

**CHAPTER 2**

**PRIMARY GLOMERULONEPHRITIS**

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## 2.1: Introduction

This chapter covers the main primary glomerulonephritis that were reported to the MRRB from the years 2005-2012.

Minimal change disease is the commonest glomerulonephritis in adults, contributing to 32% of all primary glomerulonephritis in Malaysia. This was followed by focal segmental glomerulosclerosis (29%) and Ig A nephropathy (22%). Idiopathic membranous nephropathy contributed only 9% of all biopsy-proven primary glomerulonephritis. The other types of primary glomerulonephritis were relatively uncommon (Table 2.1).

**Table 2.1: Primary Glomerulonephritis, 2005-2012**

Histopathological Diagnosis	2005-2010		2011		2012		Total	
	n	%	n	%	n	%	n	%
Minimal Change Disease (MCD)	687	32.5	175	32.4	153	29.8	1015	32.0
Focal Segmental Glomerulosclerosis (FSGS)	627	29.6	135	25.0	157	30.5	919	29.0
Ig A nephropathy (Ig AN)	437	20.7	147	27.2	125	24.3	709	22.4
Membranous nephropathy (IMN)	198	9.4	46	8.5	46	8.9	290	9.2
Membrano-proliferative GN (MPGN)	41	1.9	5	0.9	9	1.8	55	1.7
Mesangial Proliferative GN (non Ig A)	72	3.4	17	3.1	11	2.1	100	3.2
Crescentic ANCA	11	0.5	3	0.6	3	0.6	17	0.5
Idiopathic Crescentic	34	1.6	8	1.5	6	1.2	48	1.5
Not available/ Missing	8	0.4	4	0.7	4	0.8	16	0.5
<b>Total</b>	<b>2115</b>	<b>100</b>	<b>540</b>	<b>100</b>	<b>514</b>	<b>100</b>	<b>3169</b>	<b>100</b>

## 2.2: Minimal Change Disease (MCD)

### 2.2.1: Introduction

Minimal change disease (MCD) is typically characterized by normal appearing glomeruli by light microscopy and absence of complement or immunoglobulin deposits by immunofluorescence microscopy. Glomerular size is usually normal by standard methods of light microscopy, although enlarged glomeruli may be observed. On electron microscopy, there is diffuse effacement ("fusion") of the epithelial foot processes. Minimal change disease is a major cause of nephrotic syndrome in both children and adults.

### 2.2.2: Patient Population and Characteristics

A total of 1015 cases of minimal change disease were reported in 2005-2012. The mean age of patients at the time of biopsy was  $30.9 \pm 13.6$ . Majority of patients (70%) belonged to age groups 15 to <25 and 25 to <35. The observed trend can be explained partly by the fact that most children with steroid responsive nephrotic syndrome are not biopsied. The bimodal age distribution of minimal change disease described in other cohorts was not observed, with frequency only about 7% after the age of 55.

**Table 2.2.2(a): Demographic characteristics for MCD, 2005-2012**

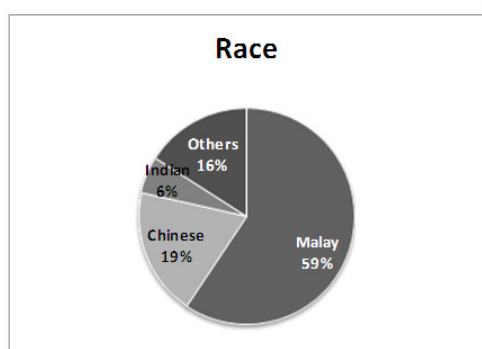
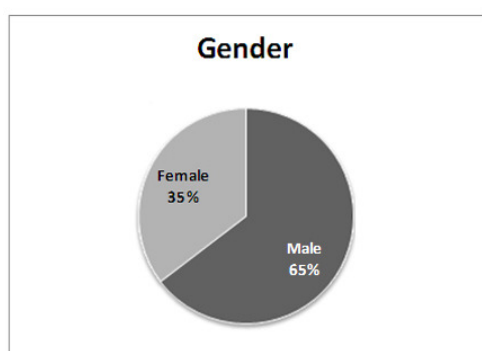
Demographic Characteristics		n	%
Age (year)	Mean (SD)	30.88 (13.579)	
	Median (IQR)	26.06 (18.01)	
	Min, max	(15.00, 86.26)	
Gender	Male	656	64.6
	Female	359	35.4
Race	Malay	603	59.4
	Chinese	194	19.1
	Indian	56	5.5
	Others	162	16.0

There has been a consistently higher incidence of minimal change disease in male (65%) but there was no predilection of any particular ethnic group. The pattern of racial distribution reflects the ethnic composition of patients admitted to public hospitals (Table 2.2.2 (a)).

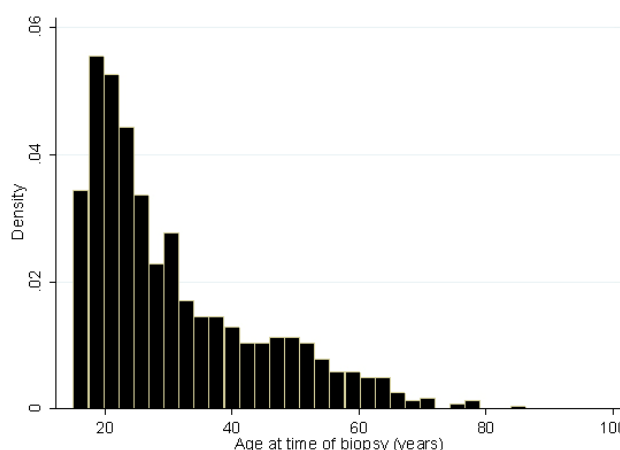
**Table 2.2.2(b): Age group at time of biopsy (years) for MCD, 2005-2012**

Age group (years)	2005-2010		2011		2012		Total	
	n	%	n	%	n	%	n	%
15-<25	333	48.5	73	41.7	62	40.5	468	46.1
25-<35	156	22.7	50	28.6	35	22.9	241	23.7
35-<45	91	13.2	14	8.0	21	13.7	126	12.4
45-<55	65	9.5	23	13.1	17	11.1	105	10.3
55-<65	31	4.5	13	7.4	12	7.8	56	5.5
≥65	11	1.6	2	1.1	6	3.9	19	1.9
<b>Total</b>	<b>687</b>	<b>100</b>	<b>175</b>	<b>100</b>	<b>153</b>	<b>100</b>	<b>1015</b>	<b>100</b>

**Figure 2.2.2(a): Demographic characteristics for MCD, 2005-2012**



**Figure 2.2.2(b): Age at time of biopsy (years) MCD, 2005-2012**

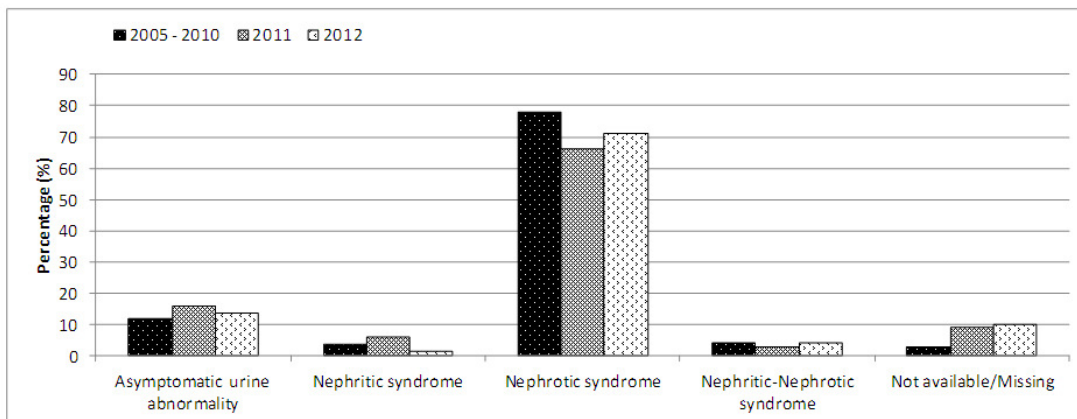


**2.2.3: Clinical presentation**

The most common clinical presentation remained nephrotic syndrome (75%), followed by asymptomatic urine abnormality (13%), nephritic-nephrotic syndrome (4%) and nephritic syndrome (4%) (Table & Figure 2.2.3(a)). As expected, most patients have normal blood pressures (74%) and preserved eGFR (73%) at presentation (Table 2.2.3(b) & (c)).

**Table 2.2.3(a): Clinical presentation for MCD, 2005-2012**

Clinical Presentation	2005-2010		2011		2012		Total	
	n	%	n	%	n	%	n	%
Asymptomatic urine abnormality	82	11.9	28	16.0	21	13.7	131	12.9
Nephritic syndrome	24	3.5	10	5.7	2	1.3	36	3.5
Nephrotic syndrome	536	78.0	116	66.3	109	71.2	761	75.0
Nephritic-Nephrotic syndrome	28	4.1	5	2.9	6	3.9	39	3.8
Not available/Missing	17	2.5	16	9.1	15	9.8	48	4.7
<b>Total</b>	<b>687</b>	<b>100.0</b>	<b>175</b>	<b>100.0</b>	<b>153</b>	<b>100</b>	<b>1015</b>	<b>100.0</b>

**Figure 2.2.3(a): Clinical presentation for MCD, 2005-2012****Table 2.2.3(b): Presence of hypertension in MCD, 2005-2012**

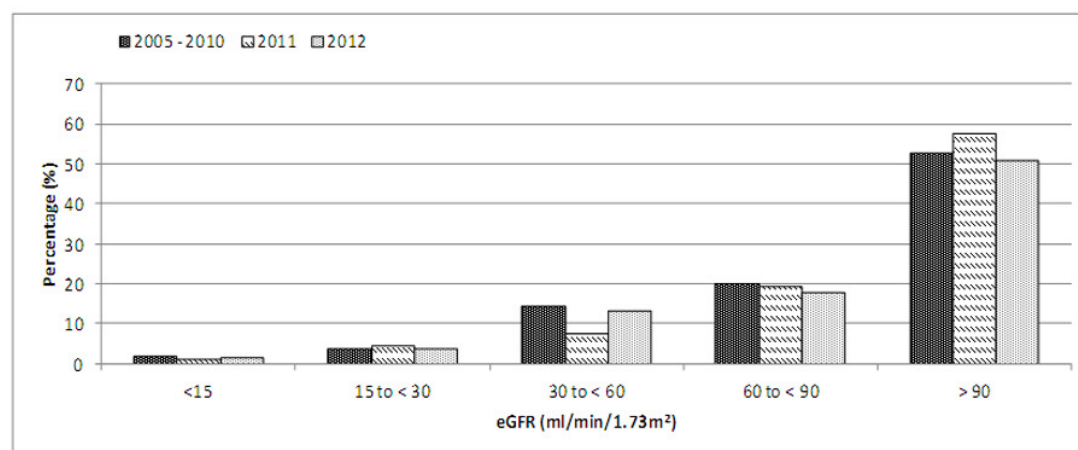
Hypertension	2005-2010		2011		2012		Total	
	n	%	n	%	n	%	n	%
Present	117	17.0	29	16.6	31	20.3	177	17.4
Absent	533	77.6	112	64.0	101	66.0	746	73.5
Not available/ Missing	37	5.4	34	19.4	21	13.7	92	9.1
<b>Total</b>	<b>687</b>	<b>100</b>	<b>175</b>	<b>100</b>	<b>153</b>	<b>100</b>	<b>1015</b>	<b>100</b>

**Table 2.2.3(c): Renal function in MCD by year, 2005-2012**

GFR (ml/min/1.73m <sup>2</sup> )	2005-2010		2011		2012		Total n
	n	%	n	%	n	%	
<15	14	2.0	2	1.1	2	1.3	18
15 to <30	27	3.9	8	4.6	6	3.9	41
30 to <60	98	14.3	13	7.4	20	13.1	131
60 to <90	139	20.2	34	19.4	27	17.6	200
≥90	362	52.7	101	57.7	78	51.0	541
Missing	47	6.8	17	9.7	20	13.1	84
<b>Total</b>	<b>687</b>	<b>100</b>	<b>175</b>	<b>100</b>	<b>153</b>	<b>100</b>	<b>1015</b>

\*84 cases are missing on GFR, including 29 cases with GFR>200 (GFR range between 201 to 3349)

**Figure 2.2.3(c): Renal function in MCD by year, 2005-2012**



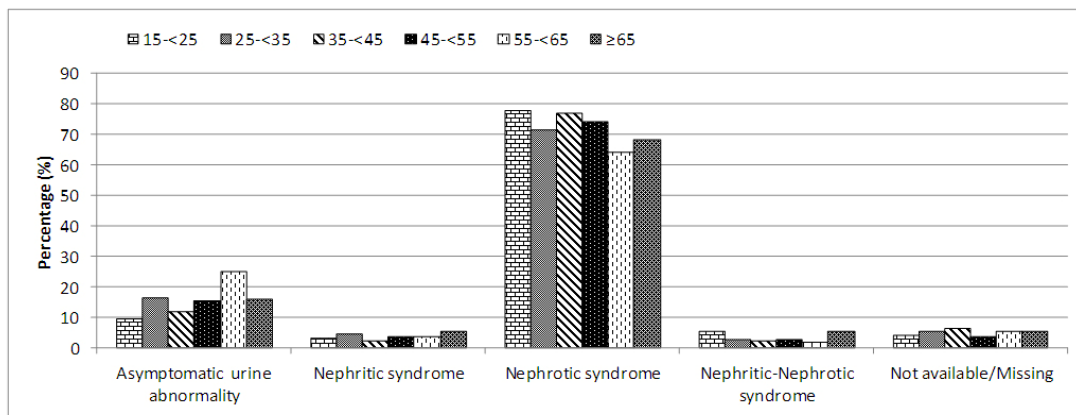
### 2.2.3.1: Clinical presentation by age

Nephrotic syndrome was the most common clinical presentation for minimal change disease throughout all age groups (Table & Figure 2.2.3.1(a)). However, the presence of hypertension and impaired renal function increased with increasing age (Table 2.2.3.1(b) & (c)). The patients with impaired renal function were 36% and 63% respectively for age group 55 to <65 and ≥ 65 (Table 2.2.3.1(c)).

