

CHAPTER 7

NUTRITIONAL STATUS ON DIALYSIS

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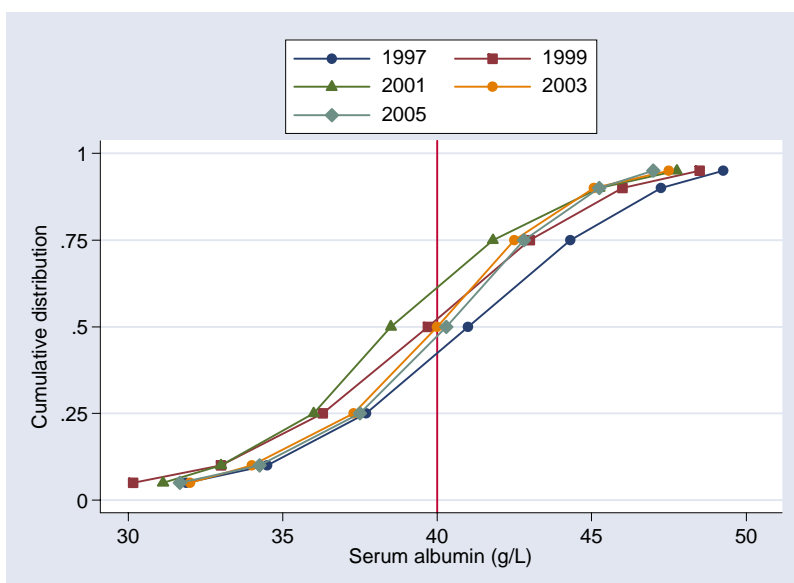
7.1: SERUM ALBUMIN LEVELS ON DIALYSIS

Despite patient numbers increasing by 931 for HD in 2005, mean serum albumin levels was 40 g/L, which is just at the borderline for mortality risk (>40 g/L). This trend has stabilised since 2003 as reflected in the median, LQ and UQ values. For the years 1997 to 2005, the percentage of patients having mean serum albumin levels <35 g/L ranged between 11 to 18% with a decreasing trend seen since 2003 (12-13%) and hence improving trends in mean serum albumin levels. (Table and figure 7.1.1)

Table 7.1.1: Distribution of serum Albumin (g/L), HD patients 1997-2005

Year	No. of subjects	Mean	SD	Median	LQ	UQ	% patients <30g/L	% patients 30-<35g/L	% patients 35-<40g/L	% patients ≥40g/L
1997	1644	40.9	6.2	41	37.7	44.3	3	8	30	59
1998	2075	41.2	6.5	41	37.5	44.7	3	9	28	59
1999	2755	39.7	6.1	39.7	36.3	43	4	13	35	49
2000	3733	38.6	7	39	36	42	5	11	41	43
2001	4666	39	5.6	38.5	36	41.8	3	15	44	38
2002	5568	39.2	5.6	39	36.5	42	3	12	42	43
2003	6529	39.9	5.4	40	37.3	42.5	3	9	35	52
2004	7581	39.9	5.3	40	37	42.8	3	10	34	53
2005	8512	40	5.3	40.3	37.5	42.8	3	9	32	56

