

Chapter 5 Dialysis Initiation - Clinical Profile at First HD Session

This chapter presents the clinical profile of HD patients in Lebanon at initiation of dialysis. Demographic and risk profile of these patients was covered in chapter 4. Information on clinical parameters, immunization, comorbidity, laboratory data, vital signs and prior medications are presented below.

Cause of End Stage Renal Disease (ESRD – Ref. table 5.1)

The categories used for the cause of ESRD are mostly similar to the USRDS categories. To minimize the “unknown”, the categories “other kidney disease” and “other non-kidney disease” were used. The results of this analysis may guide some changes to these categories in the next database update. There were considerable differences in the cause of ESRD between regions of Lebanon. Also, changes in patient distribution by cause were evident among recent starters on HD compared to earlier starters (**figure 5.1**).

Diabetes was primary cause in 29.2% of all patients but was 31.5% among recent starters compared to 27.1% among earlier starters and higher in males (31.7%) compared to females (24.1%). This segment was highest in Bekaa (36.8%) and lowest in Beirut (22.1%).

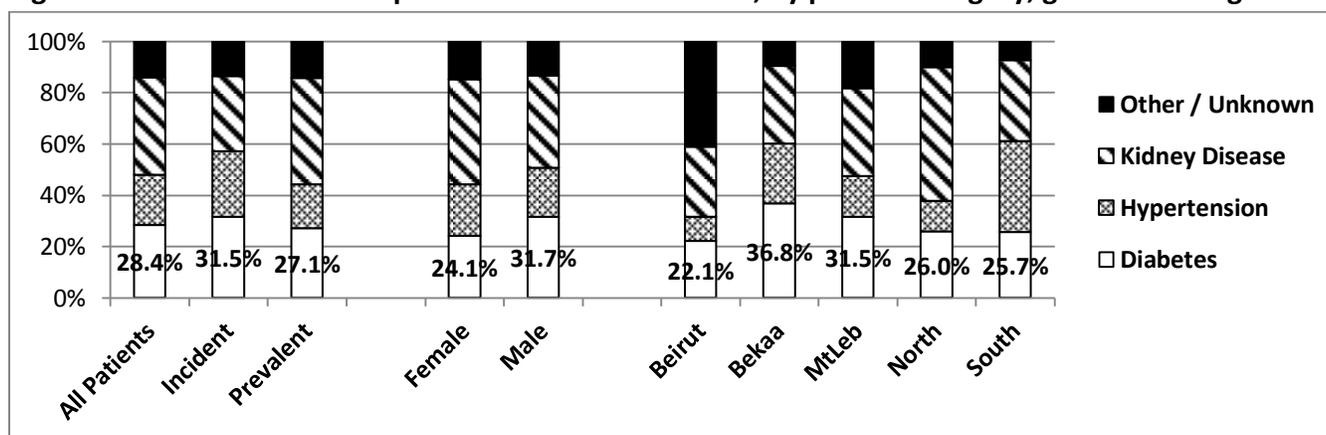
Hypertension was primary cause in 19.5% of all patients but was 25.6% among recent starters compared to 17% among earlier starters and slightly higher among females (20%) compared to males (19%). This segment was highest in South (35.5%) and lowest in Beirut (9.6%).

Kidney disease of all pathology types (except PKD) was primary cause in 38% of all patients, but was only 29.3% among recent starters compared to 41.6% among earlier starters and higher in females (41%) compared to males (35.9%). This segment was highest in North (52.1%) and ranged between 27.2 – 34.4% in the remaining regions.

Polycystic kidney disease was 4% overall with no difference between recent and earlier starters. It did not exceed 5.2% in any region.

Non-kidney disease and unknown causes were 14.1% overall with little differential between recent and earlier starters or by gender. This segment was high in Beirut due to missing data, while other regions ranged between 9.5% and 18.2%.

Figure 5.1 Distribution of HD patients into cause of ESRD, by patient category, gender and region



Kidney Disease (KD) = Glomerulonephritis, polycystic KD, lupus nephritis and other KD

Viral Exposure (Ref. table 5.1)

At start of HD, 2.2% of patients were Hepatitis-B positive, 5.7% were Hepatitis-C positive and 0.2% were HIV positive. Among recent starters, 1.9% was Hep-C positive compared to 7.3% among earlier starters, but no sizeable difference by region. No noticeable differences in Hep-B or HIV positive by patient type or region.

