

CHAPTER 2

PRIMARY GLOMERULONEPHRITIS

**Esther Tan Zhao Zhi
Tan Min Hui
Chan Chee Eng**

2.1 Introduction

- Chapter 2 reports the primary glomerulonephritis (GN) in adults (defined as age ≥ 15) from the years 2005-2022.
- There appeared to be changing trends in the frequency of primary GN.
 - This may be due to increased CKD awareness, changing practices in CKD screening and renal biopsy.
 - There was an increasing incidence of IgA nephropathy from 19.6% in 2005-2009 period to 33.7% in 2022.
 - Minimal change disease was the commonest glomerulonephritis in adults in previous decade (2005-2014).
 - However, from 2015 to 2022, the incidence of IgA nephropathy had increased, making it the most common primary GN from 2020-2022, followed closely by FSGS.
 - Membranous nephropathy accounted for only 10.7% of all biopsy-proven primary GN. There was a slight increase in the incidence of patients with membranous nephropathy, rising from 9.2%-9.6% between years 2005-2014 to 11.3%-13.3% between years 2015-2022.
 - The other types of primary GN were relatively uncommon (Table 2.1).

Table 2.1: Primary Glomerulonephritis, 2005-2022

Histopathological Diagnosis	2005-2009 (n=1627)		2010-2014 (n=2640)		2015-2019 (n=2931)		2020 (n=656)		2021 (n=481)		2022 (n=609)		Total (n=8944)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
FSGS	489	30.1	782	29.6	888	30.3	169	25.8	128	26.6	156	25.6	2612	29.2
MCD	539	33.1	786	29.8	682	23.3	154	23.5	103	21.4	128	21.0	2392	26.7
IgAN	319	19.6	629	23.8	786	26.8	191	29.1	151	31.4	205	33.7	2281	25.5
Membranous nephropathy	156	9.6	243	9.2	331	11.3	87	13.3	63	13.1	73	12.0	953	10.7
MPGN	34	2.1	38	1.4	58	2.0	12	1.8	8	1.7	6	1.0	156	1.7
Mesangial Prol (Non IgA)	54	3.3	79	3.0	70	2.4	23	3.5	10	2.1	13	2.1	249	2.8
Idiopathic Crescentic	24	1.5	31	1.2	24	0.8	3	0.5	2	0.4	1	0.2	85	1.0
Crescentic ANCA	8	0.5	20	0.8	23	0.8	11	1.7	9	1.9	15	2.5	86	1.0
Not available/Missing	4	0.2	32	1.2	69	2.4	6	0.9	7	1.5	12	2.0	130	1.5

Abbreviation

FSGS: Focal Segmental Glomerulosclerosis

MCD: Minimal Change Disease

IgAN: IgA nephropathy

MPGN: Membranoproliferative GN

Mesangial Prol: Mesangial Proliferative GN

2.2 Focal Segmental Glomerulosclerosis (FSGS)

2.2.1 Introduction

- Focal segmental glomerulosclerosis is a histological diagnosis and is defined by the presence of segmental glomerular capillary tufts obliteration with increased mesangial matrix deposition, intra-capillary hyaline deposits and focal adhesions of the capillary tuft to Bowman's capsule.
- Differentiating idiopathic FSGS changes from secondary FSGS clinically can be challenging as electron microscopy is not readily available in Malaysia.

2.2.2 Patient Population and Characteristics

- Between 2005 to 2022, a total of 2612 FSGS cases were reported to the registry.
- FSGS was slightly more common in males (57.2%) (Figure 2.2.2(a))
- FSGS tended to be diagnosed in younger patients with mean age 35.9 ± 14.93 years (Figure 2.2.2(b)).

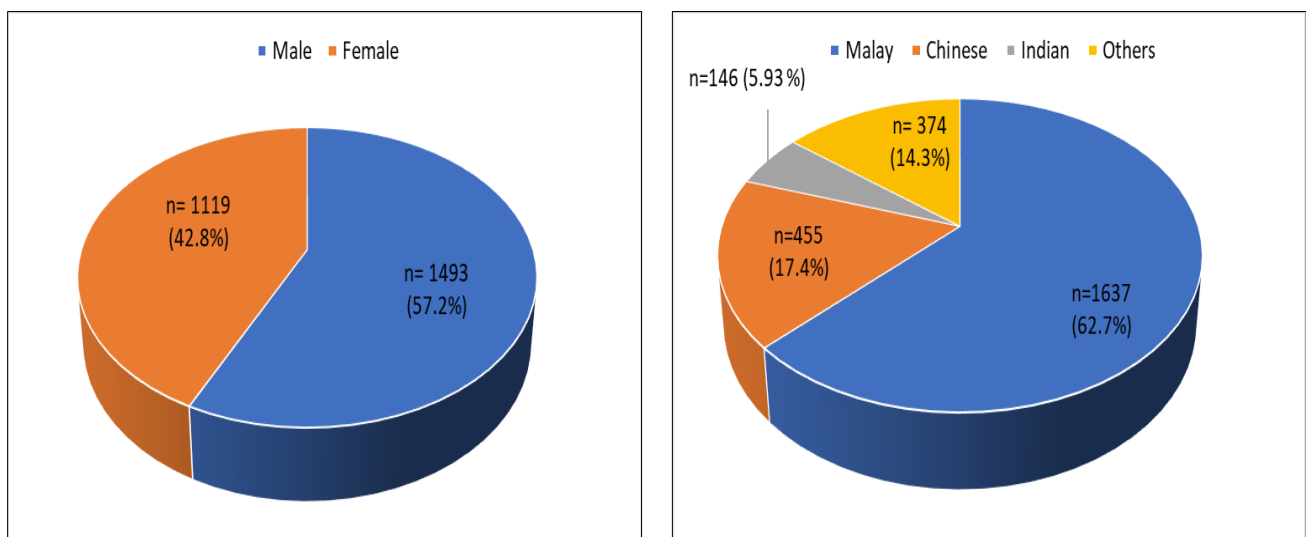


Figure 2.2.2(a): Demographic characteristics for FSGS, 2005-2022

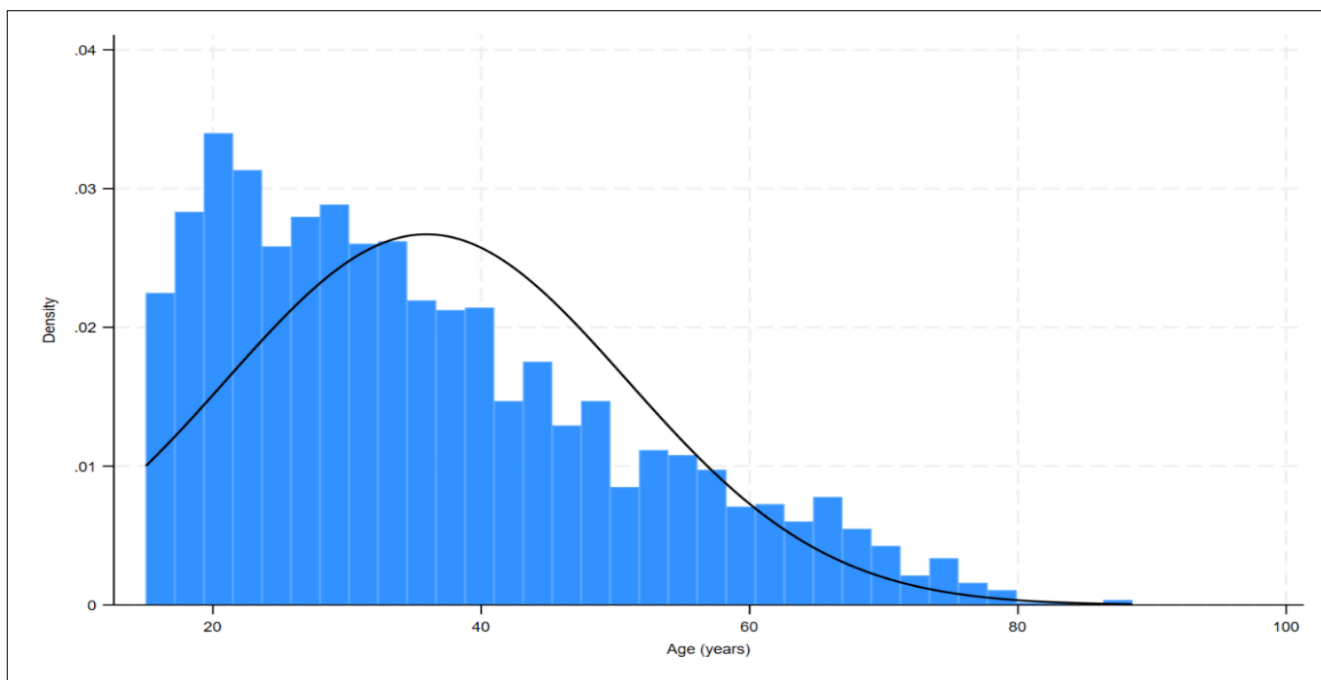


Figure 2.2.2(b): Age at time of biopsy (years) FSGS, 2005-2022

2.2.3 Clinical presentation

- Nephrotic syndrome was the most common clinical presentation of FSGS (49.5%) followed by asymptomatic urine abnormalities (26.4%) (Table 2.2.3(a)).
- Nephrotic syndrome was the commonest presentation of FSGS regardless of the gender (Figure 2.2.3(a)) and age (Figure 2.2.3(b)).
- Females with FSGS were more likely to present with asymptomatic urine abnormalities compared to males (Figure 2.2.3(a)).

Table 2.2.3(a): Clinical presentation for FSGS, 2005-2022

Clinical Presentation	2005-2009 (n=489)		2010-2014 (n=782)		2015-2019 (n=888)		2020 (n=169)		2021 (n=128)		2022 (n=156)		Total (n=2612)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Nephrotic syndrome	298	60.9	379	48.5	395	44.5	77	45.6	58	45.3	85	54.5	1292	49.5
Asymptomatic urine abnormalities	112	22.9	202	25.8	241	27.1	52	30.8	42	32.8	41	26.3	690	26.4
Nephritic-Nephrotic	22	4.5	61	7.8	89	10.0	13	7.7	15	11.7	13	8.3	213	8.2
Nephritic	24	4.9	30	3.8	47	5.3	5	3.0	6	4.7	9	5.8	121	4.6
Not available	33	6.7	110	14.1	116	13.1	22	13.0	7	5.5	8	5.1	296	11.3

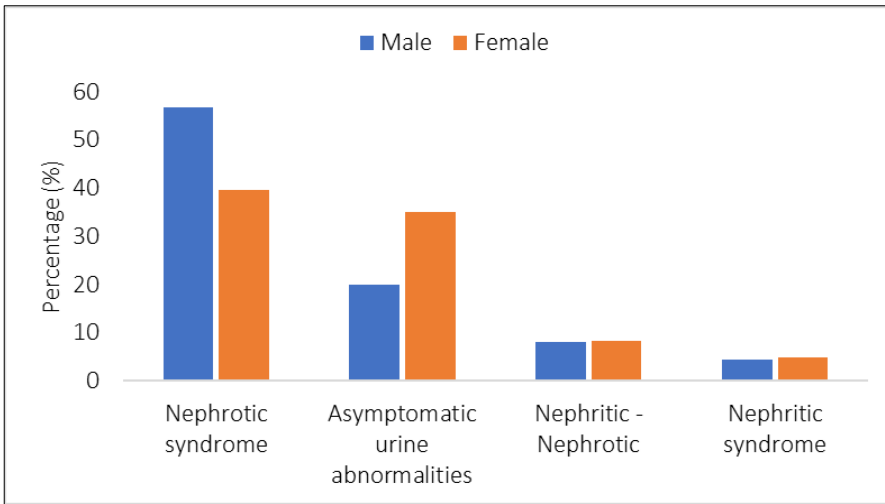


Figure 2.2.3(a): Clinical presentation by gender for FSGS, 2005-2022

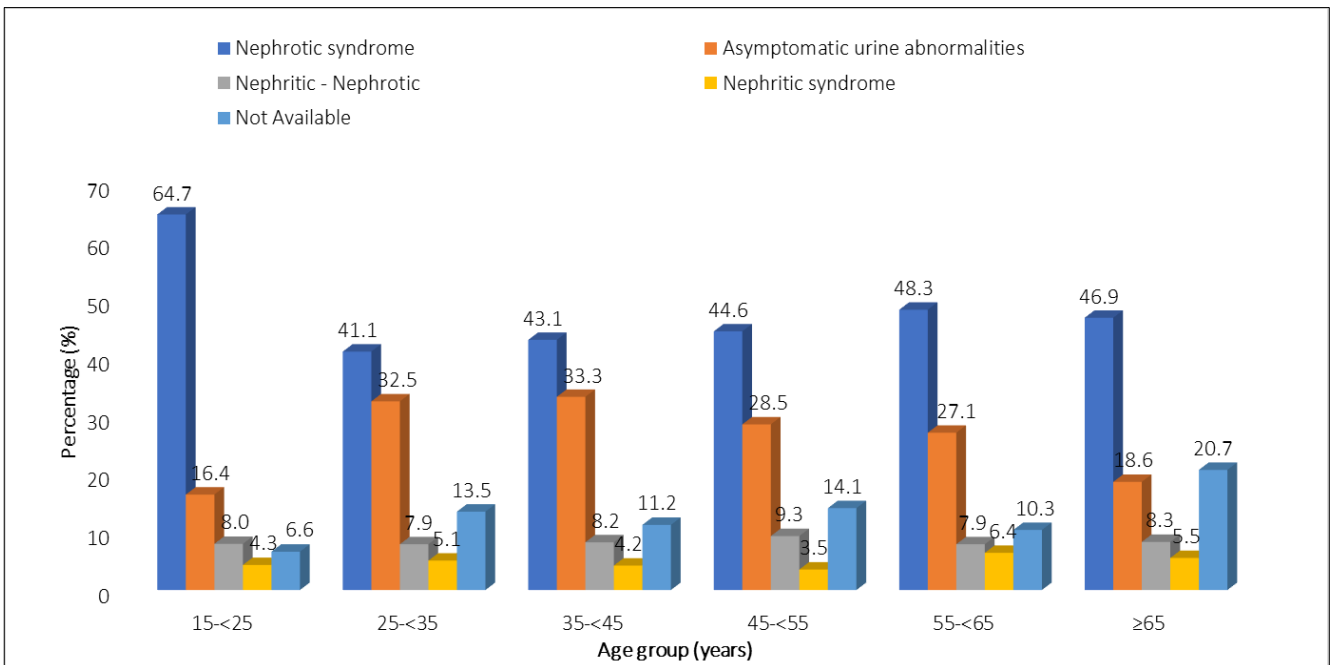


Figure 2.2.3(b): Clinical presentation by age group for FSGS, 2005-2022

2.2.4 Hypertension

- One thousand and ninety-seven patients (42%, n=1097) with FSGS had hypertension at presentation.
- The prevalence of hypertension in FSGS was similar in both genders: males: 621/1493 (41.6%) and females 476/1119 (42.5%) (Figure 2.2.4(a)).
- Older patients were more likely to be hypertensive. (Figure 2.2.4(b)). This could be related to natural history of onset of hypertension and may also be contributed by the decline in renal function in the older patients.

