



Decade-Long Experience of Pediatric Renal Biopsies in Meghalaya: Spectrum, Challenges, and Outcomes

Dear Editor,

The spectrum of renal diseases worldwide is shifting, partly due to the increased availability of medical facilities. An interesting aspect of renal diseases is the regional variation.¹ Data on the ethnic North-East Indian population are extremely scarce.² To examine the clinico-pathological spectrum, hurdles faced, troubleshooting measures adopted, the outcome of such measures, and possible lacunae, we conducted a retrospective assessment of renal biopsies on pediatric patients from a single institute reporting medical renal biopsies in the state of Meghalaya, India.

A decade-long (January 2014 to December 2024) review of 303 pediatric renal biopsies was done, of which 278 (91.8%) were satisfactory for analysis. A slightly higher female predominance (56.5%) with a male-to-female ratio of 1:1.3, and a mean age of 12.14 years (11 months to 18 years) was noted. Commonest indication for renal biopsy was nephrotic syndrome (124, 44.6%) followed by acute nephritic syndrome (117, 42.1%), nephritic-nephrotic syndrome (11 (4%)), acute kidney injury (9, 3.2%), rapidly progressive glomerulonephritis (7, 2.5%), chronic kidney disease (5, 1.8%), and asymptomatic urinary abnormalities (5, 1.8%). Histomorphological evaluation using light microscopy, aided by immunofluorescence study findings, remains the cornerstone of diagnosing medical renal diseases. In the study, all 278 cases that had an adequate number of glomeruli on light microscopy evaluation and were satisfactory for analysis were subjected to an immunofluorescence study. Electron microscopy was not performed in any case.

The commonest histopathological diagnosis based on presenting symptoms has been highlighted in Table 1.

Glomerulopathy was observed in 261 cases (93.9%), it was further categorized into primary glomerulopathy (122, 46.7%) and secondary glomerulopathy (139, 53.3%). Amongst primary glomerulopathies, minimal change disease (41, 23%) was the leading cause, whereas lupus nephritis (68, 81.9%) was the commonest etiology for secondary glomerulopathy. Class IV lupus nephritis (52, 76.5%) was the commonest amongst all patients diagnosed as lupus nephritis.

Based on questionnaire responses (Scale-Level Content Validity Index, Average method: S-CVI/Average: 0.92: Excellent validity), 5 years of independent renal biopsy reporting experience were noted amongst five histopathologists. However, exposure to renal biopsies during the residency period and the following years was

Table 1: Predominant histopathological diagnoses according to clinical presentation.

Presentation	Number (%)
A. Nephrotic syndrome	124 (44.6)
Minimal change disease	41 (33.1)
Focal segmental glomerulosclerosis	33 (26.6)
IgA nephropathy	21 (16.9)
Membranoproliferative glomerulonephritis	18 (14.5)
Post-infectious glomerulonephritis	08 (6.5)
Membranous nephropathy	03 (2.4)
B. Acute nephritic syndrome	117 (42.1)
Lupus nephritis	68 (58.1)
Post-infectious glomerulonephritis	23 (19.7)
IgA nephropathy	15 (12.8)
Membranoproliferative glomerulonephritis	11 (9.4)
C. Nephritic-nephrotic syndrome	11 (4)
Focal segmental glomerulonephritis	04 (36.4)
Post-infectious glomerulonephritis	04 (36.4)
Membranoproliferative glomerulonephritis	02 (18.2)
IgA nephropathy	01 (9)
D. Acute kidney injury	9 (3.2)
Hemolytic uremic syndrome	06 (66.7)
Tubulo-interstitial disease	03 (33.3)
E. Rapidly progressive glomerulonephritis	7(2.5)
Post-infectious glomerulonephritis	04 (57.1)
Henoch-schonlein purpura nephritis	02 (28.6)
Pauci-immune crescentic glomerulonephritis	01 (14.3)
F. Chronic kidney disease	5 (1.8)
Tubulo-interstitial disease	04 (80)
Focal segmental glomerulonephritis	01 (20)
G. Asymptomatic urinary abnormalities	5 (1.8)
IgA nephropathy	03 (60)
Tubulo-interstitial disease	02 (40)

noted amongst all seven histopathologists, and only one pathologist attended a short-term renal pathology observership. Despite the absence of formal training related to nephropathology, all emphasized that while specialized training is valuable, it is not indispensable for competent renal biopsy reporting. Hurdles in getting an optimal diagnosis included insufficient glomerular yield, sub-optimal clinico-laboratory details, non-representative sampling, non-standardized request forms, absence of multidisciplinary meetings, limited nephropathology-focused continuing medical education programs, and lack of disease registries. Based on the hurdles faced, troubleshooting measures implemented and proposed, along with the outcome, have been highlighted in Supplementary Table 1. Significant improvements in the form of a reduction in the need for second opinions (improved staining quality for slides, improvement

in received core length, and a drop in sub-optimally filled requisition forms) highlight the impact of regular brainstorming sessions and improved clinician-radiologist-pathologist interactions. Despite these gains, several proposed measures to tackle the hurdles are yet to be addressed due to administrative, financial, and manpower constraints and geographical limitations.

