

CHAPTER 1

Overview Of Renal Biopsy In Malaysia

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1.1: Introduction

The Malaysian Renal Registry of Renal Biopsy (MRRB) was introduced in 2005 to provide information on the incidence and prevalence of glomerular disease in Malaysia. Data submission includes both paediatric and adult renal biopsies performed from participating centres.

In the 1st MRRB Report 2007, the participating centres were only from the Ministry of Health (MOH) hospitals. The private, army and university hospitals participated in data submission from year 2008 onwards.

This 5th MRRB Report shows data for renal biopsies done in year 2011-2012. Data for year 2005-2010 were included for comparison in the report.

1.2: Type of renal biopsy performed

1.2.1: Ascertainment rate of total biopsy performed

A total of 45 centres participated in this MRRB report; 23 (15 adult and 8 paediatric) Ministry of Health (MOH) hospitals, 3 Universities, 1 army hospital and 18 private hospitals. All participating centres were identified by their individual source document provider (SDP) number. Although there were no new centres reporting to MRRB since 2010 the total number of biopsies performed had increased from 1538 in 2010 to 1733 in 2011 and 1761 in 2012 (Table 1.2.1).

It is encouraging to note that there appeared to be also a progressive improvement in the ascertainment rate. The average ascertainment rate for 2005-2010 was 72.1% while the ascertainment rate for 2011 was up to 90% and further increased to 95% in 2012.

1.2.2: Type of renal biopsy performed

The majority of biopsies reported were from native kidneys; 88% (from 2005-2010), 86.2% in 2011 and 83.5% in 2012 (Table 1.2.2). There was also a slight increase in trend of the total number of graft biopsies being done over the last 3 years.

1.2.3: Number of native renal biopsy performed on each individual patient (by number of episodes) 2005-2012

From 2005-2010, a total of 5428 patients underwent native renal biopsy. For 4711 (86.8%) patients, it was their first renal biopsy, while 577 (10.6%) patients had biopsy done twice, 119 (2.2%) done thrice and 21 (0.4%) underwent biopsy 4 times or more. In 2011 and 2012, the figures were quite similar for both years where majority (about 85%) of the patients underwent biopsy for the first time. About 12% underwent biopsy twice and less than 4% underwent biopsy more than twice (Table 1.2.3(a)).

For graft biopsies (Table 1.2.3(b)), the percentage of patients who underwent multiple renal biopsy were higher compared to native biopsies. In year 2011 and 2012, about 50% of the patients had graft biopsy done once, 30% done twice and 20% required 3 or more biopsies. There appeared to be more repeat graft biopsies in 2011-2012(52%) compared to the 2005-2010 period (42%).

Table 1.2.1: Total number of renal biopsies by centres, 2005 – 2012

Centre	2005-2010		2011		2012		Total	
	Done and reported	Done but not reported	Done and reported	Done but not reported	Done and reported	Done but not reported	Done and reported	Done but not reported
	n	n	n	n	n	n	n	n
180	772	1	137	0	108	0	1017	1
380	319	0	96	0	111	0	526	0
480	467	1	78	1	69	0	614	2
481	107	0	22	0	22	0	151	0
580	177	34	89	12	83	2	349	48
680	0	0	0	0	0	0	0	0
780	302	1	80	0	65	0	447	1
880	152	0	49	0	68	1	269	1
881	49	4	8	0	4	0	61	4
980	138	0	33	0	20	0	191	0
1080	457	0	88	0	63	2	608	2
1180	142	34	44	4	48	0	234	38
1181	9	0	0	0	0	11	9	11
1280	61	66	40	0	28	1	129	67
1380	155	1	51	14	36	14	242	29
1480	142	84	3	105	2	0	147	189
1780	516	0	81	0	105	0	702	0
2081	277	0	42	0	41	0	360	0
2380	28	0	40	0	55	0	123	0
4380	788	0	159	0	165	0	1112	0
4381	119	1	24	0	26	0	169	1
7781	192	0	30	0	24	0	246	0
20080	0	240	76	0	74	8	150	248
20180	398	432	183	2	252	0	833	434
20280	20	25	15	1	2	16	37	42
25280	14	0	3	0	3	0	20	0
60680	5	18	0	11	0	4	5	33
60980	18	12	7	0	10	0	35	12
61080	39	0	14	0	13	0	66	0
61280	26	12	11	18	12	14	49	44
61780	0	10	0	0	0	0	0	10
61880	5	0	0	12	0	0	5	12
62380	178	1	21	0	0	0	199	1
62480	0	0	18	0	40	0	58	0
62580	6	0	0	0	1	0	7	0
65480	0	0	0	0	0	0	0	0
65780	4	0	0	0	0	0	4	0
65880	36	0	7	7	9	1	52	8
68580	44	8	8	10	10	11	62	29
106881	39	0	9	0	8	0	56	0
108180	162	7	76	0	70	2	308	9
112780	0	1	0	3	0	0	0	4
114580	0	0	0	0	0	0	0	0
121580	14	5	4	0	0	12	18	17
126080	63	0	82	0	107	0	252	0
127780	18	0	5	0	7	0	30	0
Total	6458	998	1733	200	1761	99	9952	1297

Table 1.2.2: Distribution of reported native and graft renal biopsies by centre, 2005-2012