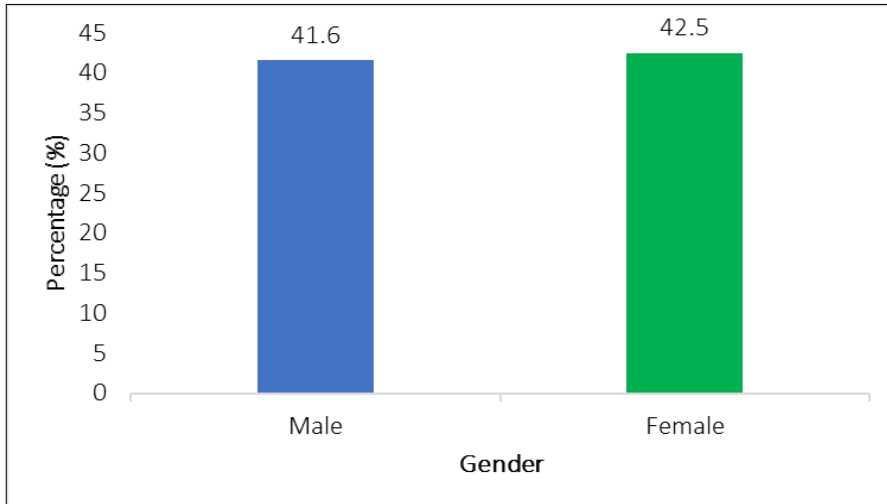


Figure 2.2.4(a): Hypertension by gender for FSGS, 2005-2022

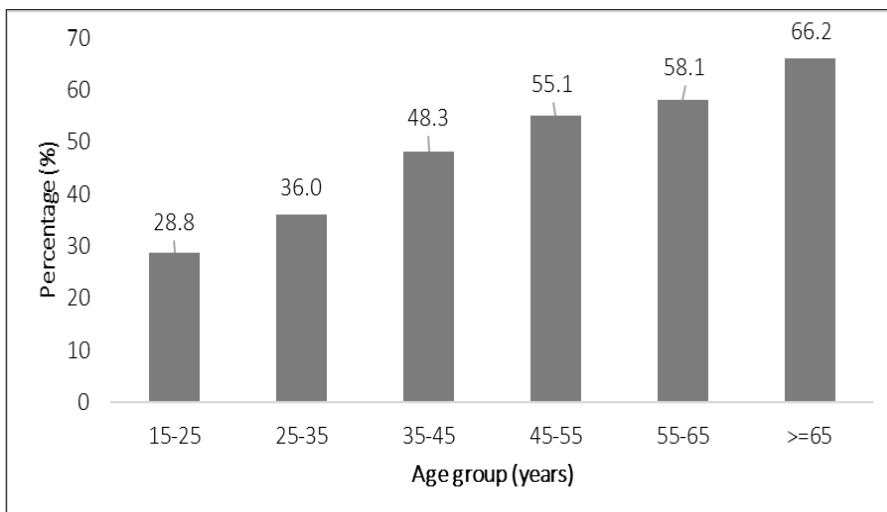


Figure 2.2.4(b): Hypertension by age group for FSGS, 2005-2022

2.2.5 Renal function

- Over a quarter of patients had eGFR ≥ 90 ml/min/1.73m², while 17% of patients had severely impaired renal function of less than 30 ml/min/1.73m² (Table 2.2.5(a)).
- There were no differences in renal function at presentation between the genders (Figure 2.2.5(a)).
- Older patients had lower eGFR which is in keeping with the prevalence of CKD in the general population (Figure 2.2.5(b)).

Table 2.2.5(a): Renal function in FSGS, 2005-2022

eGFR (mls/min/1.73m ²)	2005-2009 (n=489)		2010-2014 (n=782)		2015-2019 (n=888)		2020 (n=169)		2021 (n=128)		2022 (n=156)		Total (n=2612)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
< 15	21	4.3	46	5.9	55	6.2	6	3.6	7	5.5	9	5.8	144	5.5
15 to < 30	63	12.9	89	11.4	98	11.0	22	13.0	16	12.5	11	7.1	299	11.5
30 to < 60	120	24.5	186	23.8	225	25.3	38	22.5	23	18.0	47	30.1	639	24.5
60 to < 90	104	21.3	143	18.3	181	20.4	34	20.1	21	16.4	28	18.0	511	19.6
≥ 90	142	29.0	217	27.8	211	23.8	45	26.6	37	28.9	39	25.0	691	26.5
Not available	39	8.0	101	12.9	118	13.3	24	14.2	24	18.8	22	14.1	328	12.6

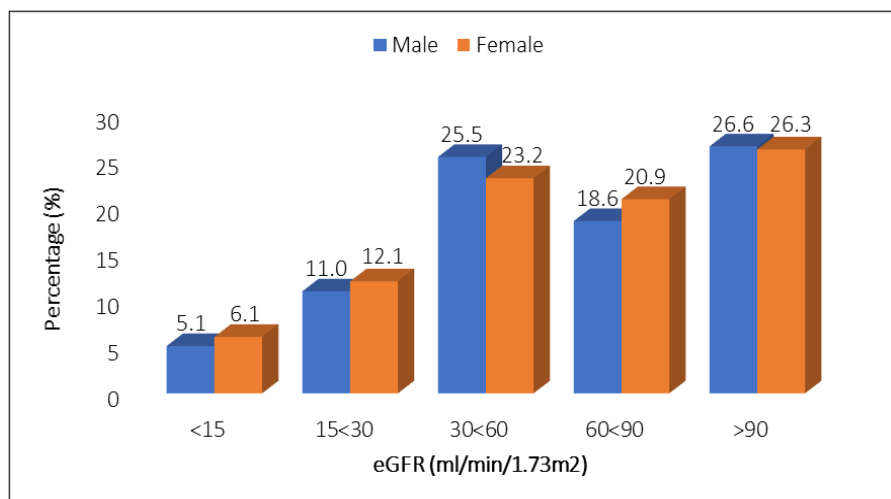


Figure 2.2.5(a): Renal function by gender for FSGS, 2005-2022

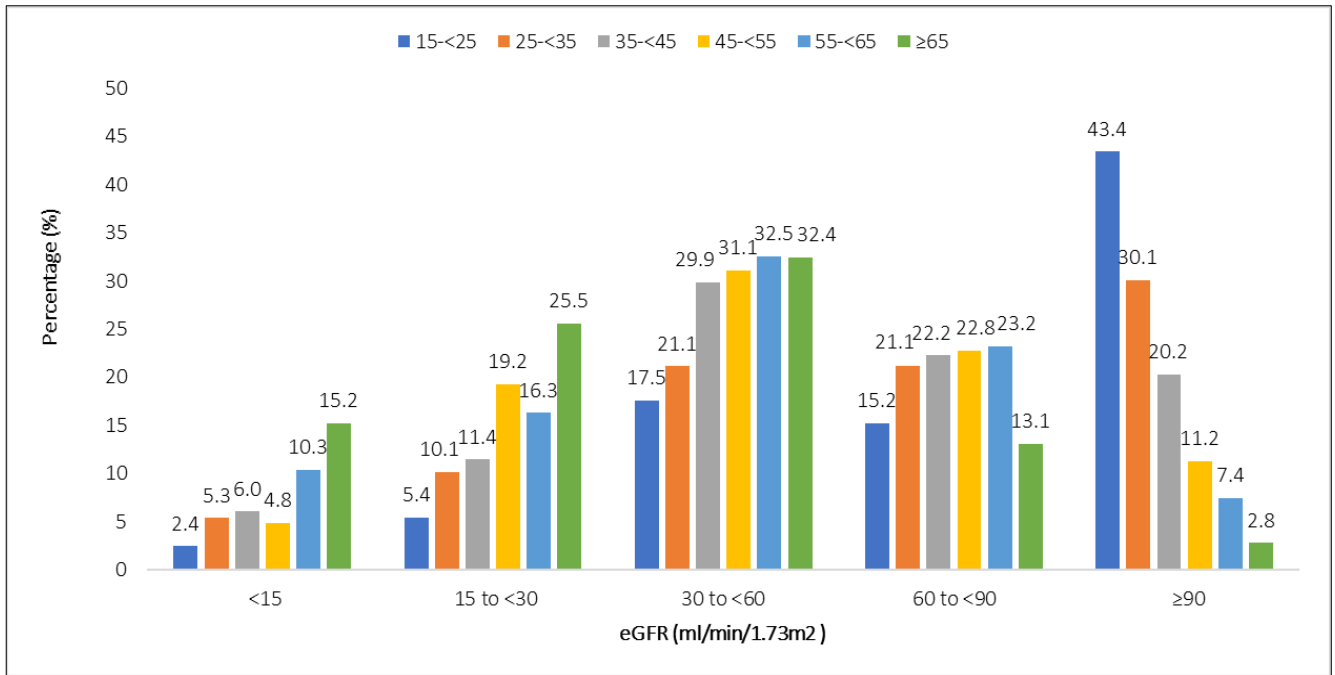


Figure 2.2.5(b): Renal function at presentation by age group for FSGS, 2005-2022

2.2.6 Outcome

- The 5-year and 10-year renal survival was 83.6% and 75.6% respectively and this was higher than the reported outcome worldwide (Figure 2.2.6(a)).
- We noted that most of the patients with FSGS had good kidney function at the time of presentation.
- Patient survival at 5 and 10 years were 88.3% and 85.0% respectively. (Figure 2.2.6(b)).

