Review of Renal Biopsies, A Single Center Experience

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No large study has been conducted on biopsy-proven nephropathies. Our aim was to report clinical and pathological pattern of kidney disease diagnosed by kidney biopsy in our center.
This is a retrospective study on kidney biopsy during 7 years; we analyzed the results of kidney biopsies and their clinical data. Data were analyzed by SPSS 18.0 and a $P < .05$ was considered.
In 1355 kidney biopsies (55.7% women, age = 33.2 ± 16.4), primary glomerulonephritis (GN) was the main feature (57.1%). The most common presentation was asymptomatic urine abnormality (32.3%). Lupus nephritis (24.5%), membranous GN (17.0%), and focal segmental glomerulosclerosis (13.9%) were the most frequent diagnosis.
This study highlights the histopathological patterns of kidney disease in southern Iran. lupus nephritis, membranous GN, and focal segmental glomerulosclerosis are currently the three major diseases. These results have an important role in organizing renal health plans as an initial phase in our population.

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Special Report

INTRODUCTION

Clinical and pathologic data about kidney disease provides important information.[1-5] Some studies of renal diseases in Western countries are existing from kidney biopsy registries.[6] Several kidney biopsy registries in some countries are available, showing comparable trends in incidence and prevalence of kidney diseases.[7-8] In contrast, few reports provide detailed data for kidney diseases in the Middle East.[6] The essential of kidney disease studies is felt in other regions due to kidney diseases differences in various regions that may arise from the diversity in prevalence of infectious diseases, social/economic status in indication for biopsy, environmental exposure, and socio-economic status.[1-6,9]

In previous papers, we have described a high frequency of chronic kidney disease and dialysis population in our center among different age groups.[10-12] There is a lack of systematic data of renal disease from our country over a long period of time that indicated the needs and usefulness of these studies in this regard.

The aim of this study was to describe the clinical and histopathological patterns of kidney disease diagnosed by kidney biopsy during a period of 7 years in Fars province, Sothern Iran.

MATERIALS AND METHODS

General Data

This is a retrospective study that was performed on renal diseases in native kidneys diagnosed by a biopsy since January of 2011 to December of 2017, from the center of nearly 5 million people, from Fars province, Sothern Iran, by the same pathologist, including the available clinical, laboratorial and histological parameters. A total of 1355 renal biopsies were performed.

Histopathological Data

Biopsies were evaluated by light microscopy and/or electron microscopy (EM). All biopsy

samples were evaluated by light microscopy; EM was used at the discretion of the pathologist (in 43.8% of cases). Almost all of the electron biopsies (99.6%) were reported by only one pathologist and 85.0% of the light biopsies by the only one pathologist. Renal diseases were divided into five categories: primary glomerulonephritis (PGN), secondary glomerulonephritis (SGN), global sclerosis as ESRDs, tubular nephropathies, and unclassified (normal tissue, inadequate sampling, or non-diagnosed biopsies). PGN consisted of minimal change disease (MCD), focal segmental glomerulosclerosis (FSGS), crescent GN, membranoproliferative GN (MPGN), mesangioproliferative GN (MsPGN), IgA nephropathy (IgAN), membranous GN (MGN), acute necrotizing GN, global and segmental GN, diffuse active proliferative GN, and mesangial cell proliferation. SGN involved amyloidosis, post-streptococcal GN (PSGN), alport, post infectious GN (PIGN), hemolytic uremic syndrome, henoch-Schonlein purpura, diabetic nephropathy (DN), lupus nephritis (LN), and mesangial sclerosis. Tubular diseases included chronic tubulointerstitial nephritis (TIN), acute TIN, acute tubular necrosis, acute and chronic TIN, and oxalosis.