Centre	2005-2010		2011		2012		Total	
	Native	Graft	Native	Graft	Native	Graft	Native	Graft
	n	n	n	n	n	n	n	n
180	522	250	96	41	75	33	693	324
380	304	15	93	3	110	1	507	19
480	421	46	71	7	60	9	552	62
481	106	1	22	0	21	1	149	2
580	172	5	89	0	82	1	343	6
680	0	0	0	0	0	0	0	0
780	251	51	70	10	56	9	377	70
880	147	5	48	1	66	2	261	8
881	49	0	8	0	4	0	61	0
980	134	4	30	3	18	2	182	9
1080	450	7	87	1	61	2	598	10
1180	142	0	44	0	47	1	233	1
1181	9	0	0	0	0	0	9	0
1280	61	0	39	1	28	0	128	1
1380	154	1	51	0	36	0	241	1
1480	135	7	3	0	2	0	140	7
1780	494	22	80	1	101	4	675	27
2081	214	63	33	9	33	8	280	80
2380	27	1	38	2	54	1	119	4
4380	634	154	106	53	122	43	862	250
4381	117	2	24	0	26	0	167	2
7781	185	7	26	4	23	1	234	12
20080	0	0	66	10	65	9	131	19
20180	333	65	147	36	165	87	645	188
20280	20	0	15	0	2	0	37	0
25280	14	0	3	0	3	0	20	0
60680	5	0	0	0	0	0	5	0
60980	18	0	7	0	10	0	35	0
61080	39	0	12	2	13	0	64	2
61280	25	1	11	0	11	1	47	2
61780	0	0	0	0	0	0	0	0
61880	5	0	0	0	0	0	5	0
62380	178	0	21	0	0	0	199	0
62480	0	0	18	0	39	1	57	1
62580	6	0	0	0	1	0	7	0
65480	0	0	0	0	0	0	0	0
65780	4	0	0	0	0	0	4	0
65880	34	2	6	1	9	0	49	3
68580	44	0	8	0	10	0	62	0
106881	39	0	9	0	8	0	56	0
108180	158	4	76	0	67	3	301	7
112780	0	0	0	0	0	0	0	0
114580	0	0	0	0	0	0	0	0
121580	14	0	4	0	0	0	18	0
126080	10	53	28	54	36	71	74	178
127780	18	0	5	0	7	0	30	0
Total	5692	766	1494	239	1471	290	8657	1295

Table 1.2.3(a): Distribution of native renal biopsy in patients by number of episodes, 2005-2012

Native	2005-2010		2011		2012		Total
	n	%	n	%	n	%	n
1 st episode	4711	86.8	1214	84.5	1219	85.0	7144
2 nd episode	577	10.6	174	12.1	162	11.3	913
3 rd episode	119	2.2	37	2.6	41	2.9	197
≥4 th episode	21	0.4	11	0.8	12	0.8	44
Total	5692	766	1494	239	1471	290	8657

Table 1.2.3(b): Distribution of renal allograft biopsy in patients by number of episodes, 2005-2012

Graft	2005-2010		2011		2012		Total
	n	%	n	%	n	%	n
1 st episode	344	58.6	71	46.7	96	49.7	511
2 nd episode	148	25.2	46	30.3	53	27.5	247
3 rd episode	55	9.4	10	6.6	20	10.4	85
≥4 th episode	40	6.8	25	16.4	24	12.4	89
Total	587	100	152	100	193	100	932

1.2.4: Demographic distribution of renal biopsy (Native and Graft)

1.2.4.1: Age distribution

About two thirds, (66%) of the native renal biopsies were done in the age group 15-45 years. Paediatric patients less than 15 years contributed to about 14% of the native biopsies. Very few biopsies (8.6%) were done in patients older than 55 years of age (Table 1.2.4.1(a)).

In graft biopsies, majority (86%) of the biopsies were done in the age group 15-55 years of age. Very few graft biopsies were from the extreme age groups; 4.2% in the <15 years and 11.4% in those above 55 years of age (Table 1.2.4.1(b)).

For adult patients (age > 15 years) the highest number of renal biopsy were reported in WP KL (26.7%), followed by Selangor (22.4%) and Penang (9.9%). In the paediatric age group (<15 years), the highest number of renal biopsy were reported in Wilayah Persekutuan KL (27.2%) followed by Johor (19.9%) and Selangor (16.4%) (Table 1.2.4.1(c)).

Table 1.2.4.1(a): Age distribution of native renal biopsy, 2005-2012

Age group (years)	2005-2010	2011	2012	Total	
	n	n	n	n	%
<15	879	184	158	1221	14.1
15-<25	1589	404	391	2384	27.5
25-<35	1266	373	341	1980	22.9
35-<45	892	205	234	1331	15.4
45-<55	627	180	192	999	11.5
55-<65	292	100	109	501	5.8
≥65	147	48	46	241	2.8
Total	5692	1494	1471	8657	100

Table 1.2.4.1(b): Age distribution of renal allograft biopsy, 2005-2012

Age group (years)	2005-2010		2011	2012	Total	
	n	%	n	n	n	%
<15	37		9	8	54	4.2
15-<24	122		34	21	177	13.7
25-<35	133		36	78	247	19.1
35-<45	218		86	76	380	29.3
45-<55	176		44	69	289	22.3
55-<65	65		29	33	127	9.8
≥65	15		1	5	21	1.6
Total	766		239	290	1295	100

Table 1.2.4.1(c): Age group distribution of reported renal biopsies by state, 2005-2012

Year of biopsy	2005-2010				2011				2012				Total			
	Age < 15		Age ≥ 15		Age < 15		Age ≥ 15		Age < 15		Age ≥ 15		Age < 15		Age ≥ 15	
State	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Johor	197	21.5	485	8.8	31	16.1	127	8.2	26	15.7	116	7.3	254	19.9	728	8.4
Kedah	16	1.7	309	5.6	10	5.2	86	5.6	7	4.2	105	6.6	33	2.6	500	5.8
Kelantan	13	1.4	162	2.9	7	3.6	59	3.8	3	1.8	35	2.2	23	1.8	256	3.0
Melaka	7	0.8	131	2.4	1	0.5	32	2.1	0	0.0	20	1.3	8	0.6	183	2.1
N. Sembilan	52	5.7	149	2.7	10	5.2	47	3.1	7	4.2	65	4.1	69	5.4	261	3.0
Pahang	16	1.7	153	2.8	4	2.1	45	2.9	2	1.2	53	3.3	22	1.7	251	2.9
Perak	5	0.5	205	3.7	5	2.6	91	5.9	7	4.2	79	5.0	17	1.3	375	4.3
Perlis	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Penang	114	12.4	638	11.5	24	12.4	115	7.5	25	15.1	106	6.6	163	12.8	859	9.9
Sabah	44	4.8	137	2.5	9	4.7	3	0.2	8	4.8	2	0.1	61	4.8	142	1.6
Sarawak	48	5.2	525	9.5	6	3.1	96	6.2	2	1.2	126	7.9	56	4.4	747	8.6
Selangor	150	16.4	1301	23.5	29	15.0	325	21.1	30	18.1	315	19.7	209	16.4	1941	22.4
Terengganu	3	0.3	58	1.0	5	2.6	35	2.3	5	3.0	23	1.4	13	1.0	116	1.3
WP KL	251	27.4	1289	23.3	52	26.9	479	31.1	44	26.5	550	34.5	347	27.2	2318	26.7
Total	916	100	5542	100	193	100	1540	100	166	100	1595	100	1275	100	8677	100