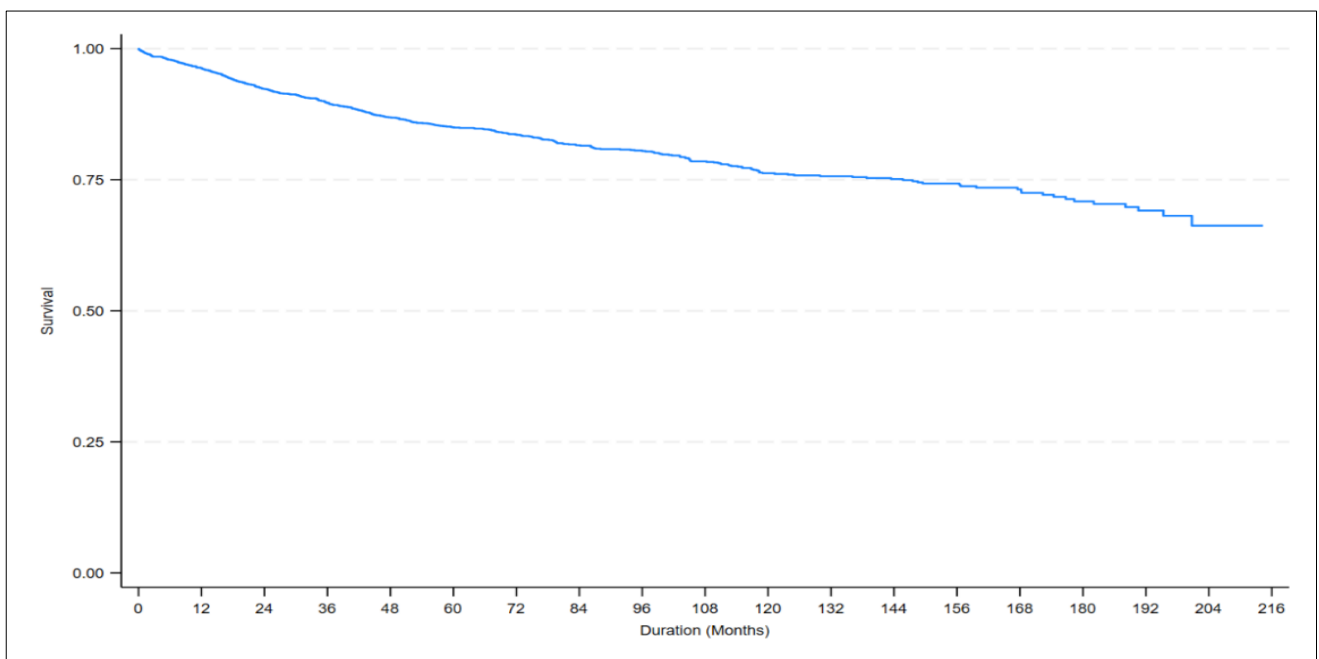


Figure 2.2.6(a): Renal Survival estimates for FSGS, 2005-2022

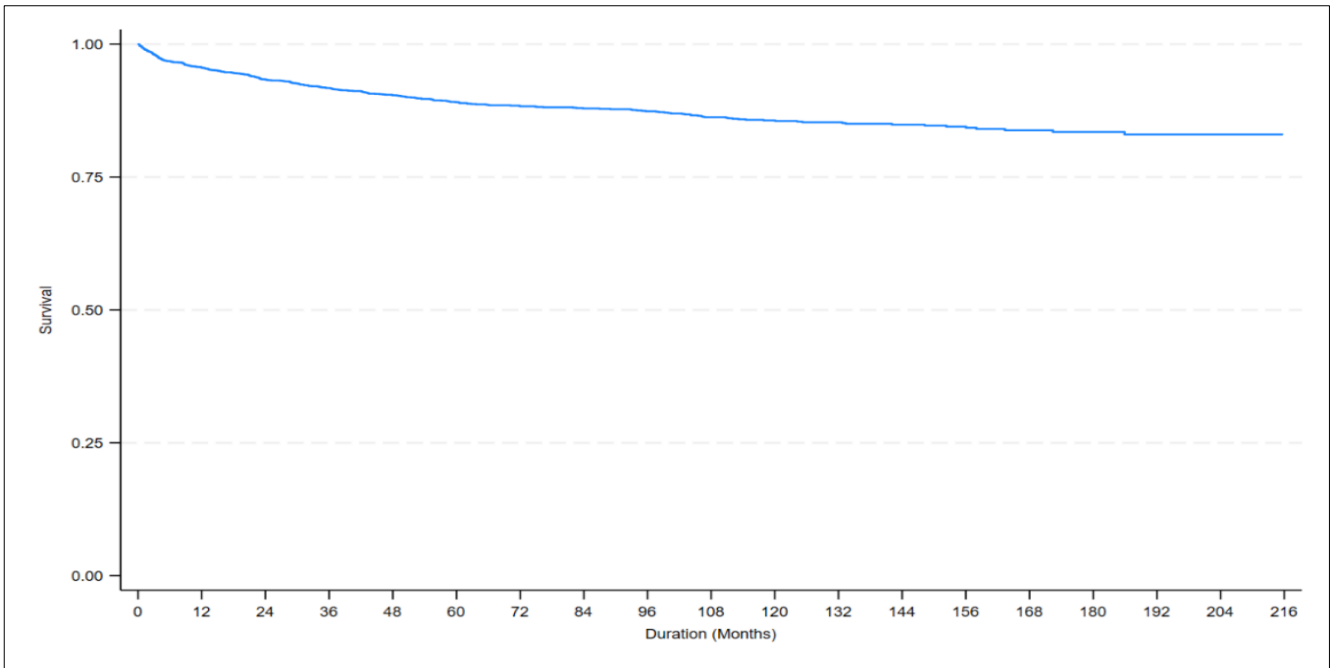


Figure 2.2.6(b): Patient Survival estimates for death in FSGS, 2005-2022

2.3 Minimal Change Disease (MCD)

2.3.1 Introduction

- Minimal change disease is a major cause of nephrotic syndrome in both children and adults.
- MCD is typically characterized by normal appearing glomeruli by light microscopy and absence of complement or immunoglobulin deposits on 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.
- The biopsy sampling size/location may affect the diagnosis of MCD/FSGS.
- Electron microscopy service is not readily available.

2.3.2 Patient Population and Characteristics

- A total of 2392 cases of MCD were reported to the registry from 2005 to 2022.
- MCD was more common in males (62.3%) (Figure 2.3.2(a)).
- There was no obvious racial predilection observed in our cohort (Figure 2.3.2(a)).
- MCD was mainly diagnosed in young patients, with a mean age of 31.5 ± 14.30 years at the time of biopsy (Figure 2.3.2(b)).
- Traditionally MCD is known to have a bimodal distribution. However, this trend was not seen in our cohort with the higher proportion of younger patients presenting with MCD.

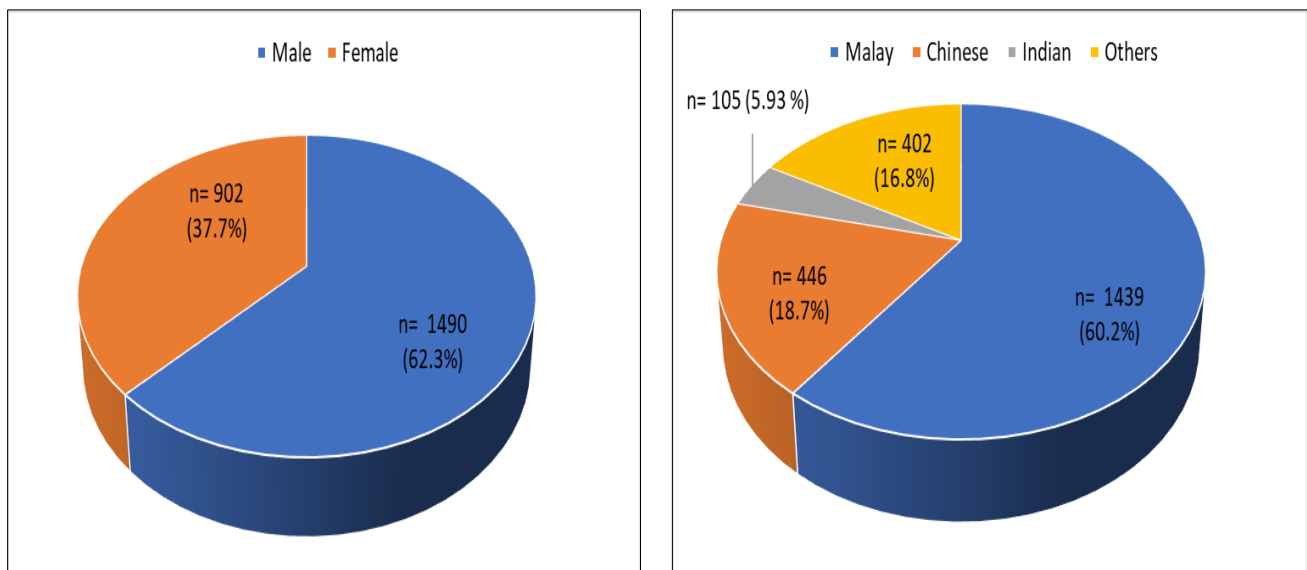


Figure 2.3.2(a): Demographic characteristics for MCD, 2005-2022

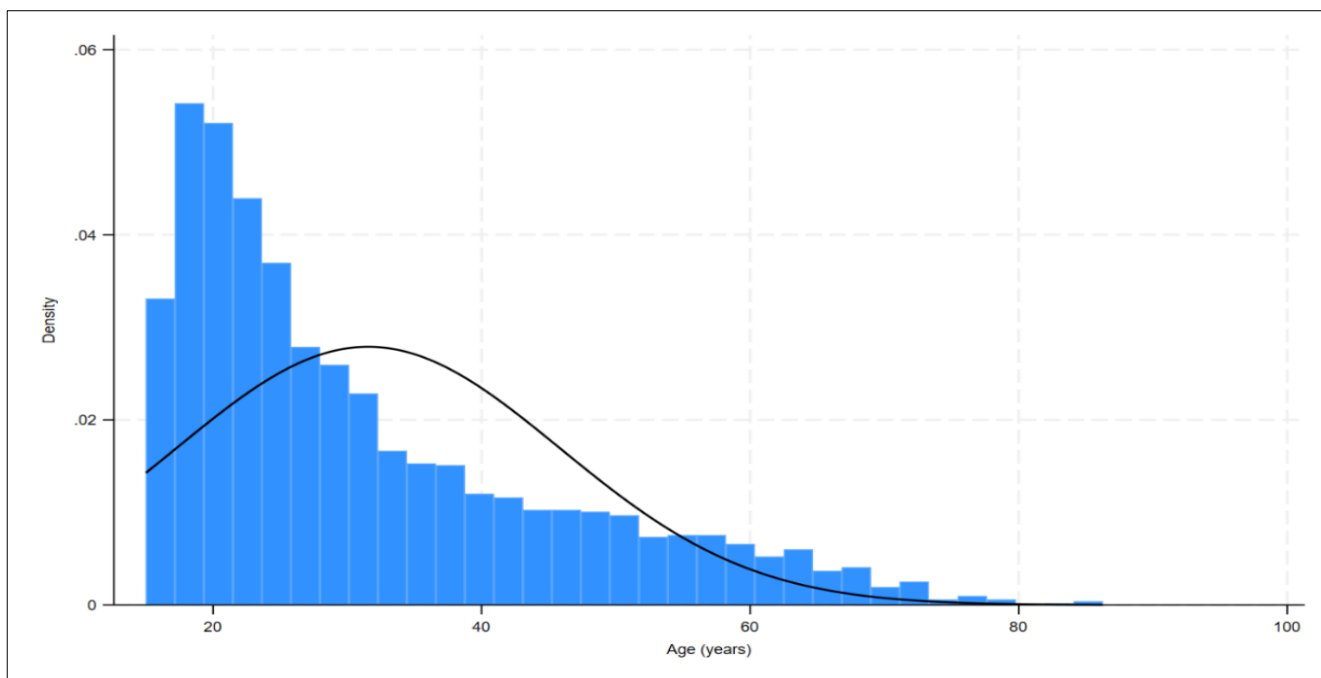


Figure 2.3.2(b): Age at time of biopsy (years) MCD, 2005-2022

2.3.3 Clinical presentation

- Nephrotic syndrome accounted for over two-thirds of clinical presentation of MCD (68.7%) (Table 2.3.3(a)).
- Nephrotic syndrome remained the commonest presentation of MCD regardless of the gender (Figure 2.3.3(a)) and age (Figure 2.3.3(b)).

Table 2.3.3(a): Clinical presentation for MCD, 2005-2022

Clinical Presentation	2005-2009 (n=539)		2010-2014 (n=786)		2015-2019 (n=682)		2020 (n=154)		2021 (n=103)		2022 (n=128)		Total (n=2392)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Nephrotic syndrome	425	78.8	529	67.3	437	64.1	101	65.6	65	63.1	87	68.0	1644	68.7
Asymptomatic urine abnormalities	60	11.1	132	16.8	98	14.4	24	15.6	23	22.3	24	18.8	361	15.1
Nephritic-Nephrotic	19	3.5	34	4.3	46	6.7	11	7.1	9	8.7	10	7.8	129	5.4
Nephritic	20	3.7	27	3.4	29	4.3	5	3.2	3	2.9	3	2.3	87	3.6
Not available	15	2.8	64	8.1	72	10.6	13	8.4	3	2.9	4	3.1	171	7.1

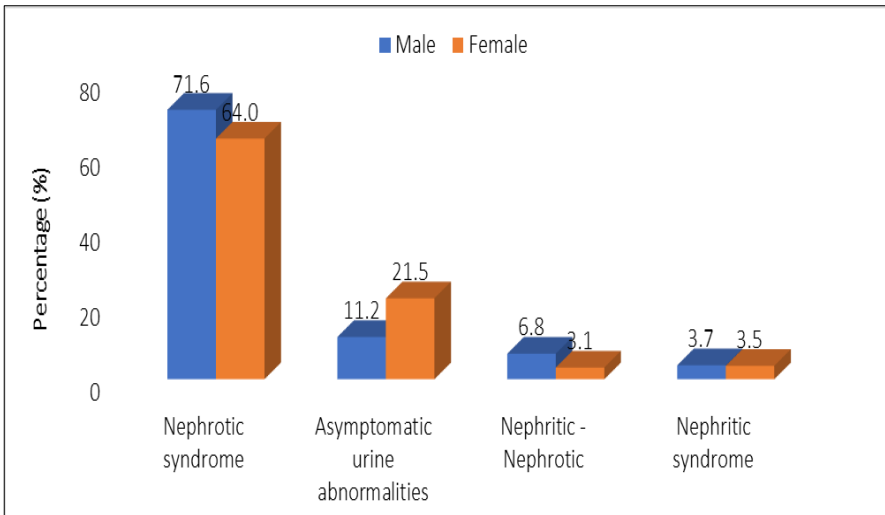


Figure 2.3.3(a): Clinical presentation by gender for MCD, 2005-2022

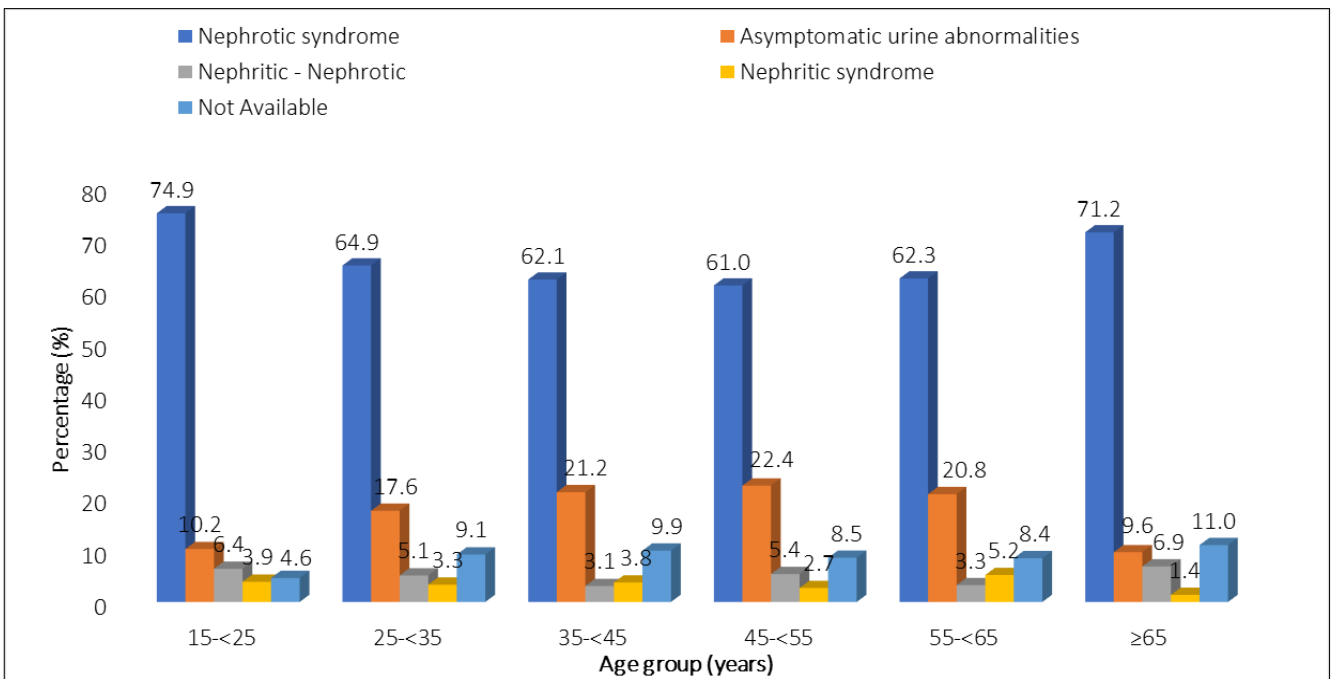


Figure 2.3.3(b): Clinical presentation by age group for MCD, 2005-2022

2.3.4 Hypertension

- Four hundred and eighty-four patients (20.2%) with MCD were hypertensive at presentation.
- The prevalence of hypertension was similar between the two genders, 20.6% in males and 19.6% in females (Figure 2.3.4(a)).
- One third of the patients above the age of 45 years were hypertensive at presentation (Figure 2.3.4(b)). This could be related to natural onset of hypertension and also decline in renal function in the older patients.

