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PATTERN OF GLOMERULAR DISEASE IN BANGLADESH- A SINGLE CENTER STUDY AT TERTIARY CARE HOSPITAL

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ABSTRACT

Introduction: Glomerular disease is a leading cause of chronic kidney disease in developing countries as well as developed countries. In Bangladesh, prevalence of CKD and ESRD increasing mostly due to glomerulonephritis. Presentation of glomerular disease ranges from asymptomatic to life threatening acute complications. The prevalence of glomerular disease is different in various regions of the world. This study reflects pattern of glomerular disease and their clinicopathological and histological characteristics in Bangladeshi population. **Objective:** In this study our main goal is to Identify of Clinical and Histological pattern of glomerular disease can introduce earlier treatment and prevent chronic kidney disease and ESRD. **Methods:** This study has been conducted at department of nephrology, Shaheed Suhrawardy Medical College hospital from January 2017 to June 2018. 206 patients of glomerular disease included in the study with proteinuria >0.5gm/day or presence of RBC or RBC cast in urine and or renal impairment. Selected patients were evaluated with history, clinical examination and laboratory investigations. After taking consent renal biopsy was performed and histopathology (light microscopy and DIF) done by expert pathologist. Data were analyzed by using SPSS software. **Result:** Total 206 patients included in the study with mean age 34.5±14.13 years (13-70 years), female was predominant than male (61.5%). More than 50% of participant were less than 40 years of age. Most common presentation was edema (87.2%). Others were oliguria, hematuria, shortness of breath, hypertension, anemia, arthritis, skin rash, sore throat and features of renal failure. Histologically mesangial proliferative glomerulonephritis was more common variety among all (34.3%). Others were lupus nephritis (15%), membranoproliferative (MPGN) 12.1%, FSGS (11.6%), IgA nephropathy (5.8%), MCD (5.3%), membranous nephropathy (3.9%) and IgM nephropathy (2.9%). Histological diagnosis could not be performed remaining 8.7% of patient due inadequate sample or chronic sclerosing glomerulonephritis. Proteinuria varies in different type of glomerulonephritis with mean UTP 4.24±3.17 gm/day (0.5-19.7 gm/day). Renal impairment (serum creatinine >1.4 mg/dl) was found to be 50.49% (104) cases. More than 50% of patient with mesangial proliferative, membranoproliferative glomerulonephritis, FSGS, Membranous Nephropathy, Lupus Nephritis and IgA Nephropathy had renal impairment. **Conclusion:** Presentation of glomerulonephritis ranges from asymptomatic to chronic kidney disease. Early histological diagnosis is essential for management of glomerular disease to prevent CKD and other complications. The result of this study may helpful for treatment of glomerulonephritis and reduce glomerulonephritis related complications as well as prevent chronic kidney disease in our country.

KEYWORDS: Glomerular, oliguria, hematuria, chronic kidney disease.

INTRODUCTION

Many diseases affect kidney function by attacking the glomeruli, the tiny units within the kidney where blood is cleaned. Glomerular diseases include many conditions with a variety of genetic and environmental causes, but they fall into two major categories such as, Glomerulonephritis describes the inflammation of the membrane tissue in the kidney that serves as a filter, separating wastes and extra fluid from the blood. Whereas Glomerulosclerosis describes the scarring or hardening of the tiny blood vessels within the kidney.

Although glomerulonephritis and glomerulosclerosis have different causes, they can both lead to kidney failure.[1]