**Table 2.2.3.1 (a): Clinical presentation by age group for MCD, 2005-2012**

Clinical Presentations	15-<25		25-<35		35-<45		45-<55		55-<65		≥65		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Asymptomatic urine abnormality	44	9.4	39	16.2	15	11.9	16	15.2	14	25.0	3	15.8	131	12.9
Nephritic syndrome	15	3.2	11	4.6	3	2.4	4	3.8	2	3.6	1	5.3	36	3.5
Nephrotic syndrome	365	78.0	172	71.4	97	77.0	78	74.3	36	64.3	13	68.4	761	75.0
Nephritic-Nephrotic syndrome	25	5.3	6	2.5	3	2.4	3	2.9	1	1.8	1	5.3	39	3.8
Not available	19	4.1	13	5.4	8	6.3	4	3.8	3	5.4	1	5.3	48	4.7
<b>Total</b>	<b>468</b>	<b>100</b>	<b>241</b>	<b>100</b>	<b>126</b>	<b>100</b>	<b>105</b>	<b>100</b>	<b>56</b>	<b>100</b>	<b>19</b>	<b>100</b>	<b>1015</b>	<b>100</b>

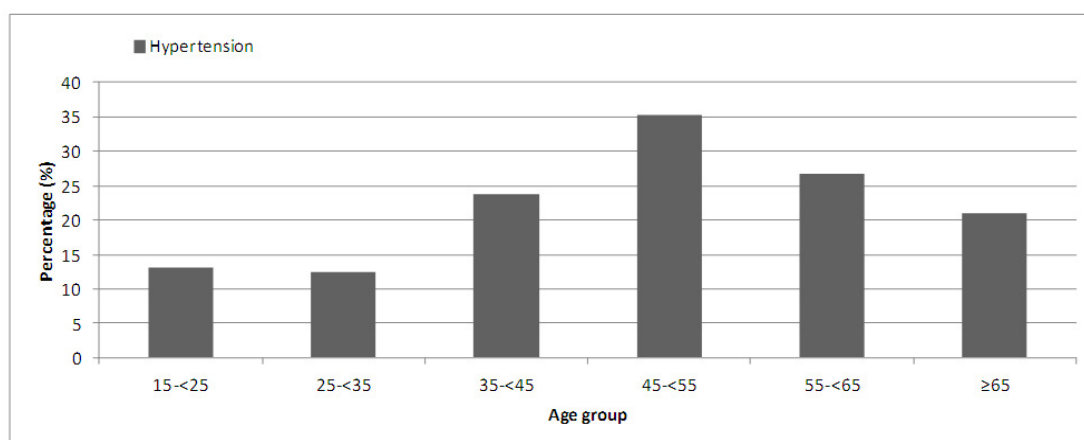
**Figure 2.2.3.1(a): Clinical presentation by age group for MCD, 2005-2012**



**Table 2.2.3.1 (b): Hypertension by age group for MCD, 2005-2012**

Hypertension	15-<25		25-<35		35-<45		45-<55		55-<65		≥65		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Present	61	13.0	30	12.4	30	23.8	37	35.2	15	26.8	4	21.1	177	17.4
Absent	370	79.1	185	76.8	83	65.9	58	55.2	39	69.6	11	57.9	746	73.5
Not available/ Missing	37	7.9	26	10.8	13	10.3	10	9.5	2	3.6	4	21.1	92	9.1
<b>Total</b>	<b>468</b>	<b>100</b>	<b>241</b>	<b>100</b>	<b>126</b>	<b>100</b>	<b>105</b>	<b>100</b>	<b>56</b>	<b>100</b>	<b>19</b>	<b>100</b>	<b>1015</b>	<b>100</b>

**Figure 2.2.3.1 (b): Hypertension by age group for MCD, 2005-2012**

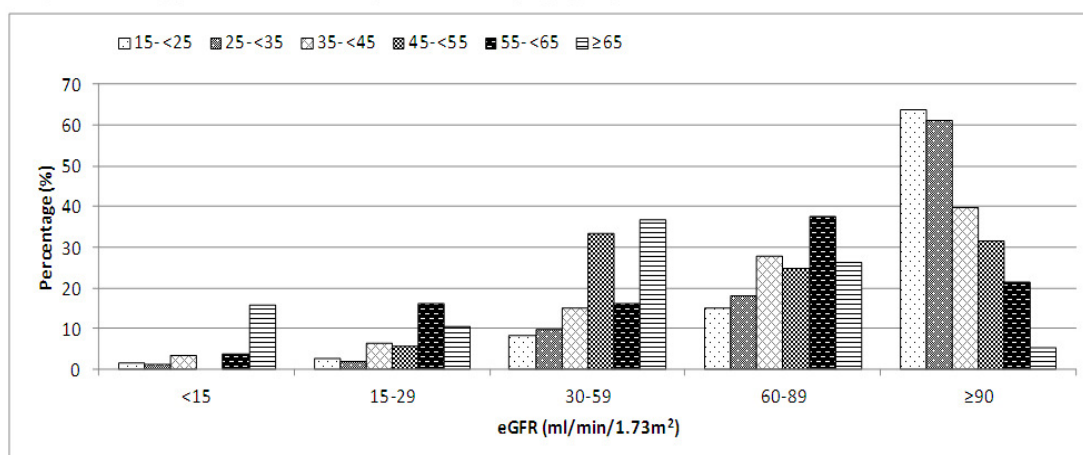


**Table 2.2.3.1 (c): Renal function at presentation by age group for MCD, 2005-2012**

eGFR (ml/min/1.73m <sup>2</sup> )	15-<25		25-<35		35-<45		45-<55		55-<65		≥65		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
<15	6	1.3	3	1.2	4	3.2	0	0.0	2	3.6	3	15.8	18	1.8
15-29	12	2.6	4	1.7	8	6.3	6	5.7	9	16.1	2	10.5	41	4.0
30-59	38	8.1	23	9.5	19	15.1	35	33.3	9	16.1	7	36.8	131	12.9
60-89	70	15.0	43	17.8	35	27.8	26	24.8	21	37.5	5	26.3	200	19.7
≥90	298	63.7	147	61.0	50	39.7	33	31.4	12	21.4	1	5.3	541	53.3
Missing*	44	9.4	21	8.7	10	7.9	5	4.8	3	5.4	1	5.3	84	8.3
<b>Total</b>	<b>468</b>	<b>100</b>	<b>241</b>	<b>100</b>	<b>126</b>	<b>100</b>	<b>105</b>	<b>100</b>	<b>56</b>	<b>100</b>	<b>19</b>	<b>100</b>	<b>1015</b>	<b>100</b>

Total of 84 cases are missing on GFR, including 29 cases with GFR>200 (GFR range between 201 to 3349)

**Figure 2.2.3.1 (c): Renal function at presentation by age group for MCD, 2005-2012**



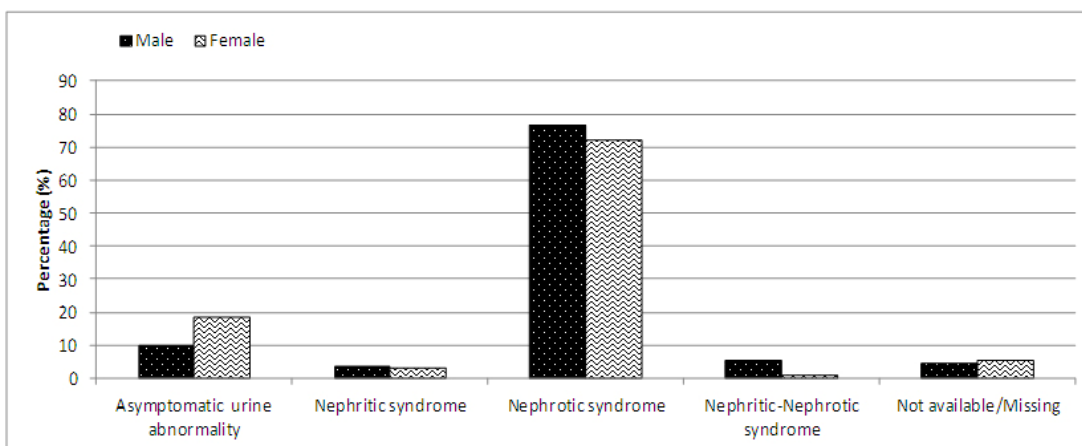
**2.2.3.2: Clinical presentation by gender**

There was no difference between genders in terms of clinical presentation, presence of hypertension and renal function at presentation (Table 2.2.3.2 (a, b & c)). Both genders have relatively well preserved renal function with less than a quarter having eGFR <60 ml/min/1.72 m<sup>2</sup> (Figure 2.2.3.2 (c)).

**Table 2.2.3.2(a): Clinical presentation by gender for MCD, 2005-2012**

Clinical Presentation	Male		Female	
	n	%	n	%
Asymptomatic urine abnormality	65	9.9	66	18.4
Nephritic syndrome	24	3.7	12	3.3
Nephrotic syndrome	502	76.5	259	72.1
Nephritic-Nephrotic syndrome	36	5.5	3	0.8
Not available	29	4.4	19	5.3
<b>Total</b>	<b>656</b>	<b>100</b>	<b>359</b>	<b>100</b>

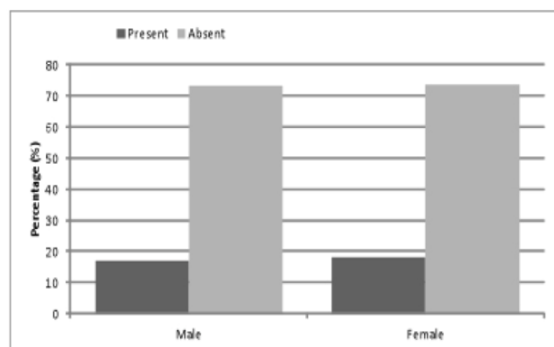
**Figure 2.2.3.2(a): Clinical presentation by gender for MCD, 2005-2012**



**Table 2.2.3.2(b): Hypertension by gender for MCD, 2005-2012**

Hypertension	Male		Female	
	n	%	n	%
Present	112	17.1	65	18.1
Absent	481	73.3	265	73.8
Not available/ Missing	63	9.6	29	8.1
<b>Total</b>	<b>656</b>	<b>100</b>	<b>359</b>	<b>100</b>

**Figure 2.2.3.2(b): Hypertension by gender for MCD, 2005-2012**



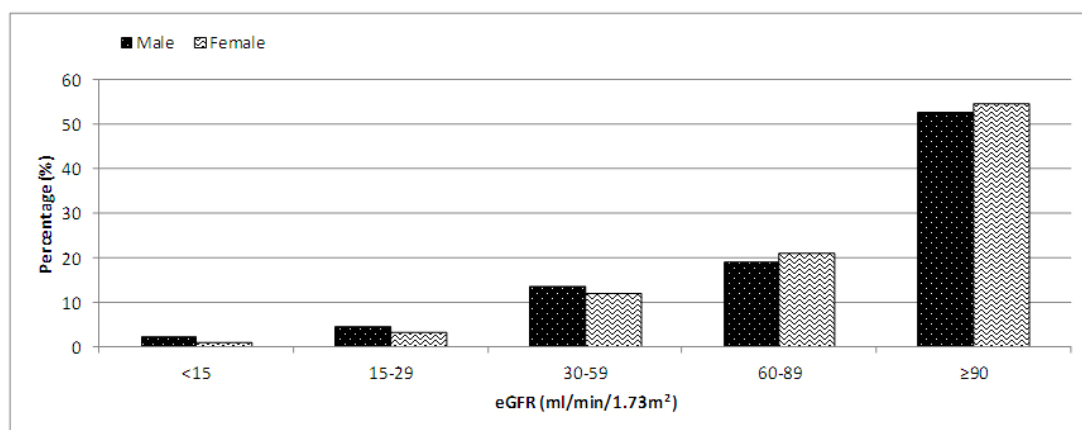


**Table 2.2.3.2(c): Renal function by gender for MCD, 2005-2012**

eGFR (ml/min/1.73m <sup>2</sup> )	Male		Female	
	n	%	n	%
<15	15	2.3	3	0.8
15-29	29	4.4	12	3.3
30-59	88	13.4	43	12.0
60-89	125	19.1	75	20.9
≥90	345	52.6	196	54.6
Missing*	54	8.2	30	8.4
<b>Total</b>	<b>656</b>	<b>100</b>	<b>359</b>	<b>100</b>

\*Total of 84 cases are missing on GFR, including 29 cases with GFR>200 (GFR range between 201 to 3349)

**Figure 2.2.3.2(c): Renal function by gender for MCD, 2005-2012**



#### 2.2.4: Outcome of Minimal Change Disease

In general, the outcome for minimal change disease was excellent, with 5-year patient and renal survival of 94% and 98% respectively (Figure 2.2.5 (a) & (b)).

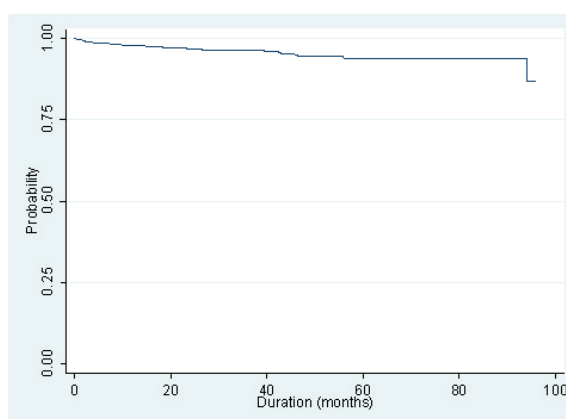
**Table 2.2.4(a): Patients survival estimates for death in MCD, 2005 2012**

Interval (months)	Patients survival		
	n	% survival	n
0	1003	100	-
12	816	98	0.005
24	637	97	0.006
36	493	96	0.007
48	354	94	0.009
60	217	94	0.010
72	138	94	0.010

Event = death; Status as at 31<sup>st</sup> Dec 2012 or last follow-up

\*Missing of 2 censored cases where the outcome date < date of 1<sup>st</sup> biopsy

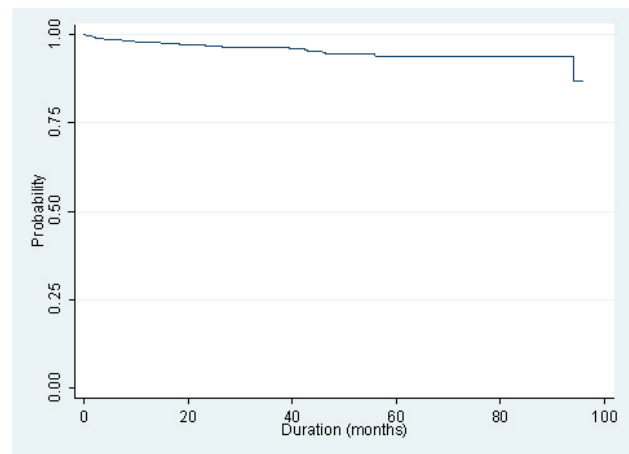
**Figure 2.2.4(a): Patients Survival estimates for death in MCD, 2005-2012**



**Table 2.2.4 (b): Renal survival estimates for death in MCD, 2005-2012**

Interval (months)	Patients survival		
	n	% survival	n
0	1003	100	-
12	816	100	-
24	637	99	0.002
36	493	99	0.003
48	354	98	0.005
60	217	98	0.005
72	137	97	0.009

\*Missing of 1 censored and 1 event cases where the outcome date < date of 1<sup>st</sup> biopsy  
Event = ESRF; Status as at 31<sup>st</sup> Dec 2012 or died or last follow-up

**Figure 2.2.4 (b): Renal Survival estimates for death in MCD, 2005-2012**

## 2.3: Focal Segmental Glomerulosclerosis (FSGS)

### 2.3.1: Introduction

Focal segmental glomerulosclerosis is defined on histological criteria by segmental capillary obliteration with increased mesangial matrix deposition, intra-capillary hyaline deposits and focal adhesions of the capillary tuft to Bowman's capsule. The diagnosis of FSGS can be challenging in term of differentiating the idiopathic FSGS from secondary FSGS changes.