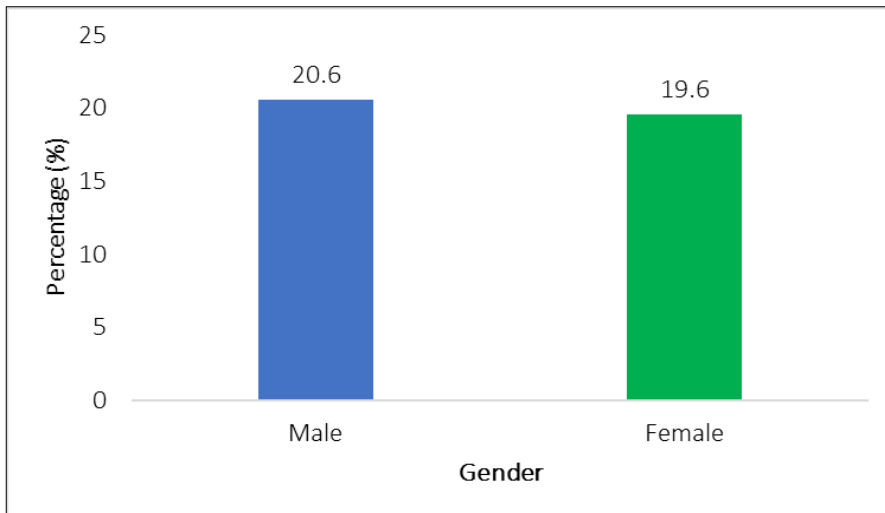


Figure 2.3.4(a): Hypertension by gender for MCD, 2005-2022

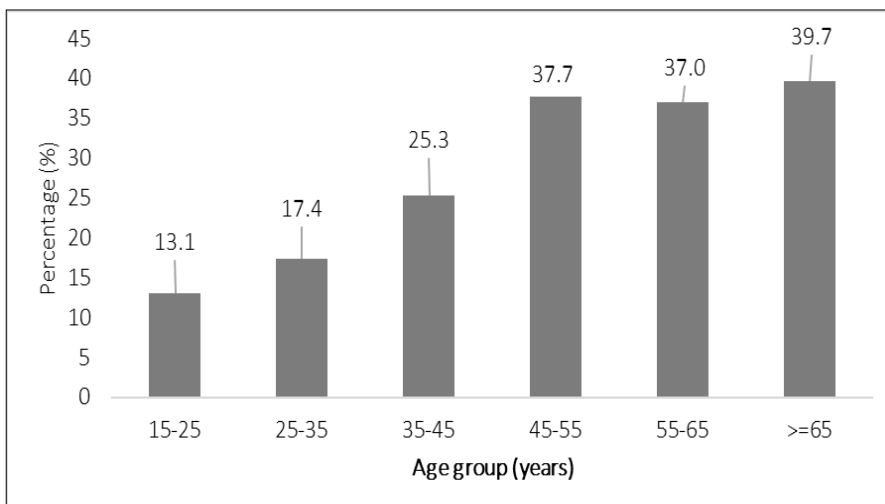


Figure 2.3.4(b): Hypertension by age group for MCD, 2005-2022

2.3.5 Renal function

- Most patients (67.4%) with MCD had eGFR more than 60mls/min/1.73m² with half having eGFR more than 90mls/min/1.73m².
- There were no differences in renal function by gender (Figure 2.3.5(a)).
- Older patients had lower eGFR at presentation and this was in keeping with the prevalence of CKD in the general population (Figure 2.3.5(b)).

Table 2.3.5(a): Renal function in MCD, 2005-2022

eGFR (mls/min/1.73m ²)	2005-2009 (n=539)		2010-2014 (n=786)		2015-2019 (n=682)		2020 (n=154)		2021 (n=103)		2022 (n=128)		Total (n=2392)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
< 15	7	1.3	16	2.04	9	1.3	2	1.3	2	1.9	0	0	36	1.5
15 to < 30	18	3.3	35	4.45	28	4.1	12	7.79	1	1.0	6	4.69	100	4.2
30 to < 60	69	12.8	98	12.47	66	9.7	16	10.39	19	18.5	19	14.84	287	12.0
60 to < 90	118	21.9	138	17.56	101	14.8	19	12.34	22	21.4	25	19.53	423	17.7
≥ 90	294	54.6	392	49.87	322	47.2	81	52.6	37	35.9	62	48.44	1188	49.7
Not available	33	6.1	107	13.61	156	22.9	24	15.58	22	21.4	16	12.5	358	15.0

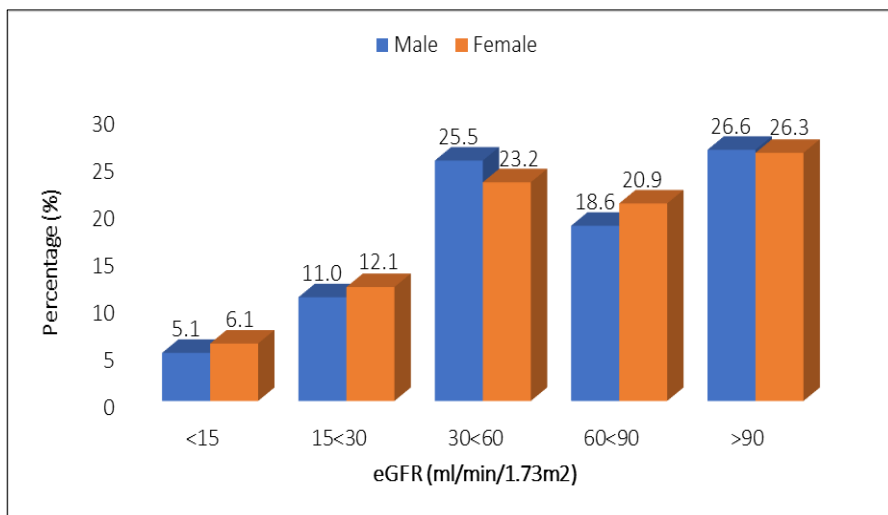


Figure 2.3.5(a): Renal function by gender for MCD, 2005-2022

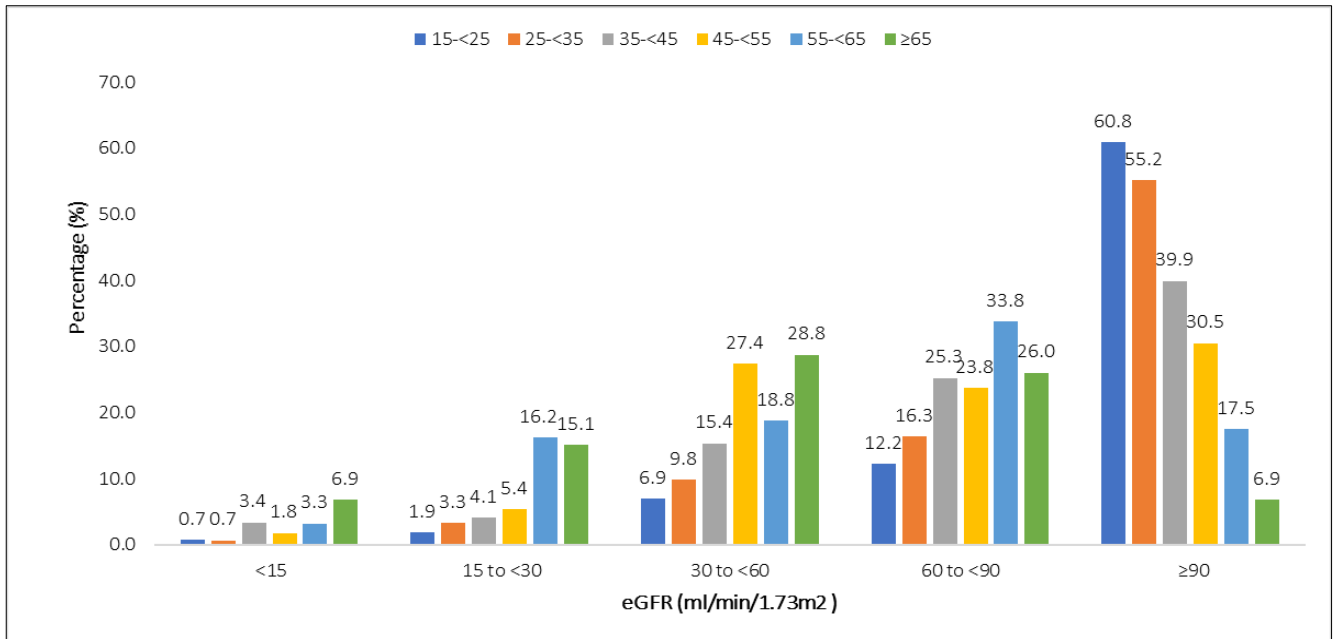


Figure 2.3.5(b): Renal function at presentation by age group for MCD, 2005-2022

2.3.6 Outcome

- The 5-year and 10-year renal survival were 98.1% and 96.7% respectively (Figure 2.3.6(a)).
- The 5-year and 10-year patient survival of MCD were 93.7% and 91.0% respectively (Figure 2.3.6(b)).
- Mortality rate for MCD is usually low. However it may occur due to complications of nephrotic syndrome itself (such as infection and thrombosis) or complications following treatment with infection being the predominant one or cardiovascular disease.

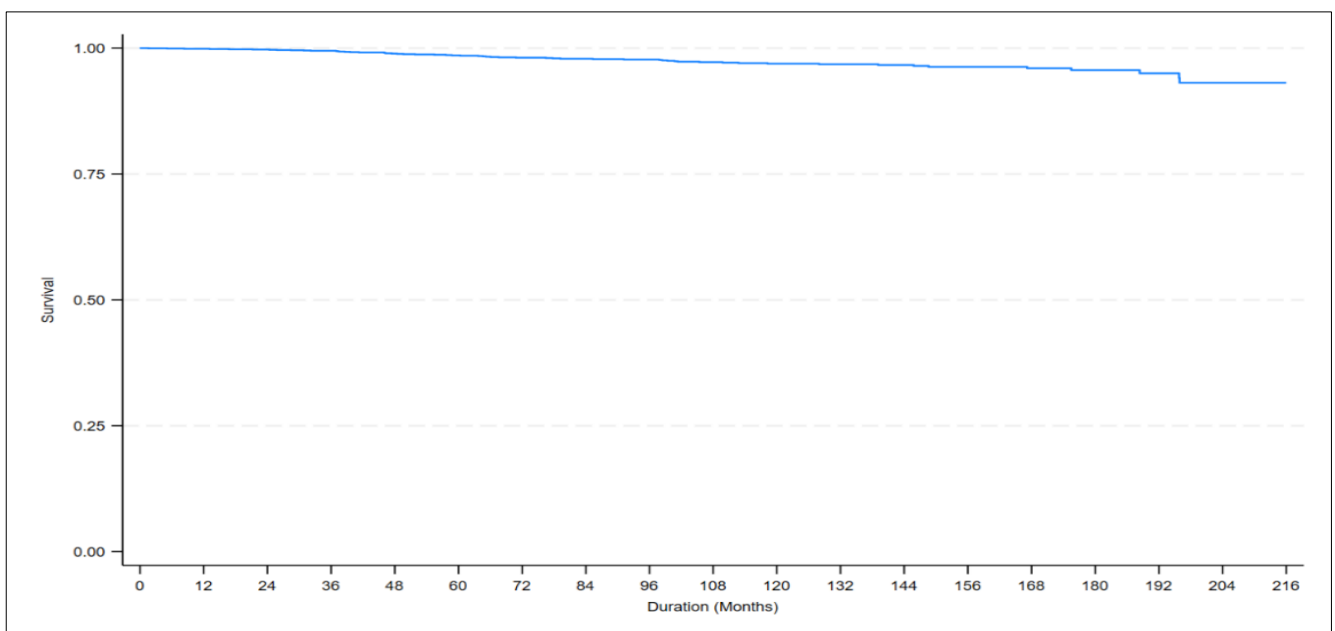


Figure 2.3.6(a): Renal Survival estimates for MCD, 2005-2022

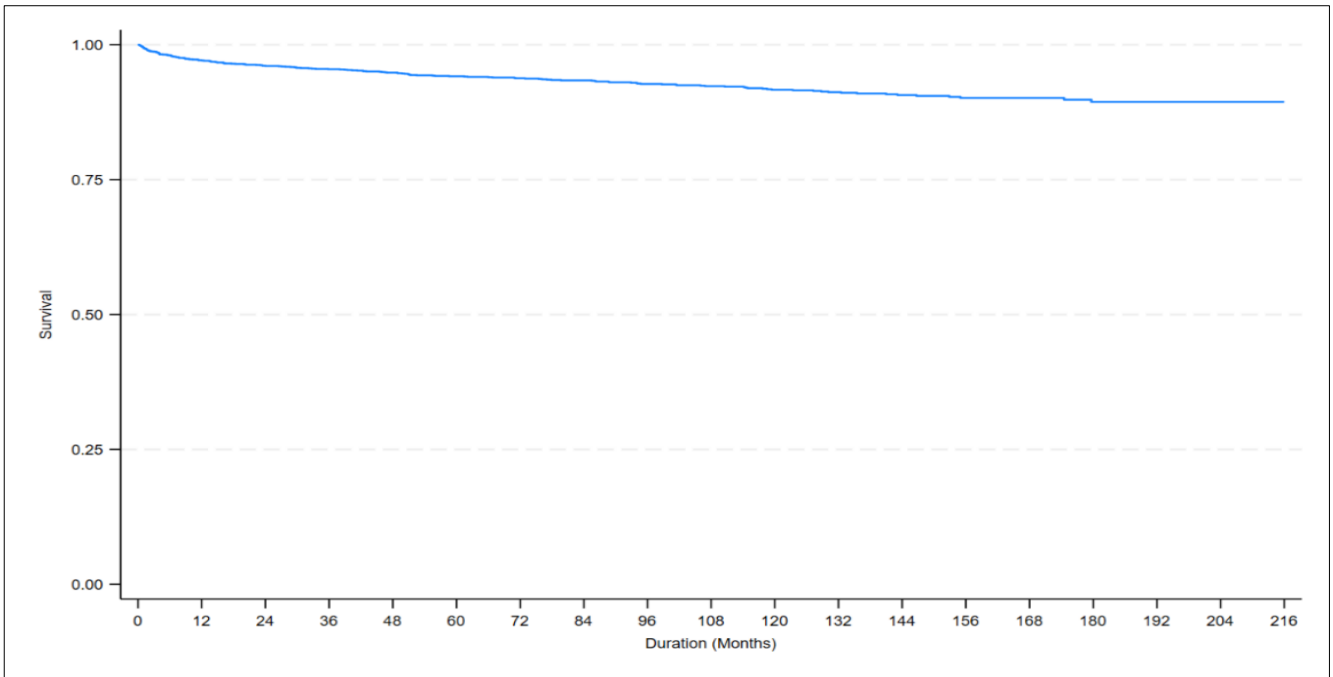


Figure 2.3.6(b): Patients Survival estimates for death in MCD, 2005-2022

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.
- The prevalence of IgAN varies as it depends on screening procedures and biopsy practices.
- There has been a significant increase in the number of patients with IgAN. This is likely due to better awareness in chronic kidney disease, improved screening procedures, earlier referral to nephrologist and lower biopsy threshold.