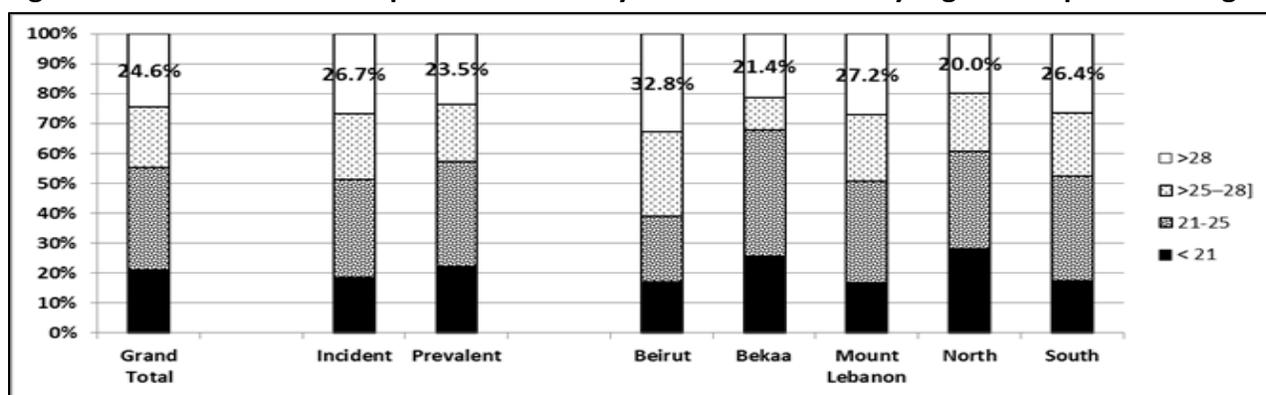
Body Mass Index (Ref. tables 5.1 & 5.2)

At onset of HD, patients had a mean weight of 67.6 ± 15.3 kg (median = 67 kg) and a mean height of 164 ± 10.1 cm (median = 165 cm) adding up to a mean BMI of 25 ± 4.9 kg/m² (median = 24.4 kg/m²). About one quarter of patients were obese (BMI > 27.8) and another quarter had BMI ≤ 21.6 kg/m², while 10% at each end of the distribution were either severely overweight (BMI > 31.5) or underweight (BMI < 18.9).

Obesity was moderate to severe (BMI > 28) among 24.6% of patients at start of HD with noticeable difference in recent starters of whom 26.7% were obese compared to 23.5% among earlier starters (**figure 5.2**). Obesity was higher in females (27.3%) compared to males (22.7%) and highest in Beirut (32.8%) and lowest in North (19.5%). Another 20.6% were borderline obese (BMI 25-28), higher among males (21.9%) compared to females (17.7%) and highest in Beirut (28.1%) and lowest in Beqaa (10.7%).

Lower weight (BMI < 21) was observed in 21.1% of patients overall with a high of 28.2% in North and a low of 16.8% in Mount Lebanon and higher in females (25%) compared to males (18.1%). About 1/3 of patients were in the normal range of BMI 21-25. No sizeable differences existed between recent vs. earlier starters or males vs. females; however, only 19.3% in Beirut were in the normal range compared to 42.3% in Beqaa.

Figure 5.2 Distribution of HD patients into body mass index levels by region and patient category



Experience with Nephrologist (Ref. table 5.1)

Of all HD patients in Lebanon, 69.1% had seen a nephrologist at least once prior to start of dialysis. Of those, 72.8% saw the nephrologist 3 or more times over the past year. About 60% were last seen by nephrologist more than 6 months and only 22.3% were seen during the last month prior to starting dialysis.

Pre-Existent Comorbidity (Ref. table 5.1)

At onset of HD, 35.8% of patients had cardiac disease, 57.8% were hypertensive and 29.2% were reported as diabetic. However, combining primary cause of ESRD and comorbidity reports, there were 35.6% of patients reported as diabetic and 61.1% reported as hypertensive. Another 3.8% of patients had lung disease and 1.9% had cancer. Pre-existent comorbidity reporting may not be accurate among earlier starters of HD due to recall error.