### 2.3.2: Patient Population and Characteristics

A total of 919 cases of FSGS were reported in our eight-year registry data. FSGS was mainly diagnosed in young patients, with mean age at the time of biopsy of  $34.4 \pm 14.6$ . Similar to minimal change disease, FSGS was slightly more common in males (59%) with no obvious preponderance in racial distribution (Table 2.3.2 (a)).

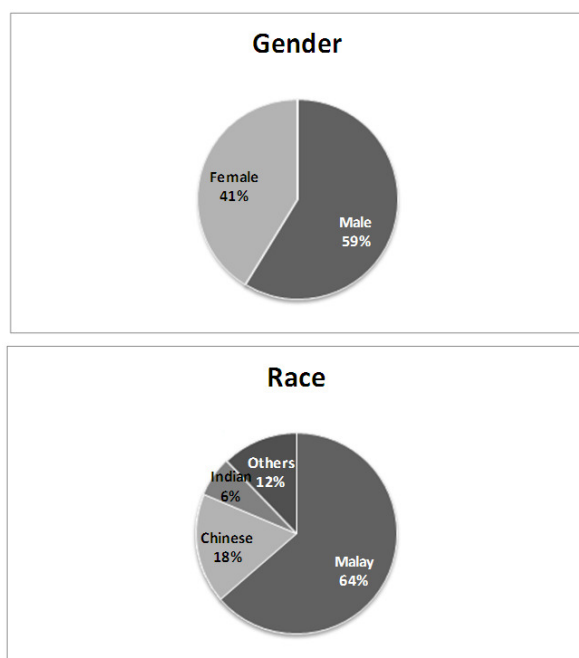
**Table 2.3.2(a): Demographic characteristics for FSGS, 2005-2012**

Demographic		n	%
Age (year)	Mean (SD)	34.38 (14.613)	
	Median (IQR)	30.75 (21.02)	
	Min, max	(15.00, 88.54)	
Gender	Male	540	58.8
	Female	379	41.2
Race	Malay	585	63.7
	Chinese	163	17.7
	Indian	59	6.4
	Others	112	12.2

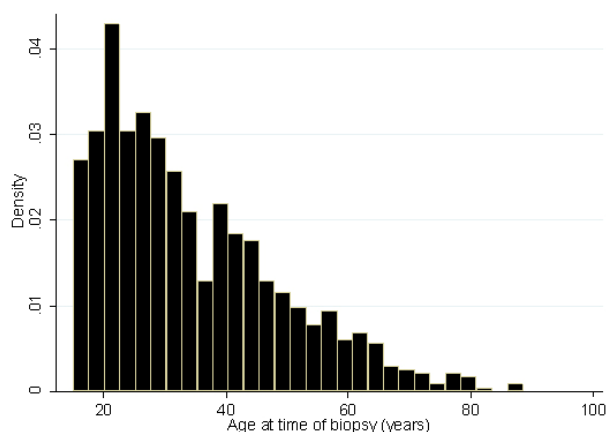
**Table 2.3.2(b): Age group at time of biopsy (years) for FSGS, 2005-2012**

Age group (years)	2005-2010		2011		2012		Total	
	n	%	n	%	n	%	n	%
15-<25	215	34.3	44	32.6	41	26.1	300	32.6
25-<35	164	26.2	47	34.8	41	26.1	252	27.4
35-<45	118	18.8	16	11.9	30	19.1	164	17.8
45-<55	66	10.5	13	9.6	24	15.3	103	11.2
55-<65	38	6.1	12	8.9	13	8.3	63	6.9
≥65	26	4.1	3	2.2	8	5.1	37	4.0
<b>Total</b>	<b>627</b>	<b>100</b>	<b>135</b>	<b>100</b>	<b>157</b>	<b>100</b>	<b>919</b>	<b>100</b>

**Figure 2.3.2(a): Demographic characteristics for FSGS, 2005-2012**



**Figure 2.3.2(b): Age at time of biopsy (years) FSGS, 2005-201**



### 2.3.3: Clinical presentation

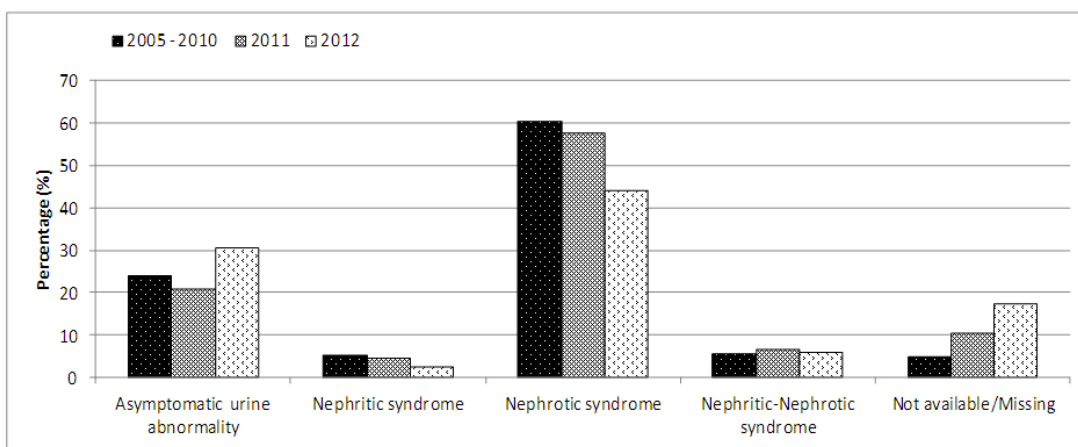
Nephrotic syndrome was the most common clinical presentation (57%), followed by asymptomatic urine abnormality (25%), nephritic-nephrotic syndrome (6%) and nephritic syndrome (5%) (Table & Figure 2.3.3(a)).

As compared to minimal change disease, more patients have hypertension and impaired renal function at presentation. Only half of the patients with FSGS have preserved renal function at presentation. (Table & Figure 2.3.3(b) & (c)).

**Table 2.3.3(a): Clinical presentation for FSGS, 2005-2012**

Clinical Presentations	2005-2010		2011		2012		Total	
	n	%	n	%	n	%	n	%
Asymptomatic urine abnormality	150	23.9	28	20.7	48	30.6	226	24.6
Nephritic syndrome	33	5.3	6	4.4	4	2.5	43	4.7
Nephrotic syndrome	380	60.6	78	57.8	69	43.9	527	57.3
Nephrotic-Nephritic syndrome	34	5.4	9	6.7	9	5.7	52	5.7
Not available/Missing	30	4.8	14	10.4	27	17.2	71	7.7
<b>Total</b>	<b>627</b>	<b>100</b>	<b>135</b>	<b>100</b>	<b>157</b>	<b>100</b>	<b>919</b>	<b>100</b>

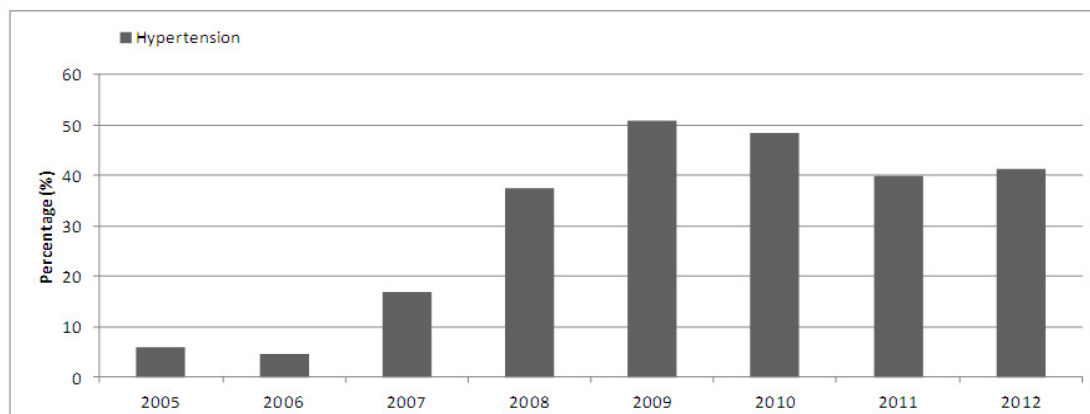
**Figure 2.3.3(a): Clinical presentation for FSGS, 2005-2012**



**Table 2.3.3(b): Presence of hypertension in FSGS, 2005-2012**

Hypertension	2005-2010		2011		2012		Total	
	n	%	n	%	n	%	n	%
Present	190	30.3	54	40.0	65	41.4	309	33.6
Absent	386	61.6	61	45.2	66	42.0	513	55.8
Not available/Missing	51	8.1	20	14.8	26	16.6	97	10.6
<b>Total</b>	<b>627</b>	<b>100</b>	<b>135</b>	<b>100</b>	<b>157</b>	<b>100</b>	<b>919</b>	<b>100</b>

**Figure 2.3.3(b): Presence of hypertension in FSGS, 2005-2012**

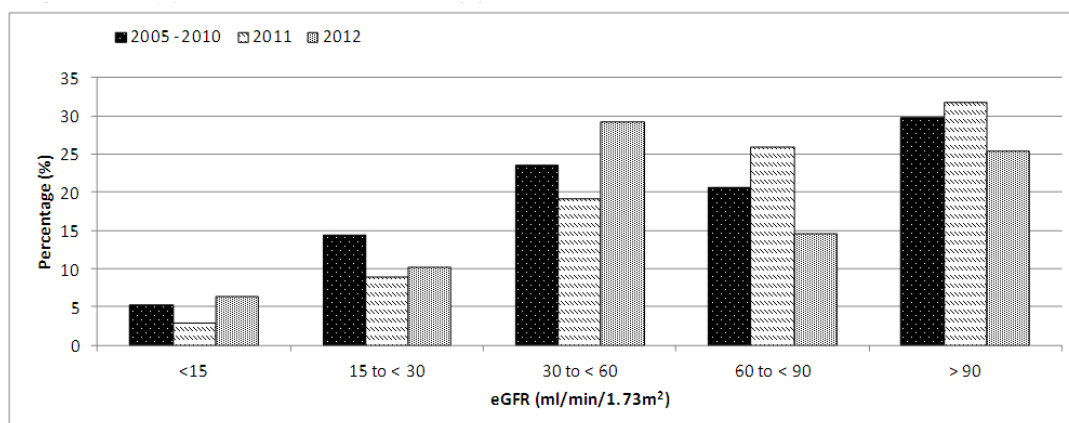


**Table 2.3.3 (c): Renal function in FSGS by year, 2005-2012**

GFR (ml/min/1.73m <sup>2</sup> )	2005-2010		2011		2012		Total	
	n	%	n	%	n	%	n	%
<15	33	5.3	4	3.0	10	6.4	47	5.1
15 to < 30	90	14.4	12	8.9	16	10.2	118	12.8
30 to < 60	148	23.6	26	19.3	46	29.3	220	23.9
60 to < 90	130	20.7	35	25.9	23	14.6	188	20.5
≥ 90	187	29.8	43	31.9	40	25.5	270	29.4
Missing	39	6.2	15	11.1	22	14.0	76	8.3
<b>Total</b>	<b>627</b>	<b>100</b>	<b>135</b>	<b>100</b>	<b>157</b>	<b>100</b>	<b>919</b>	<b>100</b>

\*76 cases are missing on GFR, including 14 cases with GFR>200 (GFR range between 205 to 1350)

**Figure 2.3.3 (c): Renal function in FSGS by year, 2005-2012**



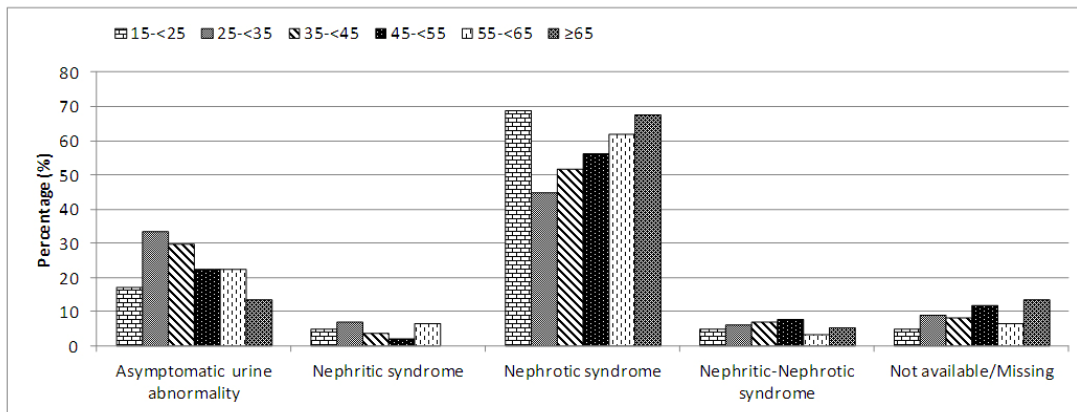
**2.3.3.1: Clinical presentation by age**

Nephrotic syndrome consistently dominated the clinical presentation throughout all age groups particularly in the very young (below 25 years) and those above 55 years. More patients presented with hypertension and impaired renal function with increasing age (Table 2.3.3.1(b) & (c)). Up to 62% and 78% of patients had impaired renal function at presentation for age group 55-<65 and ≥ 65 respectively. (Table & Figure 2.3.3.1(c))

**Table 2.3.3.1(a): Clinical presentation by age group for FSGS, 2005-2012**

Clinical Presentations	15-<25		25-<35		35-<45		45-<55		55-<65		≥65		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Asymptomatic urine abnormality	51	17.0	84	33.3	49	29.9	23	22.3	14	22.2	5	13.5	226	24.6
Nephritic syndrome	14	4.7	17	6.7	6	3.7	2	1.9	4	6.3	0	0.0	43	4.7
Nephrotic syndrome	207	69.0	113	44.8	85	51.8	58	56.3	39	61.9	25	67.6	527	57.3
Nephritic-Nephrotic syndrome	14	4.7	15	6.0	11	6.7	8	7.8	2	3.2	2	5.4	52	5.7
Not available	14	4.7	23	9.1	13	7.9	12	11.7	4	6.3	5	13.5	71	7.7
<b>Total</b>	<b>300</b>	<b>100</b>	<b>252</b>	<b>100</b>	<b>164</b>	<b>100</b>	<b>103</b>	<b>100</b>	<b>63</b>	<b>100</b>	<b>37</b>	<b>100</b>	<b>919</b>	<b>100</b>