1.2.4.2: Gender distribution

As in the previous years, more females underwent native renal biopsy (Table 1.2.4.2(a)). This is probably due to the higher number of females amongst patients biopsied for SLE. However in the graft biopsy group, this was reverse with more males (Table 1.2.4.2(b)). This is consistent with the trend of male predominance amongst the transplant patients as reported in the 20th Malaysian Dialysis and Transplant Registry.

Table 1.2.4.2(a): Gender distribution of native renal biopsy, 2005-2012

Gender	2005-2010	2011	2012	Total	
	n	n	n	n	%
Male	2176	589	599	3364	40.5
Female	3252	847	835	4934	59.5
Total	5428	1436	1434	8298	100

Table 1.2.4.2(b): Gender distribution of renal allograft biopsy, 2005-2012

Gender	2005-2010	2011	2012	Total	
	n	n	n	n	%
Male	370	101	121	592	63.5
Female	217	51	72	340	36.5
Total	587	152	193	932	100

1.2.4.3: Racial distribution

Amongst patients who had native renal biopsy, majority were Malays (58.1%), followed by Chinese (24.8%) (Table 1.2.4.3(a)). In the allograft renal biopsy group, majority were Chinese (52.7%) followed by Malay (31.5%) (Table 1.2.4.3(b)).

Table 1.2.4.3(a): Racial distribution of native renal biopsy, 2005-2012

Race	2005-2010	2011	2012	Total	
	n	n	n	n	%
Malay	3110	862	851	4823	58.1
Chinese	1390	320	346	2056	24.8
Indian	359	109	98	566	6.8
Others	569	145	139	853	10.3
Total	5428	1436	1434	8298	100

Table 1.2.4.3(b): Racial distribution of renal allograft biopsy, 2005-2012

Race	2005-2010	2011	2012	Total	
	n	n	n	n	%
Malay	186	49	59	294	31.5
Chinese	314	80	97	491	52.7
Indian	56	12	24	92	9.9
Others	31	11	13	55	5.9
Total	587	152	193	932	100

1.2.5: Renal Biopsy Report Analysis

A total of 9952 renal biopsies were performed and reported from 2005-2012. Seven thousand four hundred and thirty six (75%) of the biopsies were adequate ie had ≥ 10 glomeruli as defined by our pathologist. Two thousand three hundred and ninety eight or almost 24% yielded less than 10 glomeruli. One hundred and eighteen (1.2%) biopsies were classified as missing because the histopathology reports were not submitted to MRRB (Table 1.2.5).

Table 1.2.5: Number of glomeruli obtained at each biopsy by centres, 2005-2012

Total number of glomeruli	Less 10		10 & above		Missing		Total
	Centre	n	%	n	%	n	
180	180	17.70	828	81.42	9	0.88	1017
380	118	22.43	408	77.57	0	0.00	526
480	177	28.83	437	71.17	0	0.00	614
481	17	11.26	134	88.74	0	0.00	151
580	63	18.05	285	81.66	1	0.29	349
780	85	19.02	360	80.54	2	0.45	447
880	61	22.68	207	76.95	1	0.37	269
881	20	32.79	41	67.21	0	0.00	61
980	74	38.74	117	61.26	0	0.00	191
1080	246	40.46	362	59.54	0	0.00	608
1180	60	25.64	149	63.68	25	10.68	234
1181	2	22.22	7	77.78	0	0.00	9
1280	35	27.13	90	69.77	4	3.10	129
1380	73	30.17	153	63.22	16	6.61	242
1480	11	7.48	130	88.44	6	4.08	147
1780	169	24.07	533	75.93	0	0.00	702
2081	54	15.00	305	84.72	1	0.28	360
2380	41	33.33	82	66.67	0	0.00	123
4380	237	21.31	861	77.43	14	1.26	1112
4381	52	30.77	117	69.23	0	0.00	169
7781	88	35.77	158	64.23	0	0.00	246
20080	64	42.67	84	56.00	2	1.33	150
20180	245	29.41	569	68.31	19	2.28	833
20280	16	43.24	20	54.05	1	2.70	37
25280	10	50.00	10	50.00	0	0.00	20
60680	1	20.00	4	80.00	0	0.00	5
60980	6	17.14	29	82.86	0	0.00	35
61080	5	7.58	61	92.42	0	0.00	66
61280	11	22.45	38	77.55	0	0.00	49
61880	2	40.00	3	60.00	0	0.00	5
62380	30	15.08	168	84.42	1	0.50	199
62480	11	18.97	47	81.03	0	0.00	58
62580	0	0.00	7	100.00	0	0.00	7
65780	1	25.00	3	75.00	0	0.00	4
65880	6	11.54	46	88.46	0	0.00	52
68580	10	16.13	52	83.87	0	0.00	62
106881	7	12.50	49	87.50	0	0.00	56
108180	42	13.64	264	85.71	2	0.65	308
121580	8	44.44	10	55.56	0	0.00	18
126080	49	19.44	189	75.00	14	5.56	252
127780	11	36.67	19	63.33	0	0.00	30
Total	2398	24.10	7436	74.72	118	1.19	9952

1.2.6: Histopathology specimen distribution to histopathology laboratories

As shown in Table 1.2.6 and Figure 1.2.6 (a & b), not all biopsies performed at the centres were read by the local histopathologists. A number of renal biopsy specimens were sent to other centres for processing and reporting.