Blood Pressure Measurements (Ref. table 5.2)

At the first HD session, patients had an elevated mean systolic blood pressure (BP = 144.7 ± 25.1 mmHg, median = 140) and normal mean diastolic BP (78.2 ± 12.6 mmHg, median = 80). Post dialysis, mean systolic BP dropped to normal (120.9 ± 20.1 mmHg, median = 120) and mean diastolic BP dropped to 67.8 ± 11.3 mmHg (median = 70). About 10% of patients were hypotensive post-dialysis (BP ≤ 100/50 mmHg) while another 10% continued to have high systolic BP ≥ 150 mmHg.

Clinical & Laboratory Parameters (Ref. tables 5.3-5.6)

Anemia Parameters (Ref. tables 5.3 and 5.4)

Patients who started HD in Lebanon were mostly anemic, but the majority had reasonable iron parameters (**table 5.8**). Differences existed in Hb levels at onset of dialysis by region and patient type (**figure 5.3**). More than half of patients started HD with Hb < 10 g/dL, but the proportion was higher among recent starters (60.2%) compared to earlier starters (47.7%) and highest in North (69.9%) while lowest in South (34.4%).

Most patients started HD (recently or earlier) with iron parameters in the normal range, with a clear differential between the mean and median of these parameters, skewed by the high levels in a few patients (**figure 5.4**) who were apparently treated aggressively with intravenous iron prior to the start of dialysis.

Table 5.8 Profile of key anemia parameters at onset of HD among incident and prevalent patients

	Hemoglobin (g/dL)		TIBC (mg/ml)		S-Iron (mg/ml)		Ferritin (pg/ml)		TSAT (%)	
	Incident	Prevalent	Incident	Prevalent	Incident	Prevalent	Incident	Prevalent	Incident	Prevalent
Mean	9.6	9.9	222.6	244.6	61.3	63.8	422	459	27.2	27.3
SD	1.6	1.9	57.5	64.7	57.1	38.9	503	487	20	17.9
Median	9.7	10.0	224	236	50.5	55	262	301	21.4	23
Min/Max	5/13.8	5/15.5	42 / 433	61 / 462	6.2/636	5.3/280	2.3/4328	11.3/3658	6.4/138	4.4/169

Figure 5.3 Distribution of patients at onset of HD by Hb level and by patient type and region