Figure 7.1.1: Cumulative distribution of Albumin, HD patients 1997-2005



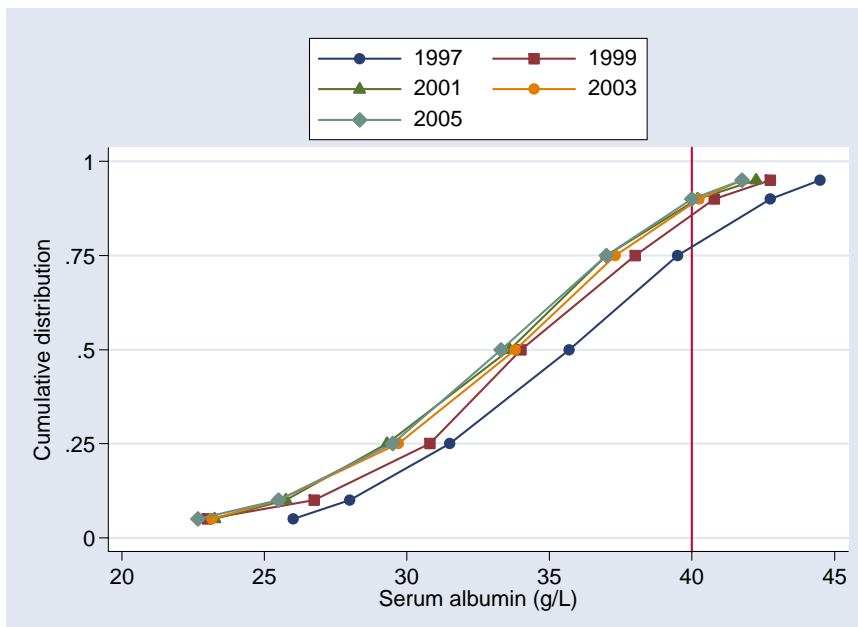
The downward trend in mean serum albumin levels for patients on CAPD continued - from 35.7 g/L in 1997 to 33.3% in 2005. Percentage of patients at increased mortality risk (<35 g/L) increased from 44% in 1997 to 60% by 2005 despite a 2.9-fold increase in patient numbers. This may be explained by the acceptance of elderly diabetic patients for CAPD.

Table 7.1.2: Distribution of serum Albumin, CAPD patients 1997-2005

Year	No. of subjects	Mean	SD	Median	LQ	UQ	% patients <30g/L	% patients 30- <35g/L	% patients 35- <40g/L	% patients ≥40g/L
1997	471	35.7	6.8	35.7	31.5	39.5	16	28	34	22
1998	536	35.8	6.7	36	32	39.7	16	25	35	24
1999	597	34.1	6.6	34	30.8	38	21	33	32	14
2000	640	34.3	6.1	35	31	38.3	20	28	37	14
2001	750	33.3	6.2	33.6	29.3	37	27	33	28	12
2002	862	33.9	5.9	34.3	30.8	37.5	21	35	33	12
2003	1182	33.3	5.8	33.8	29.7	37.3	26	33	30	11
2004	1285	33	6	33.8	29.5	37.3	27	32	30	11
2005	1345	33.2	6.4	33.3	29.5	37	27	33	30	10

The cumulative distribution for 2005, reflects the trend that the patient percentage <35 g/L is increasing.

Figure 7.1.2: Cumulative distribution of Albumin, CAPD patients 1997-2005



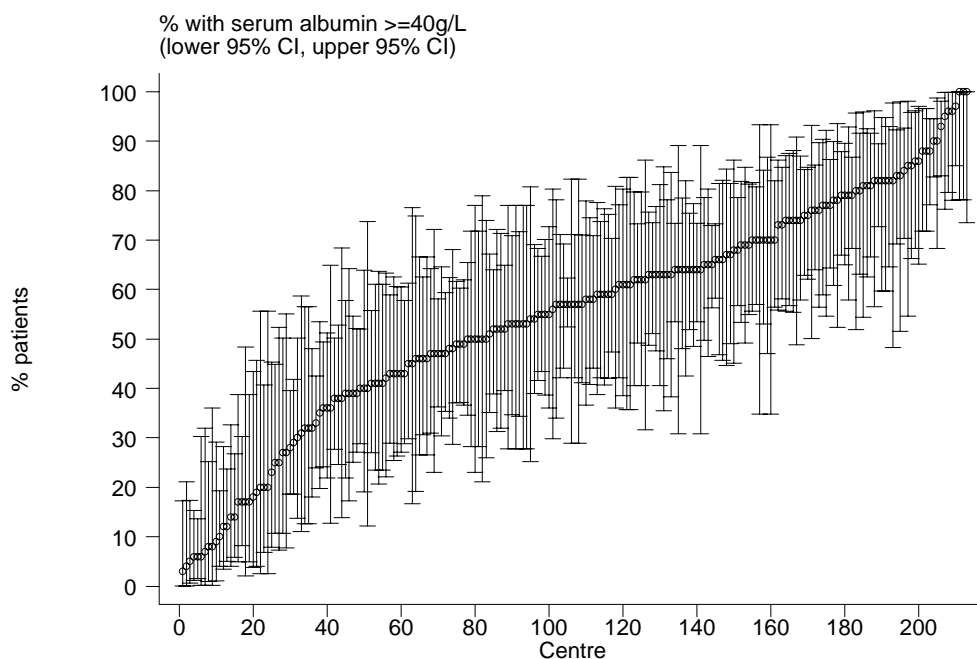
Huge variation was observed in serum albumin results amongst 213 HD centers for 2005. The best centre had all (100%) patients achieving serum albumin $\geq 40\text{g/L}$ (target albumin), while the worst center had only 3% of patients achieving this target. For all HD centres, greater than 8-fold variation in meeting albumin target was observed.