Glomerular disease associated with wide variety of biochemical disturbance and pathophysiological

alteration in human body.[2,3,4] These are the leading cause of end stage renal disease globally.[5] The prevalence of glomerular disease is different in various regions of the world and varies depending on the race, age, geographical, etiological, cultural and economic characteristics.[6] Recent studies suggested a changing pattern of incidence of GN in different parts of the world.[7] It constitutes an important cause of morbidity and mortality which imposes a considerable burden on the already sustained health services in developing countries.[8] As glomerular disease is a common cause of end stage renal disease it comprises 25-45% cases of ESRD in developing nations, including Bangladesh.[9] The pattern of glomerular disease is not well documented in Bangladesh. Glomerulonephritis may be primary or unknown etiology and secondary due to infection, connective tissue disease like SLE, Anti-GBM disease, ANCA associated vasculitis. Glomerulonephritis presented as nephrotic syndrome, acute nephritic illness, asymptomatic proteinuria, asymptomatic hematuria, RPGN, chronic kidney disease.[3] Kidney biopsy has been established to be a valuable laboratory method for clinical evaluation and management of patients with undiagnosed kidney disease.

In this study we performed a hospital based study aiming to determine the pattern of glomerular disease among Bangladeshi population.

AIMS AND OBJECTIVES

- Identification of Clinical and Histological pattern of glomerular disease can introduce earlier treatment and prevent chronic kidney disease and ESRD.

General objective

- To identify histological Pattern of Glomerular disease in Bangladesh.

Specific objective

- To evaluate demographic profile of Glomerular disease.
- To determine the Clinical presentation of Glomerulonephritis.
- To assess the Histological Pattern of Glomerular Disease.

METHODOLOGY

Study type

- This study was cross sectional study.

Study place and period

- This study was carried out at department of nephrology, Shaheed Suhrawardy Medical College hospital from January 2017 to June 2018.

Study population

- All suspected patient of glomerulonephritis included in the study following fulfilment of inclusion and exclusion criteria where 206 patients included as a sample size.

Method

Study parameter included age, sex, occupation, marital status, presenting symptoms, general examination of the patient, relevant laboratory investigation including complete blood count, urine routine and microscopic examination, 24 hours urinary total protein excretion, serum creatinine, serum electrolytes, serological markers for hepatitis B and C, antibody against the human immunodeficiency virus (HIV), serological and immunological studies for some autoimmune diseases, ultrasonography of kidney ureter and bladder, renal histopathology.

Renal tissue was obtained by percutaneous biopsy using a tru cut needle under ultrasound guidance in all patients.

Two kidney biopsy cores were taken from each patient for light microscopy and immunofluorescence technique. Biopsy specimens containing four or more glomeruli were considered adequate.[9] For light microscopy, samples were fixed in 10% formaldehyde solution and the sections were stained with hematoxylin and eosin, periodic acid Schiff (PAS), and silver methenamine. Masson Trichrome and congo-red stains were used whenever required. For immunofluorescence study sample were taken in normal saline and panel included staining for IgA, IgG, IgM, C3, C1q, and fibrinogen. Electron microscopy study was not available for diagnostic purposes in our country. All specimens were studied by an experienced histopathologist. Repeat biopsy was performed for those with inconclusive reports or inadequate sampling. WHO Classification for histological pattern of glomerular disease were used.

Data analysis

Data will be entered, cleaned and analyzed using statistical methods (SPSS). All data presented with mean, percentage and range. Compare between groups will done by students t test for categorical variable or x2 test for non-categorical variable. Risk factors and association analysis will be done by Pearson's correlations and univariate or multivariate regression analysis. In all cases P value less than 0.05 counted as significant.

RESULTS

We have included 206 patients in our study. 61.5% (126) were female and 79.2% (181) were married. The following figure is given below in detail:

