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ORIGINAL ARTICLE

Spectrum of Glomerulonephritis and Trends of its Changing Patterns: A Retrospective Study

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Abstract :

The study of glomerular disease is a challenging field of nephrology. Glomerular diseases represent a large number of diseases, which are rapidly evolving in number and complexity with the advancement of diagnostic facilities and knowledge of their underlying pathogenic mechanisms.

Method : This study looked at 161 kidney biopsy reports from Bangladesh Medical University (BMU) between 2010 and 2025. It included patients aged 16 and older who had biopsies for issues like proteinuria. We collected data about the patients' clinical details, lab results, and immune system markers. Biopsies were done using automated biopsy guns with ultrasound guidance. After that we processed the tissue with formalin fixation, paraffin embedding, and various microscopy and staining methods.

Results: In our study, 49% of patients were male and 51% were female, yielding a male-to-female ratio of 1:1.04,Mesangial proliferative glomerulonephritis (GN) is the most common variety among the primary GN, affecting 26% of patients. MPGN followed as the second most common, at 18%, with an increasing incidence of focal segmental glomerulosclerosis (FSGS) observed in 13% of patients. Among the secondary GN lupus nephritis is most common. Post-infectious GN (PIGN) was seen in 3% of patients, Renal impairment was present in 33 patients, primarily with MPGN and FSGS. Nephrotic-range proteinuria was the most important indication for kidney biopsy, seen in 46% of cases, followed by sub-nephrotic proteinuria with hematuria.

Conclusion: The primary aim of the study is to share our experience in clinicopathological and histological spectrum of Glomerulonephritis in Bangladeshi population.

Keywords: Glomerulonephritis, Mesengial proliferative GN, Proteinuria

Introduction :

Glomerulonephritis (GN) is an inflammation of the glomeruli in the kidneys, which can be triggered by autoimmune disorders, infections, or systemic diseases. If it becomes chronic or severe, GN can lead to progressive glomerular scarring and a decline in kidney function, potentially resulting in end-stage renal disease (ESRD)[1]. The ultimate treatment of ESRD is renal replacement therapy which is a huge cost burden for a developing country , like Bangladesh. GN exhibits a broad range of clinical manifestations, including nephrotic syndrome (NS), nephritic syndrome, rapidly progressive renal failure (RPRF), macroscopic hematuria (MH), isolated proteinuria or hematuria, acute kidney injury (AKI), chronic kidney disease (CKD), and recurrent disease in the post-transplant kidney as well[2]. Despite advanced treatment like

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immunosuppressive drugs, glomerulonephritis is one of the leading causes of CKD and End-Stage renal Disease worldwide. In Bangladesh 25% to 45% cases of ESRD were caused by GN[3] . The pattern of glomerular diseases is different from country to country due to its ecological, genetic, socioeconomic, racial influences. The global disease burden of chronic kidney disease (CKD) stemming from glomerulonephritis has seen a significant rise, particularly in areas and nations with lower socio-demographic indices [4,5]. IgA nephropathy was once considered the most common cause of GN worldwide [6,7] , but in the past few decades, the incidence of FSGS is increased in many countries of the world, including Bangladesh. [8,9,10]. In order to effectively address end-stage renal disease (ESRD) resulting from glomerulonephritis (GN), early intervention is essential for this patient population. Establishing a national registry will facilitate the accurate identification of early changes in the patterns of glomerular diseases. In our study, we conducted a retrospective analysis of renal biopsy reports for 161 patients. Our findings were compared with data from other studies conducted both nationally and internationally to discern differences and similarities in outcomes.

