

Evaluation of nutritional status in hemodialysis: adding serum prealbumin to the Protein Energy Wasting score is it beneficial?

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Introduction

Protein Energy Wasting (PEW) is associated with poor clinical outcomes and mortality in hemodialysed patients. A PEW score proposed by Moreau-Gaudry and al.¹ predicts mortality in a large dialysis cohort but doesn't include serum prealbumin, an earlier and strong parameter of PEW.

Design

In this observational single-centre study including patients in maintenance hemodialysis at the 1st January 2014, we applied the PEW score, with ("standard PEW score") and without ("modified PEW score") prealbumin serum, and evaluated mortality at 1 year. For each item achieved, one point is given. The individual score was therefore comprised between 4 (normal nutritional status) and 0 (severe wasting) (table 1). Means were compared with ANOVA or KRUSKAL-WALLIS tests according to values' distribution. Cox proportional hazard models were used to estimate the hazard ratios (HRs). The Kaplan-Meier method was used to plot survival curves.

Results

A total of 108 of the 141 patients were included. Table 2 details patient's characteristics at base line according to the PEW score. 50 % of the cohort had a moderate to severe PEW (scores 0, 1 and 2) and 53% a high level of comorbidity (Charlson score ≥ 6). According to PEW score, weight, serum albumin, serum prealbumin, predialysis serum creatinine/body surface area (Scr/BSA) and nPNA were significantly different. Charlson's score were significantly lower in patients with normal nutritional status (score 4). Kt/V was significantly lower in patients with severe PEW (score 0-1) compared to patients with moderate PEW (score 2). No difference was observed between groups for PCR values. Survival at 1 year according to standard and modified PEW score is reported respectively in figures 1 and 2. Using "standard PEW score", mortality was significantly different only between score 0-1 and score 3 (HR 0.12, p= 0.007, CI 0.02-0.55) but not between score 0-1 and score 2 and score 0-1 and score 4. With "modified PEW score", mortality was significantly different between score 0-1 and respectively score 2 (HR 0.31, p= 0.038, CI 0.10-0.94) and score 3 (HR 0.14, p=0.013, CI 0.03-0.66) but not between score 0-1 and score 4 (HR 0.21, p= 0.136, CI 0.03-1.64).

Table 1. Standard PEW score and modified PEW score.

Points	Standard PEW score	Modified PEW score
1	Serum Albumin > 38 g/l	Serum Albumin > 38 g/l Or <u>Serum prealbumine > 0.3 g/l</u>
1	BMI > 23 kg/m ² (1)	BMI > 23 kg/m ² (1)
1	SCr/BSA > 380 μ mol/L/m ² (2)	SCr/BSA > 380 μ mol/L/m ² (2)
1	nPNA > 0.8 g/kg/d (3)	nPNA > 0.8 g/kg/d (3)

(1) BMI, Body Mass Index; (2) SCr/BSA, predialysis serum creatinine/body surface area; (3) nPNA, normalized protein nitrogen appearance.

Table 2. Patient's characteristics according to standard PEW score at base line (mean \pm SD)

	All	P*	Score 0-1	Score 2	Score 3	Score 4
Number of patients	108		23	31	43	11
Number of deaths (%)	17 (16)	0.01	8 (34.8)	6 (19.4)	2 (4.7)	1 (9.1)
Age (y)	63.7 \pm 15.6	0.11	67.8 \pm 14.7	66 \pm 15.7	77 \pm 15.9	56.8 \pm 1.7
Dry weight (kg)	73 \pm 19.4	0.0001	58.8 \pm 11.6	70.4 \pm 17*	63.4 \pm 19.1	80 \pm 23
Dialysis vintage (m)	42.1 \pm 43.9	0.79	51.8 \pm 67.8	39.3 \pm 36	37.4 \pm 34	48.3 \pm 38
PCR (mg/L)	13 \pm 22	0.86	22 \pm 38.6	10.1 \pm 12.4	11.2 \pm 16.9	9.1 \pm 10.6
Charlson Score	6 \pm 3.8	0.03	6.7 \pm 3.7	6.4 \pm 4.1	6.1 \pm 3.6	2.9 \pm 3.3†
KT/Veq	1.6 \pm 0.4	0.048	1.3 \pm 0.6	1.7 \pm 0.3*	1.4 \pm 0.4	1.6 \pm 0.4
Serum albumin (g/dL)	38.9 \pm 4.3	0.0001	34.3 \pm 5	37.9 \pm 3.2*	40 \pm 2.4**	43 \pm 1.7
Scr/BSA (μ mol/L/m ²)	322.8 \pm 108.2	0.0001	268.9 \pm 86.9	307.5 \pm 67.5	340 \pm 116	470.7 \pm 83.6†
nPNA (g protein/kg/d)	1 \pm 0.3	< 0.0001	0.8 \pm 0.3	1.0 \pm 0.2*	1.2 \pm 0.2	1.3 \pm 0.3
Serum prealbumin (g/L)	0.3 \pm 0.1	0.0001	0.3 \pm 0.1	0.3 \pm 0.1	0.4 \pm 0.1	0.4 \pm 0.0