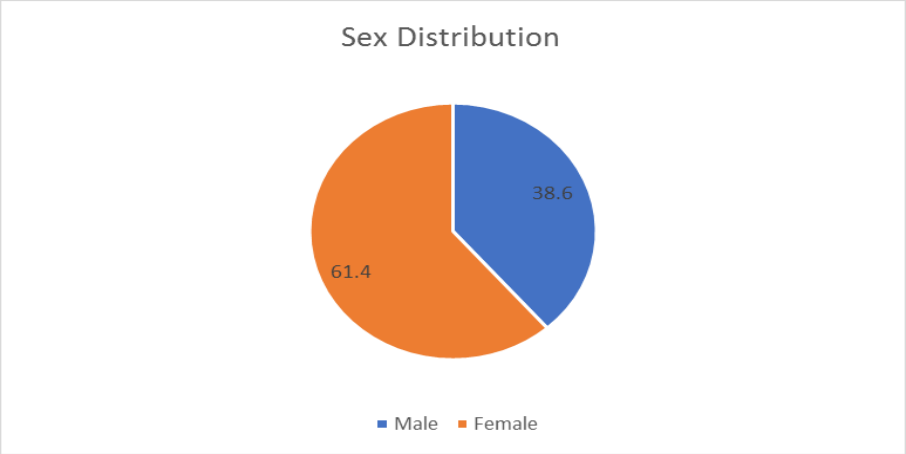

Figure 1: Distribution of patient according to sex.

In figure-1 shows distribution of the patients according to occupational status where most of the patients were house wife and students by profession. Where as service holder cases were less amount noted. The following figure is given below in detail:

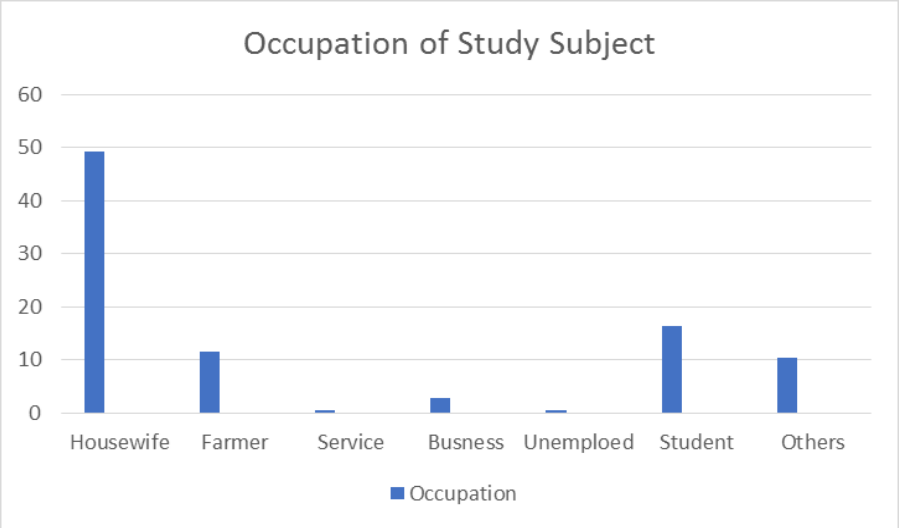

Figure 2: Distribution of patient according to occupation.

In figure-3 shows marriage status of the patients where majority were unmarried, 79.2%. The following figure is given below in detail:

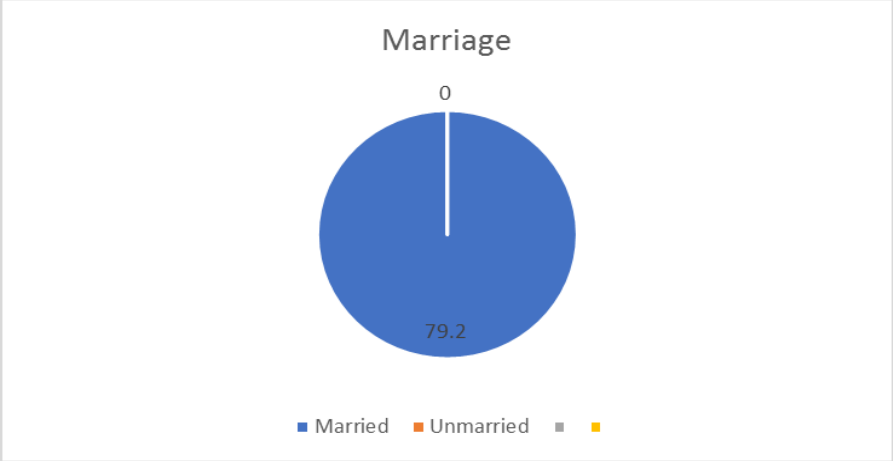

Figure 3: Distribution of patient according to marital status.