Table 1.2.6(a): Distribution of biopsy specimens to histopathology laboratories by participating centres, 2005-2012

Centre	In house histopathology laboratories								External histopathology laboratories								All	
	2005 - 2010		2011		2012		Total		2005 - 2010		2011		2012		Total		n	%
	n	%	n	%	n	%	n	%	n	%	n	%	n	%				
180	669	73.4	136	14.9	107	11.7	912	100	103	98.1	1	1	1	1	105	100	1017	10.2
380	-	-	-	-	-	-	-	-	319	60.6	96	18.3	111	21.1	526	100	526	5.3
480	368	71.5	78	15.1	69	13.4	515	100	99	100	0	0	0	0	99	100	614	6.2
481	73	62.4	22	18.8	22	18.8	117	100	34	100	0	0	0	0	34	100	151	1.5
580	168	49.6	89	26.3	82	24.2	339	100	9	90	0	0	1	10	10	100	349	3.5
780	-	-	-	-	-	-	-	-	302	67.6	80	17.9	65	14.5	447	100	447	4.5
880	54	50.9	13	12.3	39	36.8	106	100	98	60.1	36	22.1	29	17.8	163	100	269	2.7
881	44	78.6	8	14.3	4	7.1	56	100	5	100	0	0	0	0	5	100	61	0.6
980	137	72.1	33	17.4	20	10.5	190	100	1	100	0	0	0	0	1	100	191	1.9
1080	456	75.1	88	14.5	63	10.4	607	100	1	100	0	0	0	0	1	100	608	6.1
1180	12	100	0	0	0	0	12	100	130	58.6	44	19.8	48	21.6	222	100	234	2.4
1181	-	-	-	-	-	-	-	-	9	100	0	0	0	0	9	100	9	0.1
1280	60	47.2	39	30.7	28	22	127	100	1	50	1	50	0	0	2	100	129	1.3
1380	77	51.7	51	34.2	21	14.1	149	100	78	83.9	0	0	15	16.1	93	100	242	2.4
1480	-	-	-	-	-	-	-	-	142	96.6	3	2	2	1.4	147	100	147	1.5
1780	-	-	-	-	-	-	-	-	516	73.5	81	11.5	105	15	702	100	702	7.1
2081	248	75.2	41	12.4	41	12.4	330	100	29	96.7	1	3.3	0	0	30	100	360	3.6
2380	-	-	-	-	-	-	-	-	28	22.8	40	32.5	55	44.7	123	100	123	1.2
4380	89	21.5	159	38.5	165	40	413	100	699	100	0	0	0	0	699	100	1112	11.2
4381	21	29.6	24	33.8	26	36.6	71	100	98	100	0	0	0	0	98	100	169	1.7
7781	-	-	-	-	-	-	-	-	192	78	30	12.2	24	9.8	246	100	246	2.5
20080	0	0	75	50.3	74	49.7	149	100	0	0	1	100	0	0	1	100	150	1.5
20180	394	49.9	168	21.3	227	28.8	789	100	4	9.1	15	34.1	25	56.8	44	100	833	8.4
20280	20	57.1	13	37.1	2	5.7	35	100	0	0	2	100	0	0	2	100	37	0.4
25280	-	-	-	-	-	-	-	-	14	70	3	15	3	15	20	100	20	0.2
60680	-	-	-	-	-	-	-	-	5	100	0	0	0	0	5	100	5	0.1
60980	-	-	-	-	-	-	-	-	18	51.4	7	20	10	28.6	35	100	35	0.4
61080	-	-	-	-	-	-	-	-	39	59.1	14	21.2	13	19.7	66	100	66	0.7
61280	18	72	7	28	0	0	25	100	8	33.3	4	16.7	12	50	24	100	49	0.5
61880	-	-	-	-	-	-	-	-	5	100	0	0	0	0	5	100	5	0.1
62380	172	89.1	21	10.9	0	0	193	100	6	100	0	0	0	0	6	100	199	2
62480	-	-	-	-	-	-	-	-	0	0	18	31	40	69	58	100	58	0.6
62580	-	-	-	-	-	-	-	-	6	85.7	0	0	1	14.3	7	100	7	0.1
65780	-	-	-	-	-	-	-	-	4	100	0	0	0	0	4	100	4	0
65880	-	-	-	-	-	-	-	-	36	69.2	7	13.5	9	17.3	52	100	52	0.5
68580	-	-	-	-	-	-	-	-	44	71	8	12.9	10	16.1	62	100	62	0.6
106881	-	-	-	-	-	-	-	-	39	69.6	9	16.1	8	14.3	56	100	56	0.6
108180	-	-	-	-	-	-	-	-	162	52.6	76	24.7	70	22.7	308	100	308	3.1
121580	-	-	-	-	-	-	-	-	14	77.8	4	22.2	0	0	18	100	18	0.2
126080	-	-	-	-	-	-	-	-	63	25	82	32.5	107	42.5	252	100	252	2.5
127780	-	-	-	-	-	-	-	-	18	60	5	16.7	7	23.3	30	100	30	0.3
Total	3080	60	1065	20.7	990	19.3	5135	100	3378	70.1	668	13.9	771	16	4817	100	9952	100

Figure 1.2.6(a): Distribution of biopsy specimens to in house histopathology laboratories by participating centres, 2005-2012