**Figure 2.3.3.1(a): Clinical presentation by age group for FSGS, 2005-2012**



**Table 2.3.3.1(b): Hypertension by age group for FSGS, 2005-2012**

Hypertension	15-<25		25-<35		35-<45		45-<55		55-<65		≥65		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Present	67	22.3	67	26.6	71	43.3	52	50.5	35	55.6	17	45.9	309	33.6
Absent	203	67.7	149	59.1	84	51.2	40	38.8	20	31.7	17	45.9	513	55.8
Not available / Missing	30	10.0	36	14.3	9	5.5	11	10.7	8	12.7	3	8.1	97	10.6
<b>Total</b>	<b>300</b>	<b>100</b>	<b>252</b>	<b>100</b>	<b>164</b>	<b>100</b>	<b>103</b>	<b>100</b>	<b>63</b>	<b>100</b>	<b>37</b>	<b>100</b>	<b>919</b>	<b>100</b>

Figure 2.3.3.1(b): Hypertension by age group for FSGS, 2005-2012

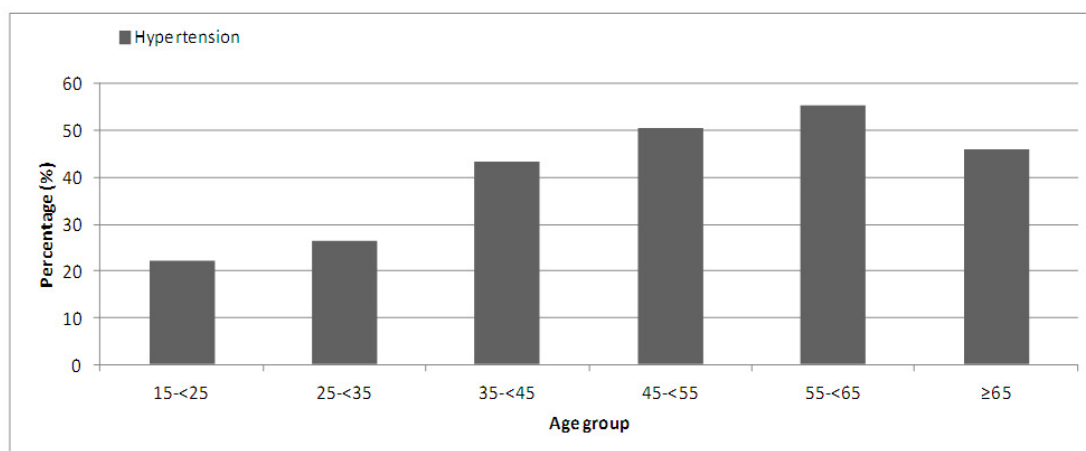
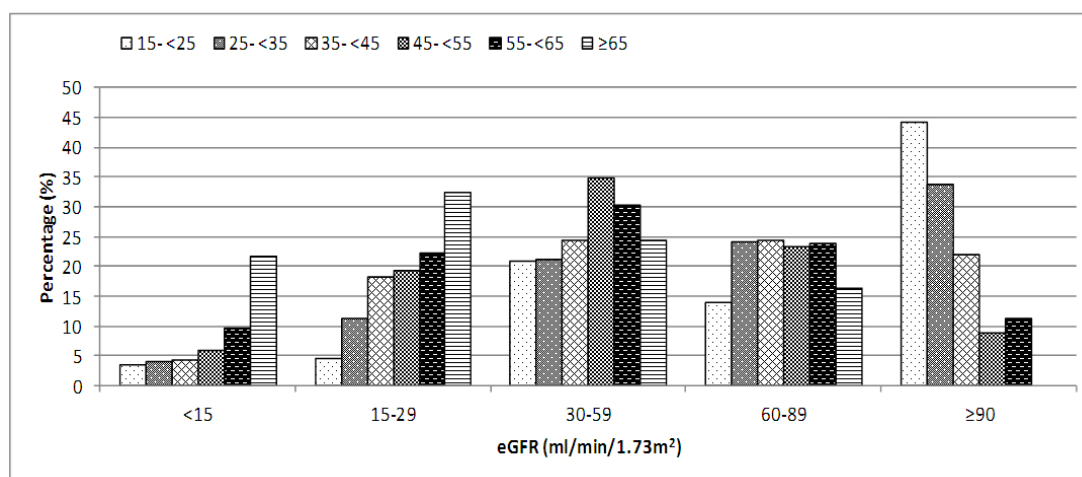


Table 2.3.3.1(c): Renal function at presentation by age group for FSGS, 2005-2012

eGFR (ml/min/1.73m <sup>2</sup> )	15-<25		25-<35		35-<45		45-<55		55-<65		≥65		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
<15	10	3.3	10	4.0	7	4.3	6	5.8	6	9.5	8	21.6	47	5.1
15-29	14	4.7	28	11.1	30	18.3	20	19.4	14	22.2	12	32.4	118	12.8
30-59	63	21.0	53	21.0	40	24.4	36	35.0	19	30.2	9	24.3	220	23.9
60-89	42	14.0	61	24.2	40	24.4	24	23.3	15	23.8	6	16.2	188	20.5
≥90	133	44.3	85	33.7	36	22.0	9	8.7	7	11.1	0	0.0	270	29.4
Missing*	38	12.7	15	6.0	11	6.7	8	7.8	2	3.2	2	5.4	76	8.3
<b>Total</b>	<b>300</b>	<b>100</b>	<b>252</b>	<b>100</b>	<b>164</b>	<b>100</b>	<b>103</b>	<b>100</b>	<b>63</b>	<b>100</b>	<b>37</b>	<b>100</b>	<b>919</b>	<b>100</b>

\*76 cases are missing on GFR, including 14 cases with GFR>200 (GFR range between 205 to 1350)

Figure 2.3.3.1(c): Renal function at presentation by age group for FSGS, 2005-2012



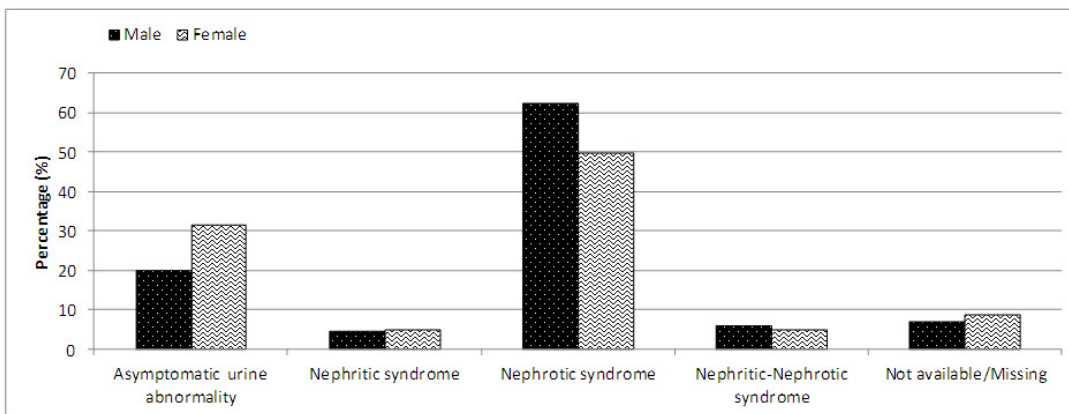
**2.3.3.2: Clinical presentation by gender**

Nephrotic syndrome appeared slightly more common in males and more females presented with asymptomatic urine abnormality. (Table 2.3.3.2(a)). There was no gender difference in the prevalence of hypertension and renal function at presentation (Table 2.3.3.2(b) & (c)).

**Table 2.3.3.2(a): Clinical presentation by gender for FSGS, 2005-2012**

Clinical Presentations	Male		Female	
	n	%	n	%
Asymptomatic urine abnormality	107	19.8	119	31.4
Nephritic syndrome	24	4.4	19	5.0
Nephrotic syndrome	338	62.6	189	49.9
Nephritic-Nephrotic syndrome	33	6.1	19	5.0
Not available	38	7.0	33	8.7
<b>Total</b>	<b>540</b>	<b>100</b>	<b>379</b>	<b>100</b>

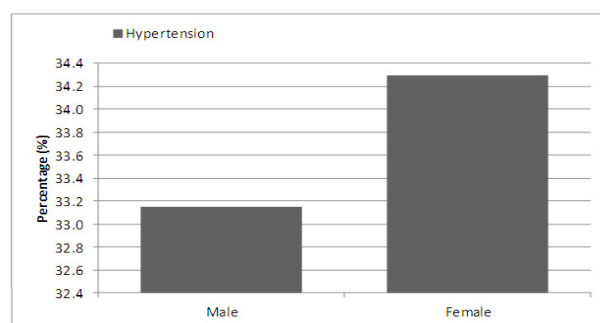
**Figure 2.3.3.2(a): Clinical presentation by gender for FSGS, 2005-2012**



**Table 2.3.3.2(b): Hypertension by gender for FSGS, 2005-2012**

Hypertension	Male		Female	
	n	%	n	%
Present	179	33.1	130	34.3
Absent	303	56.1	210	55.4
Not available/ Missing	58	10.7	39	10.3
<b>Total</b>	<b>540</b>	<b>100</b>	<b>379</b>	<b>100</b>

**Figure 2.3.3.2(b): Hypertension by gender for FSGS, 2005-2012**



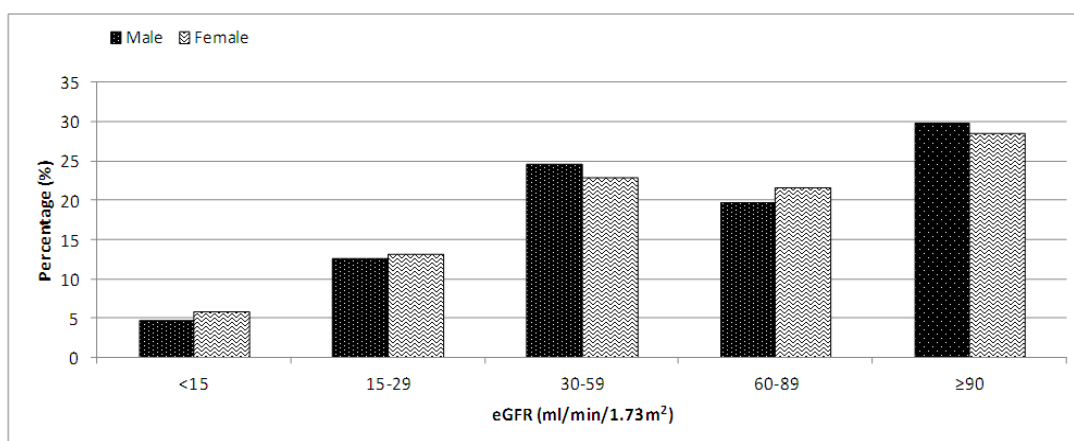


**Table 2.2.3.2(c): Renal function by gender for FSGS, 2005-2012**

eGFR (ml/min/1.73m <sup>2</sup> )	Male		Female	
	n	%	n	%
<15	25	4.6	22	5.8
15-29	68	12.6	50	13.2
30-59	133	24.6	87	23.0
60-89	106	19.6	82	21.6
≥90	162	30.0	108	28.5
Missing*	46	8.5	30	7.9
<b>Total</b>	<b>540</b>	<b>100</b>	<b>379</b>	<b>100</b>

\*76 cases are missing on GFR, including 14 cases with GFR>200 (GFR range between 205 to 1350)

**Figure 2.3.3.2(c): Renal function by gender for FSGS, 2005-2012**



### 2.3.4: Outcome of FSGS

The outcome of FSGS was reasonable, though less favourable compared with minimal change disease. The 5-year patient and renal survival was 86% and 87% respectively.

**Table 2.3.4(a): Patient survival estimates for death in FSGS, 2005-2012**

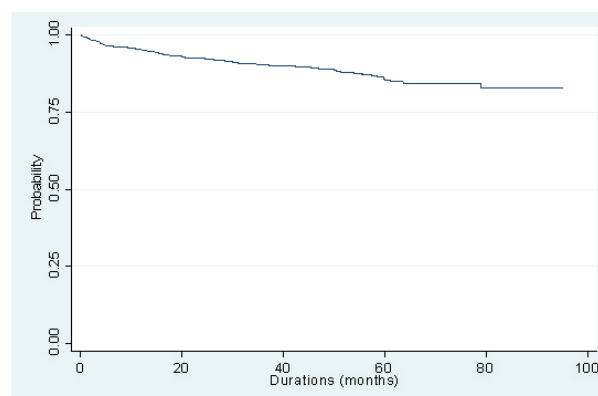
Interval (months)	Patients survival		
	n	% survival	SE
0	879	100	-
12	676	95	0.008
24	514	92	0.010
36	385	90	0.012
48	278	89	0.013
60	187	86	0.017
72	111	85	0.018

Event= death;

Status as at 31<sup>st</sup> Dec 2012 or last follow-up

\*Missing of 2 censored cases and 1 event case where the outcome date < date of 1<sup>st</sup> biopsy

**Figure 2.3.4(a): Patient Survival estimates for death in FSGS 2005-2012**

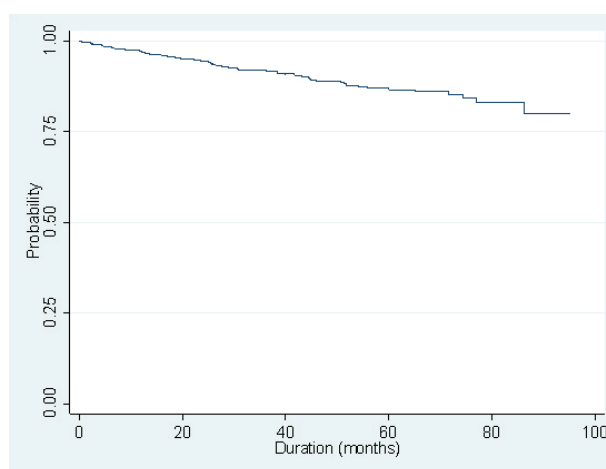


**Table 2.3.4(b): Renal survival estimates for death in FSGS, 2005 2012**

Interval (months)	Patients survival		
	n	% survival	SE
0	878	100	-
12	673	97	0.006
24	512	94	0.009
36	382	92	0.011
48	275	89	0.014
60	185	87	0.017
72	111	85	0.019

Event = ESRF;  
Status as at 31<sup>st</sup> Dec 2012 or died or last follow-up  
\*Missing of 3 censored and 1 event case where the outcome date < date of 1<sup>st</sup> biopsy

**Figure 2.3.4(b): Renal Survival estimates for death in FSGS 2005-2012**



## 2.4: IgA Nephropathy (IgAN)

### 2.4.1: Introduction

IgAN is defined by the predominant deposition of IgA in the glomerular mesangium although light microscopic appearances and clinical features can vary considerably due to the various patterns of histopathologic injury found in this glomerulonephritis.

