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Original Research

PREVALENCE OF MALNUTRITION AND ASSOCIATED FACTORS IN ELDERLY HEMODIALYSIS PATIENTS AT THONG NHAT HOSPITAL

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Abstract: We conducted this study to determine the prevalence of malnutrition and its associated factors among elderly hemodialysis patients at Thong Nhat Hospital, thereby providing evidence to guide nutritional support and dietary interventions. This cross-sectional, descriptive, retrospective, and comparative study included 158 hemodialysis patients at the Department of Nephrology and Dialysis, Thong Nhat Hospital, Ho Chi Minh City. Participants were divided into two groups: those aged ≥60 years and those aged <60 years. Nutritional status was assessed by using body mass index and serum albumin levels. The results showed that the prevalence of malnutrition among elderly hemodialysis patients varied depending on the assessment criteria: 39,82% based on serum albumin levels and 12,9% based on body mass index. Multivariate analysis revealed no statistically significant associations between hypoalbuminemia and diabetes mellitus (OR = 1,30; p = 0,516), hyperparathyroidism (OR = 0,54; p = 0,156), dyslipidemia (OR = 0,81; p = 0,665), hemoglobin levels (OR = 1,01; p = 0,935), duration of dialysis (OR = 1,00; p = 0,672), type of dialysis membrane (OR = 1,30; p = 0,542), or dialysis adequacy (Kt/V) (OR = 1,30; p = 0,355). Our study revealed the prevalence of malnutrition – particularly when defined by serum albumin – is high (39,82%) among hemodialysis patients, especially the elderly. These findings underscore the importance of investigating additional contributing factors to malnutrition in population.

Keywords: malnutrition; elderly; hemodialysis; serum albumin; body mass index

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1. INTRODUCTION

The prevalence of malnutrition (MN) in hemodialysis (HD) patients is very high, especially in the elderly, causing reduced quality of life, increased hospitalization rates, morbidity, and mortality. Data from the DOPPS (Dialysis Outcomes and Practice Patterns Study) study showed that the rate of patients >75 years old achieving albumin >40g/L in Europe, Australia-New Zealand, Japan, and North America was very low, at 22.6%, 17.8%, 23.7%, and 22.6%, respectively [1]. In Vietnam, there have been some studies evaluating MN in HD patients, but there have not been many in-depth studies on MN in the elderly population . Thong Nhat Hospital (TNH) has over 70% of HD patients who are elderly, but nutritional issues have not received adequate attention, and there is no data on MN prevalence and factors related to MN.

Some studies have identified causes of MN in HD patients including: inadequate dialysis dose, increased catabolism, metabolic acidosis, endocrine disorders, protein and amino acid metabolism disorders, and amino acid loss during hemodialysis. Meanwhile, other studies suggest that anemia, hyperparathyroidism, chronic inflammation, and dietary restrictions are factors related to MN .

We conducted an assessment of MN through body mass index (BMI) and serum albumin and indices of dialysis adequacy, type of dialysis membrane, duration of dialysis, diabetes mellitus, anemia, bone metabolism disorders, etc., in elderly patients undergoing HD at TNH with the objective of assessing the prevalence of MN and identifying the relationship between the above factors and MN in elderly patients undergoing HD to provide guidance and treatment intervention strategies.

2. SUBJECTS AND RESEARCH METHOD

2.1. Study subjects

158 HD patients at the Department of Nephrology and Dialysis, Thong Nhat Hospital, Ho Chi Minh City, from June 2022 to June 2023. Patients were divided into 2 groups: patients ≥60 years old and patients <60 years old.

Inclusion criteria: (1) Outpatient HD patients, complete at TNH ≥3 months; (2) Age ≥18 at the time of starting HD; (3) Adherent to treatment regimen and dialysis.

Exclusion criteria: (1) Dialysis at TNH only for a short time then transferred to local facilities; (2) Emergency dialysis; (3) Currently having severe internal or surgical disease requiring inpatient treatment.