2.4.2 Patient Population and Characteristics

- There were 2281 reported cases of IgAN from 2005 to 2022.
- As previously reported, there was a slight female preponderance in our cohort (60.3% vs 39.7%) (Figure 2.4.2(a)).
- There appeared to be no racial predilection in the incidence of IgA nephropathy (Figure 2.4.2(a)).
- The mean age at biopsy was 34.2 ± 12.16 years and the majority of cases (82.0%) were between the ages 15 to 45 years (Figure 2.4.2(b)).

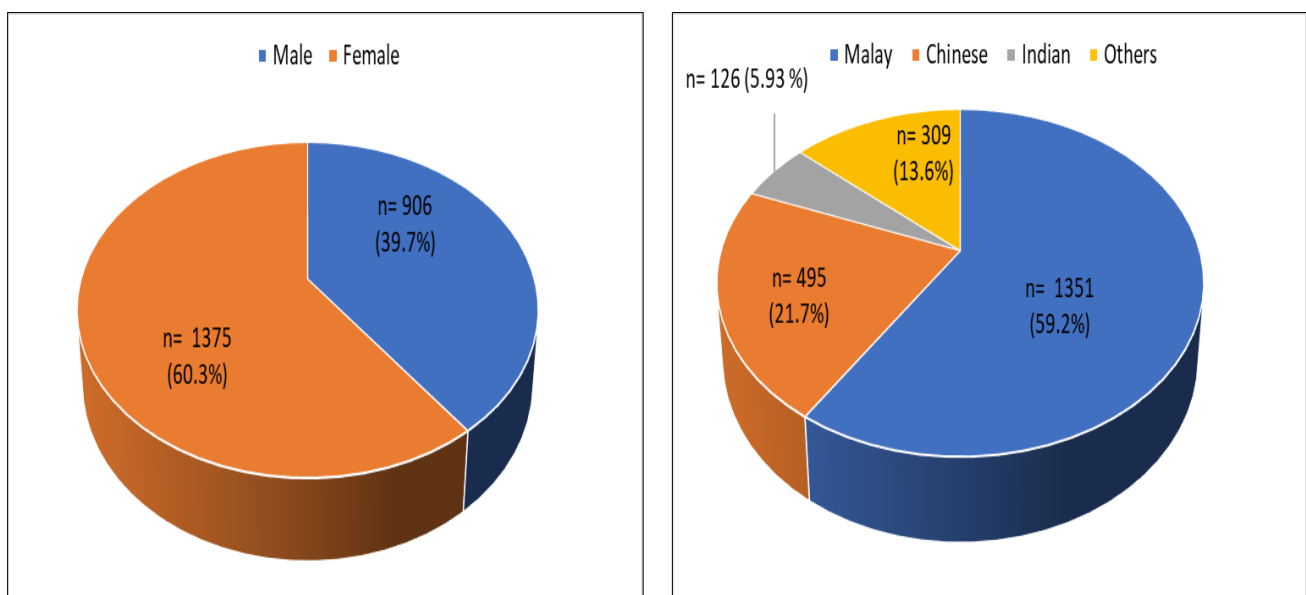


Figure 2.4.2(a): Demographic characteristics for IgAN, 2005-2022

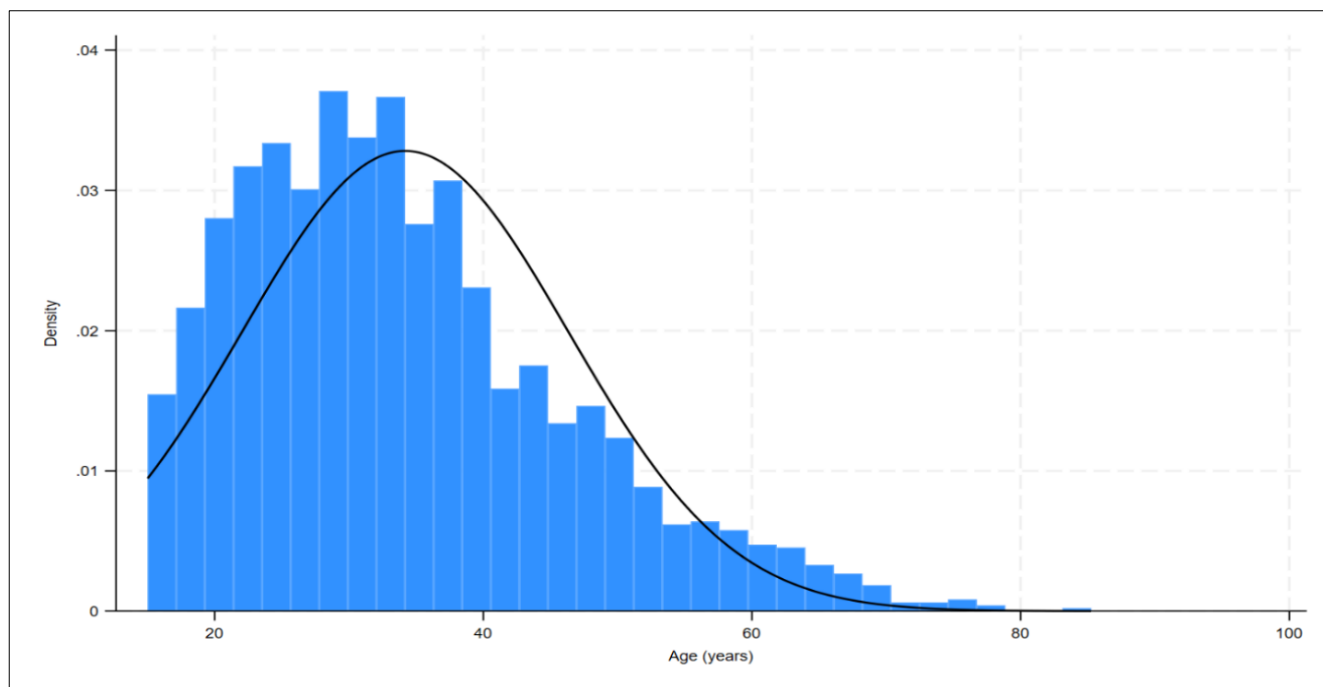


Figure 2.4.2(b): Age at time of biopsy (year) IgAN, 2005-2022

2.4.3 Clinical presentation

- Asymptomatic urine abnormalities was the most common presentation of IgAN (49.3%). Asymptomatic urine abnormalities remained the most common presentation regardless of age group. (Figure 2.4.3(b)).
- Up to 21.2% of those who were biopsied presented with nephrotic syndrome (Table 2.4.3(a)).
- Nearly a quarter of those above the age of 65 years did not have data available. Overall, the number of cases for whom data was missing on clinical presentation had reduced to 8.8% in 2022, implying a better reporting by nephrology units.

Table 2.4.3(a): Clinical presentation for IgAN, 2005-2022

Clinical Presentation	2005-2009 (n=319)		2010-2014 (n=629)		2015-2019 (n=786)		2020 (n=191)		2021 (n=151)		2022 (n=205)		Total (n=2281)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Nephrotic syndrome	80	25.1	134	21.3	163	20.7	37	19.4	39	25.8	31	15.1	484	21.2
Asymptomatic urine abnormalities	165	51.7	284	45.2	383	48.7	92	48.2	87	57.6	114	55.6	1125	49.3
Nephritic-Nephrotic	22	6.9	60	9.5	78	9.9	22	11.5	13	8.6	27	13.2	222	9.7
Nephritic	22	6.9	47	7.5	44	5.6	18	9.4	4	2.6	15	7.3	150	6.6
Not available	30	9.4	104	16.5	118	15.0	22	11.5	8	5.3	18	8.8	300	13.2

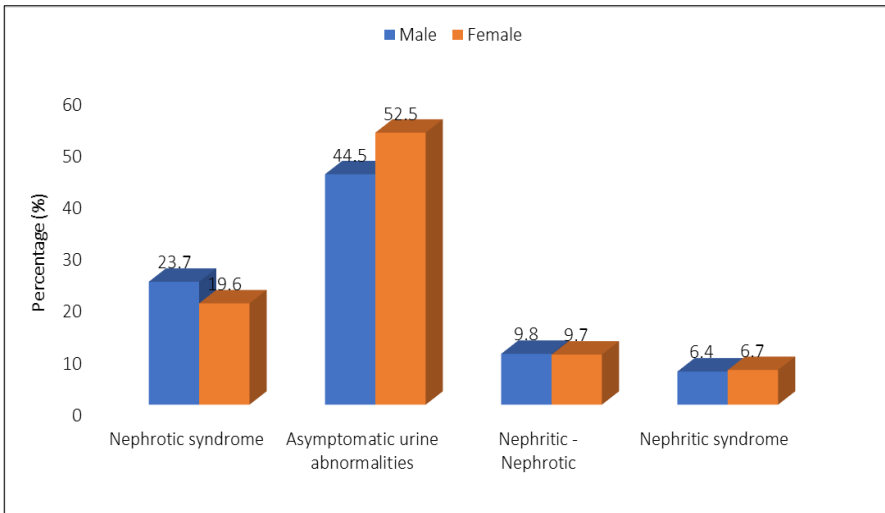


Figure 2.4.3(a): Clinical presentation by gender for IgAN, 2005-2022

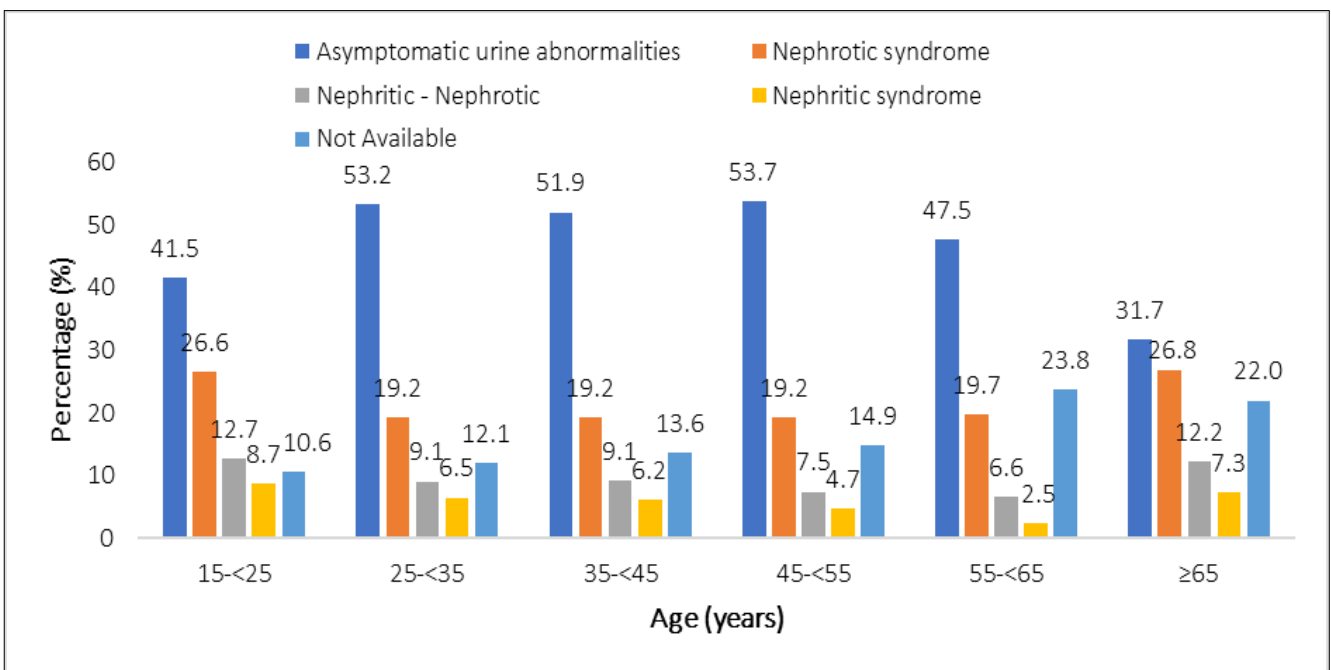


Figure 2.4.3(b): Clinical presentation by age group for IgAN, 2005-2022

2.4.4 Hypertension

- Nearly half (49.3%, n=1102) of patients with IgAN were hypertensive at presentation.
- The prevalence of hypertension in IgAN was 51.3% for males, 46.3% for females (Figure 2.4.4(a)).
- More than 3/4 of patients over the age of 65 years were hypertensive and 55.6% of those above the age of 35 years old were hypertensive (Figure 2.4.4(b)).