Method and Materials:

A retrospective analysis was conducted on 161 kidney biopsy reports collected from Bangladesh Medical University (BMU) between January 2010 and May 2025. The minimum age for patient participation in this study was established at 16 years. Each patient underwent evaluation by a nephrologist. The reasons for conducting kidney biopsies were classified into various clinical syndromes: nephrotic syndrome, sub- nephrotic proteinuria, rapidly progressive glomerulonephritis (RPGN)-like presentation, isolated hematuria, and unexplained renal impairment. The data recorded for each individual included name, age, sex, reason for the kidney biopsy, and results from laboratory investigations, such as serum creatinine levels, 24-hour urinary protein, urine microscopy, and virological tests, including hepatitis B surface antigen (HBsAg) and hepatitis C antibody (anti-HCV).The immunological indicators that were assessed included anti-double stranded DNA antibodies, antinuclear antibodies (ANA), complement levels C3 and C4, p-ANCA, and c-ANCA. In patients with chronic kidney disease (CKD) who experienced unexplained decreases in kidney function, a biopsy was performed if ultrasound evaluations indicated normal kidney sizes, ensuring preservation of corticomedullary differentiation. Following the acquisition of informed written consent, biopsies were carried out using automated biopsy guns with ultrasound guidance.

All kidney biopsy specimens were processed in accordance with established protocols. Tissue processing involved formalin fixation and paraffin embedding (FFPE). The analysis included light microscopy (LM) and immunofluorescence (IF), while electron microscopy (EM) was not employed as it is not available in our facility. After processing the tissue with hematoxylin and eosin (HE), periodic acid-Schiff (PAS), silver stain (Jones' Methenamine), and Masson's trichrome stain were applied for histological evaluation of the tissue. Immunoglobulin and complement analyses were performed using an immunohistochemical antibody panel that targeted immunoglobulins G, M, and A (IgG, IgM, IgA), as well as complement component C3 and complement component 1q (C1q). Additionally, kappa and lambda light chain analyses were conducted.

Result :

A total 161 patients were included in this study. Among them male patients were 79 (49.06%) and female patients were 82 (50.93%). Male to female ratio was 1 : 1.04

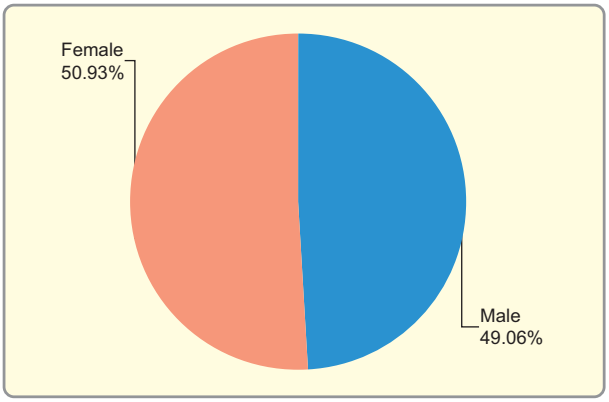

Figure 1: *Gender distribution of GN patient.*

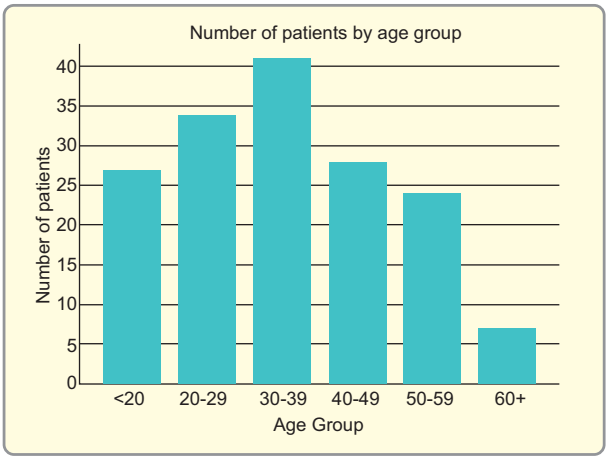

Figure 2: *Bar diagram showing age distribution of GN patient.*

The bar diagram shows that the highest number of patients are in the 30-39 age group that is 41 patients (25.46%), while the least number of patients are in the 60 and above age group (7 patients). The other age groups have a more balanced distribution, with 20-29 and 30-39 age groups having notably higher numbers of patients. The mean age of the patient distribution is approximately 34.33 years. Age range 16-70 year.