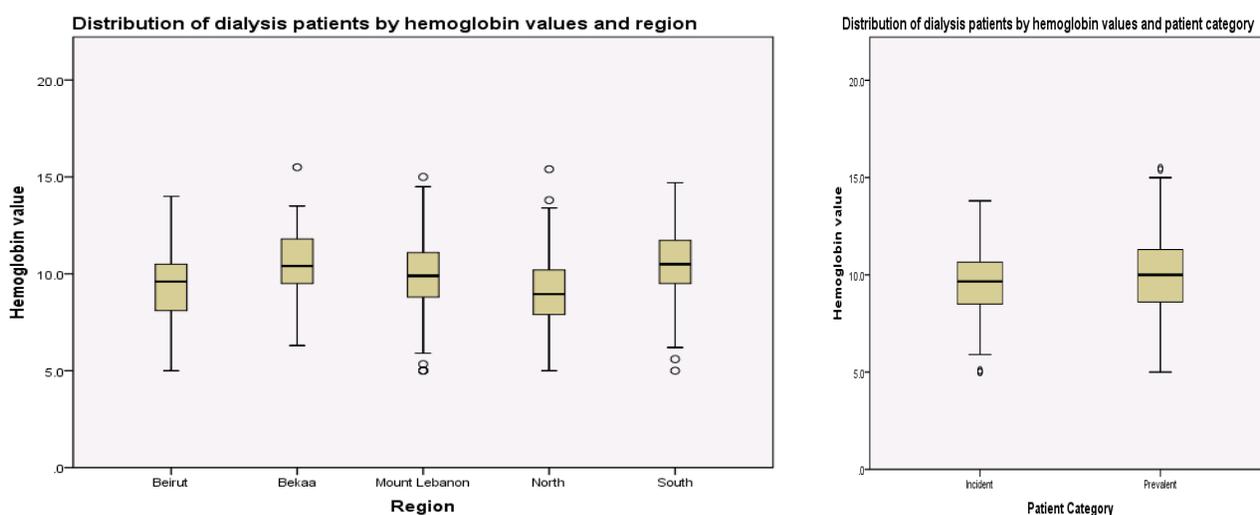
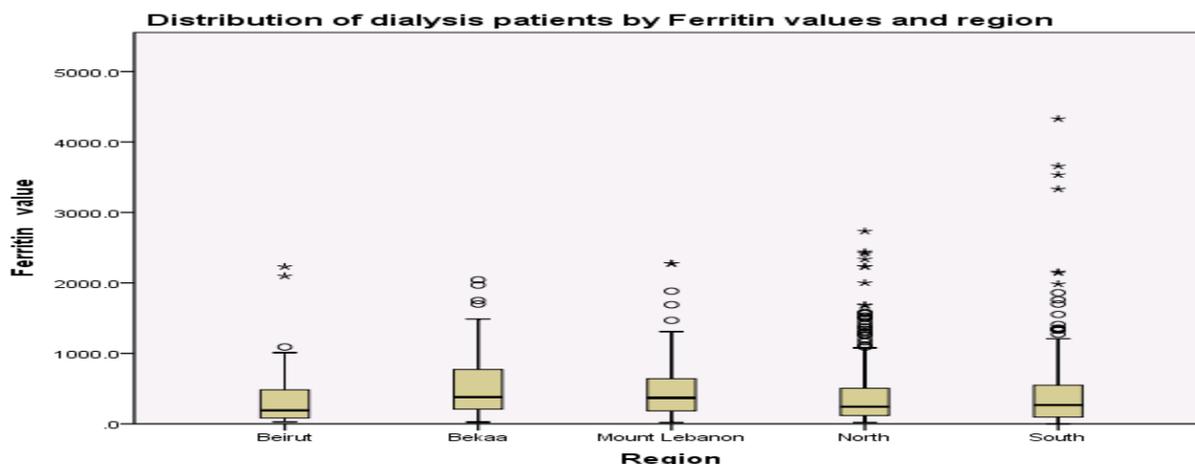


Figure 5.4 Distribution of patients at onset of HD by Ferritin levels and region



Pre-Dialysis Use of Erythropoietin Stimulating Agents (ESA) and Iron (Ref. table 5.6)

Overall, 58.1% of patients used ESA at least once prior to start of HD, more among recent starters (63.6%) compared to earlier starters (55.6%). Use of ESA was highest in Bekaa (94.5%) and lowest in South (40.2%) and Beirut (44.8%). The use of iron supplements prior to start of HD was less common than ESA. Overall, 44% of patients used iron at least once prior to start (mostly oral), more among recent starters (48%) than earlier starters (42%). Use of iron pre-dialysis was highest in Bekaa (78.1%) and lowest in South (29.9%).

Molecular Chemistry / eGFR (Ref. tables 5.3, 5.5)

The levels of blood urea nitrogen (BUN), serum creatinine (sCr), albumin, alkaline phosphatase (AlkP) and intact parathyroid hormones (iPTH) were abnormal in most patients who started HD in Lebanon (**table 5.9**).

Table 5.9 Profile of key molecular chemistry parameters at HD start by patient type

	BUN (mg/dL)		Creatinine (mg/dL)		Albumin (g/dL)		Alk.Phos (U/L)		iPTH (pg/dL)	
	Incident	Prevalent	Incident	Prevalent	Incident	Prevalent	Incident	Prevalent	Incident	Prevalent
Mean	146.8	139.5	8	9.3	3.5	3.7	107.9	118.7	418.2	435.7
SD	77.3	84.8	2.7	2.8	0.6	0.6	66.3	84.2	400.2	450.6
Median	147.7	145	7.9	9.2	3.6	3.7	88.5	97	303.5	280
Min/Max	5/297	5/300	2.5/15	2.5/15	2.2/5	2.1/5.5	1.2/392	2.7/500	3/2342	1/2750

The average **BUN** in patients at start of HD was 10 times higher than the middle of normal range, with only a handful of patients at normal levels.

In contrast, mean **AlkP** level was at the high end of normal range except for a small proportion of patients who had high levels resulting in the mean being markedly higher than the median. There was no marked difference between recent and earlier starters in both tests.

