

CHAPTER 5

**PAEDIATRIC RENAL
REPLACEMENT THERAPY**

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A: RRT Provision for Paediatric Patients (younger than 20 years of age)

The paediatric RRT population in this report is defined as patients less than 20 years of age.

The number of new patients commencing on dialysis had increased from 12 in 1990 to 74 in 2004 giving a dialysis acceptance rate of 1 per million age related population to 7 per million age related population (pmarp) respectively. The number of new transplant patients has not shown much increase over the years at about 6-8 in the early 1990s to about 10 in the last few years with an equivalent transplant rate at only 1 pmarp over the last 15 years.

Not surprisingly the number of prevalent dialysis patients continued to rise steeply and by the end of 2004 there were a total of 390 children under 20 on dialysis. The equivalent dialysis prevalence rate increased from 4 pmarp in 1990 to 36 in 2004. The number of patients with functioning transplants increased only slightly from 38 in 1990 to 111 in 2004 (prevalence rate of 4 and 10 pmarp respectively). ((tables & figures 5.01 & 5.02)

Table 5.01: Stock and Flow of Paediatric Renal Replacement Therapy 1990-2004

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
New HD patients	10	6	8	10	5	7	21	21	22	23	12	24	28	33	34
New CAPD patients	2	2	6	7	13	12	23	20	28	29	37	38	53	39	40
New Transplants	8	6	6	9	11	8	5	14	6	11	14	9	11	11	9
HD deaths	0	2	1	2	0	2	0	3	3	2	4	1	10	5	9
CAPD deaths	0	2	0	0	0	2	2	3	7	2	3	8	8	9	4
Transplant deaths	1	0	0	0	1	0	2	0	0	0	1	0	1	1	0
On HD at 31st Dec	26	27	30	33	34	38	56	70	91	107	121	145	164	189	216
On CAPD at 31st Dec	5	5	8	14	26	32	51	62	73	91	109	122	150	161	174
Functioning transplant at 31st Dec	38	40	45	53	62	67	63	72	75	84	91	96	103	108	111

Figure 5.01a: Incident cases of RRT by modality in children under 20 years old, 1990-2004

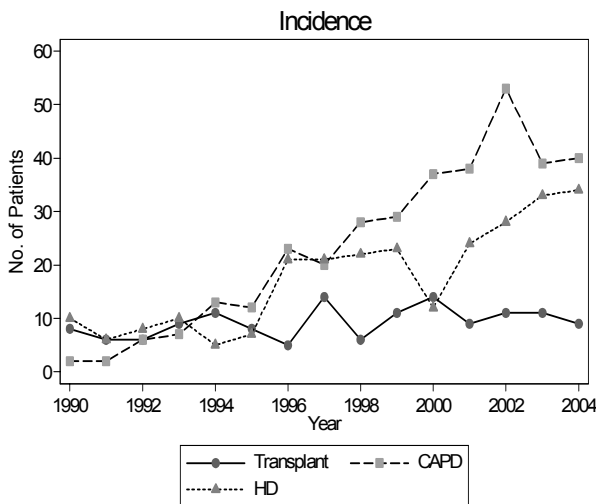


Figure 5.01b: Prevalent cases of RRT by modality in children under 20 years old, 1990-2004