* comparison between all groups

*score 2 vs 0-1; **score 3 vs 2; †score 4 vs 3, p<0.05

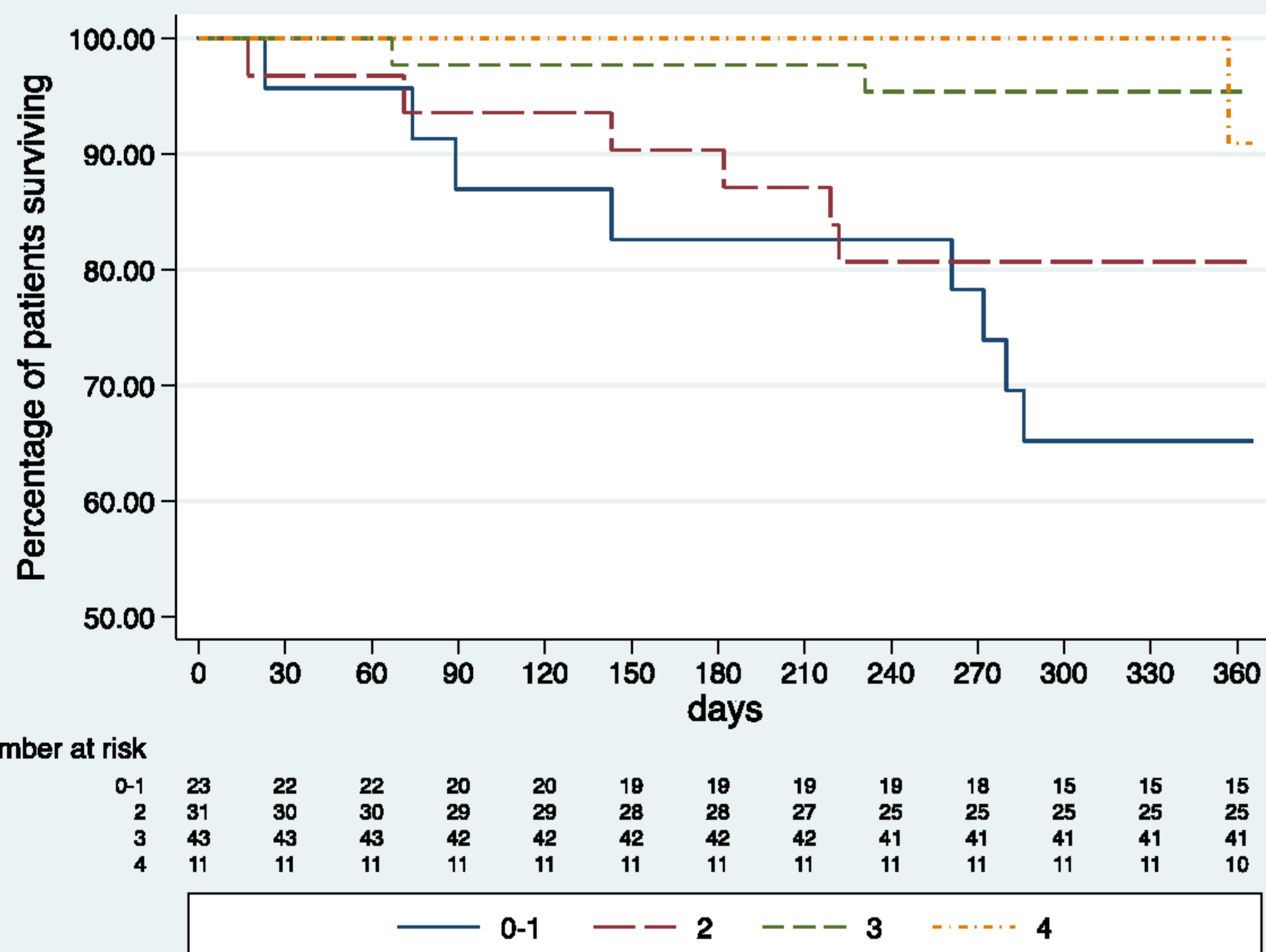


Figure 1. Patients survival according to standard PEW score (Kaplan Meier)