In table-1 shows clinical presentation of the patients where most common presentation was edema (87.4%), followed by 22.7% were oliguria, 29.5% were fever, 37.7% were anemia, 50.49% were renal failure was commonly seen. The following g table is given below in detail:

Table 1: Clinical presentation of study population.

Presentations	Numbers	Percentages %
Edema	181	87.4
Oliguria	47	22.7
Fever	61	29.5
Respiratory distress	5	2.5
Sore throat	2	1.4
Rash	19	9.2
Arthritis	27	13.5
Anemia	77	37.7
Hypertension	78	38.2
Renal failure	104	50.49

In table-2 shows pattern of glomerular disease on the basis of histology where 34.3% cases were Mesangial Proliferative GN besides that Lupus Nephritis seen in 15% cases and Membranoproliferative GN seen in 12% cases. The following table is given below in detail:

Table 2: Pattern of glomerular disease on the basis of histology.

Histology	Numbers	Percentages
MCD	11	5.3
FSGS	24	11.6
Membranous	8	3.9
Membranoproliferative GN(MPGN)	25	12.1
Mesangial Proliferative GN(MesPGN)	71	34.3
Lupus Nephritis (LN)	31	15.00
IgA Nephritis	12	5.8
IgM Nephritis	6	2.9
Non specific /inadequate sample	18	8.7
Total	206	

In table 3- shows the status of blood pressure according to histological pattern where According to blood pressure status more than 50% were hypertensive in patient having of FSGS, MPGN, MesPGN and LN. The following table is given below in detail:

Table 3: Status of blood pressure according to histological pattern.

Histology	Hypertensive	Non-hypertensive	Total
MCD	3	8	11
FSGS	12	12	24
MGN	1	7	8
MPGN	15	10	25
MesPGN	25	46	71
LN	16	15	31
IgA	2	10	12
IgM	2	4	6

In table-4 shows the status of anemia according to histological pattern. More than 50% of patient with MCD, FSGS, MPGN, MesPGN, LN and IgA glomerulonephritis were anemic. The following table is given below in detail:

Table 4: Status of anemia according to histological pattern.

Histology	Anaemia	Normal	Total
MCD	5	6	11
FSGS	6	11	24
MGN	0	8	8

MPGN	18	7	25
MesPGN	22	49	71
LN	17	14	31
IgA	7	5	12
IgM	1	5	6

In table-5 shows frequency of histological pattern of glomerular disease according to age group. Common age of MCD was 10-20 years (6/11), in case of FSGS more than 50% presented in 21-40 years, membranous glomerulonephritis mostly presented in 21-40 years of age, in case of membranoproliferative glomerulonephritis age of presentation was 21-50 years, mesangial proliferative glomerulonephritis presented in all age group mostly in 10-50 years, lupus nephritis patients present mostly in 10-40 years, IgA presented in 10-50 years age and IgM presented in 10-30 years of age. The following table and figure is given below in detail:

Table 5: Frequency of histological pattern of glomerular disease according to age group.

Histology	10-20	21-30	31-40	41-50	51-60	60+	Total
MCD	6	2	3	0	0	0	11
FSGS	2	10	4	3	2	3	24
MN	1	2	4	0	0	1	8
MPGN	1	8	6	7	1	2	25
MesPGN	10	22	17	13	5	4	71
LN	9	13	7	2	0	0	31
IgA	2	2	2	4	0	2	12
IgM	2	3	0	0	1	0	6
Total	33	62	43	29	9	12	188