Levels of **iPTH** were already markedly elevated in patients at start of HD, where about half the patients having levels > 300 µg/dL among recent and earlier starters. Only about 30% of patients had levels < 150.

Levels of **albumin** in patients at start of HD were markedly low, with mean albumin slightly lower in recent starters (3.5 ± 0.6) compared to earlier starters (3.7 ± 0.6), but minimal differences by region (**figure 5.5**). Almost half of recent starters had albumin < 3.6 compared to 40.8% of earlier starters

Creatinine levels were markedly higher than normal (**figure 5.6**), with earlier starters having higher levels (9.3 ± 2.8) at start of HD compared to recent starters (8.0 ± 2.7). Differences by region were minor.

Figure 5.5 Distribution of patients at onset of HD by Albumin levels, region and patient type

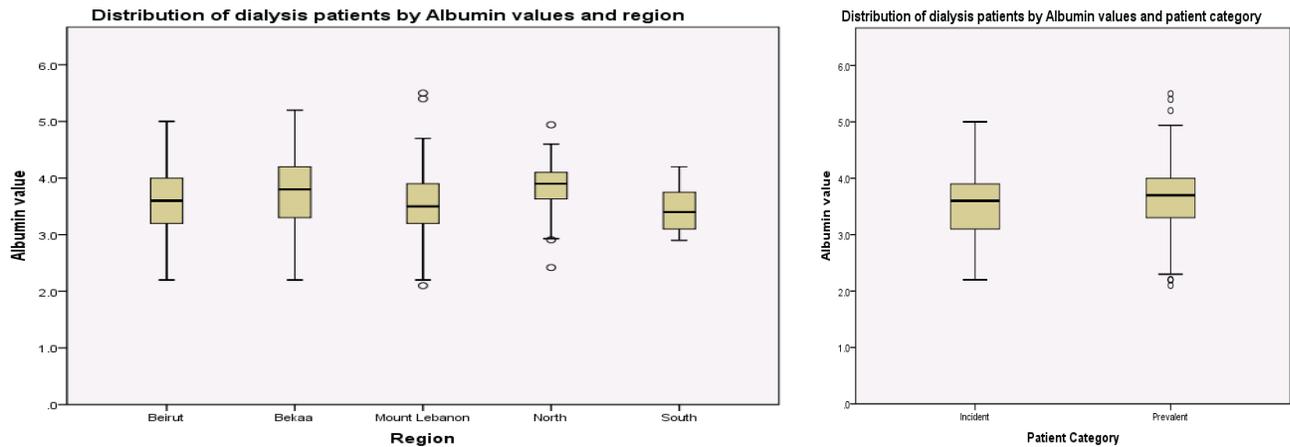
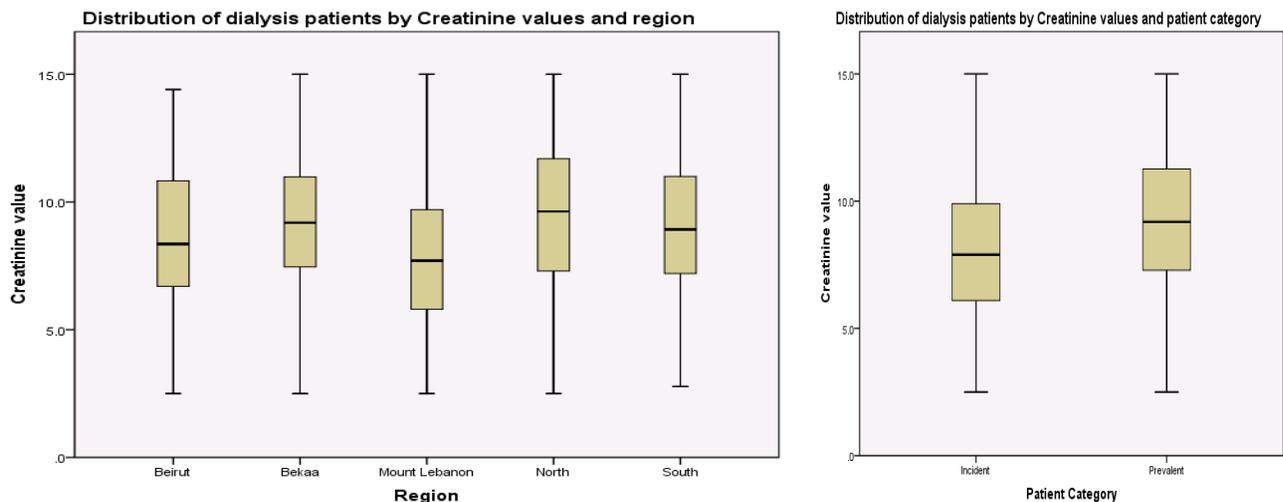