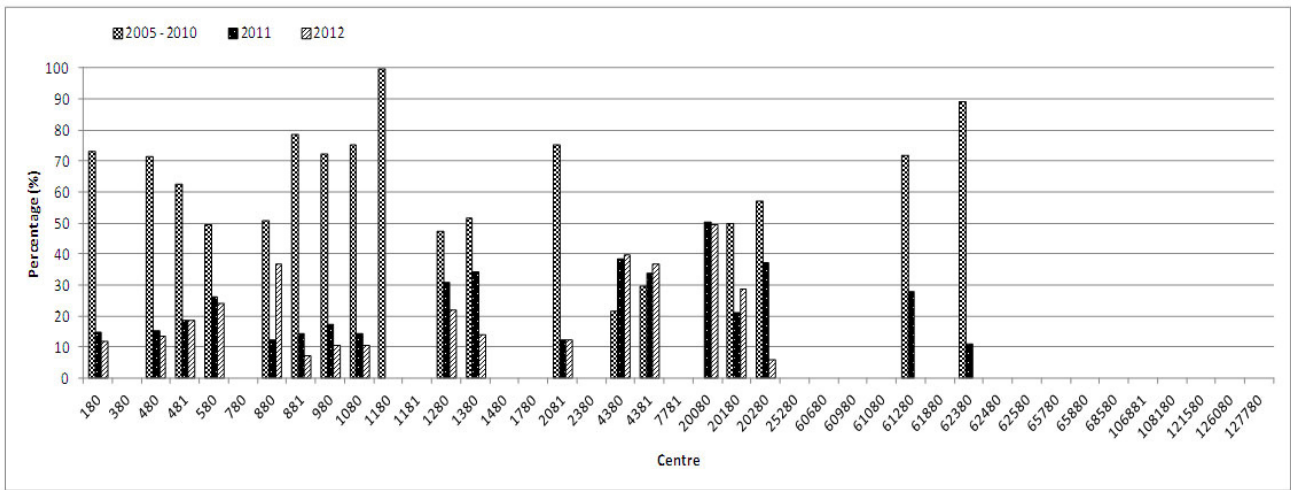


Figure 1.2.6(b): Distribution of biopsy specimens to external histopathology laboratories by participating centres, 2005-2012

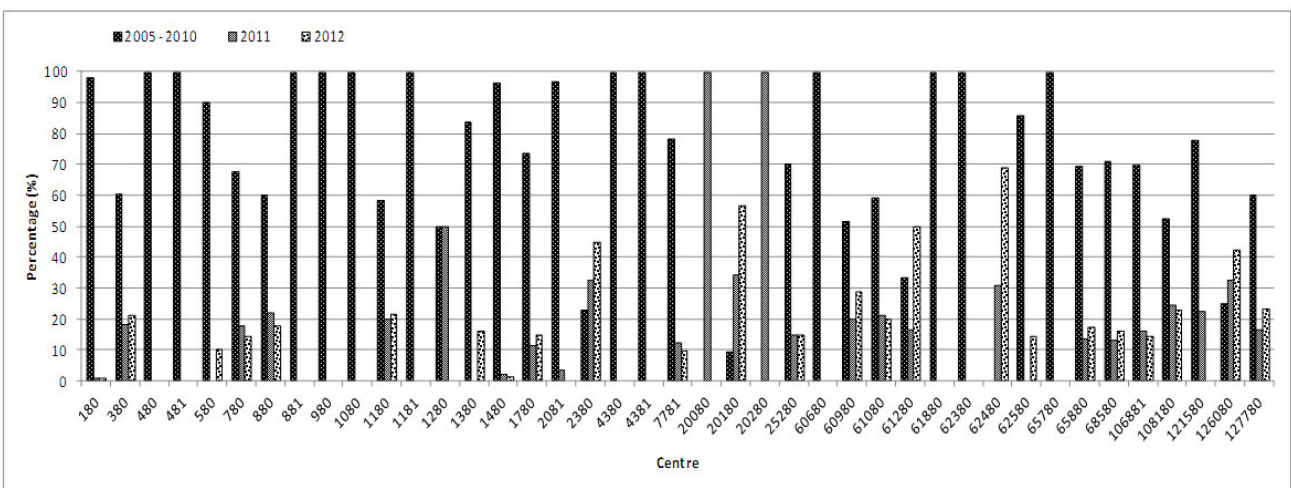


Table 1.2.6(c): Summary of biopsies received by in-house and external laboratories, 2007-2012

	2007		2008		2009		2010		2012	
	n	%	n	%	n	%	n	%	n	%
In house Lab	1085	44.9	1799	47.6	2360	48.5	2984	47.8	5135	51.6
Outside Lab	1334	55.1	1978	52.4	2506	51.5	3265	52.2	4817	48.40
All Lab	2419	100	3777	100	4866	100	6249	100	9952	100

Table 1.2.6(d): Histopathology laboratories receiving renal biopsy specimens, 2005-2012

Histolab	2005 - 2010		2011		2012		Total	
	n	%	n	%	n	%	n	%
1	10	0.2	0	0.0	1	0.1	11	0.1
26	182	2.8	92	5.3	85	4.8	359	3.6
35	42	0.7	0	0.0	0	0.0	42	0.4
42	77	1.2	51	2.9	21	1.2	149	1.5
50	2699	41.8	382	22.0	279	15.8	3360	33.8
53	68	1.1	39	2.3	28	1.6	135	1.4
66	195	3.0	56	3.2	24	1.4	275	2.8
71	0	0.0	19	1.1	54	3.1	73	0.7
81	575	8.9	196	11.3	201	11.4	972	9.8
93	110	1.7	183	10.6	191	10.8	484	4.9
95	99	1.5	22	1.3	43	2.4	164	1.6
103	668	10.3	118	6.8	87	4.9	873	8.8
119	12	0.2	0	0.0	0	0.0	12	0.1
483	18	0.3	7	0.4	0	0.0	25	0.3
497	116	1.8	76	4.4	74	4.2	266	2.7
498	82	1.3	13	0.8	3	0.2	98	1.0
514	178	2.8	39	2.3	40	2.3	257	2.6
572	1238	19.2	362	20.9	383	21.7	1983	19.9
1081	0	0.0	9	0.5	69	3.9	78	0.8
1145	1	0.0	1	0.1	0	0.0	2	0.0
1260	0	0.0	22	1.3	101	5.7	123	1.2
9999	0	0.0	18	1.0	40	2.3	58	0.6
50001	22	0.3	9	0.5	9	0.5	40	0.4
50002	27	0.4	4	0.2	13	0.7	44	0.4
100001	39	0.6	15	0.9	15	0.9	69	0.7
Total	6458	100	1733	100	1761	100	9952	100

1.3: Native kidney biopsy

1.3.1: Clinical Indications of renal biopsy

Table 1.3.1(a) shows the main indications for native renal biopsies in 2005-2012 were nephrotic syndrome (40.9%), asymptomatic urine abnormality (28.6%), nephrotic-nephritic syndrome (9.6%) and nephritic syndrome (8.1%). This trend had remained the same over the last 8 years.