Table 7.1.3: Variation in Proportion of patients with serum albumin $\geq 40\text{g/L}$ among HD centres 2005

Year	No. of centres	Min	5th Centile	LQ	Median	UQ	95th Centile	Max
1997	46	0	10	30	59.5	77	95	97
1998	50	7	15	31	59	80	95	96
1999	70	2	7	23	52.5	67	100	100
2000	95	0	9	23	42	61	82	93
2001	116	0	3	18	40	56.5	82	100
2002	140	0	7.5	25.5	43.5	63	85.5	100
2003	166	0	14	39	55.5	70	92	100
2004	191	0	9	36	57	74	89	100
2005	213	3	10	41	57	70	88	100

Figure 7.1.3 indicates the wide variation amongst 213 HD centers reporting the proportion of patients achieving the target serum albumin $\geq 40\text{g/L}$ for the year 2005.

Figure 7.1.3: Variation in Proportion of patients with serum albumin $\geq 40\text{g/L}$, HD centres 2005



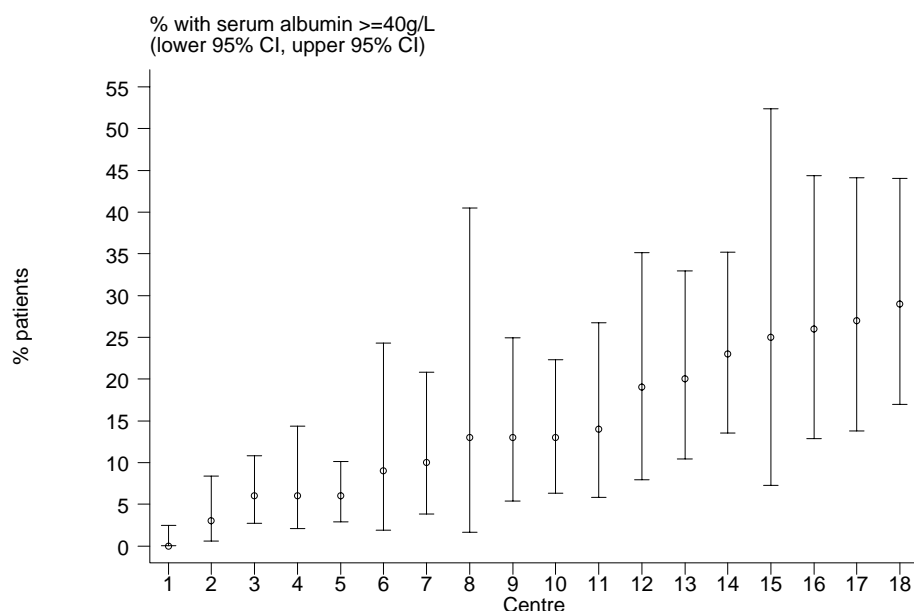
For the 18 CAPD centers in 2005, the maximum proportion of patients achieving the target serum albumin $\geq 40\text{g/L}$ was only 29% whilst some centers reported no patients achieving this target. For all CAPD centres, greater than 29-fold variation in meeting albumin target was observed.

