

Impact of Malnutrition-Inflammation Score (MIS) on Protein Intake and Erythropoietin Responsiveness in a Large Hemodialysis Population

Debbie Benner, MA, RD, CSR^{1*}; Steve Wilson, PhD²; Karen Spach, PhD²; Kamyar Kalantar-Zadeh, MD, MHP, PhD³; David Van Wyck, MD¹
 (1) DaVita Inc, Lakewood, CO (2) DaVita Clinical Research, DaVita Inc, Minneapolis, MN (3) Harold Simmons Center, Harbor-UCLA, Torrance, CA

INTRODUCTION

The MIS, a risk assessment tool used to risk-stratify nutritional status in hemodialysis patients, yields a single composite score based on information drawn from 4 categories (nutrition history, physical examination, body mass index and laboratory values) and 10 components. Each component is scored from 0 (normal) to 3 (severely malnourished).

Objectives: To evaluate and provide a description of the nutritional status in a large hemodialysis (HD) population using the Malnutrition Inflammation Score and to evaluate the relationship between MIS and clinical/demographic information.

METHODOLOGY

- In the first quarter of 2009, over 1100 dietitians recorded the MIS in DaVita in-center HD patients.
- Records were available for 28,615 patients including 44% women, 34% African Americans, and 16% Hispanics.
- The MIS were divided roughly into quartiles (Table 1), and trends across quartiles 1 through 4 were examined by p-for-trend, the adjusted model controlled for age, gender, race/ethnicity, diabetes, and vintage.

RESULTS

Figure 1. MIS Score Distribution

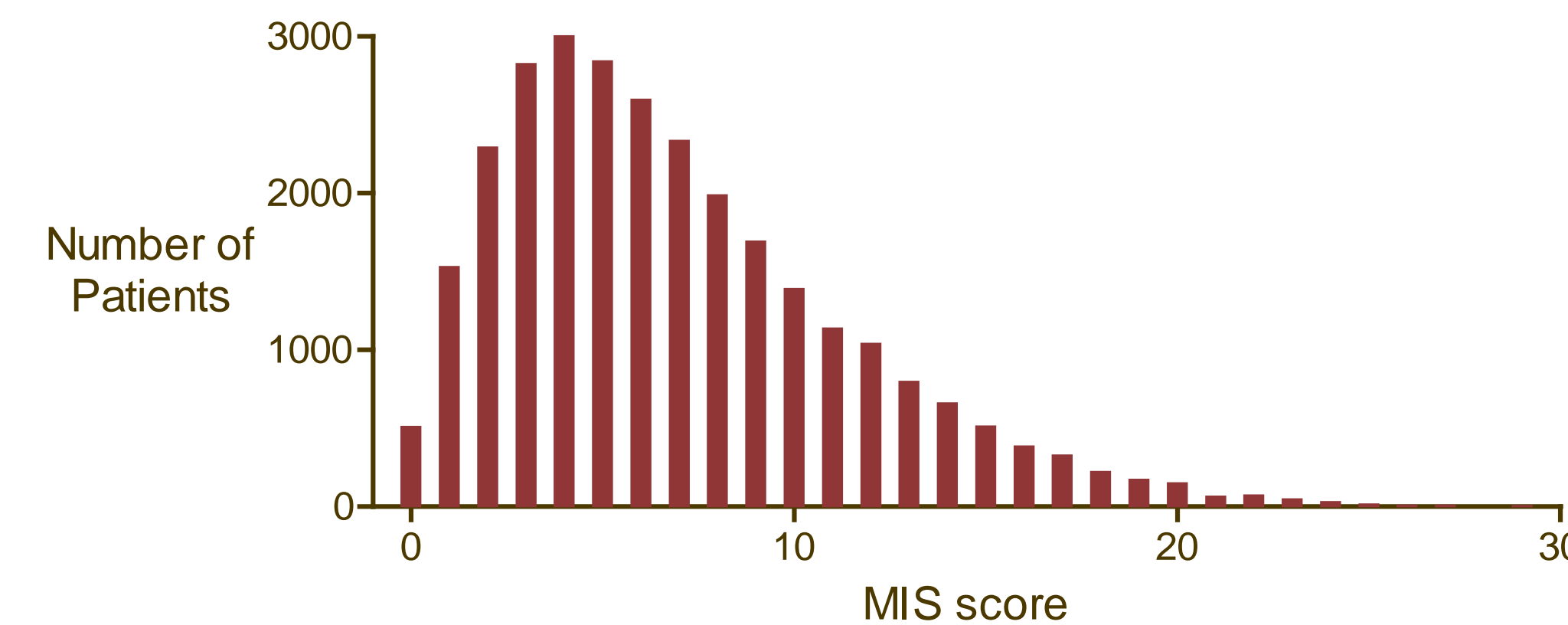


Table 1. Demographics by MIS score quartiles

	Malnutrition-Inflammation Score (MIS)				Case-mix adjusted p for trend
	0,1,2,3 (n=7150)	4,5 (n=5840)	6,7,8 (n=6916)	≥ 9 (n=8707)	
Age (yrs)	56.6 ± 15.4	59.7 ± 15.1	61.1 ± 15.2	64.6 ± 14.6	<0.0001
<40 yrs (%)	14	10	9	5	
% women	36	43	46	49	
%African American	36	36	34	31	
%Vintage < 3 m	14	22	28	33	
% Diabetics	60	71	73	72	<0.0001
nPCR	1.0±0.3	1.0±0.5	0.9±0.3	0.8±0.3	<0.0001
% nPCR<1.0	54	61	66	76	<0.0001
% EPO >15 kU/wk	44	52	59	70	<0.0001
Hb (g/dL)	11.7±1.3	11.6±1.4	11.4±1.4	11.2±1.5	<0.0001
EPO/Hb	641±631	741±733	825±719	990±847	<0.0001

CONCLUSIONS

- The MIS ranged from 0 to 29 with a bell-shaped distribution skewed sharply towards worse scores (Figure 1).
- Mean MIS 6.9 ± 4.5, median 6
- Patients in the highest MIS quartile (worst nutritional status) were more likely to be diabetic, new (first 3 months) to dialysis, have normalized protein catabolic rates of ≤1.0 and serum albumin < 3.5 suggesting lower protein intake, and receive >15,000 units EPO/week compared to the lowest MIS quartile (best nutritional status).
- The MIS disparity was especially pronounced in the extreme age groups (Table 1)
 - <40 yr age group had twice as many patients in the lowest MIS quartile compared to the highest.
 - >75 yr age group had half as many patients in the lowest MIS quartile compared to the highest.
- DaVita has adopted MIS as the standard nutritional assessment for their 110,000 patients.

KEY LEARNINGS

- ✓ In this in-center HD population, MIS scores clustered from 3 to 6 and a MIS score of >9 was more common in patients new to dialysis.
- ✓ Among in-center HD patients, high MIS scores (worse nutritional status) are significantly associated with:
 - older age,
 - diabetes,
 - low protein intake, and
 - convincing evidence of EPO hypo-responsiveness.

We thank the patients who participated in this study and DaVita Clinical Research® (DCR) for support in preparing this poster. DCR is committed to advancing the knowledge and practice of kidney care.



*Correspondence: debbie.benner@davita.com
 American Society of Nephrology RenalWeek October 2009