Clinical Data

According to the patient's data before renal biopsy in our center, we considered following category for assessing our patient's symptom before renal biopsy as; asymptomatic urine abnormality (serum Cr ≤ 1.3 and hematuria or 500 < proteinuria 24h > 3500), acute kidney injury (AKI) (serum Cr ≥ 1.3 and proteinuria 24h ≤ 500), nephritic (serum Cr ≥ 1.3 and hematuria or 500 < proteinuria 24h > 3500), nephrotic (serum Cr < 1.3 and proteinuria 24h ≥ 3500), nephrotic and nephritic (serum Cr ≥ 1.3 and proteinuria 24h ≥ 3500), advanced renal insufficiency (serum Cr ≥ 3, that may overlap with other groups). Patients were classified as ≤ 30 years, 31-45 years, 46-60 years, and > 60 years of age. The study was approved by the Ethics Committee of Shiraz University of Medical Sciences.

Statistical Analysis

Data were analyzed using Statistical Package for the Social Sciences software version 18.0 (SPSS Inc. Chicago, IL). Qualitative data were expressed as number and percentage. Quantitative data presented as mean and standard deviation. A *P* value of less than .05 was considered as statistically significant.

RESULTS

Over the 7-year study, 1355 kidney biopsies (55.7% women, mean age 33.2 ± 16.4) were performed with a diagnosis of PGN (774 cases, 57.1%), SGN (28.9%, 392 cases), tubular diseases (4.1%, 56 cases), global sclerosis (5.9%, 80 cases), and unclassified group (4.0%, 53 cases). LN (24.5%), MGN (17.0%), and FSGS (13.9%) were the most frequent diagnosis (Table 1).

Kidney Biopsy Diagnosis Based on Gender

The gender differed among groups ($P < .001$); SGN (82.1%, 322 cases) and tubular diseases (58.9%, 33 cases) were predominant in women. However PGN (55.9%, 433 cases) and global sclerosis (58.8%, 47 cases) were more common in men. Totally, among men the most diagnosis was MGN (148 cases, 24.7%) and FSGS (109 cases, 18.2%) but LN (293 cases, 38.8%), and MGN (83 cases, 11.0%) was higher among women.

Kidney Biopsy Diagnosis Based on Age

Age distribution was different ($P < .001$), the most common diagnosis in < 45 years old group was LN (299 cases, 55.6%). MGN (86 cases, 59.9%) was the most common diagnosis among 46-60 years. Upper and lower age limits at the biopsy, was seen in amyloidosis (55.2 ± 19.7 years) and oxalosis (1.0 ± 0.0 years) (Table 2).

Histopathological Data

Primary GN. It was the predominant histopathological feature in our report (774 cases, 57.1%). Most of them presented with nephrotic syndrome (280 cases, 36.2%). MGN (231 cases, 17.0%) and FSGS (188 cases, 13.9%) were the main causes (Table 3).

Secondary GN. It contained 28.9% of our patients (392 cases) with LN as the most common disease (332 cases, 24.5%). Although routinely DN patients did not do kidney biopsy in our centers, DN was in the second place (20 cases, 1.5%). Most of them presented with the nephrotic syndrome (164 cases, 41.8%).

Global Sclerosis. About 6.0% of our reports (80

Table 1. Distribution of the Histological Pattern of Kidney Disease Diagnosis According to the Symptoms Presentation Among the Studied Patients