Almost half (50.1%) of the patients had normal renal function at the time of biopsy while 37% had impaired renal function. For the remaining 13% data was not available or unknown (Table 1.3.1 (b))

Table 1.3.1(a): Indications for native renal biopsies, 2005-2012

Clinical Presentations	2005-2010		2011		2012		Total	
	n	%	n	%	n	%	n	%
Asymptomatic urine abnormality	1624	28.5	409	27.4	443	30.1	2476	28.6
Nephritic syndrome	480	8.4	124	8.3	96	6.5	700	8.1
Nephrotic syndrome	2492	43.8	558	37.3	490	33.3	3540	40.9
Nephrotic-Nephritic syndrome	505	8.9	187	12.5	136	9.2	828	9.6
Not available/Missing	591	10.4	216	14.5	306	20.8	1113	12.9
Total	5692	100	1494	100	1471	100	8657	100

Table 1.3.1(b): Renal function at time of biopsy, 2005-2012

Clinical Presentations	2005-2010		2011		2012		Total	
	n	%	n	%	n	%	n	%
Normal	2936	51.6	729	48.8	670	45.5	4335	50.1
Impaired	2106	37.0	551	36.9	541	36.8	3198	36.9
Not available/Missing	650	11.4	214	14.3	260	17.7	1124	13.0
Total	5692	100	1494	100	1471	100	8657	100

1.3.2: Histopathological Diagnosis

In the native kidney biopsy group; 3 most common primary glomerulonephritis (GN) reported were minimal change disease (33%), focal segmental glomerulosclerosis (FSGS) (30.8%) and IgA nephropathy (20.5%). Membranous nephropathy contributed 8% of the total primary GN subgroup (Table 1.3.2)

Lupus nephritis was the commonest secondary GN diagnosis; accounting for almost 80% of cases followed by diabetic nephropathy (11.2%).The most common tubulointerstitial disease reported was acute tubular necrosis (40.3%). These figures were quite similar to the previous reports .

Table 1.3.2: Histopathology of all native renal biopsies, 2005-2012

Type	Histopathological Diagnosis	2005 - 2010		2011		2012		Total	
		n	%	n	%	n	%	n	%
Primary GN (n=3824)	Minimal Change	861	33.2	220	34.6	181	30.5	1262	33.0
	FSGS	831	32.0	157	24.7	189	31.8	1177	30.8
	Ig A nephropathy	487	18.8	160	25.2	138	23.2	785	20.5
	Membranous nephropathy	211	8.1	50	7.9	46	7.7	307	8.0
	Membrano-proliferative	50	1.9	8	1.3	10	1.7	68	1.8
	Mesangial Prol: non-IgA	88	3.4	25	3.9	16	2.7	129	3.4
	Crescentic ANCA	13	0.5	3	0.5	3	0.5	19	0.5
	Idiopathic Crescentic	43	1.7	8	1.3	6	1.0	57	1.5
	Not available/Missing	11	0.4	4	0.6	5	0.8	20	0.5
	Subtotal	2595	100	635	100	594	100	3824	100
Secondary GN (n=3698)	Other Infection	14	0.6	1	0.2	3	0.5	18	0.5
	Lupus Nephritis	1980	80.9	481	77.3	492	78.2	2953	79.9
	Henoch Schonlein purpura	33	1.3	6	1.0	4	0.6	43	1.2
	HUS / TTP	3	0.1	2	0.3	1	0.2	6	0.2
	Amyloidosis	11	0.4	8	1.3	6	1.0	25	0.7
	Systemic vasculitis	12	0.5	3	0.5	5	0.8	20	0.5
	Post infection GN	100	4.1	39	6.3	33	5.2	172	4.7
	Polyarteritis Nodosa	0	0.0	0	0.0	0	0.0	0	0.0
	Malignancy	4	0.2	2	0.3	0	0.0	6	0.2
	Light/Heavy chain disease	4	0.2	0	0.0	1	0.2	5	0.1
	Diabetic nephropathy	267	10.9	68	10.9	79	12.6	414	11.2
	Anti GBM	1	0.0	0	0.0	1	0.2	2	0.1
	Immunotactoid /fibrillary GN	0	0.0	1	0.2	0	0.0	1	0.0
	Multiple myeloma	12	0.5	0	0.0	0	0.0	12	0.3
Not available/Missing	6	0.2	11	1.8	4	0.6	21	0.6	
Subtotal	2447	100	622	100	629	100	3698	100	
Tubulointerstitial disease (n=603)	Acute interstitial nephritis	94	22.7	24	25.0	33	35.5	151	25.0
	Acute tubular-necrosis	185	44.7	25	26.0	33	35.5	243	40.3
	Chronic interstitial	130	31.4	46	47.9	25	26.9	201	33.3
	Not available/Missing	5	1.2	1	1.0	2	2.2	8	1.3
Subtotal	414	100	96	100	93	100	603	100	
Vascular (n=162)	Atherosclerosis	1	1.0	0	0.0	1	3.0	2	1.2
	Benign/malignant hypertension	84	84.8	28	93.3	29	87.9	141	87.0
	Systemic sclerosis	7	7.1	2	6.7	1	3.0	10	6.2
	Not available/Missing	7	7.1	0	0.0	2	6.1	9	5.6
Subtotal	99	100	30	100	33	100	162	100	
Hereditary (n=14)	Alport's syndrome	3	27.3	1	33.3	0		4	28.6
	Thin Basement membrane disease	5	45.5	1	33.3	0		6	42.9
	Others	2	18.2	0	0.0	0		2	14.3
	Missing	1	9.1	1	33.3	0		2	14.3
Subtotal	11	100	3	100	0		14	100	
Advance GN (n=202)		159		22		21		202	
Others (n=146)		60		34		52		146	

1.3.3: Histopathology findings in common clinical presentation

1.3.3.1: Histopathological diagnosis in patients with nephrotic syndrome

Table 1.3.3.1 showed that in patients presenting with nephrotic syndrome, the commonest histopathology reported was minimal change disease (26.9%) followed by lupus nephritis (22.6%) and FSGS (20.9%).