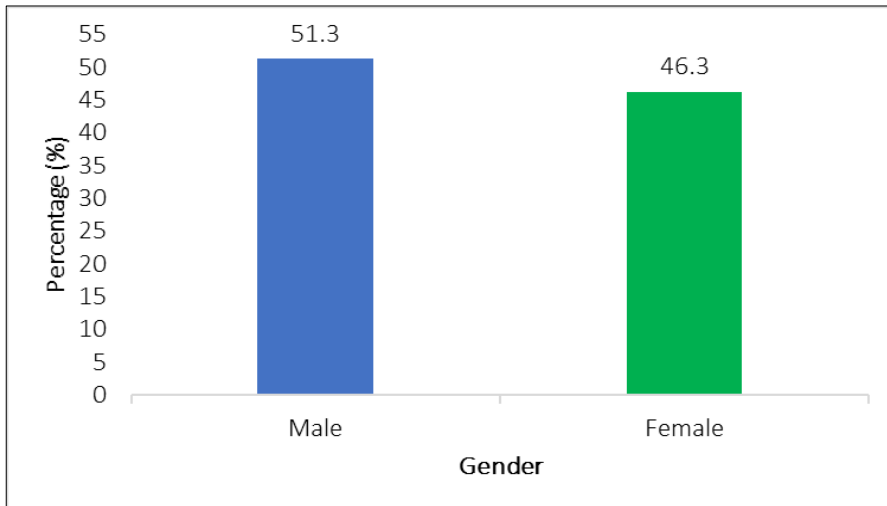


Figure 2.4.4(a): Hypertension by gender for IgAN, 2005-2022

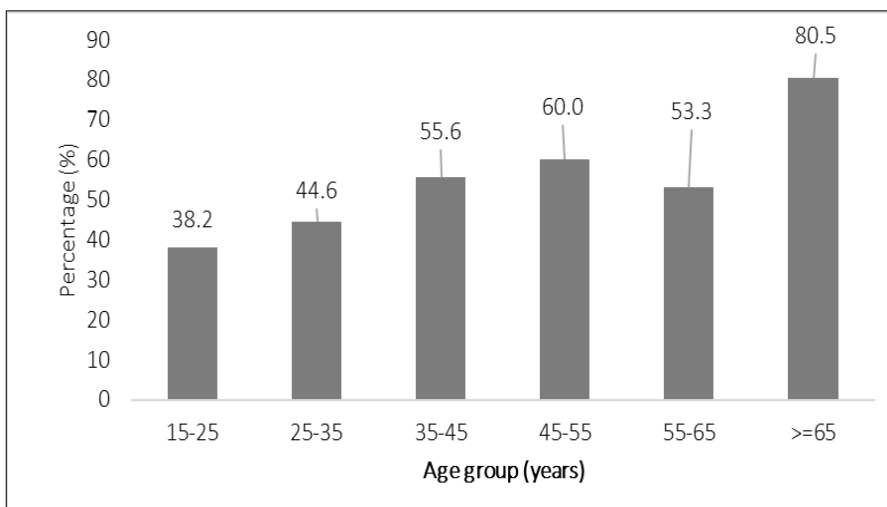


Figure 2.4.4(b): Hypertension by age group for IgAN, 2005-2022

2.4.5 Renal function

- There were no differences in renal function based on gender (Figure 2.4.5(a)).
- Older patients (age ≥ 65 years old) had poorer renal function with 41.5% had eGFR of less than 30mls/min/1.73m² (Figure 2.4.5(b)). About half of those aged between 15-35 presented with eGFR >60mls/min/1.73m² (Figure 2.4.5(b)).

Table 2.4.5(a): Renal function in IgAN, 2005-2022

eGFR (mls/min/1.73m ²)	2005-2009 (n=319)		2010-2014 (n=629)		2015-2019 (n=786)		2020 (n=191)		2021 (n=151)		2022 (n=205)		Total (n=2281)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
< 15	31	9.7	70	11.1	54	6.9	14	7.3	11	7.3	14	6.8	194	8.5
15 to < 30	30	9.4	76	12.1	92	11.7	25	13.1	10	6.6	23	11.2	256	11.2
30 to < 60	85	26.6	140	22.3	193	24.6	38	19.9	44	29.1	46	22.4	546	23.9
60 to < 90	74	23.2	130	20.7	187	23.8	49	25.7	30	19.9	52	25.4	522	22.9
≥ 90	81	25.4	161	25.6	166	21.1	35	18.3	39	25.8	46	22.4	528	23.1
Not available	18	5.6	52	8.3	94	12.0	30	15.7	17	11.3	24	11.7	235	10.3

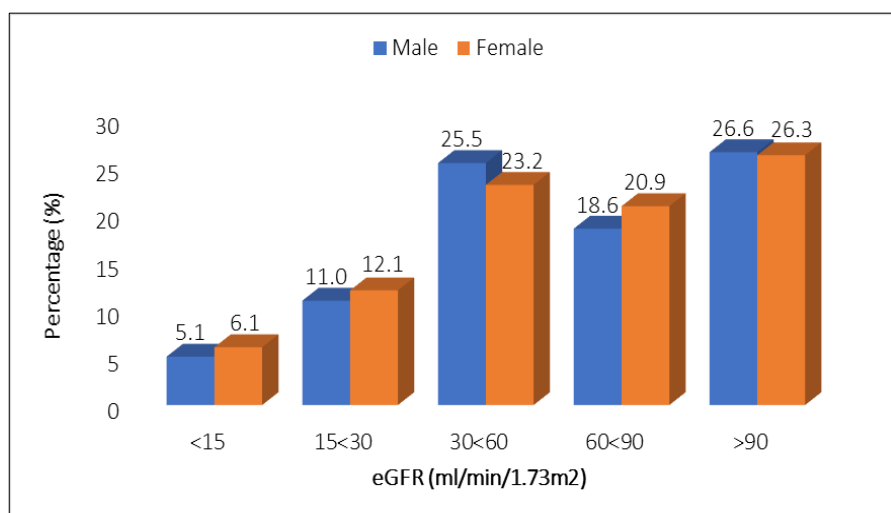


Figure 2.4.5(a): Renal function by gender for IgAN, 2005-2022

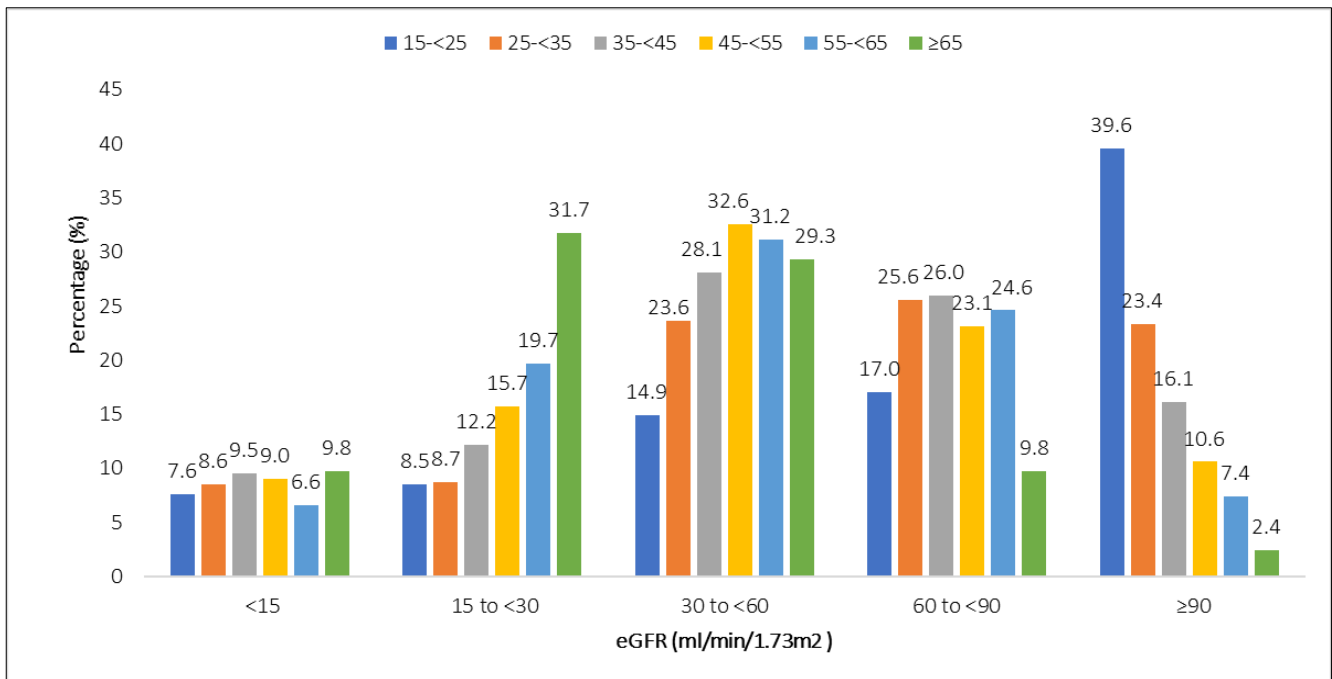


Figure 2.4.5(b): Renal function at presentation by age group for IgAN, 2005-2022

2.4.6 Outcome

- Renal survival for IgAN at 5-years and 10-years were 75.1% and 63.9% respectively (Figure 2.4.6(a)).
- The rate of progression to ESKD within 20 years is reported to be about 30%. However, Malaysian data suggested a higher rate of progression over a shorter period indicating that patients with IgAN in Malaysia may have a different natural history and progression. This data may also be compounded by local practice of not biopsying those with minimal proteinuria. Therefore, those with good prognosis may have not been included in the registry.
- Patient survival at 5-years and 10- years were 95.2% and 93.9% respectively (Figure 2.4.6(b)).

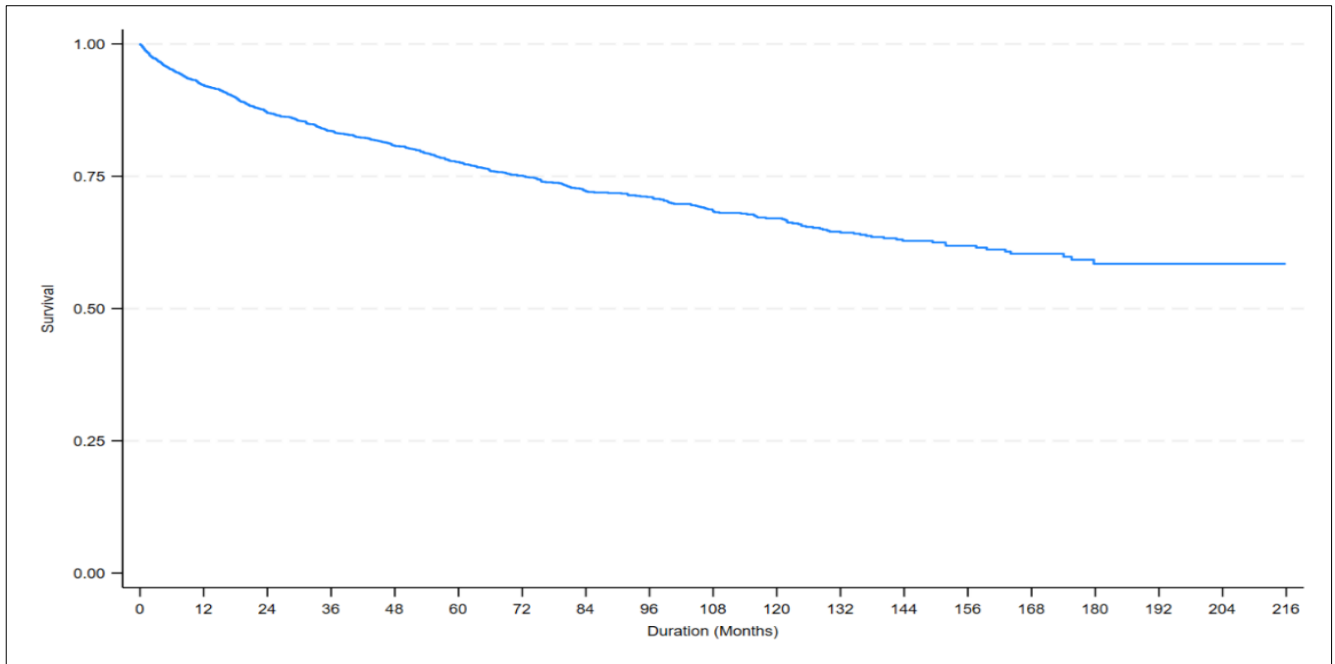


Figure 2.4.6(a): Renal Survival estimates for IgAN 2005-2022

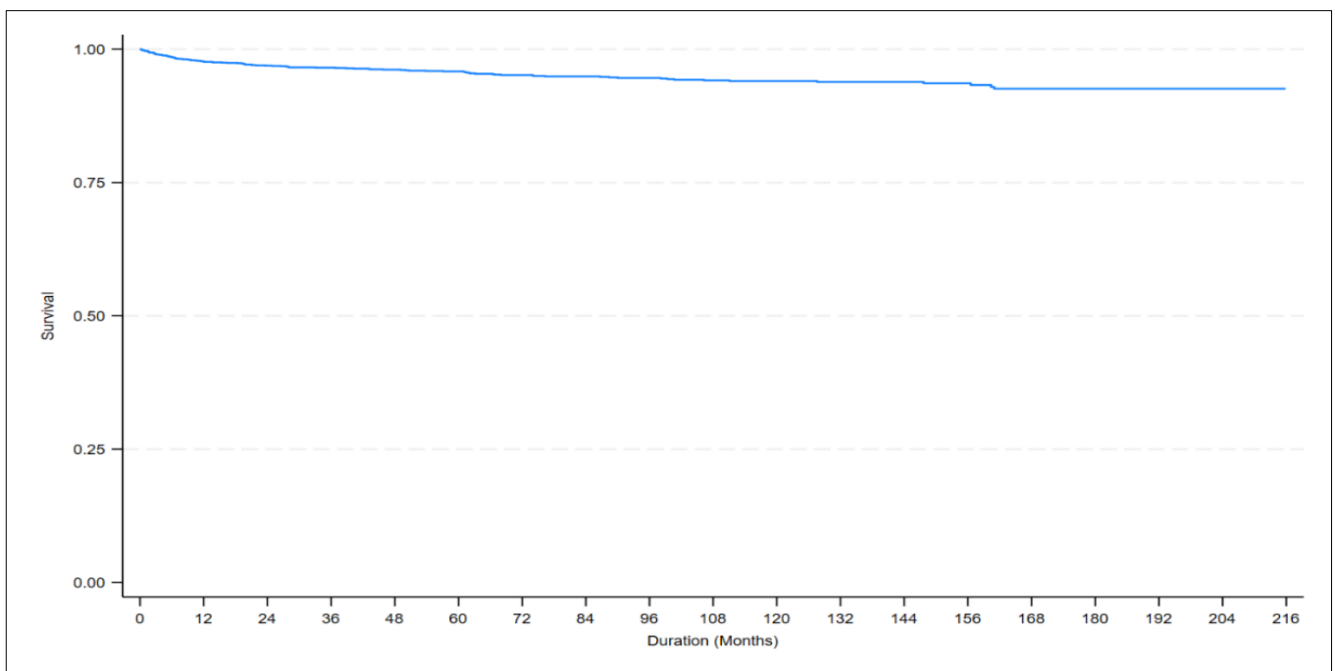


Figure 2.4.6(b): Patient Survival estimates for death in IgAN, 2005-2022

2.5 Membranous Nephropathy (MN)

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.
- Idiopathic Membranous Nephropathy was the fourth most commonly reported primary glomerulonephritis in Malaysia, contributing 10.7% of the total primary GN (Table 2.1).

