoriasis severity remain inconsistent, underscoring the need for additional

ISSN: 2663-9491 e-ISSN: 2789-6897

research to confirm their value in assessing disease activity and monitoring treatment response [3,5,11]. In Bangladesh, a study comparing psoriasis patients with healthy controls found significantly higher mean platelet volume and PLR among patients, while NLR showed no significant difference between the groups. These results suggest that the diagnostic and clinical usefulness of hematological inflammatory markers may differ [12].

Despite these results, evidence on the relationship between NLR and psoriasis severity in the Bangladeshi population is still limited. Thus, this study sought to evaluate NLR in patients with psoriasis and establish its association with disease severity, body surface area (BSA) involvement, disease duration, and other inflammatory markers.

METHODS & MATERIALS

Study design and setting: This cross-sectional, hospital-based study took place in the Department of Dermatology and Venereology at the Medical College for Women and Hospital, Uttara, Dhaka, Bangladesh, between January and December 2025.

Study population and sample size: The study enrolled a total of 110 patients who had a clinical diagnosis of psoriasis. During the study period, patients who visited the dermatology outpatient department were recruited based on the predefined inclusion and exclusion criteria.

Selection criteria:

Inclusion-criteria:

Patients were included if they had a clinical diagnosis of psoriasis confirmed by a dermatologist, were aged ≥18 years, and agreed to participate by providing written informed consent. Patients of both sexes and all clinical types and severity categories of psoriasis were eligible for inclusion.

Exclusion-criteria:

Patients were excluded if they had active infection, fever, systemic inflammatory or autoimmune diseases, malignancy, hematological disorders, pregnancy, or any condition known to influence inflammatory markers. Patients receiving systemic corticosteroids, immunosuppressive therapy, or biological treatment within the previous three months were also excluded to minimize the effect of treatment-related changes on hematological parameters.

Data collection: Following informed consent, sociodemographic details such as age, sex, body mass index (BMI), and residence were documented using a structured data collection form. Clinical data comprised disease duration, clinical type, family history, Psoriasis Area and Severity Index (PASI) score, and the percentage of body surface area (BSA) involved. According to PASI scores, psoriasis severity was categorized as mild, moderate, or severe.

Laboratory investigations: Venous blood samples were drawn from every participant to perform a complete blood count, which included total leukocyte, neutrophil, lymphocyte, and platelet counts. To evaluate systemic inflammation, erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) levels were assessed. The neutrophil-to-lymphocyte ratio (NLR) was obtained by dividing the absolute neutrophil count by the absolute lymphocyte count.

Statistical analysis: Data were analyzed using Statistical Package for the Social Sciences (SPSS), version 26.0. Categorical variables were expressed as frequencies and percentages, while continuous variables were presented as mean ± standard deviation. Differences in hematological and inflammatory parameters among psoriasis severity groups were assessed using one-way ANOVA or appropriate nonparametric tests according to data distribution. Post-hoc analysis was performed where applicable.

The relationship between NLR and clinical parameters including PASI score, BSA involvement, disease duration, ESR, and CRP was evaluated using Pearson's or Spearman's correlation analysis depending on data distribution. A p-value <0.05 was considered statistically significant.

Ethical considerations: Before the study began, ethical approval was secured from the appropriate institutional ethical review committee. Written informed consent was collected from all participants after the study objectives and procedures had been explained to them. The privacy and confidentiality of participants were preserved throughout data collection, analysis, and reporting.

RESULTS

Table I shows the majority of patients were middle-aged (40–59 years, 45.5%; 20–39 years, 38.2%; combined 83.6%), male (56.4%; M: F ≈ 1.29:1), and lived in urban areas (65.5% vs 34.5%). Overweight/obesity was frequently observed, as 62.7% had a BMI ≥ 25 kg/m^2 and merely 33.6% had a normal BMI (18.5–24.9). In general, the study mirrors the typical demographic and metabolic characteristics of psoriasis, yet the high rate of excess weight and the uneven age and sex distribution ought to be viewed as possible confounders when interpreting NLR in relation to disease severity.