The research highlights the spectrum of pediatric renal disease from an ethnic tribal population-dominated state of India and shows similarities, along with marked variation from mainland India studies. Nephrotic Syndrome, particularly steroid-resistant nephrotic syndrome, serves as the commonest indication for renal biopsy amongst the Indian pediatric population, a finding similar to our study.^{2,3} Lupus nephritis (68, 24.5%) was the most common etiologic factor attributable to pediatric renal ailment in our study population, a finding consistent with South-East Asian studies, which substantiate the strong ethnic linkage of the study population to South-East Asian countries, and hence the probable variation.^{4,5} Minimal change disease (41, 14.7%) was the second most common diagnosis. This is in contrast to other Indian pediatric studies, where minimal change disease predominates.³ These findings highlight the demographic variation with respect to renal diseases in a diverse country like India. Another key yet under-recognized aspect amongst studies focusing on regional and international data is the lack of focus on hurdles, troubleshooting measures, and outcomes.⁶ In-depth study about the hurdles, troubleshooting measures, and their outcomes helps in policy making from remote locations like North-east India will pave the way for a better understanding of grassroots level problems, eventual measures adopted, thereby improving patient management.

Author contributions: Conceptualization, methodology, formal analysis, investigation, resources, data curation, writing - original draft, writing - review: NT, PK, HB, BD; Visualization, supervision, project administration: NT, PK; Validation: NT. All authors provided final approval to the work.

Conflicts of interest: There are no conflicts of interest.

The authors declare that no generative AI or AI-assisted tools were used in drafting, editing, or preparing this manuscript.

Nirvana Thangjam¹, Pranjal Kalita¹, Himesh Barman², Biswajit Dey¹, Vandana Raphael¹

Departments of ¹Pathology, and ²Pediatrics, North Eastern Indira Gandhi Regional Institute of Health & Medical Sciences, Shillong, Meghalaya, India

Corresponding author: Pranjal Kalita, Department of Pathology, North Eastern Indira Gandhi Regional Institute of Health & Medical Sciences, Shillong, Meghalaya, India. E-mail: kalita.pranjal4@gmail.com

References

1. Junejo S, Chen M, Ali MU, Ratnam S, Malhotra D, Gong R. Evolution of chronic kidney disease in different regions of the world. *J Clin Med* 2025;14:4144.
2. Yadav S, Kandalkar B. Epidemiology of pediatric renal diseases and its histopathological spectrum - A single-center experience from India. *Saudi J Kidney Dis Transpl* 2021;32:1744-53.
3. Mohapatra A, Kakde S, Annapandian VM, Valsan AT, Duhli N, Korula A, et al. Spectrum of biopsy proven renal disease in South Asian children: Two decades at a tropical tertiary care centre. *Nephrology (Carlton)* 2018;23:1013-22.
4. Parichatikanond P, Chawanasuntorapoj R, Shayakul C, Choensuchon B, Vasuvattakul S, Vareesangthip K, et al. An analysis of 3,555 cases of renal biopsy in Thailand. *J Med Assoc Thai* 2006;89 Suppl 2:S106-11.
5. Das J, Kalita P, Dey B, Raphael V, Mishra J, Khonglah Y, et al. Clinicopathological, immunological, and laboratory parameters of childhood lupus nephritis: A study from northeast India. *J Lab Physicians* 2023;15:361-4.
6. Hayes E, Mai E, Uflacker A, Freidin N. Challenges encountered to creating a renal biopsy program at a tertiary care academic institution in the United States. *Ren Fail* 2025;47:2449576.

This is an open access article under the CC BY-NC-SA license. (<https://creativecommons.org/licenses/by-nc-sa/4.0/deed.en>)

Received: 05-01-2026; **Accepted:** 15-02-2026;

Online First: 30-04-2026; **Published:** ***

DOI: 10.25259/IJN_7_2026

Supplementary available at: https://dx.doi.org/10.25259/IJN_7_2026.