Table 7.1.4: Variation in Proportion of patients with serum albumin $\geq 40\text{g/L}$ among CAPD centres 2005

Year	No. of centres	Min	5th Centile	LQ	Median	UQ	95th Centile	Max
1997	7	5	5	10	28	29	59	59
1998	9	5	5	18	27	34	44	44
1999	10	2	2	9	14.5	18	29	29
2000	11	0	0	5	12	28	42	42
2001	12	1	1	4.5	16	27.5	36	36
2002	14	4	4	6	12.5	16	36	36
2003	18	0	0	5	12	15	48	48
2004	18	0	0	5	12.5	22	34	34
2005	18	0	0	6	13	23	29	29

Figure 7.1.4 shows the wide variation amongst 18 CAPD centers reporting the proportion of patients achieving the target serum albumin $\geq 40\text{g/L}$ for the year 2005. For the years 1997 to 2005, the percentage of patients having mean serum albumin levels $<35\text{ g/L}$ ranged between 11 to 18% with a decreasing trend seen since 2003 (12-13%)

Figure 7.1.4: Variation in Proportion of patients with serum albumin $\geq 40\text{g/L}$, CAPD centres 2005



7.2: BODY MASS INDEX (BMI) ON DIALYSIS

Table 7.2.1 indicates that mean BMI for HD patients from 1997 to 2005 is stabilising at 23 [23 to 24.2] but from 2000 onwards an improving trend [23.0 in 2000 to 23.4 in 2005] is detected despite a 2-fold increase in patient numbers. An increasing trend of improved BMI is observed for HD patients, with the percentage of HD patients with BMI ≥ 25 increasing from 20% in 1997 to 29% in 2005. This may perhaps reflect an increased number of diabetic patients coming into dialysis.

Table 7.2.1: Distribution of BMI, HD patients 1997-2005

Year	No of subjects	Mean	SD	Median	LQ	UQ	% patients <18.5	% patients 18.5-25	% patients ≥ 25
1997	1543	23.7	16.8	21.5	19.1	24.3	19	61	20
1998	1979	24.2	19	21.6	19.1	24.3	19	60	21
1999	2706	23.6	16.6	21.4	19.2	24.4	18	61	21
2000	3851	23	12.4	21.6	19.3	24.5	18	60	22
2001	4537	23.1	11.6	21.9	19.3	24.7	18	59	23
2002	5077	23.2	11.3	22	19.5	24.9	16	59	24
2003	5959	23.2	10.5	22.1	19.5	25.1	16	58	26
2004	6721	23.3	9.5	22.4	19.8	25.4	15	58	28
2005	7536	23.4	9.5	22.5	19.8	25.6	14	57	29