2.2. Study Methods

Study design: Cross-sectional, descriptive, prospective with comparison to young HD group.

MN assessment: Based on 2 criteria: BMI and serum albumin. Based on BMI: BMI <18.5 (kg/m^2) is MN; >23 (kg/m^2) is obesity . For serum albumin concentration, <35 g/L is considered MN ... Dialysis adequacy index: Assess Kt/V ≥1.2. Daugirdas' Kt/V calculation formula: kt/V = - ln (R-0.008 x t) + (4 - 3.5x R) x 0.55 x UF/V. Where: R = 1 – URR. T: Dialysis time (hours). UF: Fluid removal volume (kg). V: Urea distribution volume in the body based on weight, height (liters). Hemoglobin (Hb) concentration reaches treatment target when Hb ≥11 g/dL. Target phosphate is 1.13-1.78 mmol/L. Target PTH is 150-300 pg/mL. Diagnosis of hyperparathyroidism when PTH ≥250 pg/mL. Calcium: normal range is 2.15-2.60 .

Dialysis program: Low or high permeability dialysis membrane, reused 6 times or not reused (patient's economic condition), average blood pump speed 200-300 mL/min, standard dose heparin anticoagulation, bicarbonate dialysate, dialysate flow rate 500mL/min, water removal according to dry weight. Dialysate electrolytes and RO water according to US standards (AAMI).

2.3. Data Processing and Analysis Methods

Based on medical statistical algorithms and using computer with SPSS 22.0 software. Continuous variables were presented as mean ± standard deviation when variables followed normal distribution and presented as median (interquartile range) if variables did not follow normal distribution. Qualitative variables were presented as frequency and percentage. Relationship between

qualitative variables using Chi-square test.

2.4. 2.4. Research Ethics

The study was approved by the Bioethics Council for Biomedical Research at Thong Nhat Hospital regarding ethical aspects and safety of the research project number [decision number] dated ... month ... year 2025.

3. RESULTS

3.1. Characteristics of Study Subjects

3.1.1. General characteristics of study subjects

3.1.2. Paraclinical characteristics of study subjects

3.2. Characteristics of malnutrition in study subjects

4. DISCUSSION

The characteristics of elderly HD patients in this study were high average

Table 1. General characteristics of study subjects

Characteristics	Overall (n=158)	Age ≥60 years (n=113)	Age <60 years (n=45)	p
Age (Mean ± SD)	64.78 ± 15.62	72.81 ± 8.78	44.64 ± 9.70	<0.001
Male, n (%)	79 (50.00)	58 (51.33)	21 (46.67)	0.362
Dry weight (kg) (Mean ± SD)	56.58 ± 10.29	56.62 ± 9.47	56.47 ± 12.21	0.940
Dialysis duration (months) (Median - IQR) Dialysis duration categories	25 (12 – 81)	31 (12 – 79)	20 (9 – 86.50)	0.415
Under 1 year	33 (20.90)	21 (18.58)	12 (26.67)	
1 to 5 years	66 (41.77)	49 (43.37)	17 (37.78)	
Over 5 years	59 (37.41)	43 (38.05)	16 (35.55)	
High Flux membrane use, n (%)	93 (58.90)	70 (61.95)	23 (51.11)	0.212
Diabetes mellitus, n (%)	66 (41.80)	58 (51.33)	8 (17.78)	<0.001
Cardiovascular disease, n (%)	67 (42.4)	58 (51.33)	9 (20.00)	<0.001
Dyslipidemia, n (%)	119 (75.32)	88 (77.88)	31 (68.89)	0.237
Number of comorbidities (Mean ± SD)	2.94 ± 0.99	1.96 ± 0.29	1.91 ± 0.29	0.053
Vascular access, n (%)				
Arteriovenous fistula	148 (93.67)	106 (93.80)	41 (91.11)	0.28

age (72.81 ± 8.78), equivalent to author Loon (79.4 ± 3.3) , with many comorbidities (1.96 ± 0.29), of which diabetes mellitus and cardiovascular disease were common (51.33%), higher than the young group (p< 0.001). 38.05% of patients had been on dialysis ≥5 years, average Hb was 10.83 ± 1.58 (g/dL), average Kt/V was 1.55 ± 0.32. The rate of patients with hyperparathyroidism was 66.37%. Compared to the group of patients <60 years old, these characteristics were not statistically significantly different (Tables 1,2).