Diagnosis, n (%)	Total** (n = 1355)	Symptoms Presentation++					
		Asymptomatic Urine Abnormality (n = 437)	Acute Kidney Injury (n = 110)	Nephrotic (n = 381)	Nephritic (n = 309)	Nephrotic & Nephritic (n = 118)	Advanced Renal Insufficiencyα (n = 218)
Primary	774 (57.1)	249 (32.2)	33 (4.3)	280 (36.2)	132 (17.1)	80 (10.2)	91 (11.7)
Minimal Change Disease	58 (4.3)	12 (20.7)	0	34 (58.7)	6 (10.3)	6 (10.3)	2 (3.4)
FSGS	188 (13.9)	52 (27.6)	2 (1.1)	74 (39.4)	36 (19.1)	24 (12.8)	24 (12.8)
Crescent GN+	27 (2.0)	0 (0.0)	8 (29.6)	0	15 (55.6)	4 (14.8)	20 (74.1)
Membranoproliferative GN+	57 (4.2)	20 (35.1)	0	10 (17.5)	18 (31.6)	9 (15.8)	6 (1.1)
Mesangioproliferative GN+	128 (9.5)	72 (56.3)	4 (3.1)	24 (18.7)	16 (12.5)	12 (9.4)	8 (6.3)
IgA nephropathy	11 (0.8)	9 (81.8)	0	2 (18.2)	0	0	0
Membranous GN+	231 (17.0)	63 (27.3)	0	135 (58.4)	11 (4.8)	22 (9.5)	6 (2.6)
Acute Necrotizing GN+	20 (1.5)	0	8 (40)	0	9 (45.0)	3 (15.0)	12 (60.0)
Global and Segmental GN+	44 (3.2)	15 (34.1)	11 (25)	0	18 (40.9)	0	10 (22.7)
Diffuse Active Proliferative GN+	7 (0.5)	3 (42.4)	0	1 (14.2)	3 (42.9)	0	3 (42.9)
Mesangial Cell Proliferation	3 (0.2)	3 (100.0)	0	0	0	0	0
Secondary	392 (28.9)	164 (41.8)	10 (2.6)	96 (24.5)	90 (22.9)	32 (8.2)	38 (9.7)
Amyloidosis	15 (1.1)	0	0	6 (40.0)	3 (20.0)	6 (40.0)	3 (20.0)
Post-streptococcal GN+	3 (0.2)	0	0	0	3 (100.0)	0	0
Alport	4 (0.3)	4 (100.0)	0	0	0	0	0
Post Infectional GN+	3 (0.2)	3 (100.0)	0	0	0	0	0
Hemolytic Uremic Syndrome	7 (0.5)	2 (28.6)	2 (28.6)	0	3 (42.8)	0	5 (71.4)
Henoch-Schonlein Purpura	5 (0.4)	5 (100.0)	0	0	0	0	0
Diabetic Nephropathy	20 (1.5)	6 (30.0)	0	8 (40.0)	3 (15.0)	3 (15.0)	3 (15.0)
Lupus Nephritis	332 (24.5)	144 (43.4)	8 (2.8)	79 (23.8)	78 (23.5)	23 (6.9)	27 (8.1)
Mesangial Sclerosis	3 (0.2)	0	0	3 (100.0)	0	0	0
Tubular	56 (4.1)	0	27 (48.2)	0	29 (51.8)	0	26 (46.4)
Chronic TIN*	11 (0.8)	0	8 (72.7)	0	3 (27.3)	0	0
Acute TIN*	33 (2.5)	0	14 (42.4)	0	19 (57.6)	0	17 (51.5)
Acute Tubular Necrosis	7 (0.5)	0	0	0	7 (100.0)	0	4 (57.1)
Acute and Chronic TIN*	3 (0.2)	0	3 (100)	0	0	0	3 (100.0)
Oxalosis	2 (0.1)	0	2 (100)	0	0	0	2 (100.0)
Global Sclerosis	80 (5.9)	6 (7.5)	20 (25.0)	0	50 (62.5)	4 (5.0)	49 (61.3)
Unclassified	53 (4.0)	18 (34.0)	20 (37.7)	5 (9.4)	8 (15.1)	2 (3.8)	14 (26.4)

GN+: glomerulonephritis, *TIN: tubulointerstitial nephritis, **: Percentages were calculated in columns, ++: Percentages were calculated in rows, α: Cases may overlap with other groups.

cases) were globally sclerotic and most of them presented with nephritic syndrome (50 cases, 62.5%).

Tubular Disease. It contained 4.1% of our patients (56 cases), and nephritic syndrome was the most presentation (29 cases, 51.8%). Acute TIN was the most common feature (2.4%).

Unclassified Group. In addition, 3.9% of our patients (53 cases) were in the unclassified group that AKI (20 cases, 37.7%) was the most presentation among them.