Figure 7.2.1: Cumulative distribution of BMI, HD patients 1997-2005

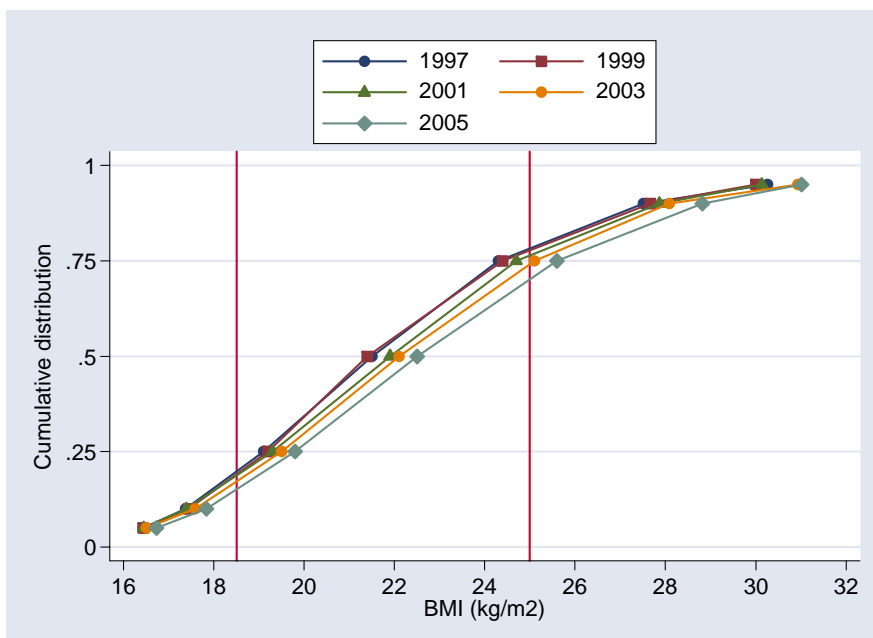


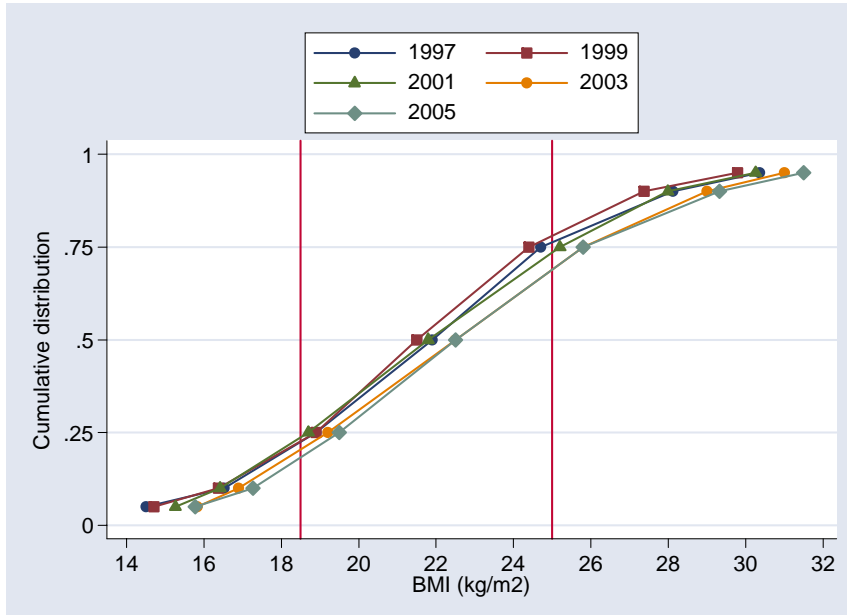
Table 7.2.2 indicates that mean BMI for CAPD patients from 1997 to 2005 is increasing [22.6 to 23.1] despite a 2.9-fold increase in patient numbers. The percentage of CAPD patients with BMI ≥ 25 increased from 23% in 1997 to 30% in 2005. This may perhaps reflect an increased number of diabetic patients coming into dialysis.

Table 7.2.2: Distribution of BMI, CAPD patients 1997-2005

Year	No of subjects	Mean	SD	Median	LQ	UQ	% patients <18.5	% patients 18.5-25	% patients ≥ 25
1997	420	22.6	12.5	21.9	18.9	24.7	21	56	23
1998	491	22.1	11.1	21.3	18.7	24	23	57	20
1999	552	21.8	4.4	21.5	18.9	24.4	22	56	22
2000	602	21.7	4.4	21.5	18.6	24.6	25	53	22
2001	663	22.2	4.9	21.8	18.7	25.2	23	50	27
2002	750	22.3	4.8	22.1	18.7	25.5	23	47	30
2003	1066	22.9	6.7	22.5	19.2	25.8	20	50	30
2004	1169	23.2	7.1	22.6	19.5	26	18	51	31
2005	1214	23.1	7.1	22.5	19.5	25.8	19	52	30

Figure 7.2.2 reflects the increasing BMI trends as the curve for 2005 is moving to the right.