Table 1.3.3.1: HPE diagnosis in patients presenting with Nephrotic Syndrome, 2005-2012

Type	Histopathological Diagnosis	n	%
Primary GN	Minimal Change	969	26.9
	FSGS	751	20.9
	Ig A nephropathy	182	5.1
	Membranous nephropathy	207	5.8
	Membrano-proliferative	33	0.9
	Mesangial Proliferative GN-non IgA	51	1.4
	Crescentic	0	0.0
	Idiopathic crescentic	8	0.2
	Not available/Missing	7	0.2
	Sub total	2208	61.3
Secondary GN	Other infection	9	0.3
	Lupus Nephritis	815	22.6
	Henoch Schonlein Purpura	4	0.1
	HUS/TTP	1	0.0
	Amyloidosis	12	0.3
	Systemic vasculitis	1	0.0
	Post infection GN	29	0.8
	Polyarteritis nodosa	0	0.0
	Malignancy	1	0.0
	Light/ heavy chain disease	1	0.0
	Diabetic nephropathy	181	5.0
	Anti GBM	0	0.0
	Immunotactoid / fibrillary GN	0	0.0
	Multiple myeloma	1	0.0
	Not available/Missing	10	0.3
Sub total	1065	29.6	
Others		327	9.1
Total		3600	100.0

**Patients may have either one or more histopathology or not have any histopathology*

Others = Tubulo. Disease + Vascular + Advance GN + Others + Hereditary (no observation)

1.3.3.2: Histopathological diagnosis in patients with urinary abnormalities

In patients presenting with asymptomatic urinary abnormalities; lupus nephritis was the commonest histopathology (42.6%) followed by IgA nephropathy (15.5%) and FSGS (9.6%) (Table 1.3.3.2).

Table 1.3.3.2: HPE diagnosis in Patients presenting with Asymptomatic Urine Abnormalities, 2005-2012

Type	Histopathological Diagnosis	n	%
Primary GN	Minimal Change	151	6.2
	FSGS	232	9.6
	Ig A nephropathy	376	15.5
	Membranous nephropathy	66	2.7
	Membrano-proliferative	8	0.3
	Mesangial Proliferative GN-non IgA	42	1.7
	Crescentic	8	0.3
	Idiopathic crescentic	13	0.5
	Not available/Missing	6	0.2
	Sub total		902
Secondary GN	Other infection	3	0.1
	Lupus Nephritis	1031	42.6
	Henoch Schonlein Purpura	22	0.9
	HUS/TTP	0	0.0
	Amyloidosis	8	0.3
	Systemic vasculitis	5	0.2
	Post infection GN	24	1.0
	Polyarteritis nodosa	0	0.0
	Malignancy	0	0.0
	Light/ heavy chain disease	1	0.0
	Diabetic nephropathy	90	3.7
	Anti GBM	0	0.0
	Immunotactoid / fibrillary GN	0	0.0
	Multiple myeloma	7	0.3
	Missing	5	0.2
Sub total		1196	49.4
Others		321	13.3
Total		2419	100.0

* Patients may have either one or more histopathology or not have any histopathology

Others = Tubulo. Disease + Vascular + Advance GN + Others + Hereditary

1.3.3.3: Histopathological diagnosis in patients with nephritic-nephrotic syndrome

In patients presenting with nephritic-nephrotic syndrome, the commonest histopathology diagnosis was lupus nephritis (49.5%) followed by IgA nephropathy (9%) and FSGS (7.2%).

Table 1.3.3.3: HPE diagnosis in patients presenting with Nephritic-Nephrotic, 2005-2012

Type	Histopathological Diagnosis	n	%
Primary GN	Minimal Change	49	5.7
	FSGS	62	7.2
	Ig A nephropathy	78	9.0
	Membranous nephropathy	13	1.5
	Membrano-proliferative	11	1.3
	Mesangial Proliferative GN-non IgA	15	1.7
	Crescentic	2	0.2
	Idiopathic crescentic	8	0.9
	Not available/Missing	1	0.1
	Sub total	239	27.7
Secondary GN	Other infection	5	0.6
	Lupus Nephritis	427	49.5
	Henoch Schonlein Purpura	8	0.9
	HUS/TTP	1	0.1
	Amyloidosis	0	0.0
	Systemic vasculitis	2	0.2
	Post infection GN	44	5.1
	Polyarteritis nodosa	0	0.0
	Malignancy	2	0.2
	Light/ heavy chain disease	0	0.0
	Diabetic nephropathy	24	2.8
	Anti GBM	0	0.0
	Immunotactoid / fibrillary GN	0	0.0
	Multiple myeloma	1	0.1
	Not available/Missing	2	0.2
Sub total	516	59.8	
Others		108	12.5
Total		863	100.0

*Patients may have either one or more histopathology or not have any histopathology

Others = Tubulo. Disease + Vascular + Advance GN + Others + Hereditary (no observation)

1.3.3.4: Histopathological diagnosis in patients with nephritic syndrome

In patients presenting with acute nephritic syndrome, the commonest GN was lupus nephritis (41.2%) followed by IgA nephropathy (9.2%) and FSGS (7.9%). Post infectious GN contributed 7.6% of this group.