### 2.4.2: Patient Population and Characteristics

Over the 8-year period of data collection there were 303 reported cases of IgAN. The mean age at biopsy was 33.5 ± 12.2 years, and the majority of cases (81.3%) were between ages 15 to 45 years ( Figure 2.5.2 (b)). As suggested in the previous report, there is slight female preponderance in our cohort (57.0 % vs. 43.0 %). This is contrary to what has been reported in the literature but may reflect local nephrology practice where the threshold for biopsying females is lower due to the relatively high incidence of SLE. The ethnic distribution was Malays (57.3%), followed by Chinese (25.8%),Others (10.3%) and Indians (6.6%) (Table 2.5.2(a)).

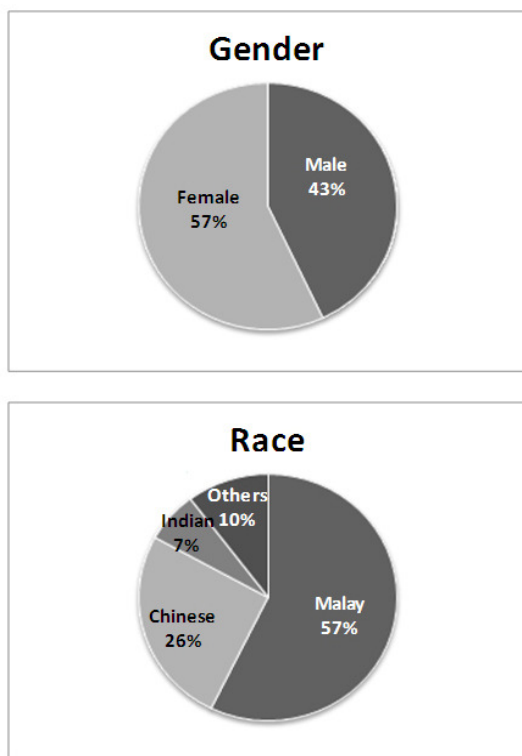
**Table 2.4.2(a): Demographic characteristics for IgAN, 2005-2012**

Demographic Characteristics		n	%
Age (year)	Mean (SD)	33.46 (12.22)	
	Median (IQR)	31.48 (17.11)	
	Min, max	15.02, 85.25	
Gender	Male	305	43.02
	Female	404	56.98
Race	Malay	406	57.26
	Chinese	183	25.81
	Indian	47	6.63
	Others	73	10.3

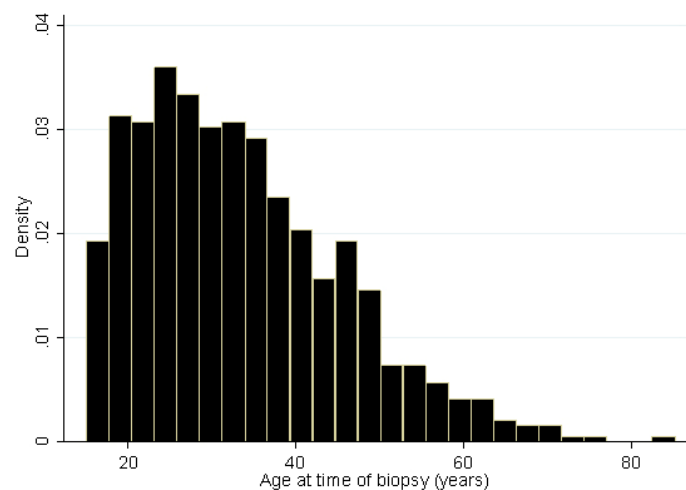
**Table 2.4.2(b): Age group at time of biopsy (years) for IgAN, 2005-2012**

Age group (years)	2005-2010		2011		2012		Total	
	n	%	n	%	n	%	n	%
15-<25	134	30.7	42	28.6	27	21.6	203	28.6
25-<35	129	29.5	46	31.3	47	37.6	222	31.3
35-<45	97	22.2	29	19.7	26	20.8	152	21.4
45-<55	50	11.4	22	15.0	16	12.8	88	12.4
55-<65	20	4.6	6	4.1	8	6.4	34	4.8
≥65	7	1.6	2	1.4	1	0.8	10	1.4
<b>Total</b>	<b>437</b>	<b>100</b>	<b>147</b>	<b>100</b>	<b>125</b>	<b>100</b>	<b>709</b>	<b>100</b>

**Figure 2.4.2(a): Demographic characteristics for IgAN, 2005-2012**



**Figure 2.4.2(b): Age at time of biopsy (year) IgAN, 2005-2012**



### 2.4.3: Clinical presentation

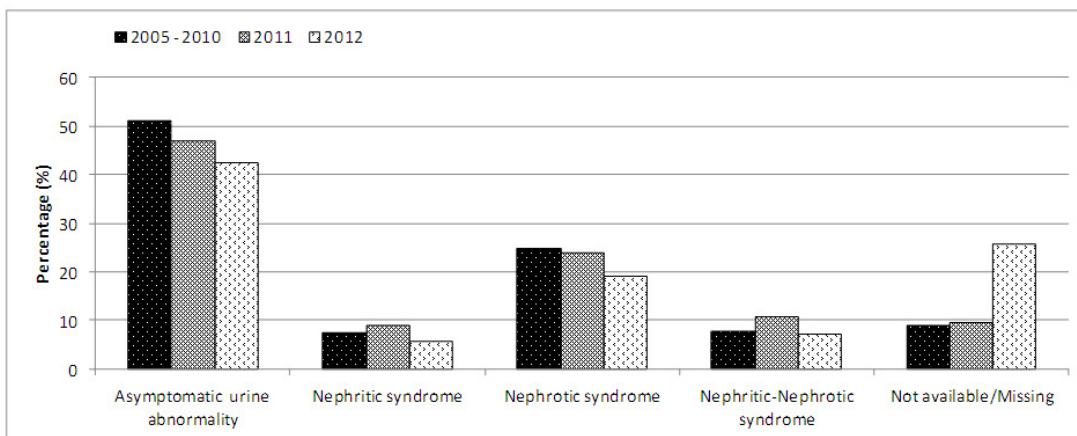
Asymptomatic urine abnormalities remains the most common presentation of IgAN (48.7%). Up to 23.6% of those who were biopsied had nephrotic syndrome (Table 2.5.3 (a)). This figure was much higher than the 5% quoted in literature but may reflect relatively conservative local practices with regards to investigation of asymptomatic urine abnormalities. However, the number of cases for whom data was missing on clinical presentation in the year 2012 has also increased to as much as a quarter of the total, so interpretation of the data has to be cautious. This trend of an increase in missing data is unfortunately also seen for blood pressure and GFR.

At presentation, hypertension was present in 44.4% of patients overall, and almost half of the patients (47.1%) had eGFR < 60 ml/min/1.73m<sup>2</sup> (Tables 2.4.3 (b) and 2.4.3(c)).

**Table 2.4.3(a): Clinical presentation for IgAN, 2005-2012**

Clinical Presentations	2005-2010		2011		2012		Total	
	n	%	n	%	n	%	n	%
Asymptomatic urine abnormality	223	51.0	69	46.9	53	42.4	345	48.7
Nephritic syndrome	33	7.6	13	8.8	7	5.6	53	7.5
Nephrotic syndrome	108	24.7	35	23.8	24	19.2	167	23.6
Nephrotic-Nephritic syndrome	34	7.8	16	10.9	9	7.2	59	8.3
Not available/Missing	39	8.9	14	9.5	32	25.6	85	12.0
<b>Total</b>	<b>437</b>	<b>100</b>	<b>147</b>	<b>100</b>	<b>125</b>	<b>100</b>	<b>709</b>	<b>100</b>

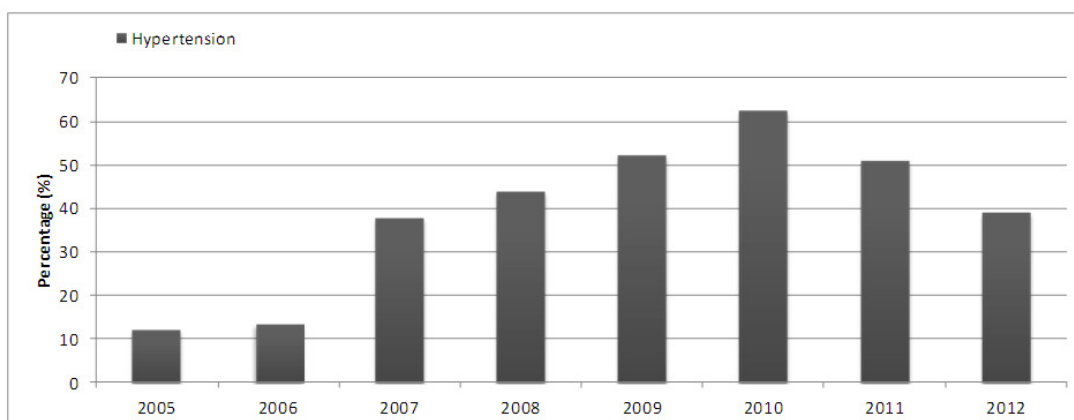
**Figure 2.4.3(a): Clinical presentation for IgAN, 2005-2012**



**Table 2.4.3(b): Presence of hypertension in IgAN, 2005-2012**

Hypertension	2005-2010		2011		2012		Total	
	n	%	n	%	n	%	n	%
Present	191	43.7	75	51.0	49	39.2	315	44.4
Absent	218	49.9	49	33.3	45	36.0	312	44.0
Not available/ Missing	28	6.4	23	15.6	31	24.8	82	11.6
<b>Total</b>	<b>437</b>	<b>100</b>	<b>147</b>	<b>100</b>	<b>125</b>	<b>100</b>	<b>709</b>	<b>100</b>

**Figure 2.4.3(b): Presence of hypertension in IgAN, 2005-2012**

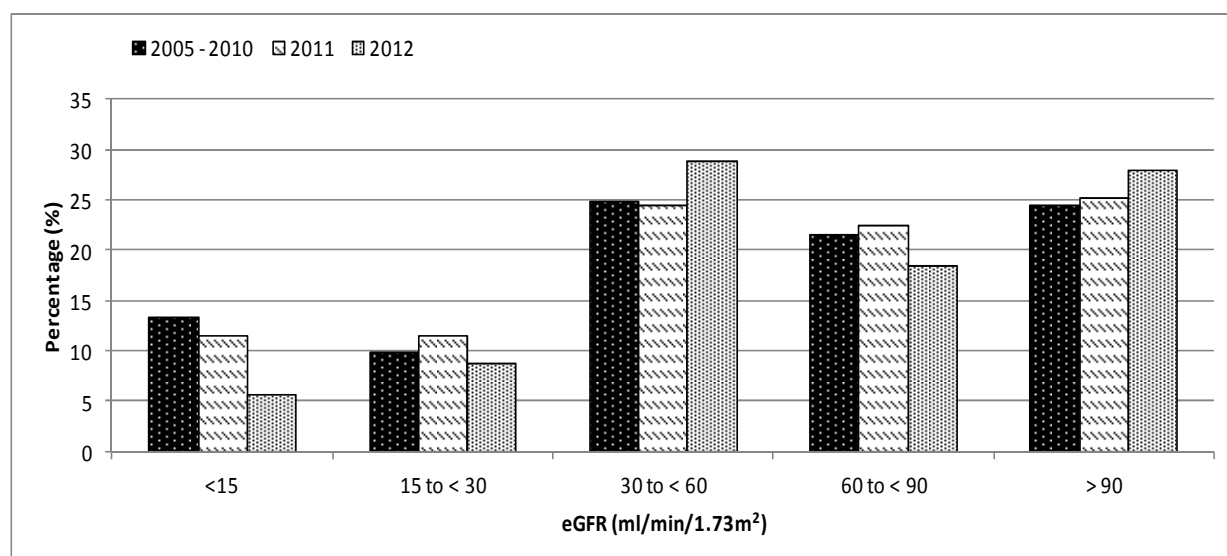


**Table 2.4.3(c): Renal function in IgAN by year, 2005-2012**

GFR (ml/min/1.73m <sup>2</sup> )	2005-2010		2011		2012		Total
	n	%	n	%	n	%	n
<15	58	13.3	17	11.6	7	5.6	82
15 to < 30	43	9.8	17	11.6	11	8.8	71
30 to < 60	109	24.9	36	24.5	36	28.8	181
60 to < 90	94	21.5	33	22.4	23	18.4	150
≥ 90	107	24.5	37	25.2	35	28	179
Missing	26	5.9	7	4.8	13	10.4	46
<b>Total</b>	<b>437</b>	<b>100</b>	<b>147</b>	<b>100</b>	<b>125</b>	<b>100</b>	<b>709</b>

\*46 cases are missing on GFR, including 2 cases with GFR>200 (GFR range between 727 to 1690)

**Figure 2.4.3 (c): Renal function in IgAN by year, 2005-2012**



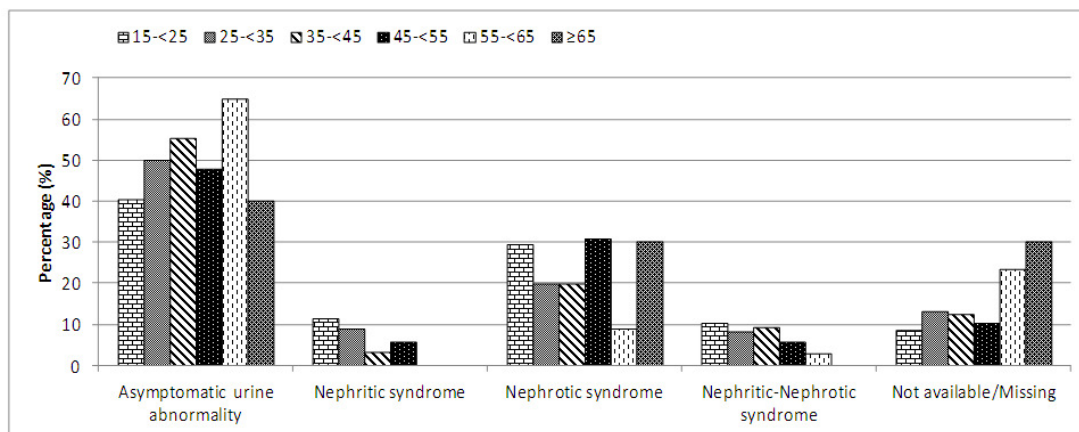
### 2.4.3.1: Clinical presentation by age

Asymptomatic urine abnormality (48.7%) was the most common clinical presentation for minimal change disease throughout all age groups, followed by nephrotic syndrome (23.6%) (Table 2.4.3.1). However, the presence of hypertension increased with increasing age (Figure 2.2.3.1(b)). The same pattern was observed for impaired eGFR. Looking at the extremes of age groups, patients with impaired renal function (eGFR< 60ml/min/1.73m<sup>2</sup>) were 36.5% as compared to 80% respectively for age groups 15 to <25 and ≥65.

