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Nutritional Status Related to Dialysis Adequacy in Maintenance Hemodialysis Patients at Sleman Regional Hospital, Indonesia.

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Objectives: Dialysis adequacy and nutritional status are significant determinants of morbidity and mortality in Maintenance Hemodialysis (MHD) patients. The decline in dialysis adequacy is negatively correlated with hospitalization dan hospital length of stay. This study aimed to distinguish the association of nutritional status and dialysis adequacy in MHD patients at Sleman Regional Hospital, Indonesia

Methods: Subjects of this research were 96 MHD patients at Hemodialysis Unit in Sleman Regional Hospital, Indonesia. The data obtained were age, Hemodialysis vintage, Handgrip Strength (HGS), anthropometric data such as weight, interdialytic weight gain (IDWG), height, body mass index (BMI), Mid-upper arm circumference (MUAC), total fat percentage, and visceral fat). Biochemical tests were assessed to serum albumin, hemoglobin, Total Iron Binding Protein (TIBC). Kt/V was ascertained to evaluate the adequacy of the dialysis procedure, Kt/v > 1.8 categorized as adequate following the recommendation from Indonesian Nephrology Association (PERNEFRI)

Results: A number of 47.9% of the subject were found to be inadequately dialyzed; however, the mean Kt/v ratio was 1.95. Half of the patients' nutritional status based on BMI appeared to be not optimum (57.3%; BMI<23 kg/m^2). Age and MHD vintage showed a significant association with dialysis adequacy. BMI and MUAC demonstrated a statistically significant association with dialysis adequacy (p=<0.05), Total fat and visceral fat also showed a statistical difference between the adequate and inadequate group (28.0±7.0 vs 20.3±7.8; p=<0.001 and 9.0 ±9.2 versus 3.8±5.0; p=0.001). MHD who got adequate dialysis had higher albumin serum level (3.9±0.7 vs 4.1±0.3 = 0.032); however, no significant differences showed in TIBC, iron serum, and hemoglobin (p = 0.232, 0.086, 0.576 respectively)

Conclusions: Nutritional status based on BMI and MUAC were associated with dialysis adequacy. The betterment of nutritional status may lead to prolonged survival and improved Quality of Life.

Table 1. Factors Associated with Dialysis Adequacy

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Variables	Adequacy		P (95% CI)
	Inadequate n(%)	Adequate n(%)	
Age			
Adult (18 – 60 years old)	31(40.3)	46(59.7)	0.002*
Elderly (≥60 years old)	15(78.9)	4(21.1)	
MHD Vintage			
< 1 year	11(84.6)	2(15.4)	
1-5 years	29(51.8)	27(48.2)	0,001*
>5 years	6(22.2)	21(77.8)	
Body Mass Index			
Poor	20(36.4)	35(63.6)	0.007*
Optimum	24(64.9)	13(35.1)	
Mid-Upper Arm Circumference			
Poor	5(21.7)	18(78.3)	0.004*
Normal	41(56.2)	32(43.8)	
Dialysis Malnutrition Score			
Well nourished	23(54.8)	19(45.2)	0.164
Moderate malnutrition	23(42.6)	31 (57.4)	
Interdialytic Weight Gain			
< 5%	30(49.2)	31(50.8)	0.912
> 5%	14(26.7)	16(53.3)	
Handgrip Strength			
Weak	22(56.4)	17(43.6)	0.093
Strong	20 (40.0)	30(60.0)	
Fatigue			
Mild	30(50.0)	30(50.0)	0.376
Severe	16(44.4)	20(56.6)	
Anorexia (SNAQ)			
Poor (<15)	15(41.7)	21(58.3)	0.230
Good (15-20)	31(51.7)	29(48.3)	

Table 2.Mean Difference between Fatigue Severity Group

Table 2. Mean difference among variables

Variables	Dialysis Adequacy		
	Inadequate (Mean)	Adequate (Mean)	p
Age	51.7±12.0	45.7±9.7	0.009*
%IDWG	4.0±1.8	4.4±1.9	0.383
BMI	24.3±4.0	21.0±3.1	<0.001*
MUAC	25.6±6.6	24.7±2.6	0.411
% Total Fat	28.0±7.0	20.3±7.8	<0.001*
Visceral Fat	9.0±9.2	3.8±5.0	0.001
HGS	15.9±10.2	13.7±7.7	0.225
Albumin level	3.9±0.7	4.1±0.3	0.032*
TIBC	101.5±39.6	114.5±62.1	0.232
Iron serum	67.2±42.2	82.6.0±44.3	0.086
Hemoglobin (mg/dl)	7.7±1.8	7.9±1.7	0.576
Energy (kcal)	1105.6±327.9	1127.7±316.4	0.743
Protein (g)	36.2±14.5	38.9±12.9	0.351
Carbohydrate (g)	158.9±51.9	144.3±55.4	0.190
Fat (g)	34.0±15.6	37.9±19.6	0.225
Fe Intake (mg)	5.0±7.8	8.6±12.9	0.114

*p<0.05 is statistically significant