Figure 5.6 Distribution of patients at onset of HD by Creatinine levels, region and patient type



Finally, we used the MDRD formula to compute the estimated glomerular filtration rate (**eGFR**): the 4-variable ($N=1308$ patients who had sCr measurement) and the 6-variable ($N=216$ patients who had sCr + albumin + BUN measurements) formulae (**table 5.10**). Recent starters had slightly higher mean eGFR (> 7 ml/min) compared to earlier starters whose eGFR was slightly > 6 . Among the recent starters, only 27.7% were at eGFR < 5 ml/min at the onset, compared to 44.6% among earlier starters, while at the higher end, the proportions were 14.8% of recent starters at eGFR > 10 ml/min compared to 8.1% in earlier starters. Nephrologists were initiating dialysis at higher GFRs probably due to seeing more patients who are older or more advanced in their primary disease (hence have more complications or comorbidity), which clinically justifies an earlier start on dialysis.

Table 5.10 Levels of eGFR at onset of HD among incident and prevalent patients and by Region

	eGFR (4-Var) N= 1308		eGFR (6-Var) N=216		% Patients by eGFR (4-Var) Level							
	Incident	Prevalent	Incident	Prevalent	Patient Type			Region				
					eGFR	Incident	Prevalent	Beirut	Beqaa	MtLeb	North	South
Mean	7.1	6.1	7.5	6.3	<5	27.7	44.6	27.8	47.8	32.1	0	61.5
SD	3.3	3.2	2.7	2.9	5-10	57.5	47.3	61.1	41.3	53.8	73.3	38.5
Median	6.3	5.2	7	5.4	>10-15	11.3	5.4	8.3	6.5	14.2	20	0
Min/Max	2.7/25	2.5/28	3.8/16	3.1/20	>15	3.5	2.7	2.8	4.3	0	6.7	0

Mineral Chemistry (Ref. tables 5.3, 5.5)

Patients who reach the ESRD stage generally have significant problem with acidosis which the body attempts to correct by releasing calcium (CA) salts from bone. The balancing of CA and phosphorous (P) is crucial for avoidance of bone disease (osteodystrophy) while these patients are on HD. About 2/3 of patients starting HD in Lebanon have normal levels of CA and P (**table 5.11**). Low serum CA levels (<8 mg/dL) are present in 34.8% of recent starters on HD compared to 26.6% of earlier starters, with only few having hypercalcemia. High serum P levels (>6 mg/dL) are present in 27.8% of recent starters compared to 29% of earlier starters, while a few exhibit low P levels. There were some differences in CA and P level by region (**figure 5.7**)

Table 5.11 Profile of key mineral chemistry parameters at onset of HD by patient type

	Calcium (mg/dL)		Phosphorous (mg/dL)		% by Mineral Level					
	Incident	Prevalent	Incident	Prevalent	Level	Calcium		Level	Phosphorous	
						Incident	Prevalent		Incident	Prevalent
Mean	8.3	8.5	5.1	5.2	<8	34.8	26.6	<3	7.3	8
SD	1.3	1.2	1.5	1.5	8-11	62.8	71.6	3-6	64.8	63
Median	7.6	8.6	5.0	5.1	>11	2.4	1.8	>6	27.8	29
Min/Max	4.7/15	4.7/15.6	1.5/8.5	1.5/8.5						