Nutritional assessment through serum albumin index. Results in Table 3 showed that the average serum albumin concentration in this study in the elderly was 35.63 ± 4.15 (g/L). The rate of patients with serum albumin <35g/L was 39.82%, lower than the young patient group (p< 0.001). The MN rate in the elderly in this study was higher than the young group at TNH as well as compared to other hospitals in Vietnam, such as Pham Thi Anh Tuyet and colleagues reporting MN rate at Military Hospital 120 according to serum albumin concentration was 28% . Author Nguyen Thi Van Anh reported MN rate at Bach Mai Hospital according to serum albumin criteria was 32.3% . We have not found any reports in Vietnam on MN in the elderly for comparison. Comparing with foreign studies on the same elderly group, we found that the MN rate in the

Table 2. Paraclinical characteristics of study subjects (n = 158)

Characteristics	Overall (n=158)	Age ≥60 years (n=113)	Age <60 years (n=45)	p-value
Kt/V (Mean ± SD)	1.55 ± 0.35	1.55 ± 0.32	1.55 ± 0.45	0.990
Hemoglobin (Mean ± SD),g/dL	10.64 ± 1.56	10.83 ± 1.58	10.18 ± 1.44	0.014
Calcium (Mean ± SD), mmol/L	2.15 ± 0.25	2.16 ± 0.26	2.13 ± 0.23	0.469
Phosphorus (Mean ± SD), mol/L	2.25 ± 6.83	2.35 ± 8.08	1.99 ± 0.73	0.642
PTH (Median) pg/mL (Interquartile Range)	344.35 (194.70 - 825.98)	333.10 (196.50 - 920.85)	433.30 (191.25 - 780.85)	0,737
PTH Target Range, n (%)	43 (27.21)	32 (28.32)	11 (24.44)	
PTH Decreased, n (%)	26 (16.46)	19 (16.81)	7 (15.56)	
PTH Elevated, n (%)	89 (56.33)	62 (54.87)	27 (60.00)	
Hyperparathyroidism, n (%)	104 (66.8)	75 (66.37)	29 (64.44)	

Table 3. Assessment of malnutrition prevalence in hemodialysis patients (n = 158)

Characteristics	Overall (n=158)	Age ≥60 years (n=113)	Age <60 years (n=45)	p-value
BMI (kg/m^2)	21,92 ± 3,32	22,01 ± 3,05	21,68 ± 3,96	0,624
BMI 18,5-23, n (%)	84 (53,16)	58 (51,33)	26 (57,78)	
BMI <18,5, n (%)	21 (13,29)	14 (12,39)	7 (15,56)	
BMI > 23, n (%)	53 (33,54)	41 (36,28)	12 (26,66)	
Serum Albumin (g/dL) (Mean ± ĐLC)	36,11 ± 4,22	35,63 ± 4,15	37,33 ± 4,20	0,023
(tRange)	(21,2 – 46,6)			
Albumin < 35g/L, n (%)	54 (34,18)	45 (39,82)	9 (20,00)	

Bảng 4. Multivariate analysis of factors related to hypoalbuminemia in elderly hemodialysis patients