Histological findings :

Among the histopathological findings the most common primary GN is mesangeal proliferative (26%). Second most common is MPGN 29 (18.01%), then FSGS 22 (13.6%). Among the secondary GN most common GN is lupus nephritis 23 (14.3%)

Table-I

Frequency distribution of GN patient

Name of GN	Number	Percentage
Primary		
Mesangeal proliferative:		
IgA Nephropathy	24	26%
C1q GN	10	
Mesangial Proliferative	8	
(Not Specified)	42	
Total		
MPGN (Membranoproliferative GN)	29	18.01%
Focal Segmental Glomerulosclerosis (FSGS)	22	13.6%
Diffuse Proliferative GN	10	6.2%
Minimal Change Disease (MCD)	8	4.9%
Membranous Nephropathy	8	4.9%
C3 GN 1	0.6%	
Secondary		
Lupus nephritis	23	14.3%
PIGN	6	3.7%
Others (Hypertensive Glomerulopathy, Diabetic Nephropathy, ATN, TIN, Chronic Sclerosing Fibrillary GN	12	7.4%

A total of 33 patients were presented with renal impairment.

Table-II

Pattern of renal impairment

Renal Impairment	Frequency
MPGN (Membranoproliferative GN)	7
FSGS (Focal Segmental Glomerulosclerosis)	7
Lupus Nephritis	5
IgA Nephropathy	3
Membranous Nephropathy	3
C3 GN (C3 Glomerulopathy)	1
MCD (Minimal Change Disease)	1
PIGN (Post-infectious GN)	1
Diabetic Nephropathy	1
Hypertensive Nephropathy	1
Chronic Interstitial Nephritis	1
ANCA Associated Vasculitis	1
Fibrillary GN	1

Out of 161 patients 100 urine RE,UTP reports were evaluated. Which shows:

Renal Impairment	Nephrotic Range Proteinuria	Sub-Nephrotic Range Proteinuria	Sub-Nephrotic Range Proteinuria with Hematuria	Isolated Hematuria
MPGN (Membranoproliferative GN)	7	1	12	
IgA Nephropathy	5	5	4	1
Lupus Nephritis	5	4	10	
FSGS (Focal Segmental Glomerulosclerosis)	7	1	5	
C1q Nephropathy	4	2	3	
MCD (Minimal Change Disease)	7		1	
Membranous Nephropathy	4	1	2	
PIGN (Post-infectious GN)	3	1	1	
Hypertensive Nephropathy	1			
Diabetic Nephropathy	2			
ANCA Associated Vasculitis	1			

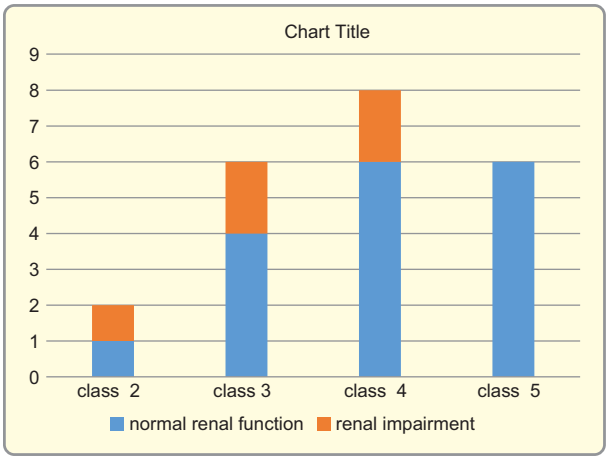

Figure 3: *Distribution of SLE patients with their renal function*

Discussion:

In our research, 49% of the individuals were male and 51% were female, leading to a male-to-female ratio of 1:1.04. Salahuddin et al. found that 49.5% of their participants were male and 50.5% female (10). Conversely, other studies suggest that males are more commonly affected than females. For example, in the research by Islam et al., female patients made up 48% [11], while Ahmed et al. reported a female prevalence of 35.2% [12]. The male-to-female ratio can vary significantly across the globe, influenced by factors such as histopathological type, genetics, and environmental factors [13]

The age group most frequently affected in our study was between 30 and 39 years, with an average age of 34.33 years. The outcomes correspond with the studies of Ahmed et al. [12] and Bhalla et al. [14]

