



Original Article

Neutrophil-to-Lymphocyte Ratio as an Inflammatory Marker Associated with Albuminuria in Patients with Diabetic Chronic Kidney Disease

Dr Trideep Nath¹, Dr Jyotismita Deka²

¹ 3rd year PG, Department of Physiology, Silchar Medical College and Hospital, Srimanta Sankardeva University of Health sciences

² Prof. Cum HOD Department of Physiology Silchar Medical College and Hospital

OPEN ACCESS

Corresponding Author:

Dr Trideep Nath

3rd year PG, Department of Physiology, Silchar Medical College and Hospital, Srimanta Sankardeva University of Health sciences.

Received: 10-06-2026

Accepted: 05-07-2026

Available online: 18-07-2026

Copyright © International Journal of
Medical and Pharmaceutical Research

ABSTRACT

Background: Chronic kidney disease (CKD) is a common and serious complication of diabetes mellitus, with inflammation playing a pivotal role in its progression. The Neutrophil-to-Lymphocyte Ratio (NLR), a simple and cost-effective inflammatory marker derived from routine blood investigations, has emerged as a potential indicator of systemic inflammation. Albuminuria is an established marker of renal damage and disease progression in diabetic CKD.

Objective: To evaluate the association between the Neutrophil-to-Lymphocyte Ratio and albuminuria in patients with diabetic chronic kidney disease.

Materials and Methods: A hospital-based cross-sectional observational study was conducted among 100 adult patients with type 2 diabetes mellitus and chronic kidney disease attending Silchar Medical College and Hospital. Clinical and laboratory parameters, including neutrophil count, lymphocyte count, serum creatinine, estimated glomerular filtration rate (eGFR), and urinary albumin levels, were recorded. NLR was calculated by dividing the absolute neutrophil count by the absolute lymphocyte count. Statistical analysis was performed to determine the association between NLR and albuminuria, with a p-value <0.05 considered statistically significant.

Results: The mean age of the participants was approximately 57 years. The mean NLR was 3.09 ± 1.47 , indicating the presence of chronic low-grade inflammation. The mean urinary albumin level was 273.03 ± 287.95 mg/g, with most patients demonstrating moderate albuminuria. Although higher NLR values were observed in patients with increased albuminuria, the association was not statistically significant.

Conclusion: Patients with diabetic CKD exhibited elevated NLR values suggestive of systemic inflammation. However, no significant association was observed between NLR and albuminuria in this study. NLR may still serve as an inexpensive and readily available inflammatory marker in diabetic CKD, although larger prospective studies are warranted to establish its prognostic significance.

Keywords: Diabetic Chronic Kidney Disease, Neutrophil-to-Lymphocyte Ratio, Albuminuria, Inflammation, Type 2 Diabetes Mellitus.

INTRODUCTION

Diabetes Mellitus is a major global health problem and one of the leading causes of Chronic Kidney Disease. Diabetic kidney disease is characterized by progressive renal damage resulting from chronic hyperglycemia, hemodynamic alterations, and inflammatory mechanisms.

Albuminuria is widely used as an early indicator of renal injury and reflects increased glomerular permeability. Persistent albuminuria is strongly associated with progression of kidney disease and increased cardiovascular risk.

Inflammation plays a central role in the development and progression of diabetic nephropathy. Recently, hematological indices derived from complete blood count have been explored as markers of systemic inflammation. Among these, the Neutrophil-to-Lymphocyte Ratio has gained attention due to its simplicity, cost-effectiveness, and clinical utility.

This study aimed to evaluate the association between NLR and albuminuria in patients with diabetic CKD.

MATERIALS AND METHODS

Study Design:

Hospital-based cross-sectional observational study.

Study Population:

100 patients with type 2 diabetes mellitus diagnosed with CKD attending Silchar Medical College and Hospital.

Inclusion Criteria

- Patients with type 2 diabetes mellitus
- Patients diagnosed with chronic kidney disease
- Age >18 years

Exclusion Criteria

- Acute infection
- Malignancy
- Autoimmune disorders
- Patients on immunosuppressive therapy

Data Collection

Clinical and laboratory data were recorded including:

- Total leukocyte count
- Neutrophil count
- Lymphocyte count
- Serum creatinine
- eGFR
- Urinary albumin

Calculation

$NLR = \text{Neutrophil count} / \text{Lymphocyte count}$.

Statistical Analysis

Data were expressed as mean $\pm$ SD. Statistical tests were used to assess the association between NLR and albuminuria, with $p < 0.05$ considered statistically significant.

RESULTS

The study included 100 patients with diabetic CKD. The mean age of participants was approximately 57 years. The mean NLR was 3.09 ± 1.47 , indicating a moderate inflammatory state.

Urinary albumin levels showed considerable variability with a mean value of 273.03 ± 287.95 mg/g. Most patients had moderate albuminuria.

Although higher NLR values were observed among patients with increased albuminuria levels, statistical analysis did not demonstrate a significant correlation between the two parameters.

DISCUSSION

The present study assessed the relationship between NLR and albuminuria in diabetic CKD patients. Elevated NLR values observed in our cohort suggest the presence of chronic low-grade inflammation.

Inflammation contributes to endothelial dysfunction and progressive glomerular damage in diabetic nephropathy. Albuminuria reflects structural renal injury and is widely recognized as an important marker of disease severity.

However, the absence of a significant association between NLR and albuminuria in our study may be attributed to the cross-sectional design and the predominance of patients with early to moderate CKD stages. Larger longitudinal studies may better clarify the predictive role of inflammatory markers such as NLR in diabetic kidney disease progression.

CONCLUSION

Patients with diabetic CKD demonstrate elevated NLR values indicating systemic inflammation. Although NLR did not show a strong association with albuminuria in this study, it may still serve as a simple and cost-effective inflammatory marker in diabetic kidney disease. Further research is required to evaluate its prognostic value.

REFERENCES

1. Buonacera A, Neutrophil-to-lymphocyte ratio: an emerging marker of the relationships between the immune system and diseases. *International Journal of Molecular Sciences*. 2022;23:3636.
2. Li X, Wang L, Liu M. Association between neutrophil-to-lymphocyte ratio and diabetic kidney disease in type 2 diabetes mellitus patients. *Frontiers in Endocrinology*. 2024;14:1285509.
3. Becker C, Inker LA. Glomerular filtration rate and albuminuria for detection and staging of acute and chronic kidney disease in adults. *JAMA*. 2015;313(8):837-846.