Figure 7.2.2: Cumulative distribution of BMI, CAPD patients 1997-2005



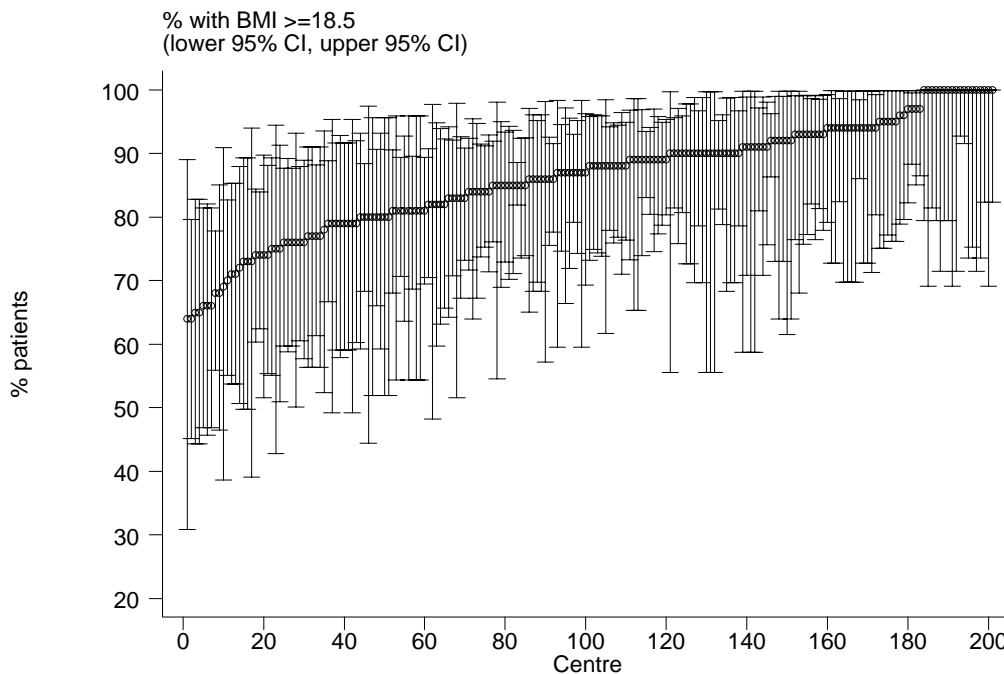
Less variation was observed in BMI measurements amongst 213 HD centers for 2005. The best centre had all (100%) patients achieving BMI ≥ 18.5 (target), while the worst center had 64% of patients achieving this target. For all HD centres, there was 1.4-fold variation in meeting target was BMI (≥ 18.5). (table 7.2.3)

Table 7.2.3: Variation in Proportion of patients with BMI ≥ 18.5 among HD centres 2005

Year	No. of centres	Min	5th Centile	LQ	Median	UQ	95th Centile	Max
1997	46	60	64	75	81	88	100	100
1998	49	61	65	75	81	85	95	100
1999	72	59	62	77	83.5	90	95	100
2000	96	55	65	75.5	82.5	89	95	100
2001	113	30	67	77	83	88	94	100
2002	127	55	71	78	85	89	100	100
2003	155	58	69	79	84	91	100	100
2004	181	60	70	81	86	90	100	100
2005	201	64	70	80	88	92	100	100

Figure 7.2.3 shows the variation amongst 213 HD centers reporting the proportion of patients achieving the target BMI ≥ 18.5 for the year 2005.

Figure 7.2.3: Variation in Proportion of patients with BMI ≥ 18.5 , HD centres 2005



For the 18 CAPD centers in 2005, the maximum proportion of patients achieving the target BMI ≥ 18.5 was 92% whilst the worst centres reported 43% of the patients achieving this target. This represented a 2-fold difference in variation.

Table 7.2.4: Variation in Proportion of patients with BMI ≥ 18.5 among CAPD centres 2005

Year	No. of centres	Min	5th Centile	LQ	Median	UQ	95th Centile	Max
1997	7	50	50	74	81	88	93	93
1998	9	0	0	71	80	87	91	91
1999	9	0	0	71	75	83	92	92
2000	11	11	11	65	76	87	90	90
2001	11	14	14	72	77	87	92	92
2002	14	24	24	73	82.5	84	86	86
2003	18	18	18	75	85	88	100	100
2004	18	38	38	71	83.5	89	95	95
2005	17	43	43	72	83	90	92	92

Figure 7.2.4 indicates that only one center reported the lowest proportion of patients achieving the target BMI ≥ 18.5 whilst a second center reported a proportion of about 55% whilst the rest reported higher proportions ($>70\%$).

Figure 7.2.4: Variation in Proportion of patients with BMI ≥ 18.5 , CAPD centres 2005