Table I: Sociodemographic characteristics (*n*=110)

Characteristic	Category	n (%)
Age (years)	<20	4 (3.6)
	20–39	42 (38.2)
	40–59	50 (45.5)
	≥60	14 (12.7)
Sex	Male	62 (56.4)
	Female	48 (43.6)
BMI (kg/m^2)	<18.5	4 (3.6)
	18.5–24.9	37 (33.6)
	25.0–29.9	46 (41.8)
	≥30.0	23 (20.9)
Residence	Urban	72 (65.5)
	Rural	38 (34.5)

ISSN: 2663-9491 e-ISSN: 2789-6897

Table II displayed a relatively balanced distribution of disease duration: 35.5% had been affected for less than 5 years, 38.2% for 5–10 years, and 26.4% for more than 10 years (meaning roughly 64.6% had a history of at least 5 years). Chronic plaque psoriasis was clearly the most common clinical type (81.8% compared with 18.2% for other types), and a family history was reported in 26.4% of patients, which supports the well-known genetic predisposition to the disease. According to PASI, moderate disease was most frequent (45.5%), followed by mild (30.0%) and severe (24.5%); in line with this, the majority of patients had limited body surface involvement, with 46.4% below 10% and 40.0% between 10–29% BSA, whereas only 13.6% had ≥30% involvement. In general, the sample consists mainly of chronic plaque psoriasis of intermediate duration and mild-to-moderate severity, with a notable minority (24.5%) affected by severe disease — a distribution that is suitable for studying how NLR varies across levels of disease severity.

Table II: Clinical Characteristics and Disease Severity of Patients with Psoriasis (*n* = 110)

Characteristic	Category	n (%)
Disease duration	<5 years	39 (35.5)
	5–10 years	42 (38.2)
	>10 years	29 (26.4)
Clinical type	Plaque psoriasis	90 (81.8)
	Other types	20 (18.2)
Family history	Present	29 (26.4)
	Absent	81 (73.6)
PASI severity	Mild	33 (30.0)
	Moderate	50 (45.5)
	Severe	27 (24.5)
BSA involvement	<10%	51 (46.4)
	10–29%	44 (40.0)
	≥30%	15 (13.6)

Table III summarizes the hematological and inflammatory parameters among psoriasis patients. The mean total leukocyte count was 7.42 ± 1.68 $\times 10^9$/L, neutrophil count was 4.62 ± 1.31 $\times 10^9$/L, lymphocyte count was 1.82 ± 0.51 $\times 10^9$/L, and NLR was 2.75 ± 1.10. The mean platelet count, ESR, and CRP levels were 278 ± 68 $\times 10^9$/L, 24.6 ± 16.8 mm/hour, and 7.8 ± 9.4 mg/L, respectively.

Table III: Baseline hematological and inflammatory parameters among psoriasis patients (*n*=110)

Variable	Mean ± SD
Total leukocyte count ($\times 10^9$/L)	7.42 ± 1.68
Neutrophil count ($\times 10^9$/L)	4.62 ± 1.31
Lymphocyte count ($\times 10^9$/L)	1.82 ± 0.51
NLR	2.75 ± 1.10
Platelet count ($\times 10^9$/L)	278 ± 68
ESR (mm/hour)	24.6 ± 16.8
CRP (mg/L)	7.8 ± 9.4

Table IV indicates that total leukocyte count, neutrophil count, platelet count, ESR, CRP, and NLR all rose as psoriasis severity increased, whereas lymphocyte count declined. NLR increased from 1.90 ± 0.44 in mild psoriasis to 3.75 ± 1.10 in severe psoriasis. Every difference was statistically significant, pointing to a link between higher psoriasis severity and greater systemic inflammation.

Table IV: Hematological and inflammatory markers by psoriasis severity

Variable	Mild (n=33)	Moderate (n=50)	Severe (n=27)	Total (n=110)	P value
Total leukocyte count ($\times 10^9$/L)	6.80 ± 1.45	7.33 ± 1.62	8.35 ± 1.90	7.42 ± 1.68	0.002
Neutrophil count ($\times 10^9$/L)	4.05 ± 0.98	4.55 ± 1.22	5.45 ± 1.60	4.62 ± 1.31	< 0.001
Lymphocyte count ($\times 10^9$/L)	2.05 ± 0.45	1.81 ± 0.49	1.55 ± 0.44	1.82 ± 0.51	< 0.001
Neutrophil-to-lymphocyte ratio (NLR)	1.90 ± 0.44	2.77 ± 0.66	3.75 ± 1.10	2.75 ± 1.10	< 0.001
Platelet count ($\times 10^9$/L)	255 ± 60	278 ± 66	306 ± 73	278 ± 68	0.014
ESR (mm/hour)	17.0 ± 11.4	23.5 ± 15.8	36.0 ± 19.6	24.6 ± 16.8	< 0.001
CRP (mg/L)	4.2 ± 5.1	6.5 ± 8.3	14.6 ± 12.6	7.8 ± 9.4	< 0.001

Table V indicates that NLR showed a positive correlation with PASI score (r = 0.52), BSA involvement (ρ = 0.45), disease duration (ρ = 0.26), ESR (r = 0.34), and CRP (r = 0.41). Every association reached statistical significance, suggesting that a higher NLR was linked to more severe psoriasis, greater body surface area involvement, longer disease duration, and raised inflammatory markers.