Risk Factors	Univariate Regression			Multivariate Regression		
	OR	KTC 95%	p	OR	KTC 95%	p
Diabetes mellitus	1.18	0.55 – 2.50	0.673	1.30	0.59 – 2.90	0.516
Hyperparathyroidism	0.53	0.24 – 1.17	0.118	0.54	0.22 – 1.30	0.165
Dyslipidemia	0.81	0.32 – 2.04	0.658	0.81	0.30 – 2.15	0.665
Hemoglobin	1.01	0.79 – 1.28	0.960	1.01	0.79 – 1.30	0.935
Phosphorus	0.74	0.36 – 1.55	0.425	0.73	0.33 – 1.63	0.446
Dialysis duration	1.00	0.99 – 1.01	0.406	1.00	0.99 – 1.01	0.627
Age	1.03	0.99 – 1.08	0.134	1.04	0.99 – 1.09	0.092
High-flux membrane	1.19	0.55 – 2.60	0.657	1.30	0.56 – 3.00	0.542
Dialysis adequacy (Kt/V)	0.70	0.21 – 2.316	0.553	0.53	0.14 – 2.02	0.35

elderly in this study was similar to Weihua Li's study in China when reporting average serum albumin 34.2 ± 2.3 (g/L) [1], but lower when compared to Loon (Albumin 39.4 ± 3.5 g/L) . Thus, the results of all studies showed that the MN rate in the elderly was higher than in young people.

The cause of MN in the elderly may be due to many factors such as decreased absorption and metabolic function of nutrients in organ systems. According to literature, there are many causes of reduced energy and protein intake in HD patients such as loss of appetite, dietary restrictions, inadequate dialysis, chronic inflammation, anemia . This study only focused on investigating factors related to dialysis to see if there was any relationship to MN. Based on multivariate analysis results in Table 4, we found no relationship between decreased serum albumin in elderly HD patients and factors such as dialysis duration, type of dialysis membrane, underlying diabetes mellitus, hyperparathyroidism, dyslipidemia, anemia, and dialysis adequacy index. We believe that diet not meeting energy requirements and necessary protein amounts in HD patients may be a factor causing MN in the elderly. Due to insufficient nutritionist staff, in this study we could not survey the role of diet. In a previous study in 2018 at TNH assessing the relationship between MN and diet in HD patients in both age groups, we obtained a very noteworthy result that HD patients with insufficient energy intake (<30 kcal/kg/day) accounted for a very high rate (72.87%) and inadequate protein intake (<1.2g/kg/day) also accounted for a high rate (74.42%) . Compared to HD patients in Japan, the energy and protein intake of patients in our study was lower. Kanazawa and colleagues (2016) reported energy and protein intake in HD patients in Japan were 28 kcal/kg/day and 1g/kg/day, respectively ...

Another index commonly used to assess nutrition is BMI. Results in Table 3 also showed that in our study, the average BMI in the elderly was 22.01 ± 3.05 (kg/m^2). 51.33% of patients achieved BMI 18.5 – 23 (kg/m^2); 12.39% achieved BMI <18.5(kg/m^2) and the rate of patients with BMI > 23 (kg/m^2) was 36.28%, higher than young people but this difference was not statistically significant. The reason may be due to the high rate of elderly with diabetes so BMI is usually higher and may also be due to BMI criteria depending on weight being biased in HD patients due to fluid retention. Compared to the same elderly group, we also recorded BMI in patients in this study similar to Xinju Zhao in China when BMI was 21.8 ± 3.6(kg/m^2) but lower than Loon at 25.3 ± 4.4(kg/m^2) . In HD patients, low BMI index usually has significance in assessing MN but normal BMI does not exclude MN status and needs to be combined with other criteria to assess MN such as SGA and serum albumin.

5. CONCLUSION

Cross-sectional study of 158 stable

outpatient HD patients including 113 patients ≥60 years old at the Department of Nephrology and Dialysis, TNH, we drew the following conclusions: The MN rate in elderly HD patients according to serum albumin criteria is high (39.82%). There is no relationship between blood albumin and diabetes mellitus, hyperparathyroidism, dyslipidemia, anemia, dialysis duration, type of dialysis membrane, dialysis adequacy index. It is necessary to find causes of MN in elderly HD patients to provide appropriate nutritional interventions.

Study limitations: MN has not been assessed according to SGA criteria and dietary analysis of HD patients has not been performed.

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