In total, mesangial proliferative glomerulonephritis (GN) constitutes a significant subset, comprising IgA nephropathy, C1q nephropathy, and mesangial proliferative GN, totaling 42 individuals or roughly 26%. This is consistent with findings from other studies conducted in Bangladesh [5, 7, 15]. MPGN is the second most prevalent form, representing about 18%. Nonetheless, there has been a rising incidence of FSGS in Southeast Asia in recent years [16]. Our research revealed FSGS in 13% of the patients, and we identified 6 individuals (3%) who had post-infectious GN (PIGN). Historically, infection-related GN, especially post-streptococcal GN (PSGN), was quite common. However, due to advancements in antibiotic treatment, improved access to primary healthcare, and better hygienic conditions, the occurrence of PSGN has decreased over recent years [17]. Within secondary glomerulonephritis cases, lupus nephritis is the most prevalent type, making up 14%.

Renal impairment was detected in 33 individuals, primarily those diagnosed with membranoproliferative glomerulonephritis (MPGN) and focal segmental glomerulosclerosis (FSGS). The leading reason for renal biopsy was nephrotic-range proteinuria, which was present in 46% of cases. The second most frequent reason for conducting a renal biopsy was sub-nephrotic range proteinuria in conjunction with hematuria.

Among the 23 SLE patients, the most prevalent histological pattern was class IV (34%), while classes III and V each accounted for 26% of the lupus patients. An overlap between class III and class V was observed in one individual. Out of 23 patients, 5 exhibited renal impairment, mostly related to class III and class IV histological patterns.

Here we present some observational studies which were done in our country.

Study Name	Author(s)	Results (Brief)
Histopathological Pattern of Glomerulonephritis	Samad T, Iqbal S, Haque WMM, Rahim MA, Haque HF	Mesangialproliferativeas primary and diabetic nephropathy as secondary observed commonly.
Pattern of Primary Glomerulonephritis	Ahmed PI, Zaman SU, Jahan F, Gupto RD, Chowdhury MN	Mesangioproliferative GN (27.3%), membranous GN (23.3%) found in primary glomerulonephritis cases.
Pattern of Glomerular Diseases among Adults in Rajshahi	Habib MA, Badruddoza SM	Common diseases: mesangioproliferative GN, lupus nephritis.
Histomorphological Pattern of Renal Biopsy	Islam MJI, Haque WS, Akhter S, Alam SMM	Various types of glomerulonephritis observed in renal biopsies.
Pattern of Glomerulonephritis	Gupta RD, Mamun AA, Morshed SM, Roy GC, Ahsan HMN	Findings: membranoproliferative GN, mesangioproliferative GN common.
Immunofluorescence Studies of Renal Biopsies	Das RK, Saleh AF, Kabir AN, Talukder SI, Kamal MI	Immunofluorescence studies found mesangioproliferative GN, membranous GN.
Clinicopathological Pattern and Outcome of Renal Diseases	Md. Ahsan Kabir et al.	Secondary glomerulonephritis, including lupus nephritis, commonly found.
Pattern of Glomerulonephritis in Mitford Hospital	Ahmed N, Mohosin M, Huda N	Proliferative GN, lupus nephritis found in kidney biopsy cases.
Renal Pathology in Adult Onset Idiopathic Nephrotic Syndrome	ISN Events, Tarik MH, Ekram ARMS, Haque MA et al.	Various glomerular diseases found in adult nephrotic syndrome cases.

Limitation:

1. Lack of electron microspic examination of renal tissue was a major drawback of the study.

2. Response to the treatment could not be evaluated as a lot of patients lost follow up.

Conclusion:

This research emphasizes important demographic and histopathological observations in individuals receiving kidney biopsies at Bangladesh Medical University. In recent years the number of biopsy proven FSGS is increasing day by day . It is necessary to continue ongoing observation of glomerular diseases all over the country to early detect changing trends in kidney pathology in Bangladesh. A national registry for renal biopsies should be established to accurately assess the shifts in the patterns of glomerulonephritis in the country. Careful through investigations are need to find out the causes of increasing number of FSGS in Bangladesh.

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