ISSN: 2663-9491 e-ISSN: 2789-6897

Table V: Correlation between neutrophil-to-lymphocyte ratio (NLR) and clinical severity parameters among psoriasis patients (*n*=110)

Variable	Correlation with NLR (r or ρ)	95% CI	p-value
PASI score	r = 0.52	0.36 – 0.65	< 0.001
BSA involvement	ρ = 0.45	0.28 – 0.59	< 0.001
Disease duration	ρ = 0.26	0.08 – 0.43	0.005
ESR	r = 0.34	0.16 – 0.50	< 0.001
CRP	r = 0.41	0.24 – 0.56	< 0.001

DISCUSSION

In our study, the majority of patients were between 40 and 59 years of age, followed by those aged 20–39 years, and 56.4% of the patients were male. These results resemble those of an earlier study carried out in Bangladesh, in which most psoriasis patients were 21–40 years old, followed by 41–60 years, and 72.2% were male [13]. In our study, 65.5% of the patients resided in urban areas, while 62.7% were overweight or obese. When interpreting the association between NLR and the severity of psoriasis, these sociodemographic and metabolic features should be taken into account.

Plaque psoriasis emerged as the most frequent clinical type in our study, with moderate disease severity coming next. The majority of patients had a disease duration of 5–10 years, while 46.4% showed BSA involvement under 10%. These results align with an earlier study from Bangladesh, which found plaque psoriasis in 67.74% of patients [14,15]. According to both studies, plaque psoriasis is the leading clinical type among psoriasis patients.

In our study, the mean total leukocyte count was 7.42 ± 1.68 $\times 10^9$/L, the neutrophil count was 4.62 ± 1.31 $\times 10^9$/L, the lymphocyte count was 1.82 ± 0.51 $\times 10^9$/L, the NLR was 2.75 ± 1.10, and the platelet count was 278 ± 68 $\times 10^9$/L. The mean ESR and CRP levels were 24.6 ± 16.8 mm/hour and 7.8 ± 9.4 mg/L, respectively. Comparable results were described in an earlier study, which reported markedly higher NLR, platelet count, and other hematological parameters among patients with psoriasis compared with healthy controls [16]. These results indicate that hematological parameters could be useful in evaluating systemic inflammation in psoriasis.

This study found that total leukocyte count, neutrophil count, platelet count, ESR, CRP, and NLR all rose markedly as psoriasis severity increased, while lymphocyte count declined. NLR rose from 1.90 ± 0.44 in mild psoriasis to 3.75 ± 1.10 in severe psoriasis. These results align with earlier research on hematological and inflammatory markers in psoriasis, reinforcing NLR as a simple and inexpensive marker of systemic inflammation and disease severity [17,18].

This study found notable positive correlations between NLR and PASI score, BSA involvement, disease duration, ESR, and CRP, showing that a higher NLR was linked to more severe disease and greater systemic inflammation. Such findings align with earlier systematic reviews and clinical studies that have documented links between NLR and the severity of psoriasis [2,3,11]. The results lend support to the possible use of NLR as a straightforward, inexpensive biomarker for evaluating disease activity and inflammatory burden in psoriasis patients.

Overall, NLR may serve as a simple, cost-effective biomarker for assessing psoriasis severity and systemic inflammation, as it correlates significantly with PASI score, BSA involvement, disease duration, ESR, and CRP

CONCLUSION

This study discovered that the neutrophil-to-lymphocyte ratio (NLR) rose notably as psoriasis severity increased, and it showed a positive correlation with PASI score, BSA involvement, ESR, and CRP. These results indicate that NLR could act as a straightforward, readily available, and economical indicator of systemic inflammation and disease severity in psoriasis patients. Nevertheless, additional prospective studies involving larger sample sizes are required to confirm its clinical usefulness.