2.5.2 Patient Population and Characteristics

- There were 953 reported cases of MN.
- There was a slight male preponderance in our cohort (53.3% vs 46.7%) (Figure 2.5.2(a)).
- There was a tendency towards more proportion of Chinese having membranous nephropathy as compared to the other glomerulonephritis. (Figure 2.5.2(a))
- Patients with MN were older with a mean age of 47.2 ± 15.57 years at biopsy and majority of cases (57.6%) were more than 45 years old (Figure 2.5.2(b)).

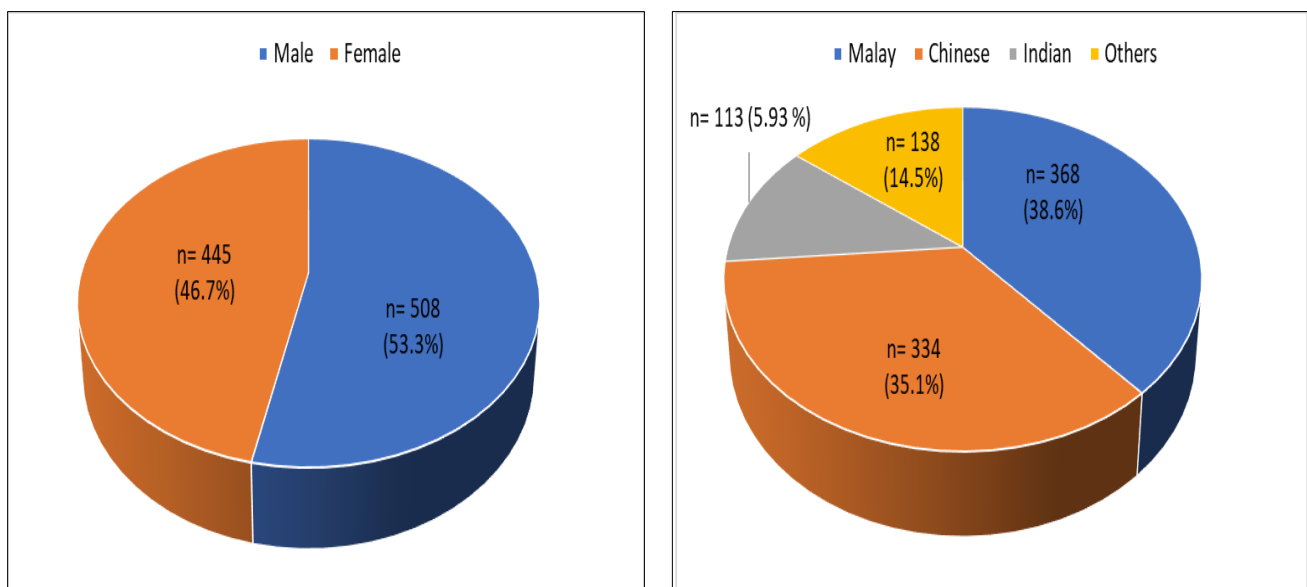


Figure 2.5.2(a): Demographic characteristics for MN, 2005-2022

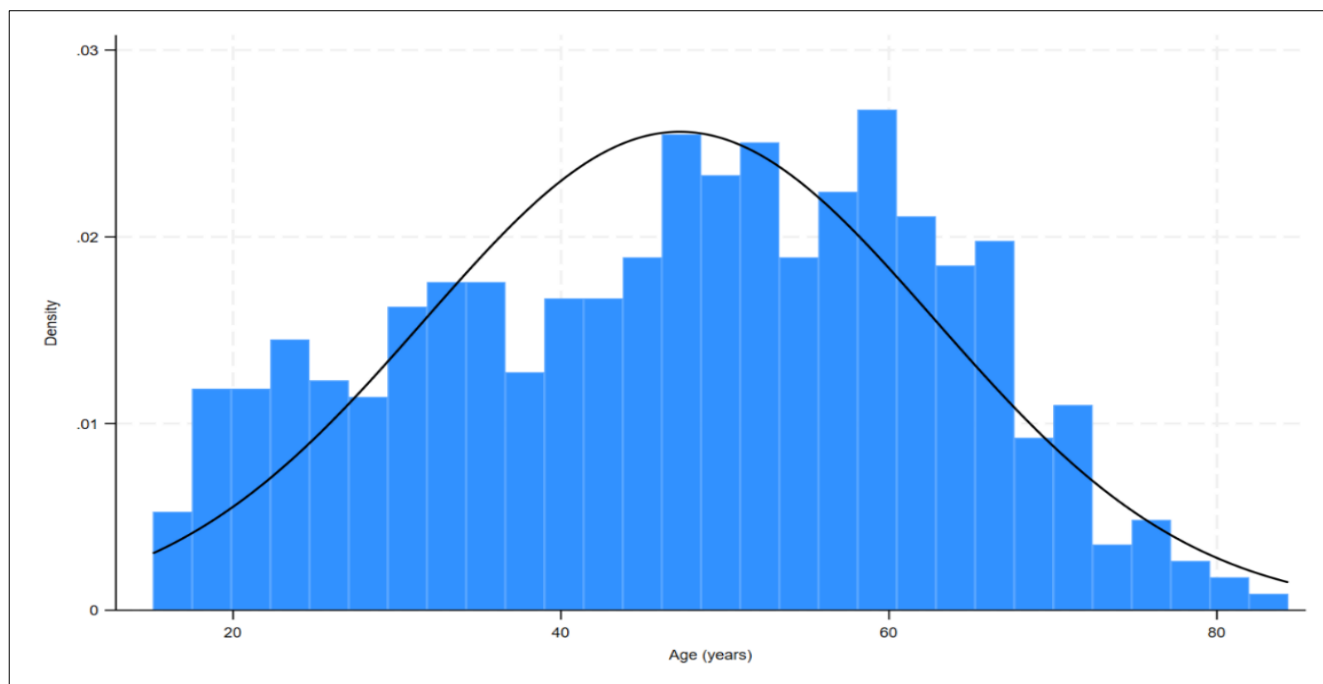


Figure 2.5.2(a): Age at time of biopsy (year) MN, 2005-2022

2.5.3 Clinical presentation

- Nephrotic syndrome was the most common presentation of MN (Table 2.5.3(a)).
- In general, there were no differences in presentation with regards to gender (Figure 2.5.3(a)) and age group (Figure 2.5.3(b)) except that males seemed more likely to present with nephritic syndrome than females.

Table 2.5.3(a): Clinical presentation for MN, 2005-2022

Clinical Presentation	2005-2009 (n=156)		2010-2014 (n=243)		2015-2019 (n=331)		2020 (n=87)		2021 (n=63)		2022 (n=73)		Total (n=953)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Nephrotic syndrome	101	64.7	147	60.5	169	51.1	41	47.1	39	61.9	40	54.8	537	56.3
Asymptomatic urine abnormalities	41	26.3	53	21.8	82	24.8	17	19.5	12	19.0	15	20.5	220	23.1
Nephritic-Nephrotic	5	3.2	15	6.2	33	10.0	14	16.1	5	7.9	8	11.0	80	8.4
Nephritic	3	1.9	3	1.2	20	6.0	5	5.7	3	4.8	5	6.8	39	4.1
Not available	6	3.8	25	10.3	27	8.2	10	11.5	4	6.3	5	6.8	77	8.1

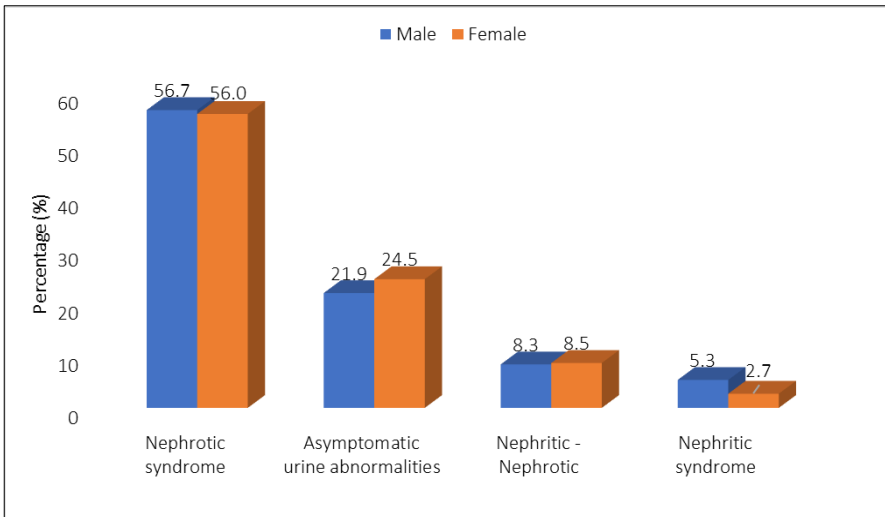


Figure 2.5.3(a): Clinical presentation by gender for MN, 2005-2022

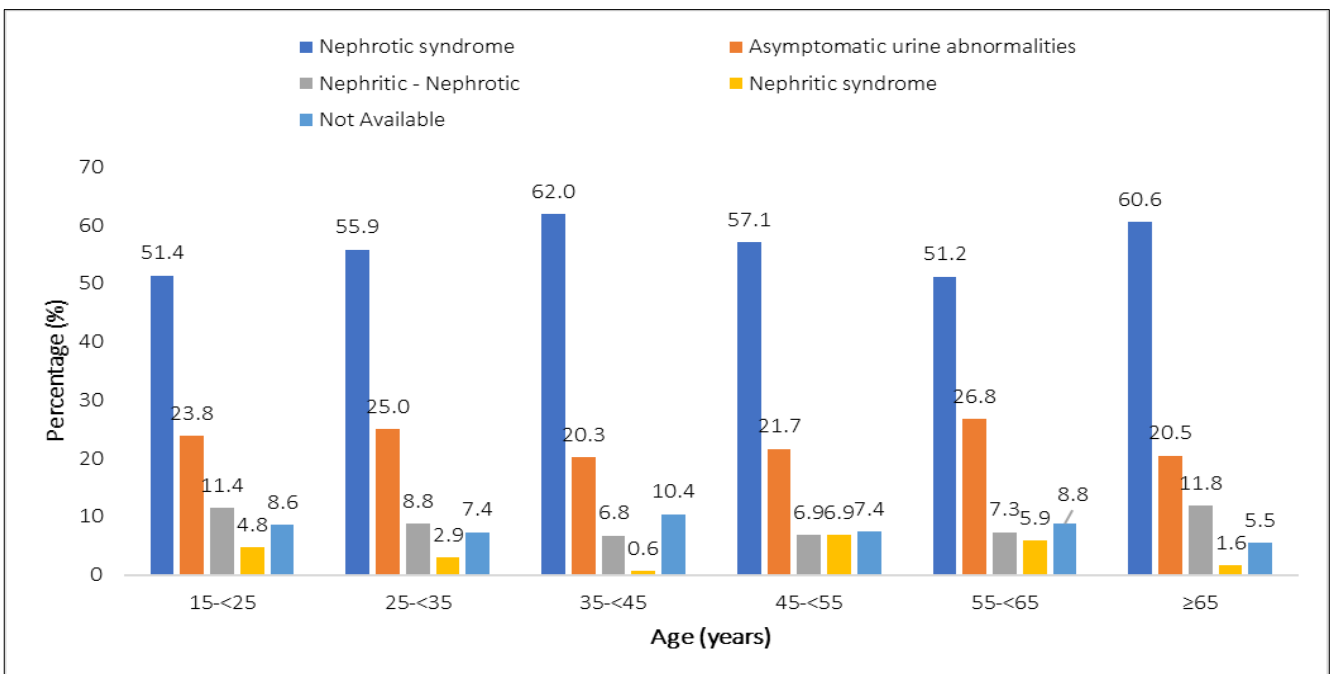


Figure 2.5.3(b): Clinical presentation by age group for MN, 2005-2022

2.5.4 Hypertension

- There appeared to be an increasing trend of hypertension over the last decade with around half of the patients with MN (48.2%) were hypertensive at presentation.
- There was no difference in the prevalence of hypertension between the two genders (Male 50.4%, Female 45.8%) (Figure 2.5.4(a)).
- More than half patients over the age of 45 years had hypertension (Figure 2.4.5(b)).