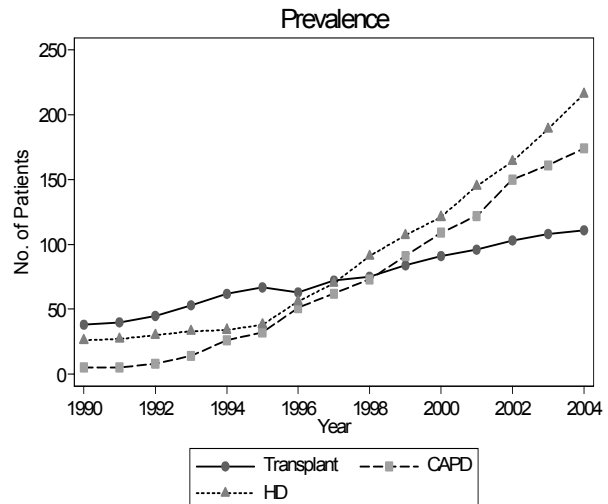
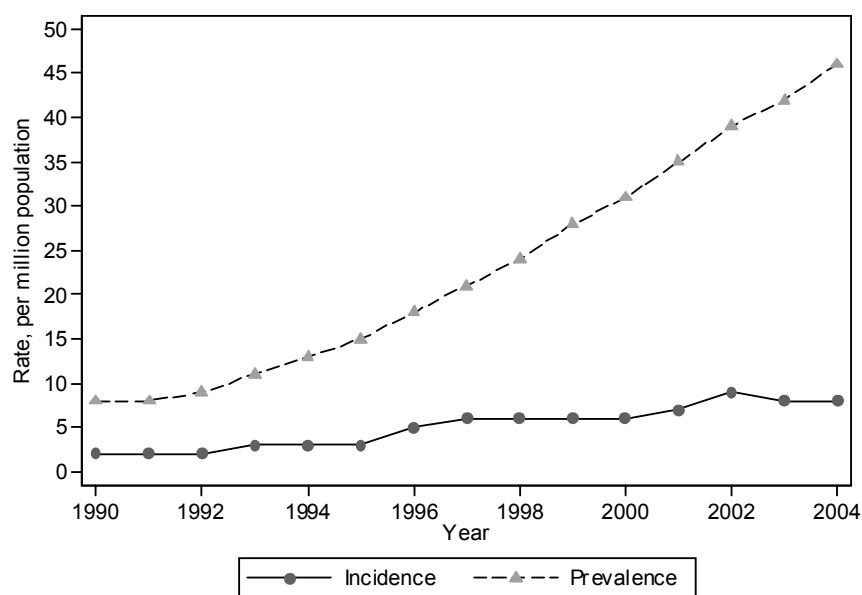


Table 5.02: Paediatric Dialysis and Transplant Treatment Rates per million age-group population 1990-2004

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	
Incidence rate																
New HD	1	1	1	1	1	1	2	2	2	2	1	2	3	3	3	
New CAPD	0	0	1	1	1	1	2	2	3	3	4	4	5	4	4	
New Transplant	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
All RRT	2	2	3	3	3	3	5	5	6	6	6	7	8	8	8	
Prevalence rate																
On HD	3	3	3	4	4	4	6	7	9	11	12	14	15	18	20	
On CAPD	1	1	1	2	3	3	5	6	7	9	11	12	14	15	16	
Functioning Graft	4	5	5	6	7	7	7	7	8	8	9	9	10	10	10	
All RRT	8	9	9	12	14	14	18	20	24	28	32	33	39	43	46	

Figure 5.02: Incidence and prevalence rate per million age related population years old on RRT, 1990-2004



B: Distribution of Paediatric Dialysis

Table 5.03 shows that except for Perak, the treatment rate was still noticeably higher for states in the west coast of West Malaysia; probably a reflection of its more economically developed status.

Table 5.03: Dialysis Treatment Rate by State, per million state age group population, 1990-2004

State	1990-1994	1995-1999	2000-2004
Negeri Melaka	2	5	11
Johor Darul Takzim	0	5	11
Negeri Sembilan	2	9	10
Kedah & Perlis	2	5	10
Pulau Pinang	4	4	10
Terengganu Darul Iman	0	3	9
Selangor & W. Persekutuan	3	8	8
Kelantan Darul Naim	0	1	7
Pahang Darul Makmur	1	5	6
Perak Darul Redzuan	1	3	6
Sarawak	2	5	5
Sabah	1	1	4

Figure 5.04 shows persistent trend of male predominance amongst the new dialysis and transplant patients consistent with higher incidence of ESRD among males. However this trend appears more marked among the transplant recipients which may indirectly reflect gender bias (spoken or unspoken) for preferential treatment in an Asian society such as ours.