**Table 2.4.3.1(a): Clinical presentation by age group for IgAN, 2005-2012**

Clinical Presentations	15-<25		25-<35		35-<45		45-<55		55-<65		≥65		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Asymptomatic urine abnormality	82	40.4	111	50.0	84	55.3	42	47.7	22	64.7	4	40.0	345	48.7
Nephritic syndrome	23	11.3	20	9.0	5	3.3	5	5.7	0	0.0	0	0.0	53	7.5
Nephrotic syndrome	60	29.6	44	19.8	30	19.7	27	30.7	3	8.8	3	30.0	167	23.6
Nephritic-Nephrotic syndrome	21	10.3	18	8.1	14	9.2	5	5.7	1	2.9	0	0.0	59	8.3
Not available	17	8.4	29	13.1	19	12.5	9	10.2	8	23.5	3	30.0	85	12.0
<b>Total</b>	<b>203</b>	<b>100</b>	<b>222</b>	<b>100</b>	<b>152</b>	<b>100</b>	<b>88</b>	<b>100</b>	<b>34</b>	<b>100</b>	<b>10</b>	<b>100</b>	<b>709</b>	<b>100</b>

**Figure 2.4.3.1(a): Clinical presentation by age group for IgAN, 2005-2012**



**Table 2.4.3.1(b): Hypertension by age group for IgAN, 2005-2012**

Hypertension	15-<25		25-<35		35-<45		45-<55		55-<65		≥65		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Present	78	38.4	92	41.4	74	48.7	48	54.5	16	47.1	7	70.0	315	44.4
Absent	106	52.2	98	44.1	62	40.8	30	34.1	13	38.2	3	30.0	312	44.0
Not available / Missing	19	9.4	32	14.4	16	10.5	10	11.4	5	14.7	0	0.0	82	11.6
<b>Total</b>	<b>203</b>	<b>100</b>	<b>222</b>	<b>100</b>	<b>152</b>	<b>100</b>	<b>88</b>	<b>100</b>	<b>34</b>	<b>100</b>	<b>10</b>	<b>100</b>	<b>709</b>	<b>100</b>

Figure 2.4.3.1(b): Hypertension by age group for IgAN, 2005-2012

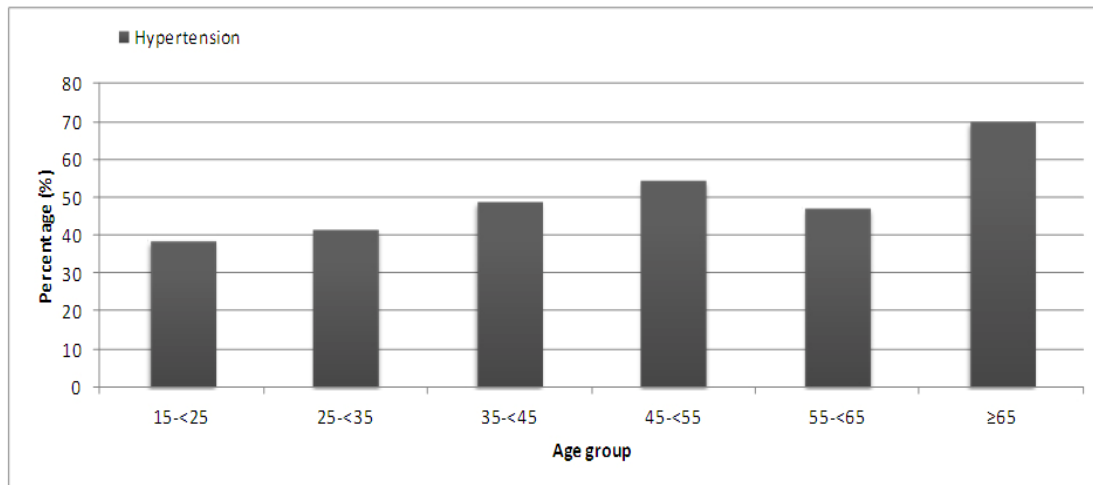
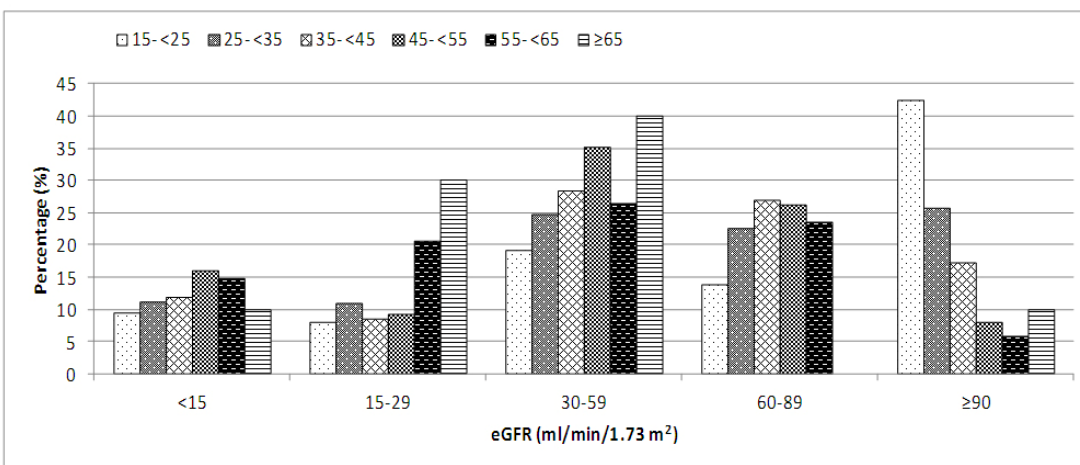


Table 2.4.3.1(c): Renal function on by age group for IgAN, 2005-2012

eGFR (ml/min/1.73m <sup>2</sup> )	15-<25		25-<35		35-<45		45-<55		55-<65		≥65		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
<15	19	9.4	25	11.3	18	11.8	14	15.9	5	14.7	1	10.0	82	11.6
15-29	16	7.9	24	10.8	13	8.6	8	9.1	7	20.6	3	30.0	71	10.0
30-59	39	19.2	55	24.8	43	28.3	31	35.2	9	26.5	4	40.0	181	25.5
60-89	28	13.8	50	22.5	41	27.0	23	26.1	8	23.5	0	0.0	150	21.2
≥90	86	42.4	57	25.7	26	17.1	7	8.0	2	5.9	1	10.0	179	25.2
Missing*	15	7.4	11	5.0	11	7.2	5	5.7	3	8.8	1	10.0	46	6.5
<b>Total</b>	<b>203</b>	<b>100</b>	<b>222</b>	<b>100</b>	<b>152</b>	<b>100</b>	<b>88</b>	<b>100</b>	<b>34</b>	<b>100</b>	<b>10</b>	<b>100</b>	<b>709</b>	<b>100</b>

Figure 2.4.3.1(c): Renal function at presentation by age group for IgAN, 2005-2012

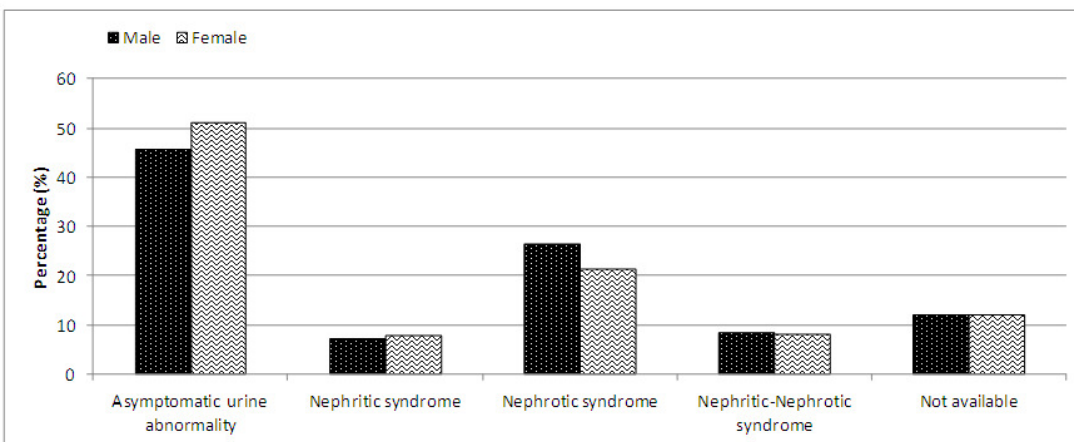


**2.4.3.2: Clinical presentation by gender**

There was no difference between genders in terms of clinical presentation, except perhaps a lower threshold for renal biopsy for asymptomatic urine abnormality in females. There was perhaps a trend towards an increased presence of hypertension in males (but the significant percentage of missing data pertaining to this variable, especially for females, makes data interpretation difficult). Renal function at presentation was similar (Table 2.2.3.2 (a, b & c)).

**Table 2.4.3.2(a): Clinical presentation by gender for IgAN, 2005-2012**

Clinical Presentations	Male		Female	
	n	%	n	%
Asymptomatic urine abnormality	139	45.6	206	51.0
Nephritic syndrome	22	7.2	31	7.7
Nephrotic syndrome	81	26.6	86	21.3
Nephritic-Nephrotic syndrome	26	8.5	33	8.2
Not available	37	12.1	48	11.9
<b>Total</b>	<b>305</b>	<b>100</b>	<b>404</b>	<b>100</b>

**Figure 2.4.3.2(a): Clinical presentation by gender for IgAN, 2005-2012****Table 2.4.3.2(b): Hypertension by gender for IgAN, 2005-2012**

Hypertension	Male		Female	
	n	%	n	%
Present	149	48.9	166	41.1
Absent	128	42.0	184	45.5
Not available/ Missing	28	9.2	54	13.4
<b>Total</b>	<b>305</b>	<b>100</b>	<b>404</b>	<b>100</b>



Figure 2.4.3.2(b): Hypertension by gender for IgAN, 2005-2012

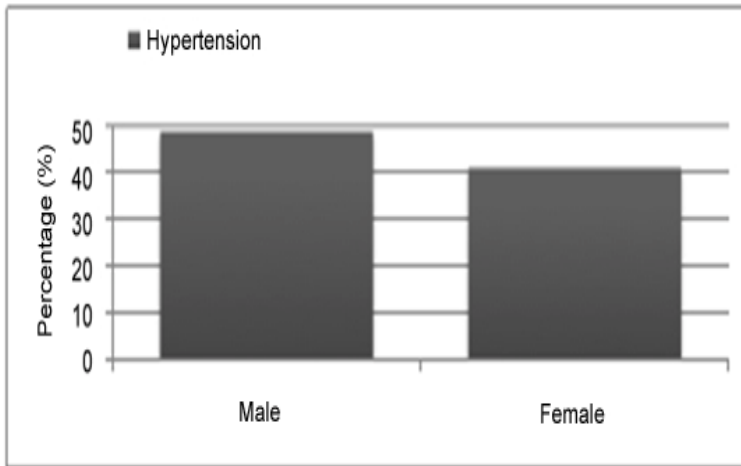
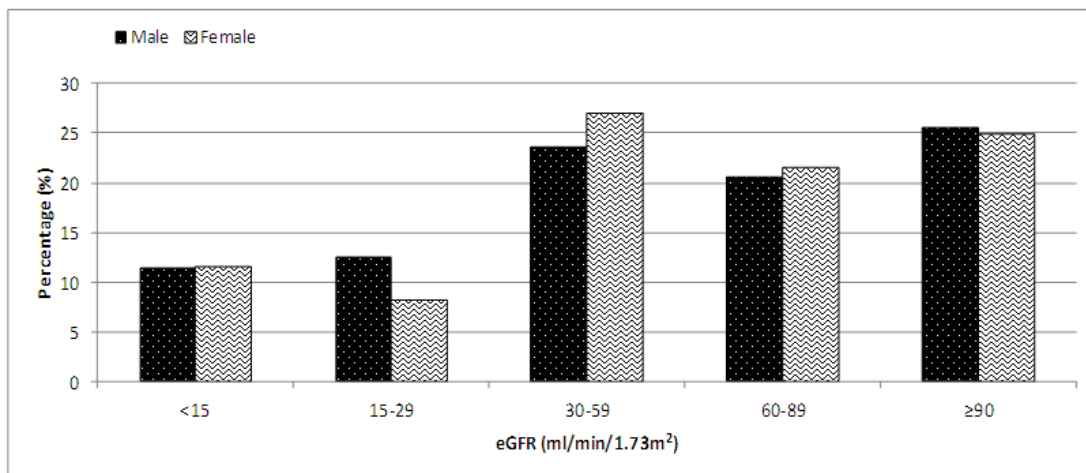


Table 2.4.3.2(c): Renal function by gender for IgAN, 2005-2012

GFR (ml/min/1.73m <sup>2</sup> )	Male		Female	
	n	%	n	%
<15	35	11.5	47	11.6
15 to < 30	38	12.5	33	8.2
30 to < 60	72	23.6	109	27.0
60 to < 90	63	20.7	87	21.5
≥ 90	78	25.6	101	25.0
Missing	19	6.2	27	6.7
<b>Total</b>	<b>305</b>	<b>100</b>	<b>404</b>	<b>100</b>

\*46 cases are missing on GFR, including 2 cases with GFR>200 (GFR range between 727 to 1690)

Figure 2.4.3.2(c): Renal function by gender for IgAN, 2005-2012



### 2.4.4: Outcome of IgA nephropathy

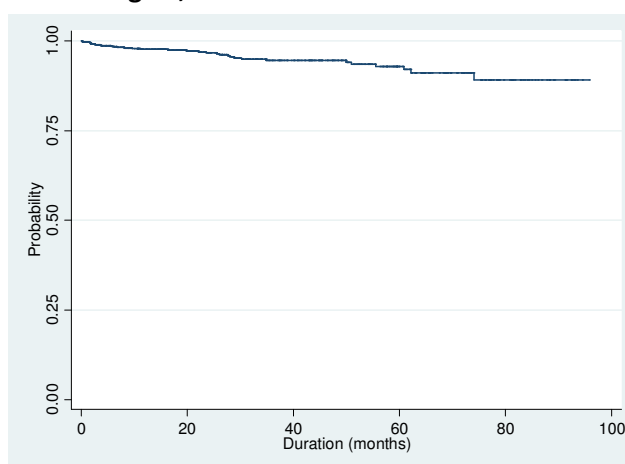
Five year patient and renal survival were 93% and 78% respectively . There is not much published data on patient survival but in one Korean study ( Lee H et al, 2012) the 10 year patient survival was 96.3% with more than 50% deaths occurring without ESRD progression. In terms of renal survival, the rate of progression to ESRD within 20-25 years is generally reported to be 25-30%, and hence our local rate measured over a shorter period seems to be higher. This may reflect the fact that IgAN in Malaysia has a different natural history and progression, especially when we have seen that close to 25% of patients are presenting with nephrotic range proteinuria.

