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Assessing Malnutrition Risk using Nutrition Risk Screening 2002 and Malnutrition Universal Screening Tool and the Correlation toward Nutritional Status and Dietary Intake in Hypertensive and Cardiovascular Patients

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Objectives: One of the major problems in hospitalized hypertensive and cardiovascular patients is malnutrition that may increase morbidity and mortality rate. Nutrition Risk Screening (NRS) 2002 and Malnutrition Universal Screening Tool (MUST) are valid tools to predict malnutrition. They usually used in several general hospitals in Indonesia. We aim to investigate correlation between both of screening tools with nutrition status and dietary intake in hypertensive and cardiovascular patients.

Methods: This cross-sectional study was carried out on 2017 – 2018 and involved 230 hospitalized participants in three general hospitals in Central Java, Indonesia. All data were constructed from medical record of hypertensive and cardiovascular patients consisted of characteristics data, score malnutrition using NRS 2002 and MUST, nutritional status (body mass index/BMI) and dietary intake (energy and protein) using 24-hours food recall. The BMI was classified based on World Health Organization (WHO), while dietary intake which <80% from daily needs would be classified as inadequate intake. Statistically test used Spearman's rank correlation and independent T-test.

Results: Risk of malnutrition prevalence was 50.4% based on NRS 2002, while only 36.1% based on MUST. The NRS-2002 and MUST revealed moderate agreement ($p < 0.001$, $\kappa = 0.506$). In both of screening tools, age, gender and BMI showed significant correlation ($r = 0.379$, $p < 0.001$; $r = -0.158$, $p = 0.012$; $r = 0.576$, $p < 0.001$, respectively for NRS 2002; and $r = 0.329$, $p < 0.001$; $r = -0.161$, $p = 0.011$; $r = 0.800$, $p < 0.001$, respectively for MUST). Dietary intake solely revealed significant correlation with risk of malnutrition in NRS 2002 ($r = 0.258$ for energy and $r = 0.314$ for protein; $p < 0.001$).

Conclusions: Risk of malnutrition is higher in older age, male, lower BMI (underweight), and inadequate dietary intake. The NRS 2002 and MUST are adequate in assessing risk of malnutrition in hospitalized hypertensive and cardiovascular hospitalized patients. However, NRS 2002 are better in predicting malnutrition due to its correlation with all objective nutrition assessment parameters (anthropometric and dietary intake).

Table 1. Correlation of Screening Tools with Nutrition Status and Dietary Intake

Table 1. Correlation between Nutritional Risk Screening (NRS) 2002 and Malnutrition Universal Screening Tool (MUST) with Characteristics Data, Nutritional Status and Dietary Intake

Variables	NRS 2002				MUST			
	At Risk (%)	No Risk (%)	r*	p*	At Risk (%)	No Risk (%)	r*	p*
Gender								
Male	43.3	56.7	-0.158	0.012	29.1	70.9	-0.161	0.011
Female	59.2	40.8			44.7	55.3		
Age								
Adult (18 – 64 years old)	74.7	25.3	0.379	<0.001	56.3	43.7	0.329	<0.001
Elderly (≥65 years old)	35.7	64.3			23.8	76.2		
Body Mass Index (BMI) (kg/m²)								
Underweight (<18,5 kg/m ²)	98.4	1.6	0.576	<0.001	100.0	0.0	0.800	<0.001
Well-nourished (18,5 – 24,9 kg/m ²)	33.1	66.9			13.0	87.0		
Energy Intake								
Inadequate (<80% of daily needs)	57.2	42.8	0.258	<0.001	35.6	64.4	-0.021	0.436
Adequate (≥80% of daily needs)	26.0	74.0			38.0	62.0		
Protein Intake								
Inadequate (<80% of daily needs)	59.6	40.4	0.314	<0.001	38.0	62.0	0.068	0.191
Adequate (≥80% of daily needs)	23.7	76.3			30.5	69.5		

Abbreviation: NRS 2002, Nutritional Risk Screening 2002; MUST, Malnutrition Universal Screening Tool
*r is correlation coefficient, r+ is positive correlation and r- is negative correlation; p<0.05 is statistically significant
Statistical test used: Spearman's rank correlation

Table 2. Mean Value of Nutrition Status and Dietary Intake

Table 2. Mean Value of Age, Body Mass Index and Dietary Intake toward Nutrition Screening Tools

Nutrition Screening Tools	Age (years)		BMI (kg/m ²)		Energy intake (kcal)		Protein intake (grams)	
	Mean±SD	p*	Mean±SD	p*	Mean±SD	p*	Mean±SD	p*
NRS 2002								
- At risk	65.03±12.9	<0.001	18.99±3.9	<0.001	639.26±441.5	<0.001	22.33±20.3	<0.001
- No risk	57.68±9.5		24.18±4.1		1105.39±496.2		41.34±27.3	
MUST								
- At risk	65.72±14.1	<0.001	16.93±2.2	<0.001	818.57±529.1	0.557	28.70±22.3	0.178
- No risk	58.95±9.7		24.18±3.7		899.51±519.7		33.48±27.5	

Abbreviation: BMI, Body Mass Index; NRS 2002, Nutritional Risk Screening 2002; MUST, Malnutrition Universal Screening Tool
*p<0.05 is statistically significant; Statistical test used: Independent T-test