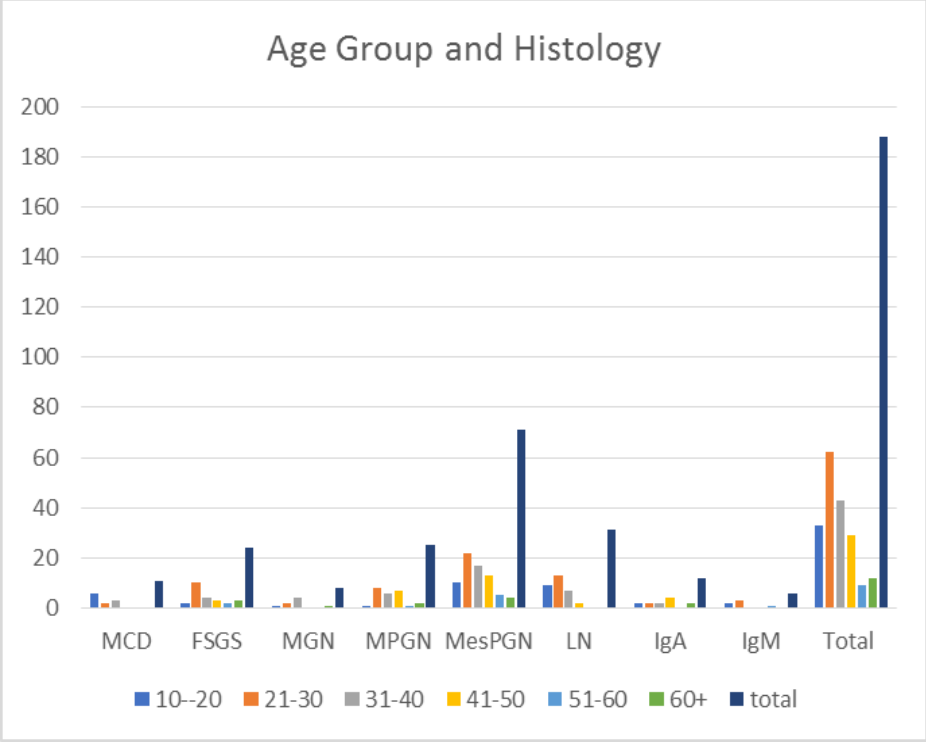

Figure 4: Frequency of histological pattern of glomerular disease according to age group.

In table 6 shows frequency of histological pattern of glomerular disease according to level of proteinuria. Where Proteinuria different in different type of glomerulonephritis, MCD 2-3gm/day, FSGS .5-10gm/day >50% had >3gm/day, MN 3-10gm/day mostly >5gm/day, MPGN .5-10gm/day >50% had 2-10gm/day, MesPGN > 50% had >3gm and >16% had >10gm/day, Lupus nephritis had .5-10 gm/day>50% had <3gm/day, Ig A 2-10gm/day, one patient had 10gm/day and IgM >5gm/day mostly /10gm. The following table is given below in detail:

Table 6: Frequency of histological pattern of glomerular disease according to level of proteinuria.

Histology	.5-1gm	1.1-2gm	2.1-3gm	3.1-5gm	5-10gm	>10gm	Total
MCD	0	1	3	0	0	0	11
FSGS	3	3	1	6	8	3	24
MN	0	0	0	2	5	1	8
MpGN	1	6	3	6	3	4	25
MesPGN	1	17	7	13	15	12	71
LN	6	9	5	4	3	0	31
IgA	0	0	3	3	3	1	12
IgM	0	0	0	0	2	4	6
Total	11	36	22	34	39	25	188