Clinical Data

About 18% of our patients had a history of hypertension. The mean serum BUN and Cr levels were 30.5 ± 27.5 and 1.9 ± 2.2, respectively. Mean 24-hour urine proteinuria was 3326.7 ± 3480.8 mg. Hematuria was seen in 58.5% and nearly all patients with IgAN, acute necrotizing GN, PSGN, PIGN, and Alport syndrome had hematuria. Also, asymptomatic urine abnormality and nephrotic syndrome were the most common presentations (437 cases, 32.3% and 381 cases, 28.1%; respectively).

Lupus Nephritis. LN (24.5%, 332 cases) was the most frequent diagnosis in our study. The mean age of patients was 30.0 ± 10.7 at the disease initiation. LN was most seen in < 30 years old (62.3%, 207 patients). The majority of them were women (293 patients, 88.3%) and mostly presented

Table 2. Distribution of the Histological Pattern of Kidney Disease Diagnosis According to the Age Groups Among the Studied Patients

Diagnosis	Age (Mean ± SD)	Age groups, n (%)				
		< 30 Years (n = 679)	31-45 Years (n = 366)	46-60 Years (n = 237)	> 60 Years (n = 73)	Total
Primary	33.9 ± 17.5	356 (46.0)	222 (28.7)	144 (18.6)	52 (6.7)	774 (100.0)
Minimal Change Disease	26.4 ± 17.0	33 (56.9)	13 (22.4)	12 (20.7)	0	58 (100.0)
FSGS	30.4 ± 18.6	96 (51.1)	55 (29.2)	28 (14.9)	9 (4.8)	188 (100.0)
Crescent GN+	29.5 ± 16.8	18 (66.7)	3 (11.1)	4 (14.8)	2 (7.4)	27 (100.0)
Membranoproliferative GN+	33.4 ± 20.0	33 (57.9)	14 (24.6)	2 (3.5)	8 (14.0)	57 (100.0)
Mesangioproliferative GN+	32.1 ± 17.8	65 (50.8)	30 (23.5)	25 (19.5)	8 (6.2)	128 (100.0)
IgA Nephropathy	26.7 ± 8.6	7 (63.6)	4 (36.4)	0	0	11 (100.0)
Membranous GN+	41.2 ± 15.1	70 (30.3)	75 (32.5)	61 (26.4)	25 (10.8)	231 (100.0)
Acute Necrotizing GN+	38.3 ± 14.1	7 (35.0)	6 (30.0)	7 (35.0)	0	20 (100.0)
Global and Segmental GN+	31.4 ± 11.8	22 (50.0)	19 (43.2)	3 (6.8)	0	44 (100.0)
Diffuse Active Proliferative GN+	23.0 ± 17.2	5 (71.4)	0	2 (28.6)	0	7 (100.0)
Mesangial Cell Proliferation	42.0 ± 0.0	0	3 (100.0)	0	0	3 (100.0)
Secondary	30.6 ± 13.2	236 (60.2)	102 (26.0)	45 (11.5)	9 (2.3)	392 (100.0)
Amyloidosis	55.2 ± 19.7	3 (20.0)	0	7 (46.7)	5 (33.3)	15 (100.0)
Post-streptococcal GN+	18.0 ± 0.0	3 (100.0)	0	0	0	3 (100.0)
Alport	21.5 ± 11.0	2 (50.0)	2 (50.0)	0	0	4 (100.0)
Post Inflectional GN+	23.0 ± 0.0	3 (100.0)	0	0	0	3 (100.0)
Hemolytic Uremic Syndrome	7.0 ± 4.1	7 (100.0)	0	0	0	7 (100.0)
Henoch-Schonlein Purpura	16.0 ± 0.0	5 (100.0)	0	0	0	5 (100.0)
Diabetic Nephropathy	43.5 ± 13.1	3 (15.0)	8 (40.0)	7 (35.0)	2 (10.0)	20 (100.0)
Lupus Nephritis	30.0 ± 10.7	207 (62.3)	92 (27.7)	31 (9.2)	2 (0.6)	332 (100.0)
Mesangial Sclerosis	4.0 ± 5.2	3 (100.0)	0	0	0	3 (100.0)
Tubular	28.8 ± 20.9	36 (64.3)	7 (12.4)	10 (17.9)	3 (5.4)	56 (100.0)
Chronic TIN*	28.6 ± 28.5	8 (72.7)	0	0	3 (27.3)	11 (100.0)
Acute TIN*	31.6 ± 20.2	18 (54.5)	5 (15.2)	10 (30.3)	0	33 (100.0)
Acute Tubular Necrosis	20.7 ± 4.5	7 (100.0)	0	0	0	7 (100.0)
Acute and Chronic TIN*	36.0 ± 12.1	1 (33.3)	2 (66.7)	0	0	3 (100.0)
Oxalosis	1.0 ± 0.0	2 (100.0)	0	0	0	2 (100.0)
Global Sclerosis	38.3 ± 14.5	34 (42.4)	17 (21.3)	24 (30.0)	5 (6.3)	80 (100.0)
Unclassified	37.7 ± 15.0	17 (32.1)	18 (34.0)	14 (26.4)	4 (7.5)	53 (100.0)