Figure 5.04: Number of New Dialysis and Transplant Patients by gender 1990-2004

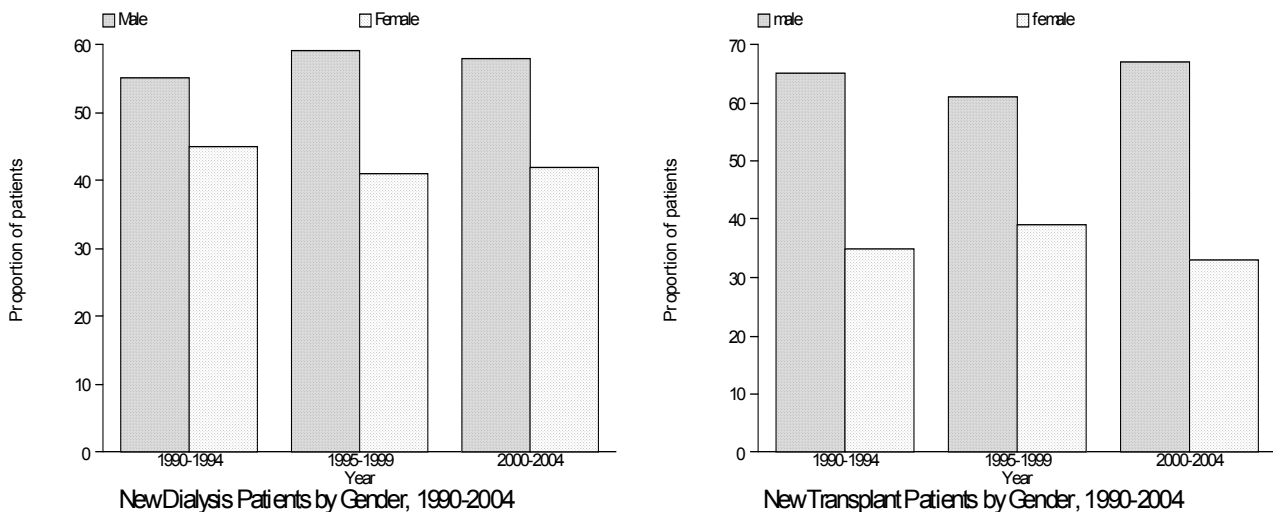


Figure 5.05 shows that after the initial rise in the early 1990s; the treatment rates have begun to level off for the age groups 5-9 years and 10-14 years. The number of 0-4 year olds provided chronic dialysis treatment remained very low. The treatment rate for the age group 15-19 years had continued to increase until the last 2 years when it has also begun to level off. The overall incidence of paediatric RRT in Malaysia remained at 8 pmarp

Figure 5.05: Dialysis and Transplant Treatment Rate by Age group 1990-2004

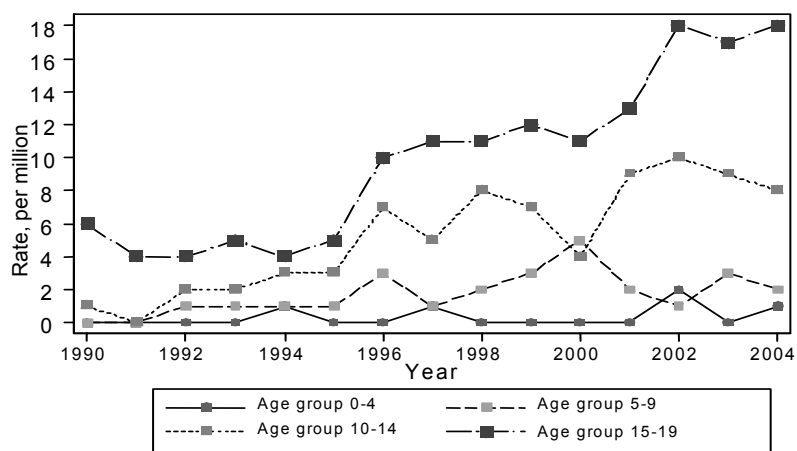


Figure 5.06 shows that CAPD was the preferred mode of dialysis as the initial treatment modality; the converse of that seen in the early 1990s when the CAPD experience was still new to nephrologist taking care of children.

