

# PREVALENCE OF MALNUTRITION AND THE ASSOCIATED FACTORS IN HAEMODIALYSIS PATIENTS: A COMMUNITY BASED CROSS SECTIONAL STUDY IN SINGAPORE

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## Introduction

Malnutrition is common in patients on maintenance haemodialysis (HD) which is associated with poorer clinical outcome<sup>1</sup>. There is limited data focusing on nutritional status of HD patients from different demographic background locally. Subjective Global Assessment (SGA) is validated as a reliable tool to diagnose malnutrition in HD patients. This study aims to investigate the prevalence of malnutrition defined by SGA among HD patients in The National Kidney Foundation (NKF), the largest dialysis provider in Singapore. We evaluated the associations between SGA and biochemical markers and factors affecting patients' nutritional status.

## Methods

All patients who were receiving haemodialysis treatments in NKF were assessed by dietitians using 7-point SGA and patient's self-reported appetite was gathered during the annual nutritional assessment conducted from August to December 2018. Patients with dialysis vintage ≤3 months, hospitalised, changed dialysis shift, unfit or refused assessment were excluded from the study. Malnutrition was defined by SGA≤5. Nutritional related biochemical markers tested within 2 months of annual nutritional assessment were obtained from NKF clinical database. Chi-square test, independent sample T test and binomial logistic regression were used to evaluate the association of malnutrition with demographic factors and biochemical markers. P-value <0.05 was considered statistically significant.

## Results

A total of 3544 patients were included in the study with 39.4% classified as malnourished and 60.6% were well nourished. Age, race, diabetes status, vintage dialysis, body mass index (BMI) and self-reported appetite were significantly different between malnourished and well nourished patients (Table 1). After adjustment for gender, race, age, diabetes status, vintage dialysis, BMI and appetite condition, multivariate analysis identified the following factors to be associated with malnutrition as defined by SGA≤5: non-Chinese, increasing age, diabetic, reduced appetite (Table 2). An increase in BMI was associated with lower odds ratio (OR) for malnutrition in HD patients (adjusted OR=0.77, 95%CI=0.75-0.79, p<0.05). Neither gender nor vintage dialysis was associated with risk of malnutrition in HD patients (p>0.05). Table 3 shows that malnourished patients had significant lower serum albumin (Alb), normalized protein catabolic rate (nPCR), serum potassium (K), serum phosphorous (PO4), pre-dialysis serum creatinine (pre-creat), pre-dialysis serum urea (pre-urea) compared to well nourished patients (all p<0.05).

**Table 1: Comparison of demographic, clinical and nutritional characteristics in well nourished and malnourished HD patients**

Variables	Total, n=3544	Well nourished, n=2149 (60.6%)	Malnourished, n=1395 (39.4%)	p-value
<b>Gender<sup>1</sup></b>				
Male	1991 (56.2)	1189 (59.7)	802 (40.3)	0.205
Female	1553 (43.8)	960 (61.8)	593 (38.2)	
<b>Race<sup>1</sup></b>				
Chinese	2093 (59.1)	1212 (57.9)	881 (42.1)	<0.001*
Non-Chinese	1451 (40.9)	937 (64.6)	514 (35.4)	
<b>Age (years)<sup>2</sup></b>	63.1 ± 11.26	60.7 ± 11.00	66.9 ± 10.60	<0.001*
<b>Diabetes mellitus<sup>1</sup></b>				
No	1309 (36.9)	863 (65.9)	446 (34.1)	<0.001*
Yes	2235 (63.1)	1286 (57.5)	949 (42.5)	
<b>Vintage dialysis (years)<sup>2</sup></b>	6.8 ± 6.17	6.56 ± 5.86	7.17 ± 6.59	0.005*
<b>BMI (kg/m<sup>2</sup>)<sup>2</sup></b>	24.6 ± 5.15	26.3 ± 4.99	22.0 ± 4.22	0.006*
<b>Appetite<sup>1</sup></b>				
Good	2084 (59.6)	1482 (71.1)	602 (28.9)	<0.001*
Reduced	1412 (40.4)	637 (45.1)	775 (54.9)	

<sup>1</sup> Frequency, n (%) for the categorical variables <sup>2</sup> Mean and standard deviation \* p<0.05

**Table 2: Factors associated with malnutrition**

Variables <sup>#</sup>	Adjusted OR (95% CI) <sup>^</sup>	p-value
<b>Gender</b>		
Female	0.899 (0.76-1.06)	0.212
<b>Race</b>		
Non-Chinese	1.438 (1.20-1.72)	<0.001*
<b>Age (years)</b>	1.052 (1.04-1.06)	<0.001*
<b>Diabetes mellitus</b>		
Yes	2.635 (2.17-3.20)	<0.001*
<b>Vintage dialysis (years)</b>	1.013 (1.0-1.03)	0.064
<b>BMI (kg/m<sup>2</sup>)</b>	0.767 (0.75-0.79)	<0.001*
<b>Appetite</b>		
Reduced	2.870 (2.43-3.38)	<0.001*

<sup>#</sup> Reference group: male, Chinese, non-diabetic, good appetite

<sup>^</sup> Case adjusted on gender, race, age, diabetes mellitus, vintage dialysis, BMI and appetite

\* p<0.05

**Table 3: Comparison of biochemical markers in well nourished and malnourished HD patients**

Variables <sup>1</sup>	Total, n=3544	Well nourished, n=2149 (60.6%)	Malnourished, n=1395 (39.4%)	p-value
Alb (g/L)	38.8 ± 3.41	39.7 ± 2.77	37.4 ± 3.80	<0.001*
nPCR (g/kg/d)	1.00 ± 0.24	1.03 ± 0.23	0.96 ± 0.25	<0.001*
K (mmol/L)	4.7 ± 0.63	4.8 ± 0.62	4.6 ± 0.64	<0.001*
PO4 (mg/dL)	4.7 ± 1.29	4.9 ± 1.26	4.4 ± 1.30	<0.001*
Pre-creat (mg/dL)	7.86 ± 1.91	8.49 ± 1.81	6.88 ± 1.65	<0.001*
Pre-urea (mg/dL)	114.5 ± 31.91	119.0 ± 30.85	107.6 ± 32.28	<0.001*

<sup>1</sup> Mean and standard deviation \* p<0.05

## Conclusion

More than 1/3 of HD patients are malnourished. Non-Chinese and older diabetic HD patients are more prone to malnutrition. A simple question of "how is your appetite" is a useful tool to detect malnutrition.

## References

- Shalabia, E.A., Amal, M.A. & Madeha, A.M. (2015). Nutritional status and malnutrition prevalence among maintenance hemodialysis patients. *IOSR Journal of Nursing and Health Science*, 4(4), 51-58. doi:10.9790/1959-04465158