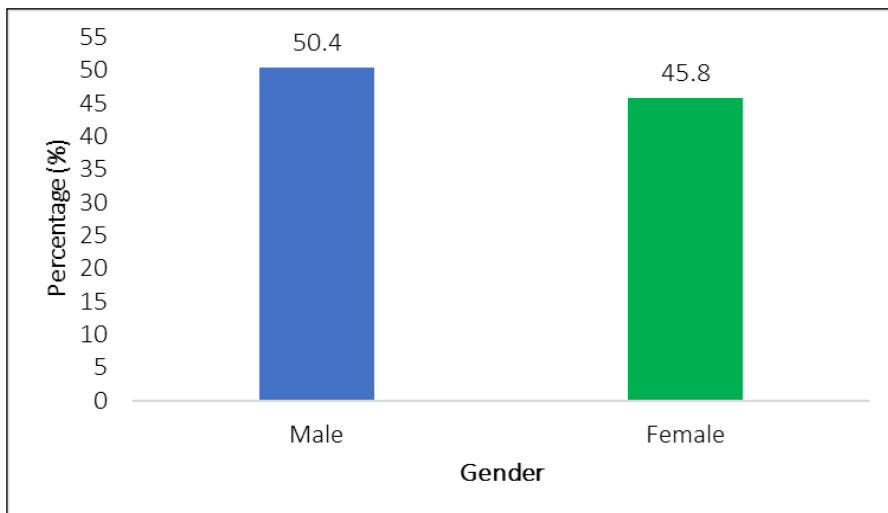


Figure 2.5.4(a): Hypertension by gender for MN, 2005-2022

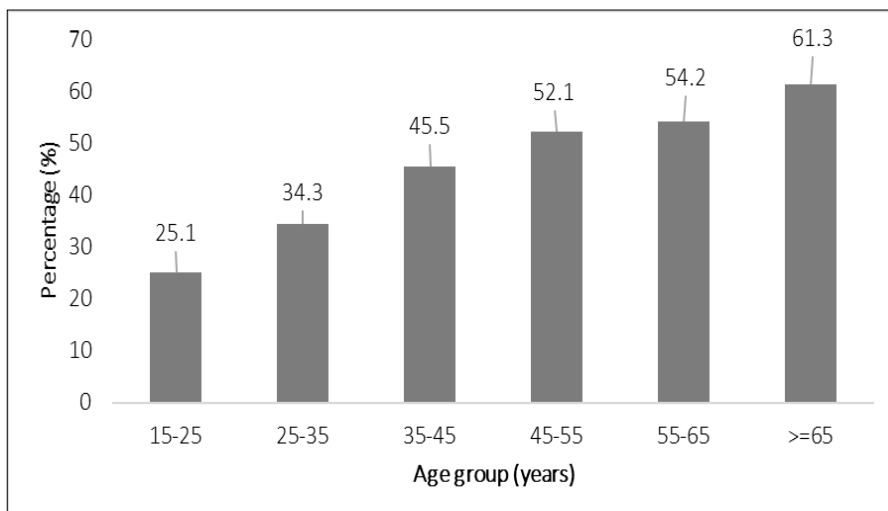


Figure 2.5.4(b): Hypertension by age group for MN, 2005-2022

2.5.5 Renal function

- Majority of the patients with MN had preserved eGFR with 62.3% had eGFR > 60 mls/min/1.73m² at presentation (Table 2.5.5(a)).
- There were no differences in renal function by gender (Figure 2.5.5(a)).
- Older patients (age ≥ 65 years old) predominantly had eGFR of < 60 mls/min/1.73m².

Table 2.5.5(a): Renal function in MN, 2005-2022

eGFR (mls/min/1.73m ²)	2005-2009 (n=156)		2010-2014 (n=243)		2015-2019 (n=331)		2020 (n=87)		2021 (n=63)		2022 (n=73)		Total (n=953)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
< 15	4	2.6	9	3.7	6	1.8	2	2.3	2	3.2	3	4.1	26	2.7
15 to < 30	10	6.4	15	6.2	30	9.1	5	5.7	7	11.1	1	1.4	68	7.1
30 to < 60	36	23.1	47	19.3	45	13.6	14	16.1	8	12.7	15	20.5	165	17.3
60 to < 90	48	30.8	50	20.6	82	24.8	27	31.0	17	27.0	19	26.0	243	25.5
≥ 90	47	30.1	92	37.9	131	39.6	32	36.8	25	39.7	24	32.9	351	36.8
Not available	11	7.1	30	12.3	37	11.2	7	8.0	4	6.3	11	15.1	100	10.5

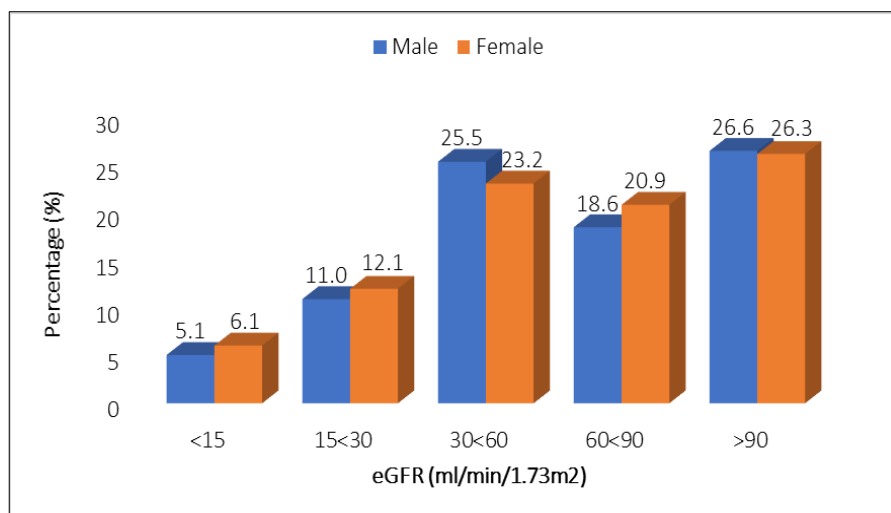


Figure 2.5.5(a): Renal function by gender for MN, 2005-2022

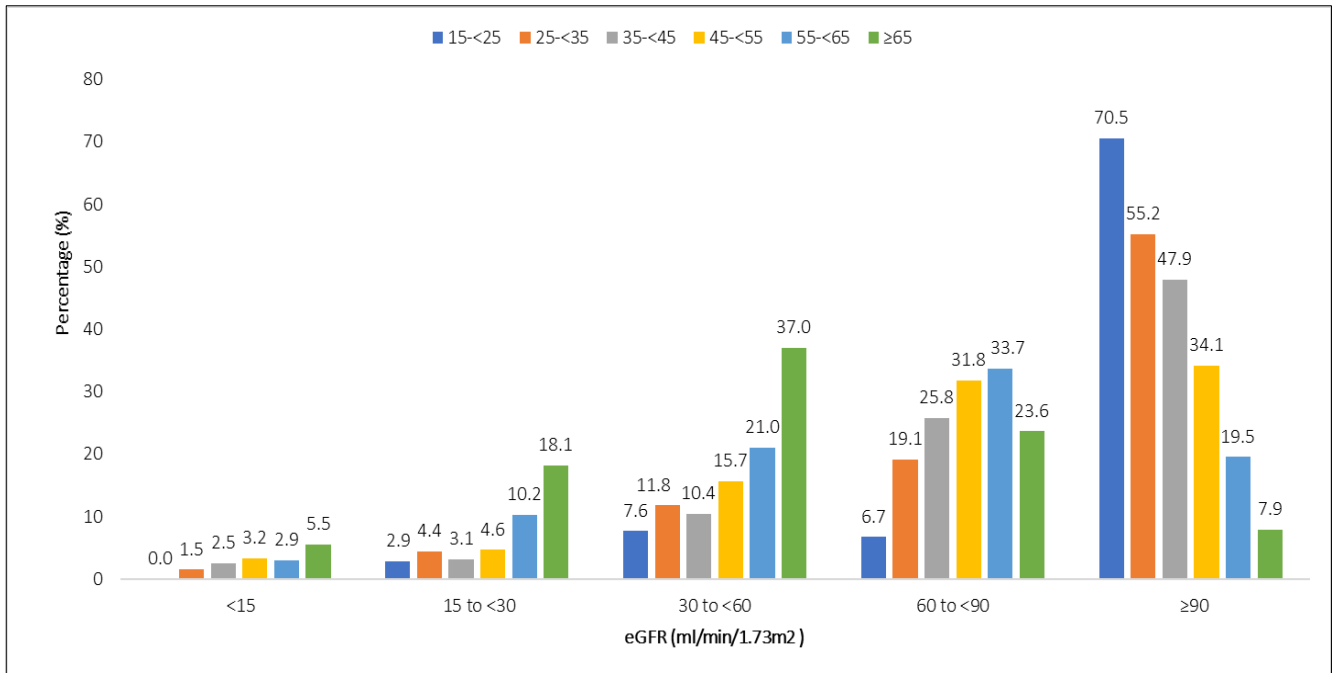


Figure 2.5.5(b): Renal function at presentation by age group for MN, 2005-2022

2.5.6 Outcome

- The 5-year and 10-year renal survival for MN were 89.3% and 88.8% respectively (Figure 2.5.6a).
- Renal survival was good at 5 years in MN compared to FSGS or IgAN.
- However, the 5-year and 10-year patient survival were lower at 86.4% and 77.7% respectively (Figure 2.5.6(b)). This was probably contributed by the older age group of patients, presence of other comorbidities as well as treatment related toxicity.

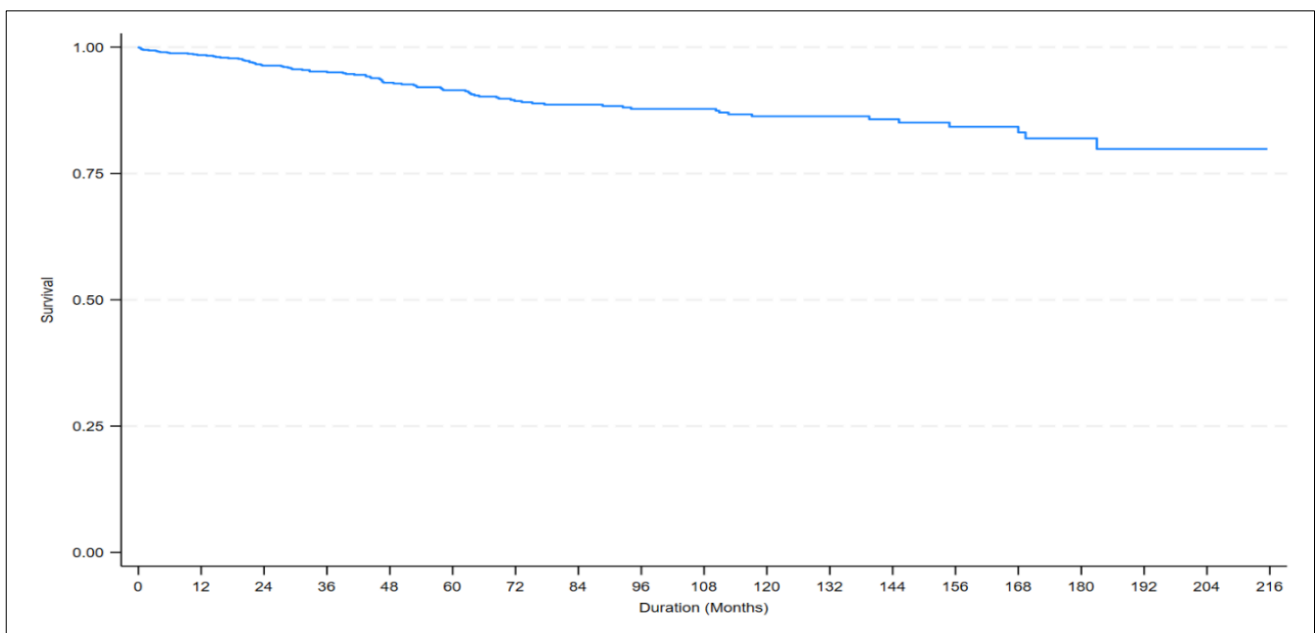


Figure 2.5.6(a): Renal Survival estimates for MN 2005-2022

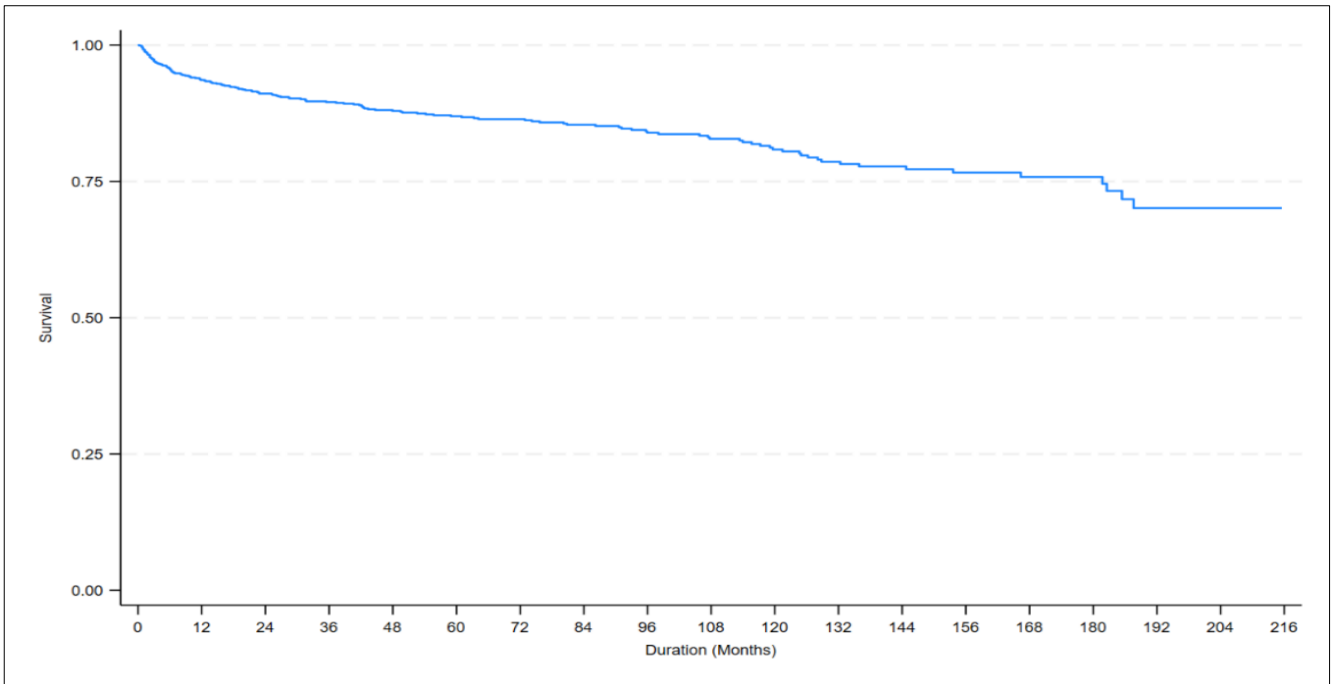


Figure 2.5.6(b): Patient Survival estimates for death in MN, 2005-2022