GN+: glomerulonephritis, *TIN: tubulointerstitial nephritis

with asymptomatic urine abnormality (43.4%, 144 cases) and nephrotic syndrome (23.8%, 79 cases).

Membranous Glomerulonephritis. It was the second diagnosis in our patients (17.0%, 231 cases), with mean age of 41.2 ± 15.1 years at the disease initiation. The majority of them had 31 to 45 years old (32.5%, 75 patients) and 64.1% (148 cases) were men, mostly presented with nephrotic syndrome (58.4%, 135 cases) and asymptomatic urine abnormalities (27.3%, 63 cases).

Focal Segmental Glomerulosclerosis. The third most frequent diagnosis was FSGS (13.9%, 188 cases). The mean age of patients was 30.4 ± 18.6 years at the disease initiation and most of the patients were < 30 years old (51.1%, 96 patients). The majority of them were men (109 patients, 58.0%), presented with nephrotic symptoms (39.4%, 74 cases) and asymptomatic urine abnormalities (27.7%, 52 cases).

DISCUSSION

The current study showed the result of renal biopsies at Fars province, Iran. The main findings of this study include: (a) the most common diagnosis was LN followed by MGN, and FSGS that mostly diagnosed at < 45 years old, (b) LN was more common in women but MGN and FSGN were more frequent in men, (c) Most of LN, presented with asymptomatic urinary abnormalities, while MGN and FSGS mostly presented with nephrotic syndrome, and (d) the most common presentation was asymptomatic urinary abnormalities and nephrotic syndrome.

The results showed that the patterns of

Table 3. Distribution of Histological Pattern of Kidney Disease Diagnosis According to Basic Data Among the Studied Patients