**Table 2.4.4(a): Patient survival estimates for death in IgAN, 2005-2012**

Interval (months)	Patients survival		
	n	% survival	SE
0	689	100	-
12	505	98	0.006
24	366	97	0.008
36	271	95	0.011
48	195	95	0.011
60	105	93	0.014
72	58	91	0.019

Event = death;  
 Status as at 31 Dec 2012 or last follow-up  
 \*Missing of 3 censored cases where the outcome date < date of 1st biopsy

**Figure 2.4.4(a): Patient Survival estimates for death in IgAN, 2005-2012**

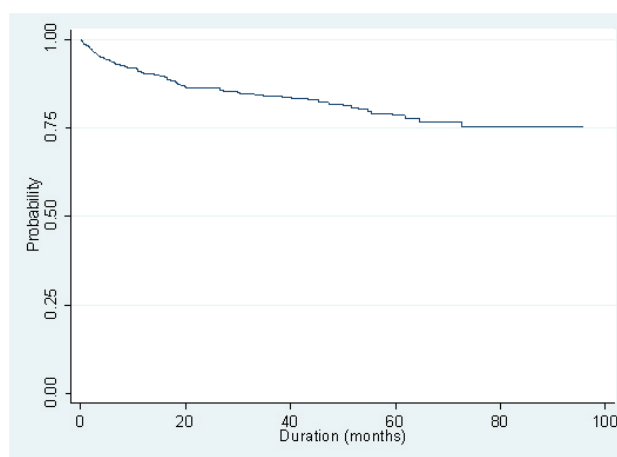


**Table 2.4.4(b): Renal survival estimates for death in IgAN, 2005-2012**

Interval (months)	Patients survival		
	n	% survival	SE
0	689	100	-
12	505	98	0.006
24	366	97	0.008
36	271	95	0.011
48	195	95	0.011
60	105	93	0.014
72	58	91	0.019

Event = death;  
 Status as at 31 Dec 2012 or last follow-up  
 \*Missing of 3 censored cases where the outcome date < date of 1st biopsy

**Figure 2.4.4(b): Renal Survival estimates for death in IgAN 2005-2012**



## 2.5: Idiopathic Membranous Nephropathy (IMN)

### 2.5.1: Introduction

Membranous nephropathy is characterised by subepithelial immune deposits with spikes and thickening of the basement membrane. The absence of associated hypercellularity or glomerular inflammation confirms the diagnosis.

In Malaysia, Idiopathic Membranous Nephropathy is the fourth most commonly reported primary glomerulonephritis but only contributes to 9.2% of the total .

### 2.5.2: Patient Population and Characteristics

Over the eight year period from 2005-2012, 290 cases of Idiopathic membranous nephropathy (IMN) were reported to the registry. The mean age at biopsy was 45.30 + 14.97 years (Table 2.5.2(a)). Unlike Caucasians where IMN is most commonly diagnosed in the 5th and 6th decades of life, in our registry there is a peak incidence in IMN between the ages of 35 to 55 years( Figure 2.5.2(b))

Overall, there was no significant gender difference. The racial distribution was 40% in Malays, 35.5% in Chinese, 10.3 % in Indians and 13.8% in others (Table and Figure 2.5.2(a)). Unlike the other main glomerulonephritides where the ethnic distribution roughly parallels the racial composition of the general population, for IMN there appears to be slightly higher incidence in the Chinese race.

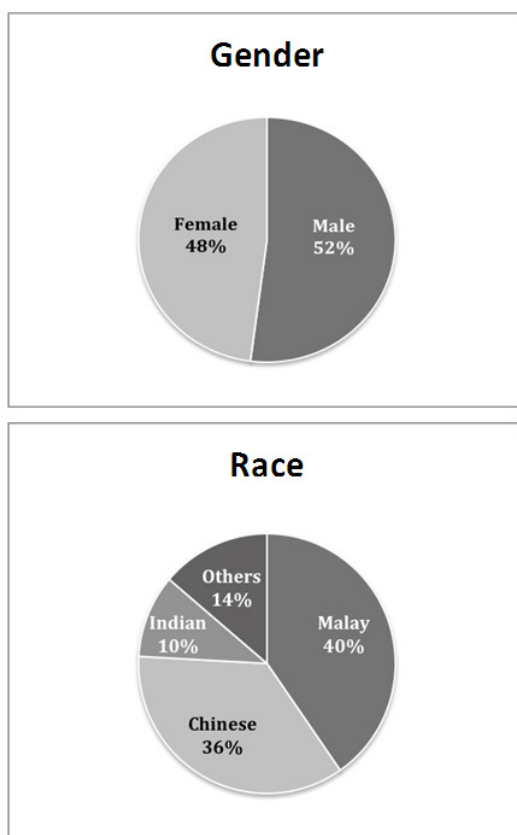
**Table 2.5.2(a): Demographic characteristics for IMN, 2005-2012**

Demographic Characteristics		n	%
Age (year)	Mean (SD)	45.30 (14.97)	
	Median (IQR)	46.21 (23.18)	
	Min, max	15.11, 84.35	
Gender	Male	151	52.1
	Female	139	47.9
Race	Malay	117	40.3
	Chinese	103	35.5
	Indian	30	10.3
	Others	40	13.8

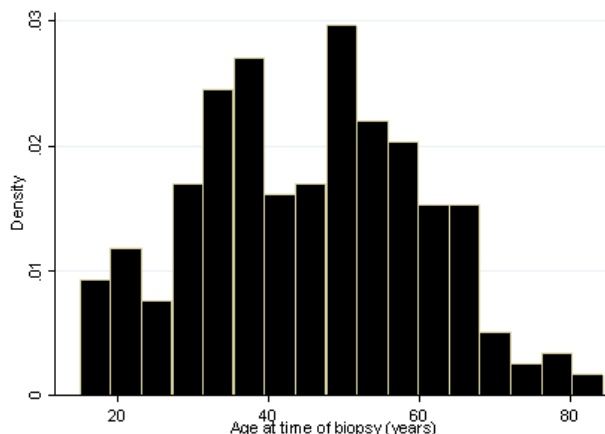
**Table 2.5.2(b): Age group at time of biopsy (years) for IMN, 2005-2012**

Age group (years)	2005-2010		2011		2012		Total	
	n	%	n	%	n	%	n	%
15-<25	20	10.1	4	8.7	5	10.9	29	10.0
25-<35	38	19.2	7	15.2	8	17.4	53	18.3
35-<45	42	21.2	8	17.4	8	17.4	58	20.0
45-<55	46	23.2	12	26.1	13	28.3	71	24.5
55-<65	32	16.2	8	17.4	10	21.7	50	17.2
≥65	20	10.1	7	15.2	2	4.3	29	10.0
<b>Total</b>	<b>198</b>	<b>100</b>	<b>46</b>	<b>100</b>	<b>46</b>	<b>100</b>	<b>290</b>	<b>100</b>

**Figure 2.5.2(a): Demographic characteristics for IMN, 2005-2012**



**Figure 2.5.2(b): Age at time of biopsy (years) for IMN, 2005-2012**



**2.5.3: Clinical presentation**

The majority of patients (67.6%) presented with overt nephrotic syndrome. The next commonest clinical presentation was asymptomatic urinary abnormalities, accounting for another 21.7% (Table & Figure 2.5.3(a)). Hypertension was found in 34.8 % of cases (Table 2.5.3 (b)) and almost one-third of patients (31.8%) presented with eGFR< 60mls/min (Table 2.5.3(c)).

**Table 2.5.3(a): Clinical presentation for IMN, 2005-2012**

Clinical Presentations	2005 - 2010		2011		2012		Total	
	n	%	n	%	n	%	n	%
Asymptomatic urine abnormality	47	23.7	9	19.6	7	15.2	63	21.7
Nephritic syndrome	3	1.5	1	2.2	0	0.0	4	1.4
Nephrotic syndrome	135	68.2	31	67.4	30	65.2	196	67.6
Nephritic-Nephrotic syndrome	6	3.0	2	4.3	3	6.5	11	3.8
Not available	7	3.5	3	6.5	6	13.0	16	5.5
<b>Total</b>	<b>198</b>	<b>100</b>	<b>46</b>	<b>100</b>	<b>46</b>	<b>100</b>	<b>290</b>	<b>100</b>

Figure 2.5.3(a): Clinical presentation for IMN, 2005-2012

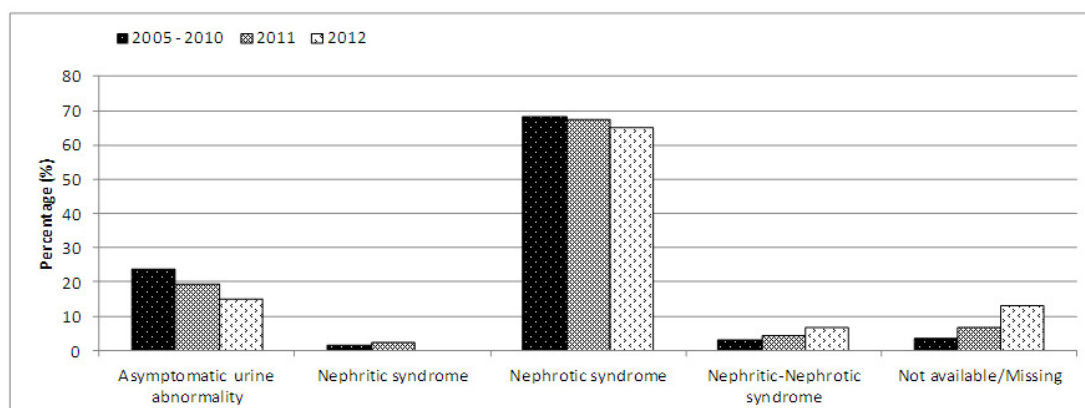


Table 2.5.3(b): Presence of hypertension in IMN, 2005-2012

Hypertension	2005-2010		2011		2012		Total	
	n	%	n	%	n	%	n	%
Present	54	27.3	25	54.3	22	47.8	101	34.8
Absent	132	66.7	17	37.0	13	28.3	162	55.9
Not available/ Missing	12	6.1	4	8.7	11	23.9	27	9.3
<b>Total</b>	<b>198</b>	<b>100</b>	<b>46</b>	<b>100</b>	<b>46</b>	<b>100</b>	<b>290</b>	<b>100</b>

Figure 2.5.3(b): Presence of hypertension in IMN, 2005-2012

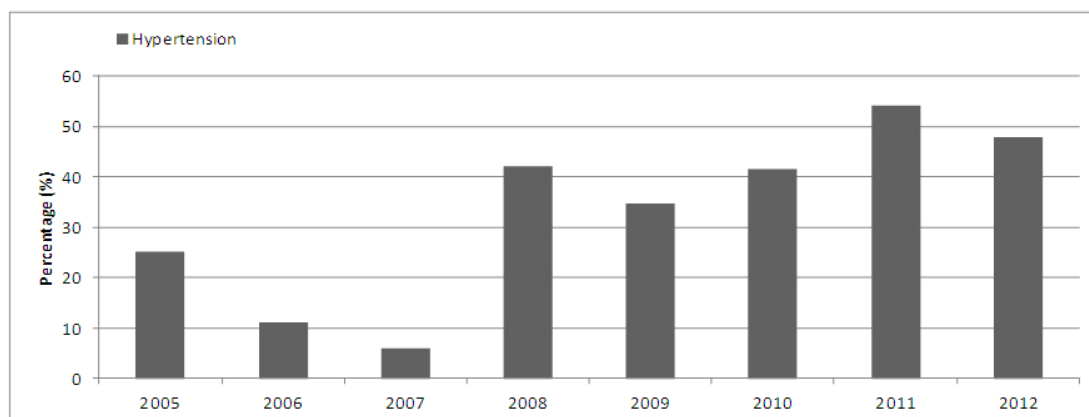


Table 2.5.3(c): Renal function in IMN by year, 2005-2012

GFR (ml/min/1.73m <sup>2</sup> )	2005-2010		2011		2012		Total	
	n	%	n	%	n	%	n	%
<15	5	2.5	2	4.3	4	8.7	11	3.8
15 to < 30	15	7.6	1	2.2	1	2.2	17	5.9
30 to < 60	43	21.7	12	26.1	9	19.6	64	22.1
60 to < 90	56	28.3	9	19.6	10	21.7	75	25.9
≥ 90	68	34.3	17	37.0	18	39.1	103	35.5
Missing	11	5.6	5	10.9	4	8.7	20	6.9
<b>Total</b>	<b>198</b>	<b>100</b>	<b>46</b>	<b>100</b>	<b>46</b>	<b>100</b>	<b>290</b>	<b>100</b>

\*20 cases are missing on GFR, including 7 cases with GFR>200 (GFR range between 201 to 1312)

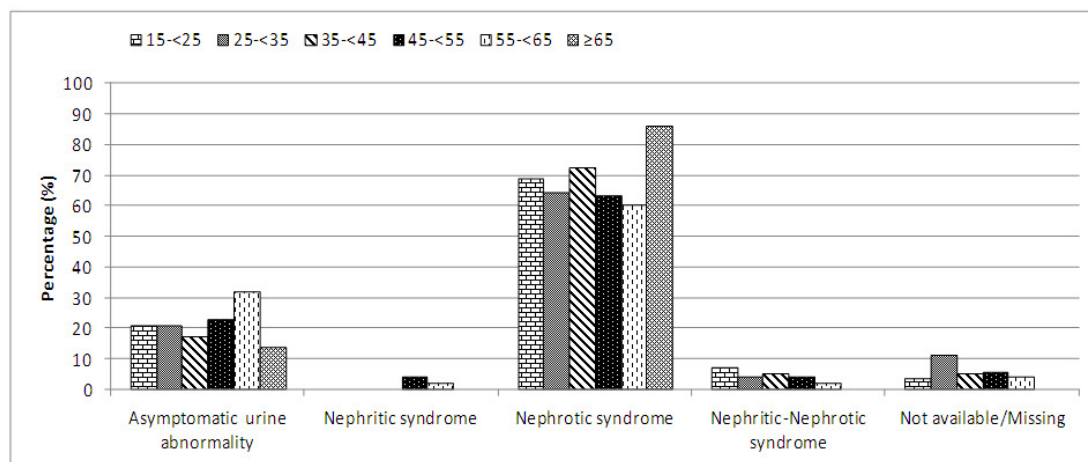
**2.5.3.1: Clinical presentation by age**

Nephrotic syndrome remained the commonest clinical presentation across all age groups (Table 2.5.3.1 (a)). Nephrotic-nephritic syndrome is more common among the younger age group between 15-25 years. As expected, there is an increased incidence of hypertension and renal impairment with increasing age (Tables & Figures 2.5.3.1(b) and (c)).