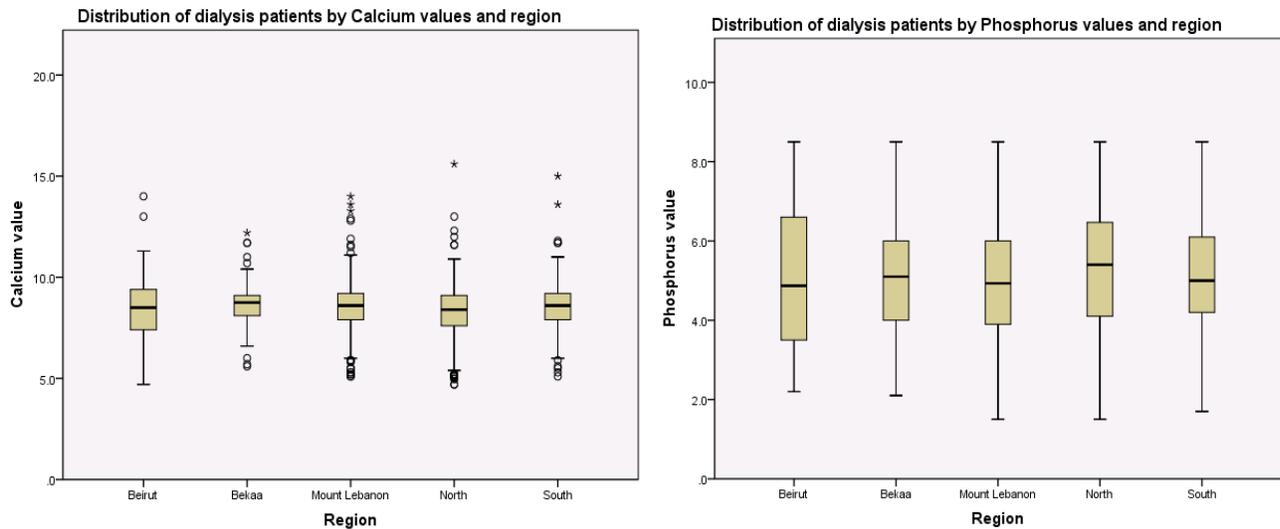
Vascular Access Construction and Use (Ref. table 5.1)

The vascular access (VA) is the lifeline of ESRD patients as they embark on chronic HD. Early attention for these patients by a nephrologist allows the insertion of a permanent VA, preferably an arteriovenous fistula (AVF) which can be used to initiate HD. The dialysis initiation module in the registry had two VA sections, one to document permanent VA creation and the second to document the access used to conduct the first dialysis session.

AVF construction was done in 52.5% of patients in Lebanon at time of first HD session; yet, only in 30.8% of patients, the AVF was mature for use. Wide variations exist between regions of Lebanon in the proportion of

patients who have AVF constructed at time of first HD session (**figures 5.8 & 5.9**): a high of 68.8% in Mount Lebanon (43.3% used AVF in first HD), and a low of 34.3% in South (20.8% used AVF in first HD).

Figure 5.7 Distribution of patients at onset of HD by calcium and phosphorous values by Region



About 40% of patients have a temporary catheter (TC) as the first VA inserted, which probably correspond to patients who presented in need for immediate onset of HD. There were 56.2% of patients who used a TC in the first HD session, and these are a combination of patients who were in immediate need for HD, or in whom the permanent VA was not mature enough for use. Again, there was a wide variation among regions with the highest use of TC in the first HD session being in South (74.5%).

The use of synthetic graft is limited in Lebanon ranging from 0% to 2.5% in various regions. A permanent catheter (PC) is the first VA constructed in 3.8% and used in the first HD session in 4.8% of patients.

Figure 5.8 Distribution of patients by type of first vascular access constructed by region