Figure 5.06: New Dialysis by treatment modality 1990-2004

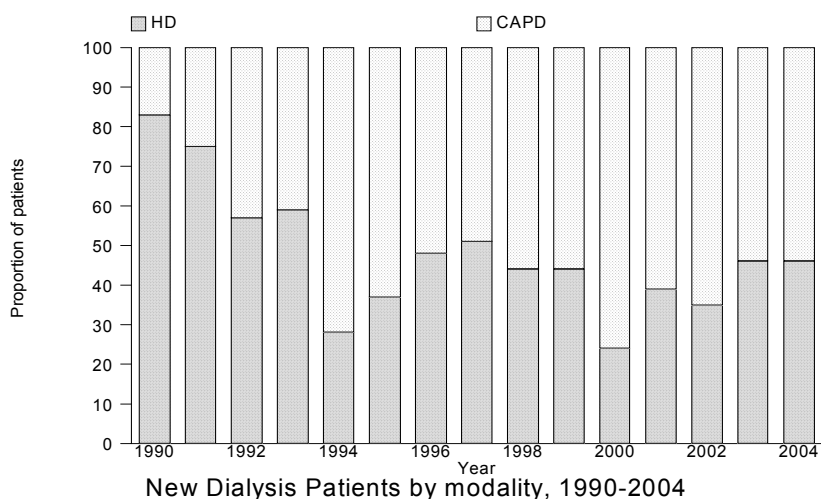
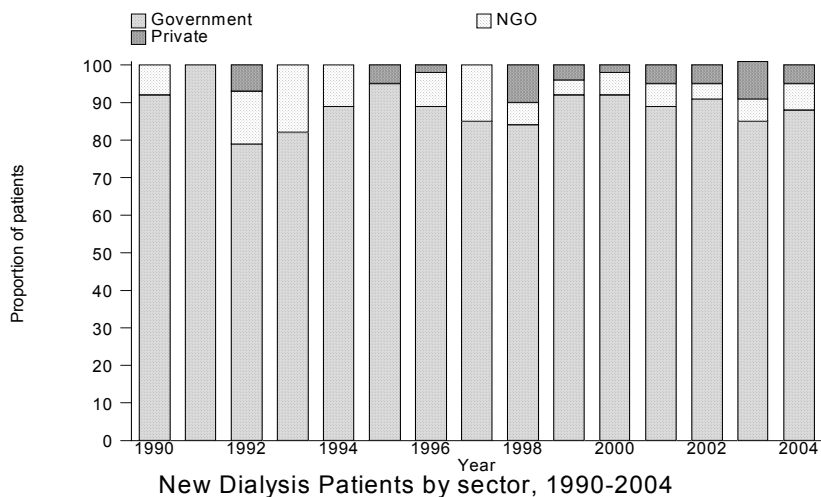


Figure 5.07 shows that almost 90% of children less than 20 years of age receive their dialysis treatment from government centres and hence government funded, unlike in adults where only one third of dialysis patients were treated in government centres.

Figure 5.07: New Dialysis by sector 1990-2004



C: Primary Renal Disease

Glomerulonephritis was the commonest cause of ESRD accounting for 29%. Focal segmental glomerulosclerosis (FSGS) on its own accounted for 11% of all ESRD. It is interesting but alarming to note that SLE was the 3rd commonest known cause of ESRD (9%) considering the age of the patient at start of RRT. Up to 30% of these children still presented with ESRD of unknown aetiology ie they present for the first time in end-stage renal failure. Hopefully this figure should decrease in future with improved access to specialized health care. (table 5.08)

Table 5.08: Primary Renal Disease 1990-2004

Primary Renal Disease	Male		Female		All	
	N	%	N	%	N	%
Glomerulonephritis	140	29	98	29	238	29
FSGS	66	14	26	8	92	11
Systemic Lupus Erythematosus	17	4	45	14	62	9
Refux nephropathy	45	9	18	5	63	8
Obstructive uropathy	35	7	6	2	41	5
Renal dysplasia	13	3	11	3	24	3
Hereditary nephritis	15	3	7	3	22	3
(Alports)	(10)	(2)	(3)	(1)	(13)	(2)
Cystic kidney disease	4	1	3	1	7	1
Others	5	1	6	2	11	1
Unknown	139	29	103	31	242	30
Total	479		323		802	100

D: Types of Renal Transplant

Table 5.09 shows that living related renal transplantation was still the commonest type of transplantation done but the incidence of cadaveric transplantation has increased noticeably in the last 5 years. An increasing number of children (20% after 2000) had their renal transplantation done overseas – the commercial cadaver and living donor programs

Table 5.09: Types of Renal Transplant 1990-2004

Year	1990-1994		1995-1999		2000-2004	
	No.	%	No.	%	No.	%
Commercial cadaver	1	3	9	20	11	20
Commercial living donor	9	23	2	5	5	9
Living related donor	30	75	31	70	21	39
Cadaver	0	0	2	5	17	31
Living emotionally related	0	0	0	0	0	0
TOTAL	40	100	44	100	54	100

E: Survival Analysis

Table and Figure 5.10 show the obvious superiority of transplantation over CAPD and HD in terms of patient survival. Patient survival for renal transplantation was 97% for 1 year, 95% at 5 years and 95% at 10 years post transplant. Patient survival on HD was 95% for 1 year, 85% for 5 years and 82% for 10 years. CAPD patients showed the worst survival; 95% at 1 year, 81% at 5 years. There were too few CAPD patients at 10 years for meaningful analysis.