**Table 2.5.3.1(a): Clinical presentation by age group for IMN, 2005-2012**

Clinical Presentations	15-<25		25-<35		35-<45		45-<55		55-<65		≥65		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Asymptomatic urine abnormality	6	20.7	11	20.8	10	17.2	16	22.5	16	32.0	4	13.8	63	21.7
Nephritic syndrome	0	0.0	0	0.0	0	0.0	3	4.2	1	2.0	0	0.0	4	1.4
Nephrotic syndrome	20	69.0	34	64.2	42	72.4	45	63.4	30	60.0	25	86.2	196	67.6
Nephritic-Nephrotic syndrome	2	6.9	2	3.8	3	5.2	3	4.2	1	2.0	0	0.0	11	3.8
Not available	1	3.4	6	11.3	3	5.2	4	5.6	2	4.0	0	0.0	16	5.5
<b>Total</b>	<b>29</b>	<b>100</b>	<b>53</b>	<b>100</b>	<b>58</b>	<b>100</b>	<b>71</b>	<b>100</b>	<b>50</b>	<b>100</b>	<b>29</b>	<b>100</b>	<b>290</b>	<b>100</b>

**Figure 2.5.3.1(a): Clinical presentation by age group for IMN, 2005-2012**



**Figure 2.5.3.1(b): Hypertension by age group for IMN, 2005-2012**

Hypertension	15-<25		25-<35		35-<45		45-<55		55-<65		≥65		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Present	9	31.0	12	22.6	21	36.2	22	31.0	22	44.0	15	51.7	101	34.8
Absent	19	65.5	35	66.0	32	55.2	40	56.3	23	46.0	13	44.8	162	55.9
Not available / Missing	1	3.4	6	11.3	5	8.6	9	12.7	5	10.0	1	3.4	27	9.3
<b>Total</b>	<b>29</b>	<b>100</b>	<b>53</b>	<b>100</b>	<b>58</b>	<b>100</b>	<b>71</b>	<b>100</b>	<b>50</b>	<b>100</b>	<b>29</b>	<b>100</b>	<b>290</b>	<b>100</b>

Figure 2.5.3.1(b): Hypertension by age group for IMN, 2005-2012

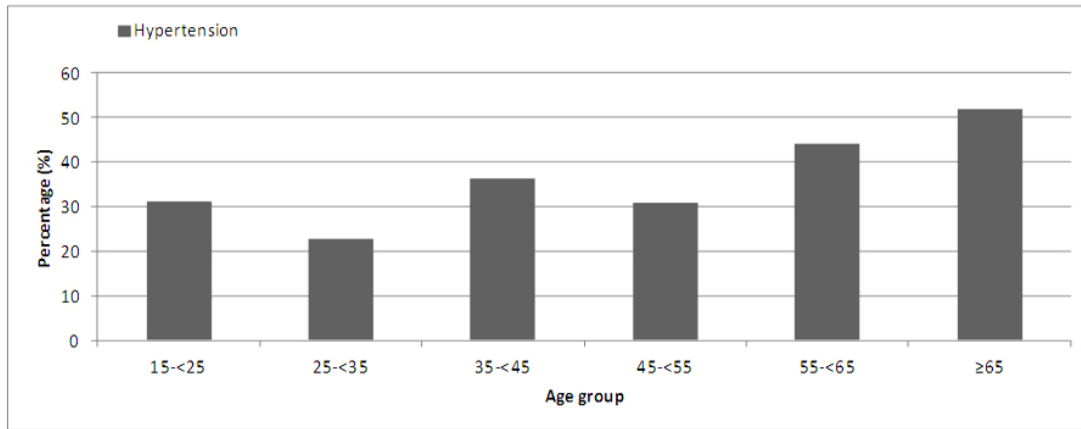
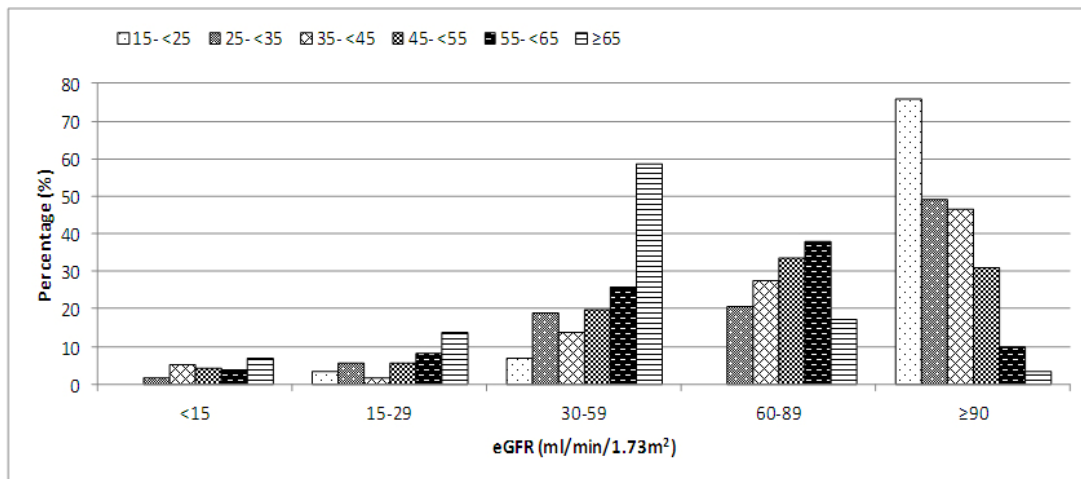


Table 2.5.3.1(c): Renal function at presentation by age group for IMN, 2005-2012

eGFR (ml/min/1.73m <sup>2</sup> )	15-25		25-35		35-45		45-55		55-65		≥65		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
<15	0	0.0	1	1.9	3	5.2	3	4.2	2	4.0	2	6.9	11	3.8
15-29	1	3.4	3	5.7	1	1.7	4	5.6	4	8.0	4	13.8	17	5.9
30-59	2	6.9	10	18.9	8	13.8	14	19.7	13	26.0	17	58.6	64	22.1
60-89	0	0.0	11	20.8	16	27.6	24	33.8	19	38.0	5	17.2	75	25.9
≥90	22	75.9	26	49.1	27	46.6	22	31.0	5	10.0	1	3.4	103	35.5
Missing*	4	13.8	2	3.8	3	5.2	4	5.6	7	14.0	0	0.0	20	6.9
<b>Total</b>	<b>29</b>	<b>100</b>	<b>53</b>	<b>100</b>	<b>58</b>	<b>100</b>	<b>71</b>	<b>100</b>	<b>50</b>	<b>100</b>	<b>29</b>	<b>100</b>	<b>290</b>	<b>100</b>

\*20 cases are missing on GFR, including 7 cases with GFR>200 (GFR range between 201 to 1312)

Figure 2.5.3.1(c): Renal function at presentation by age group for IMN, 2005-2012



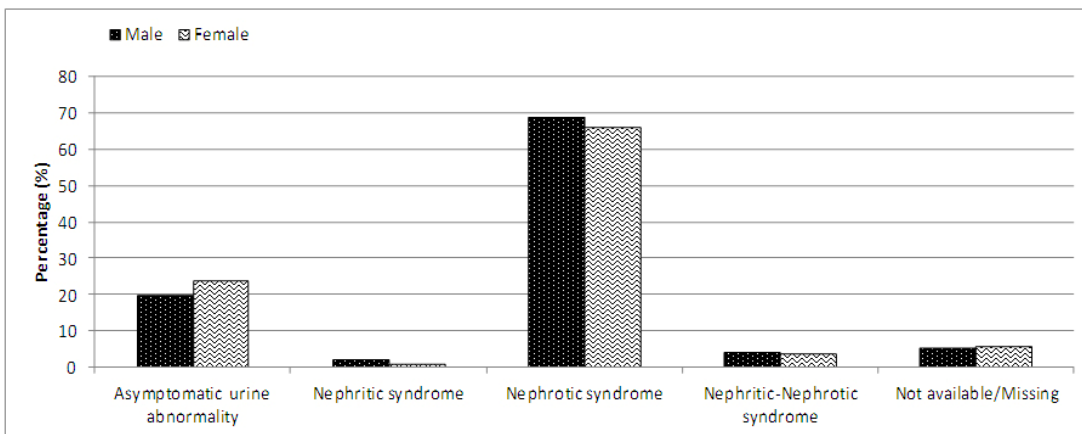
**2.5.3.2: Clinical presentation by gender**

There are no differences between gender in terms of clinical presentation or hypertension but there appears to be a higher incidence of renal impairment (GFR< 60) in males (37.8% vs 25.1%). However this needs to be viewed with caution in view that there is double the number of missing data for renal function in females as opposed to males ( 9.4% vs 4.6% ).

**Table 2.5.3.2(a): Clinical presentation by gender for IMN, 2005-2012**

Clinical Presentations	Male		Female	
	n	%	n	%
Asymptomatic urine abnormality	30	19.9	33	23.7
Nephritic syndrome	3	2.0	1	0.7
Nephrotic syndrome	104	68.9	92	66.2
Nephritic-Nephrotic syndrome	6	4.0	5	3.6
Not available	8	5.3	8	5.8
<b>Total</b>	<b>151</b>	<b>100</b>	<b>139</b>	<b>100</b>

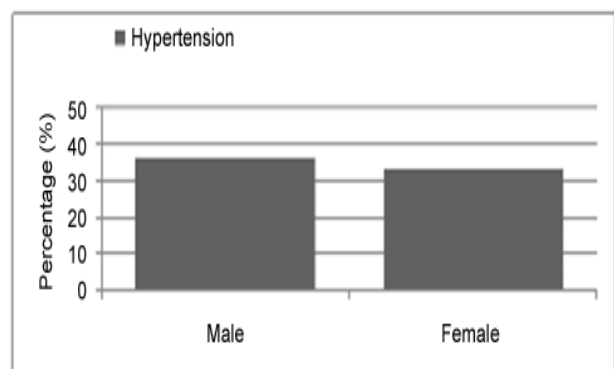
**Figure 2.5.3.2(a): Clinical presentation by gender for IMN, 2005-2012**



**Table 2.5.3.2(b): Hypertension by gender for IMN, 2005-2012**

Hypertension	Male		Female	
	n	%	n	%
Present	55	36.4	46	33.1
Absent	83	55.0	79	56.8
Not available/ Missing	13	8.6	14	10.1
<b>Total</b>	<b>151</b>	<b>100</b>	<b>139</b>	<b>100</b>

**Figure 2.5.3.2(b): Hypertension by gender for IMN, 2005-2012**

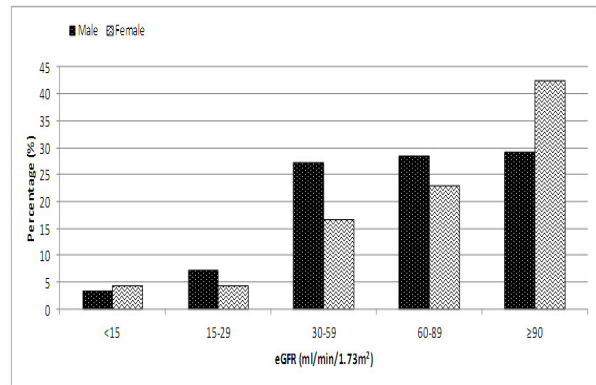




**Table 2.5.3.2(c): Renal function by gender for IMN, 2005-2012**

GFR (ml/min/1.73m <sup>2</sup> )	Male		Female	
	n	%	n	%
<15	5	3.3	6	4.3
15 to < 30	11	7.3	6	4.3
30 to < 60	41	27.2	23	16.5
60 to < 90	43	28.5	32	23.0
≥ 90	44	29.1	59	42.4
Missing	7	4.6	13	9.4
<b>Total</b>	<b>151</b>	<b>100</b>	<b>139</b>	<b>100</b>

**Figure 2.5.3.2(c): Renal function by gender for IMN, 2005-2012**



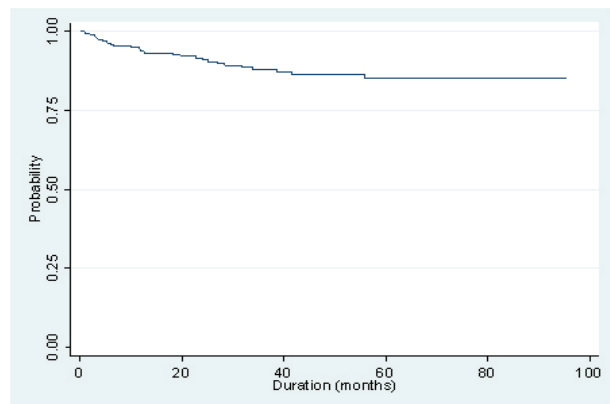
#### 2.5.4: Outcome of idiopathic membranous nephropathy

Overall 5 year patient and renal survival was 85% and 92% respectively. This 5y patient survival rate is exactly the same as reported by Donadio et al, 1988 while renal survival is similar to the 95.8% rate reported from Japan ( Shiki et al, 2004).

**Table 2.5.4(a): Patient survival estimates for death in IMN, 2005 2012**

Interval (months)	Patients survival		
	n	% survival	SE
0	278	100	-
12	216	94	0.015
24	161	91	0.019
36	121	88	0.023
48	96	86	0.025
60	62	85	0.027
72	39	85	0.027

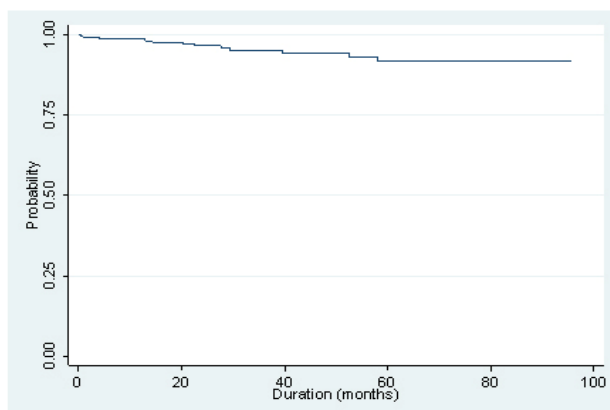
**Figure 2.5.4(a): Patient Survival estimates for death in IMN, 2005-2012**



**Table 2.5.4(b): Renal survival estimates for death in IMN, 2005 2012**

Interval (months)	Patients survival		
	n	% survival	SE
0	278	100	-
12	215	99	0.0074
24	160	96	0.0125
36	121	95	0.0154
48	96	94	0.0175
60	62	92	0.0244
72	39	92	0.0244

**Figure 2.5.4(b): Renal survival estimates for death in IMN, 2005-2012**



Event = death;

Status as at 31<sup>st</sup> Dec 2012 or last follow-up

\*Missing of 1 censored case where the outcome date < date of 1<sup>st</sup> biopsy