Diagnosis/Basic data n (%), Mean ± SD	Hypertension	Hematuria	Cr**	BUN++	24h Protein
Primary					
Minimal Change Disease	5 (8.6)	26 (44.8)	1.0 ± 0.6	17.3 ± 8.8	4160.2 ± 1884.6
FSGS	24 (12.8)	93 (49.5)	1.5 ± 1.5	26.4 ± 20.0	3828.1 ± 2299.1
Crescent GN+	8 (29.6)	23 (85.2)	4.7 ± 2.4	65.8 ± 29.5	1696.2 ± 1631.5
Membranoproliferative GN+	12 (21.1)	52 (91.2)	1.8 ± 1.3	29.1 ± 19.6	3583.6 ± 2991.5
Mesangioproliferative GN+	18 (14.1)	69 (53.9)	1.5 ± 2.3	21.2 ± 24.2	2775.2 ± 2119.9
IgA Nephropathy	4 (36.4)	11 (100.0)	0.8 ± 0.2	13.1 ± 3.1	1600.0 ± 1672.6
Membranous GN+	49 (21.2)	115 (49.8)	1.1 ± 0.9	16.6 ± 10.1	4620.3 ± 2512.6
Acute Necrotizing GN+	1 (5.0)	20 (100.0)	3.4 ± 1.6	59.1 ± 23.0	1611.7 ± 2256.5
Global and Segmental GN+	27 (61.4)	24 (54.5)	2.2 ± 1.6	26.7 ± 15.4	1211.7 ± 733.2
Diffuse Active Proliferative GN+	0 (0.0)	5 (71.4)	6.6 ± 8.7	74.7 ± 43.1	2025.3 ± 1732.7
Mesangial Cell Proliferation	0 (0.0)	0	0.7 ± 0.0	21.0 ± 8.0	1700.0 ± 0.0
Secondary					
Amyloidosis	5 (33.3)	7 (46.7)	2.1 ± 1.5	29.8 ± 24.5	6230.0 ± 2154.2
PSGS***	0 (0.0)	3 (100.0)	1.4 ± 0.0	15.0 ± 1.1	2877 ± 0.0
Alport	2 (50.0)	4 (100.0)	0.4 ± 0.0	15.0 ± 0.2	1600.0 ± 461.9
Post Infectional GN+	0 (0.0)	3 (100.0)	1.1 ± 0.0	23.0 ± 2.0	1500.0 ± 0.0
Hemolytic Uremic Syndrome	0 (0.0)	5 (71.4)	5.4 ± 3.1	122.2 ± 40.6	622.0 ± 38.3
Henoch-Schonlein Purpura	0 (0.0)	0	0.91 ± 0	16.0 ± 0.2	2500.0 ± 0.0
Diabetic Nephropathy	7 (35.0)	11 (55.0)	2.4 ± 3.2	21.7 ± 12.8	5611.6 ± 4329.5
Lupus Nephritis	43 (13.0)	225 (67.8)	1.6 ± 1.5	32.4 ± 25.2	3370.4 ± 5138.4
Mesangial Sclerosis	0 (0.0)	2 (66.7)	0.7 ± 0.2	25.6 ± 5.8	7250.0 ± 1082.5
Tubular					
Chronic TIN*	4 (36.4)	3 (27.3)	1.7 ± 0.3	27.5 ± 9.5	752.5 ± 690.9
Acute TIN*	3 (9.1)	18 (54.5)	4.2 ± 2.4	56.1 ± 29.7	654.3 ± 533.9
Acute Tubular Necrosis	0 (0.0)	4 (57.1)	5.9 ± 3.8	76.8 ± 42.8	1137.9 ± 441.2
Acute and Chronic TIN*	1 (33.3)	2 (66.7)	3.5 ± 0.4	42.0 ± 6.9	350.0 ± 0.0
Oxalosis	0 (0.0)	2 (100.0)	10.4 ± 0	116.0 ± 12.0	400.0 ± 0.0
Global Sclerosis	25 (31.3)	41 (51.2)	4.2 ± 3.1	55.2 ± 40.0	2070.3 ± 3604.1
Unclassified	9 (17.0)	24 (45.3)	2.9 ± 3.5	30.1 ± 23.3	2075.3 ± 1584.2

GN+: glomerulonephritis, *TIN: tubulointerstitial nephritis, BUN++: blood urea nitrogen, Cr**: creatinine, PSGS***: post-streptococcal glomerulosclerosis