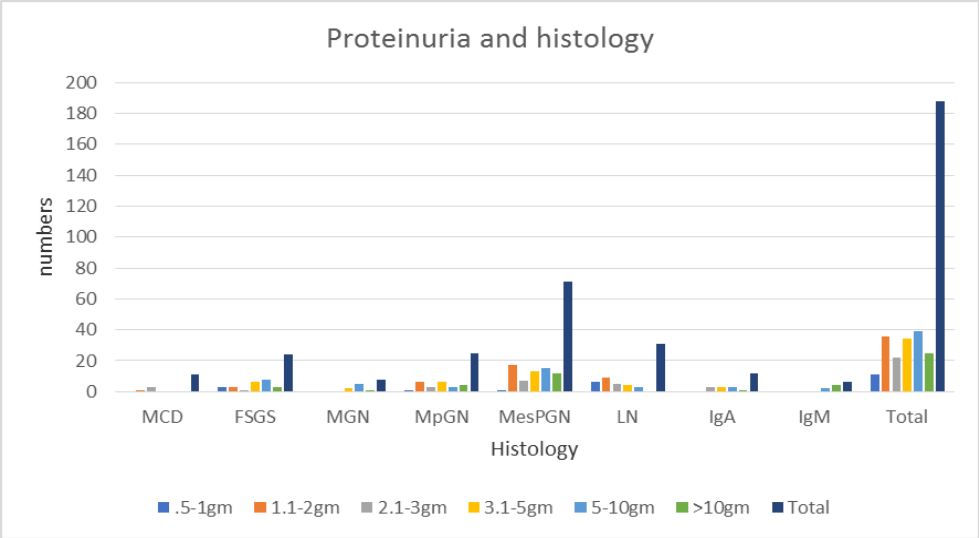

Figure 5: Frequency of histological pattern of glomerular disease according to level of proteinuria.

DISCUSSION

According to sex distribution female (61.5%) were more than male. Habib & Badruddoza had shown female were predominant (60%) in their study population. In another study done by Mohammod et al had also shown that male female ratio (50.6:49.4) was almost equal in that study. Where as another Habib et al found their study that of these, 38 (40%) were males and 57 (60%) were females, with a male to female ratio of 1:1.5.[9] Which is similar to our study.

In this study age of study population ranges from 13-70 years and mean was 34.5+_14.13. Parvez et al[10] shown in their study, age range was 18-70 years (mean age 32.94+_12.66). Pankaj beniwal et al also observed age range was 12-70 years (mean 30.34+_7.04). Both study is consistent with present study.

Clinically edema was most common presentation in this study population followed by hypertension, anemia, oliguria, hematuria. Irneet Mundi et al[11] recorded most common presentation was nephrotic syndrome (generalized edema) and others are hypertension, hematuria etc. In another study Habib & Badruddoza has shown that most patient presented with nephrotic syndrome followed by hypertension, hematuria and renal failure. Besides that, study done by Hossen et al also found 59.1% cases of nephrotic syndrome as a clinical presentation.[12] That means all cases quite similar to our study.

On the basis of histology, proliferative glomerulonephritis was frequently found (mesangial proliferative 34.3%, lupus nephritis 15%, membranoprloiferative 12.1%, IgA nephropathy 5.8%) in this current study. Non proliferative glomerulnephritis comprises FSGS 11.6%, MCD 5.3%, MN 3.9%, IgM 2.9% and others 8.7%. Habib & Badruddza done a study at northern site of Bangladesh. Most of their patient diagnosed prliferative glomerulnephritis (mesangial proliferative 45.2%, IgA 6.6%, LN 6.6%, MPGN 3% and crescentic 3%. Another study done by Parvez et al at central part of Bangladesh and had shown that most histological pattern of study population was also proliferative glomerulonephritis (mesangioproliferative 27%, membranoproliferative 11.5%, IgA 11.5%, Chronic sclerosing 9.7% and RPGN 2%). Non proliferative are MN 22.12%, MCD 10.61%, FSGS 7.96%.

Renal impairment was found (S. creatinine >1.4 mg/dl)50.49% of study population in this present study. It has been observed that more than 50% of patient having mesangial proliferative, membranoproliferative, FSGS, MN, lupus nephritis and IgA nephropathy had renal impairment. Habib & Badruddoza observed that 2.11% of their study population had renal failure.

CONCLUSIONS

206 patients included in our study with Mean age 34.5±14.13 years, 60.9% were female, 49.35% were married. Mesangial proliferative glomerulonephritis was most common histological pattern (34.9%), others were FSGS, MPGN, MCD, MGN, LN, IgA nephropathy, IgM nephropathy. Among study population mean UTP 4.24±3.17 gm/day and serum creatinine 2.002 mg/dl.

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