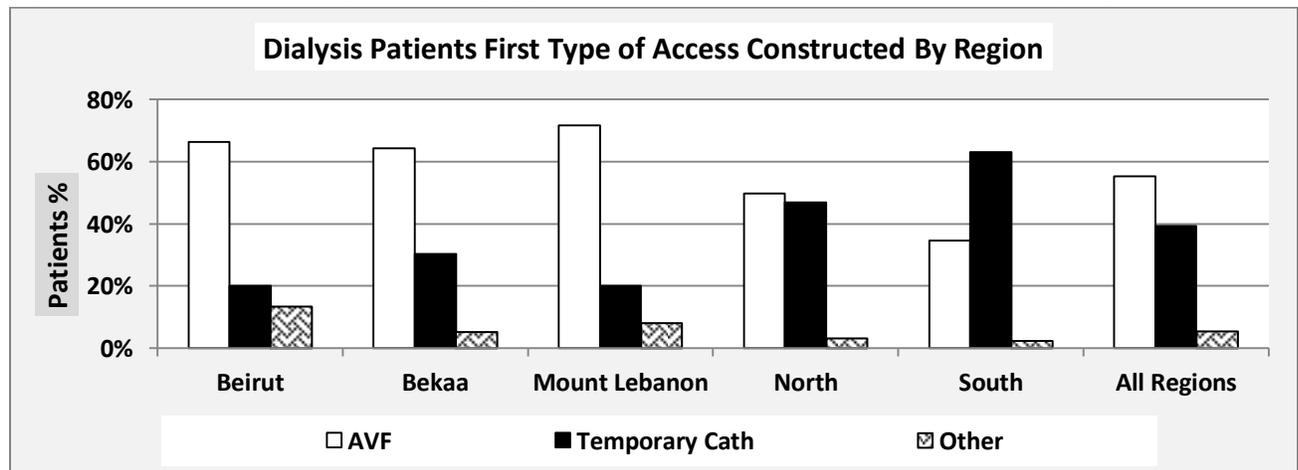
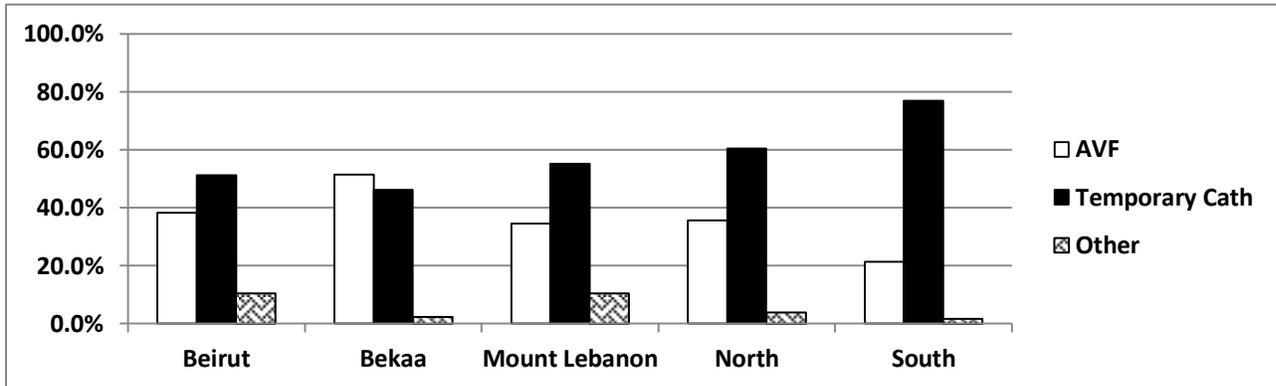


Figure 5.9 Distribution of patients by type of vascular access used in first HD session by region



Patients who initiated HD after a failed transplant (Ref. table 5.7)

There were 91 patients, 4.8% of total patients who were eligible for inclusion in this report, who came into HD after suffering a failed kidney transplant. Of these patients, 62 had a kidney from a living donor, 6 had a cadaveric kidney and the source was unknown for the remaining 23. The country of transplant was Lebanon for 46 patients, 10 in Iraq, and 4 in each of Kuwait and Egypt, with no information on 27 patients.

The mean age of these patients when re-started on dialysis was 37.8 ± 15.3 (median=37) years and 3 of them passed away during the reporting period at ages of 62, 67 and 81. Two thirds of these patients were males, 62% were married while 33% were single, 45% were still working, 35% had secondary or university education, and 24% reported consanguinity.

Only 4 of these patients had diabetes reported as primary cause of ESRD, hypertension was in 10, glomerulonephritis in 25, lupus nephritis in 2, PKD in 3, and other kidney disease in 27 patients. Primary cause was not known in 21 patients. An AVF was inserted prior to re-starting dialysis in 58 of these patients and was used in the first dialysis session in 43 of them while 38 started with a temporary catheter, 3 with a synthetic graft and 4 with a permanent catheter.

Dialysis initiation data constitutes a baseline for maintenance hemodialysis. It also represents the late pre-dialysis phase clinical profile and patient management practices.

This information is important for prevention planning in high risk patients with diabetes, hypertension and/or cardiac disease.