renal disease did not exactly correlate with the Western data and some of the Asian studies,[13] in Republic of Czech, IgAN and LN were the most frequent diagnosis among PGN and SGN cases, respectively.[14] Several studies in Spain showed that IgAN and MGN were the most frequent renal biopsy result (children: MCD, IgAN - adults: IgAN, LN - elderly: VAS, MGN).[4,15] Another study from Australia reported that the most common causes of GN were IgAN and FSGN (Children: LN, FSGS- Adults: IgA disease, FSGS- Elderly: IgAN, vasculitis).[16] In China, PGN and IgAN were the most frequent diagnosis. The most prevalent SGN was LN, and for the elderly patients with PGN, MGN was the most frequent diagnosis, but in SGN patients, vasculitis was the most frequent etiology.[17,18] In Italy, IgAN and MGN were the most frequent diagnosis.[5,19]. A German study reported that IgAN was the most common diagnosis in PGN and in SGN, autoimmune diseases dominated.[20] In China and Singapore, IgAN remains the most common GN.[21-22] A study from Romania reported that MPGN in PGN and dysgammaglobulinaemia GN in SGN were the most frequent findings.[1] The most common renal diagnosis in Southern Arizona was FSGS and MGN.[23] A similar study from Brazil showed that FSGS, MGN and IgAN were the most frequent diagnosis, respectively. FSGS in PGN and LN in SGN were the most frequent results.[2] The most common renal diagnosis in Hong Kong was LN and MCD.[24] In Jamaica, the most common histological findings were FSGS and LN.[24] MCD of PGN and LN in SGN were the most common renal diagnosis in India.[25-26] In a similar study carried out in Lebanon, the most common diagnosis was MsPGN and FSGS.[1,32].

LN was the most common pathology in Oman fallowed by FSGS.[17]

These reports demonstrated that LN was a common renal disease in Iran, Czech, Jamaica, and some Asian countries.[2,14,17,24-28] In addition, like ours, other similar studies revealed that MGN and FSGS were common in the studies conducted in Brazil, Southern Arizona, Oman, Jamaica, and Lebanon.[2,13,17,23,28] IgAN is common in European countries, some Asian countries as Japan, China, India, and Australia,[4,5,14-22,25,27] whereas it is not a common PGN in Iran. Differences in disease prevalence may mostly reflect regional differences in kidney biopsy practices. For example, because of the generally benign course of IgAN patients with isolated hematuria, a renal biopsy in our center is usually done only if there are signs suggestive of more severe or progressive disease as persistent protein excretion > 500 mg/d (which may increase over time) or an elevated serum Cr. Like some studies, we had a male predominance in all renal biopsies.[14,25,29] In accordance with most of the published studies, our results also showed LN was significantly dominant in female.[14-17,25]

In our study, the most common presentation was asymptomatic urine abnormality followed by nephrotic syndrome. A similar presentation was noted in few studies from Italy and Japan.[5,30] However, many studies across the world have shown nephrotic syndrome as the main clinical indication of the renal biopsy.[2,14,25,29]

LIMITATIONS OF THE STUDY

Lack of some information in this study, due to its retrospective nature, limits comparisons with other countries data.

CONCLUSION

Differences in diagnosis type reported from different parts of the world is difficult to explain, but this could be related to genetic, environmental, and socio-economic differences, renal biopsy indications, histological classification criteria, aging population, incidence of obesity, and diabetes. This study demonstrated that 3 major GN in Fars are LN, MGN, and FSGS. This is an initial step in understanding the renal disease in southern of Iran, provides important clues for further studies on the determinants of the risk factors of renal disease. Moreover, we need to develop a central renal biopsy records system to obtain perfect knowledge about the renal diseases.

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COMPLIANCE WITH ETHICAL STANDARDS

Conflict of Interest

The authors have declared no conflicts of interest.

Human and Animal Rights

All procedures in this study were in accordance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

Informed consent was obtained from all individuals.

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Authors' Contributions

Pakfetrat M: Contributed to idea and design, revised the manuscript, final approval, and accepts accountability for the overall work. Malekmakan L: Contributed to design, contributed to analysis, drafted the manuscript, final approval, and accepts accountability for the overall work. Torabi nezhad S: Contributed to design, contributed to data gathering, revised the manuscript, final approval, and accepts accountability for the overall work. Yousefi O and Naddaf fard D: Contributed to data collection, paper writing, revised the manuscript, final approval, and accepts accountability for the overall work.

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