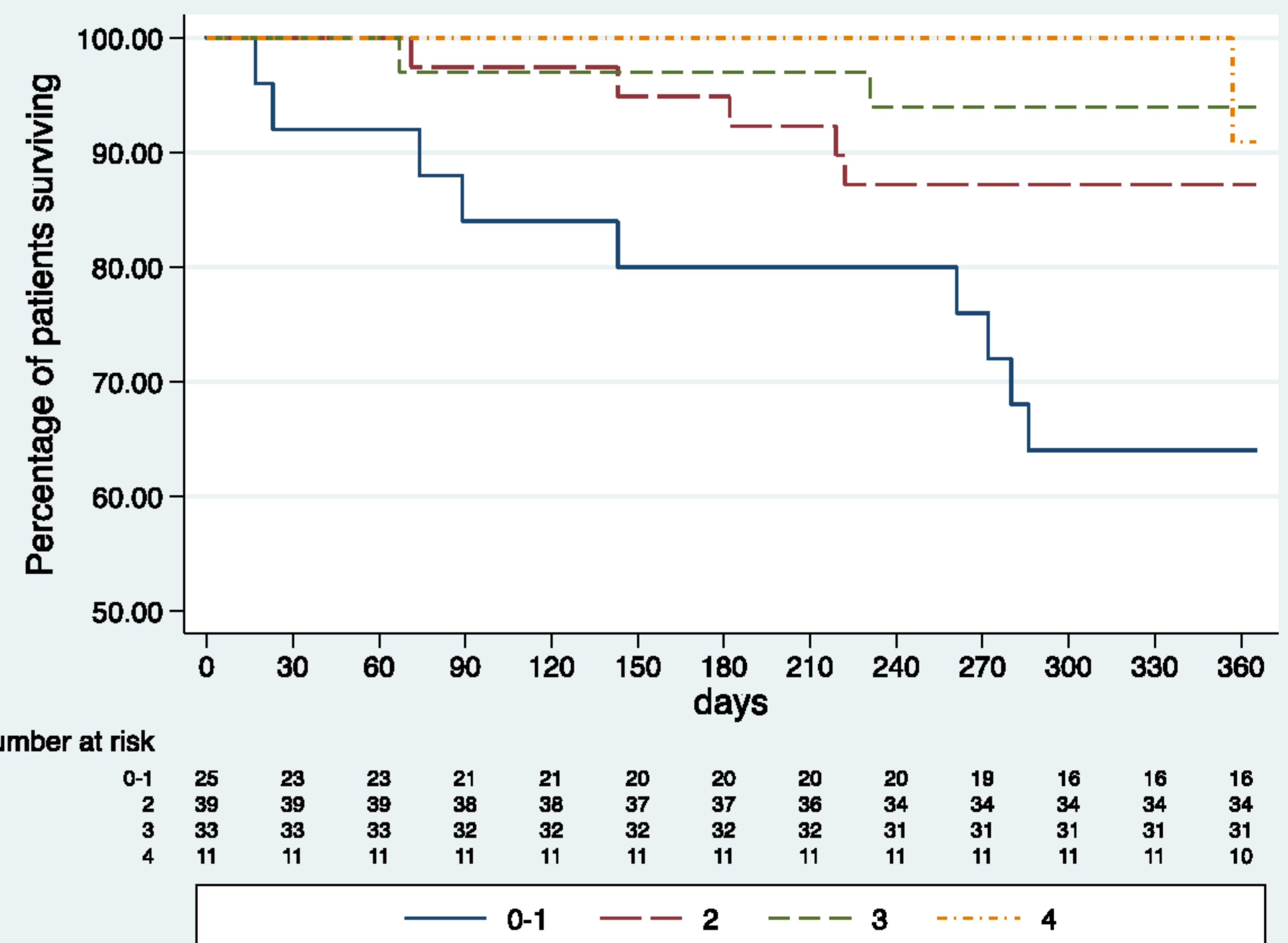


Figure 2. Patients survival according to modified PEW score (Kaplan Meier)

Discussion - Conclusion

Mortality at 1 year seems to be higher in our cohort than in Moreau-Gaudry study, especially for patients with PEW score 0-1 : our hemodialysis centre receives mainly acutely ill patients who present a high level of comorbidities that could explain this result.

Unlike Moreau-Gaudry study, no significant difference was observed between patients survival of the score 0-1 vs score 2 and score 0-1 vs score 4. In contrast, when serum prealbumin is added into the score, difference between scores is significant except between score 0-1 vs score 4.

In clinical practice, PEW score is an easy-to-use and reproducible tool to identify malnutrition and target patients for intensive nutritional program. Adding serum prealbumin to standard PEW score¹ seems improve sensitivity to predict mortality at 1 year especially for the most severe patients.

¹Moreau-Gaudry X and al. J Ren Nutr. 2014 ; 4: 1051-2276