Figure 5.10 shows that patient survival for CAPD and HD were quite comparable up till 3 to 5 years into dialysis.

Table 5.10: Patient Survival by Modality of RRT, 1990-2004

Modality Interval (years)	Transplant			CAPD			HD		
	No.	% survival	SE	No.	% survival	SE	No.	% survival	SE
1	116	97	1	284	95	1	236	95	1
5	69	95	2	55	81	3	85	85	2
10	28	95	2	2	30	22	16	82	3
12	12	95	2	2	30	22	8	82	3
14	4	95	2	-	-	-	2	34	25

* No. = Number at risk SE = Standard Error

Figure 5.10: Patient Survival by Modality of RRT, 1990-2004

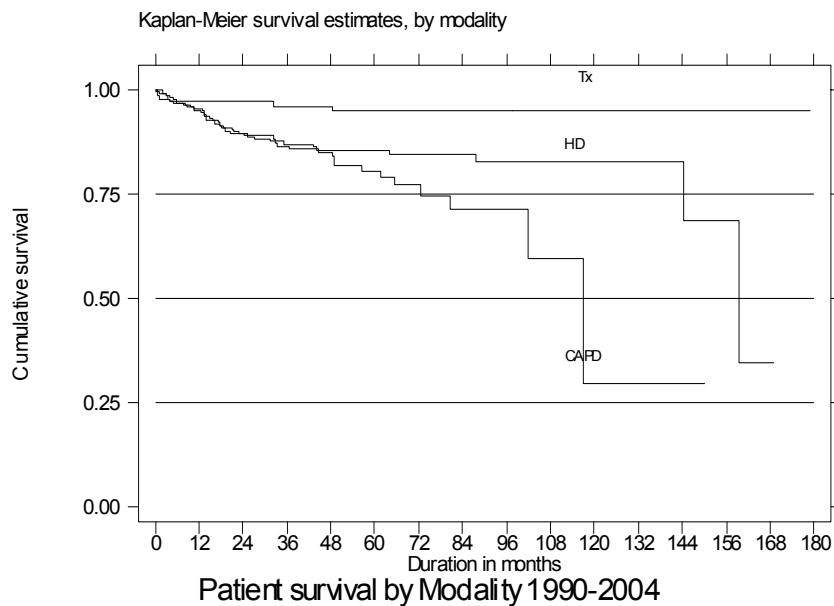


Table and Figure 5.11 below show comparable technique survival for both HD and CAPD in the first 2 years of dialysis. After that CAPD showed a progressive deterioration in technique survival compared to HD.

Table 5.11: Dialysis Technique Survival by Modality, 1990-2004

Modality Interval (years)	CAPD			HD		
	No.	% survival	SE	No.	% survival	SE
1	284	90	2	236	92	2
5	55	53	4	85	81	3
10	2	7	6	16	76	3
12	2	7	6	8	76	3
14	-	-	-	2	32	23

* No. = Number at risk SE = Standard Error

Figure 5.11: Dialysis Technique Survival by Modality, 1990-2004

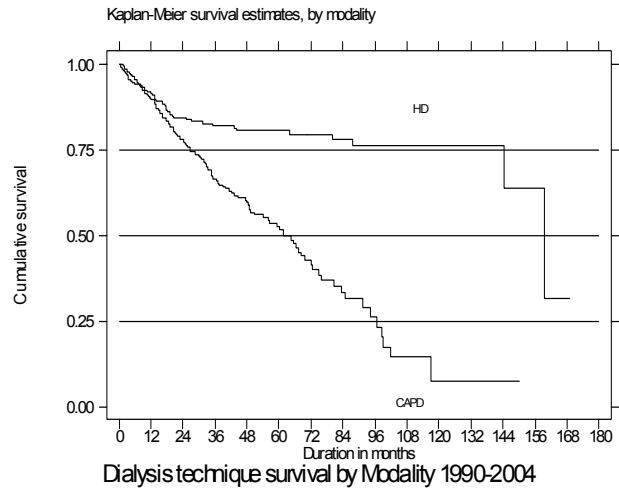


Table and Figure 5.12 show that the graft survival was 91% at 1 year, 80% at 5 years, and 69% at 10 years.

Table 5.12: Transplant Graft Survival 1990-2004

Interval (years)	No.	% survival	SE
1	116	91	3
5	69	80	4
10	28	69	5
12	12	62	7
14	4	37	12

* No. = Number at risk SE = Standard Error

Figure 5.12: Transplant Graft Survival 1990-2004