REFERENCES

1. *Ritchlin CT, Krueger JG. New therapies for psoriasis and psoriatic arthritis. Current opinion in rheumatology. 2016 May;28(3):204.*
2. *Paliogiannis P, Satta R, Deligia G, Farina G, Bassu S, Mangoni AA, Carru C, Zinellu A. Associations between the neutrophil-to-lymphocyte and the platelet-to-lymphocyte ratios and the presence and severity of psoriasis: a systematic review and meta-analysis. Clinical and experimental medicine. 2019 Feb 1;19(1):37-45.*
3. *Wang WM, Wu C, Gao YM, Li F, Yu XL, Jin HZ. Neutrophil to lymphocyte ratio, platelet to lymphocyte ratio, and other hematological parameters in psoriasis patients. BMC immunology. 2021 Sep 26;22(1):64.*
4. *Kim DS, Shin D, Lee MS, Kim HJ, Kim DY, Kim SM, Lee MG. Assessments of neutrophil to lymphocyte ratio and platelet to lymphocyte ratio in Korean patients with psoriasis vulgaris and psoriatic arthritis. The Journal of dermatology. 2016 Mar;43(3):305-10.*
5. *Albayrak H. Neutrophil-to-lymphocyte ratio, neutrophil-to-monocyte ratio, platelet-to-lymphocyte ratio, and systemic immune-inflammation index in psoriasis patients: response to treatment with biological drugs. Journal of Clinical Medicine. 2023 Aug 22;12(17):5452.*
6. *Chiang CC, Cheng WJ, Korinek M, Lin CY, Hwang TL. Neutrophils in psoriasis. Frontiers in immunology. 2019 Oct 9;10:2376.*
7. *Hu P, Wang M, Gao H, Zheng A, Li J, Mu D, Tong J. The role of helper T cells in psoriasis. Frontiers in immunology. 2021 Dec 15;12:788940.*
8. *Zeb A, Khurshid S, Bano S, Rasheed U, Zammurrad S, Khan MS, Aziz W, Tahir S. The role of the neutrophil-to-lymphocyte ratio and platelet-to-lymphocyte ratio as markers of disease activity in ankylosing spondylitis. Cureus. 2019 Oct 29;11(10).*
9. *Buonacera A, Stancanelli B, Colaci M, Malatino L. Neutrophil to lymphocyte ratio: an emerging marker of the relationships between the immune system and diseases. International journal of molecular sciences. 2022 Mar 26;23(7):3636.*
10. *Zahorec R, Marek V, Waczulikova I, Veselovský T, Palaj J, Kečkéš Š, Durdík Š. Predictive model using hemoglobin, albumin, fibrinogen, and neutrophil-to-lymphocyte ratio to distinguish patients with colorectal cancer from those with benign adenoma. Neoplasma. 2021 Jan 1;68(6):1292-300.*
11. *Ye JH, Zhang Y, Naidoo K, Ye S. Neutrophil-to-lymphocyte ratio and platelet-to-lymphocyte ratio in psoriasis: a systematic review and meta-analysis. Archives of dermatological research. 2024 Feb 8;316(3):85.*
12. *Khatun F, Ahmed Z, Paul HK, Amin Z, Chowdhury MS. Profile of mean platelet volume, neutrophillymphocyte ratio and platelet-lymphocyte ratio in patient with psoriasis. International Journal of Research. 2021 Nov;7(6):765-70.*
13. *Babu MA, Ahmed MS, Islam MS, Mollah MA. Prevalence of Psoriasis in Outpatient Department of Dermatology and Venereology in North Bengal Medical College Hospital, Sirajganj, Bangladesh. NORTH BENGAL MEDICAL COLLEGE JOURNAL.;4:3.*
14. *Ahmed I, Tasnim N, Liza SR. Clinical Patterns and Prevalence of Psoriasis in a Tertiary Healthcare Facility in Bangladesh. TAJ: Journal of Teachers Association. 2024 Dec 31;37(2):391-5.*
15. *Fatema F, Ghoshal L, Saha A, Agarwal S, Bandyopadhyay D. Early-onset versus late-onset psoriasis: a comparative study of clinical*

variables, comorbidities, and association with HLA CW6 in a tertiary care center. Indian Journal of Dermatology. 2021 Nov;66(6):705.

16. *Pujani M, Agarwal C, Chauhan V, Agarwal S, Passi S, Singh K, Singh M. Platelet parameters, neutrophil–lymphocyte ratio, platelet lymphocyte ratio, red cell distribution width: can they serve as biomarkers in evaluation of severity of psoriasis?. Journal of Applied Hematology. 2022 Apr 1;13(2):95-102.*
17. *Agarwal ST, Sankpal SG, Ghogare M. Analysing hematological parameters and inflammation in patients with psoriasis: a retrospective study.*
18. *Mondal S, Guha S, Saha A, Ghoshal L, Bandyopadhyay D. Evaluation of neutrophil-to-lymphocyte ratio and platelet-to-lymphocyte ratio in chronic plaque psoriasis. Indian Journal of Dermatology. 2022 Jul;67(4):477.*