Table 1.3.3.4: HPE diagnosis in Patients presenting with Nephritic syndrome, 2005-2012

Type	Histopathological Diagnosis	n	%
Primary GN	Minimal Change	43	6.2
	FSGS	55	7.9
	Ig A nephropathy	64	9.2
	Membranous nephropathy	4	0.6
	Membrano-proliferative	12	1.7
	Mesangial Proliferative GN-non IgA	14	2.0
	Crescentic	7	1.0
	Idiopathic crescentic	13	1.9
	Not available/Missing	5	0.7
	Sub total	217	31.0
Secondary GN	Other infection	0	0.0
	Lupus Nephritis	288	41.2
	Henoch Schonlein Purpura	7	1.0
	HUS/TTP	0	0.0
	Amyloidosis	1	0.1
	Systemic vasculitis	7	1.0
	Post infectious GN	53	7.6
	Polyarteritis nodosa	0	0.0
	Malignancy	0	0.0
	Light/ heavy chain disease	0	0.0
	Diabetic nephropathy	22	3.1
	Anti GBM	1	0.1
	Immunotactoid / fibrillary GN	0	0.0
	Multiple myeloma	0	0.0
	Not available/Missing	1	0.1
Sub total	380	54.4	
Others		102	14.6
Total		699	100

* Patients may have either one or more histopathology or not have any histopathology

Others = Tubulo. Disease + Vascular + Advance GN + Others + Hereditary

1.3.3.5: Primary GN according to various age group

FSGS (39.4%) was the commonest GN in the <15 years age group followed by minimal change disease (37.7%). This may be attributed to steroid resistant nephrotic syndrome as the main indication for biopsy in children. . Meanwhile, the commonest GN in the age group 15-<25 years were minimal change disease (43.5%) followed by FSGS (27.9%).

Among adults age 25-55 years old, FSGS (29%), minimal change disease (26.4%) and IgA nephropathy (25.8%) were the 3 commonest GN. In patients >55 years of age, the commonest GN was FSGS (31%) followed by membranous nephropathy (24.6%) (Table & Figure 1.3.3.5).

Figure 1.3.3.5: Primary glomerulonephritis according to the various age group, 2005-2012

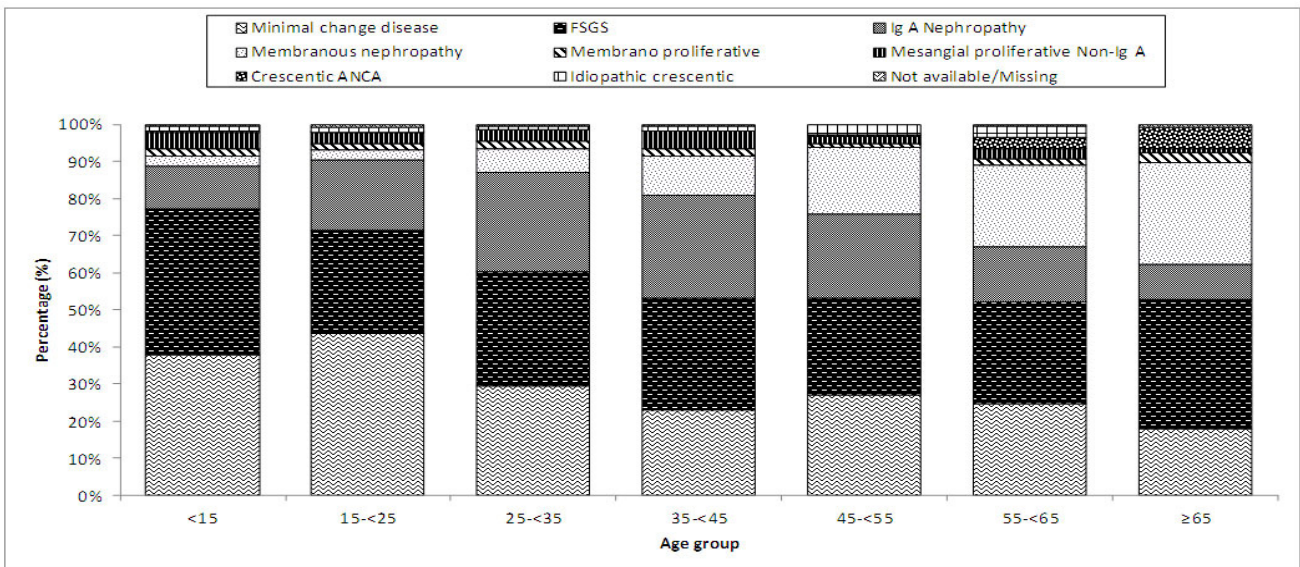


Table 1.3.3.5: Primary glomerulonephritis according to the various age group, 2005-2012

Age	<15		15-<25		25-<35		35-<45		45-<55		55-<65		≥65		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Minimal change disease	247	37.7	468	43.5	241	29.4	126	23.0	105	26.9	56	24.6	19	17.9	1262	33.0
FSGS	258	39.4	300	27.9	252	30.7	164	30.0	103	26.3	63	27.6	37	34.9	1177	30.8
IgA Nephropathy	76	11.6	203	18.9	222	27.0	152	27.8	88	22.5	34	14.9	10	9.4	785	20.5
Membranous nephropathy	17	2.6	29	2.7	53	6.5	58	10.6	71	18.2	50	21.9	29	27.4	307	8.0
Membrano-proliferative	13	2.0	18	1.7	16	1.9	10	1.8	4	1.0	4	1.8	3	2.8	68	1.8
Mesangial proliferative Non-Ig A	29	4.4	35	3.3	24	2.9	26	4.8	8	2.0	6	2.6	1	0.9	129	3.4
Crescentic ANCA	2	0.3	1	0.1	1	0.1	1	0.2	1	0.3	7	3.1	6	5.7	19	0.5
Idiopathic crescentic	9	1.4	14	1.3	8	1.0	8	1.5	11	2.8	7	3.1	0	0.0	57	1.5
Not available/Missing	4	0.6	8	0.7	4	0.5	2	0.4	0	0.0	1	0.4	1	0.9	20	0.5
Total	655	100	1076	100	821	100	547	100	391	100	228	100	106	100	3824	100