

COMPARISON OF EFFECTIVENESS IN MALNUTRITION RISK ASSESSMENT BETWEEN MST (MALNUTRITION SCREENING TOOL) AND MNA-SF (MINI NUTRITIONAL SHORT FORM) REVIEWED FROM BODY MASS INDEX ON GERIATRIC PATIENTS

A Ernawati*

Student of Clinical Nutrition, Universitas Sebelas Maret

*corresponding author: athayadhira1@gmail.com

Abstract

Malnutrition is still a major nutritional problem both when patients enter and as long as patients are hospitalized. Geriatric or elderly patients are a group of patients at high risk of malnutrition. Determination of the risk of malnutrition can be done through nutritional screening. Both of nutrition screening tools were reported to be accurate. MST (Malnutrition Screening Tool) is a screening tool that is easier, simple and faster, and is reported to have fairly good accuracy. MNA-SF (Mini Nutritional Assessment Short Form) is the most widely used nutritional screening tool and is a good prognostic tool for detecting malnutrition in elderly patients. The aim of this study was to compare the effectiveness of the risk assessment of malnutrition between the two questionnaires if used for geriatric patients. The cross sectional study was carried out on geriatric patients in the Inpatient Room of RSUD dr. Soediran Mangun Soemarmo Wonogiri. A total of 50 new geriatric patients treated in the class 3 treatment room were taken as samples. BMI <18.5 kg/m² is used as a standard category for the risk of malnutrition. The relationship between variables was tested by the chi square test. The results of data analysis showed that MST scores ≥ 2 ($p = 0.025$; OR = 4.511) and MNA-SF <12 ($p = 0.022$; OR = 8.905) were significantly associated with the risk of malnutrition. There were no significant differences in screening results between the two questionnaires ($p = 0.081$). The effectiveness of MST assessment with marginal probability ($p = 0.081$) is still below MNA-SF. These results give consideration that MST can be used as an alternative screening tool with fairly good accuracy.

Keywords: MST; MNA-SF; geriatric patient, malnutrition, BMI index

1. INTRODUCTION

Malnutrition is a common problem in hospitals and health institutions in various Asian countries, especially in patients with critical illness and the elderly with disabilities or acute and chronic diseases. The prevalence of malnutrition of patients in hospitals throughout Asia reaches 50%. Patient's nutritional status generally decreases during hospitalization [1]. Nutritional problems during hospitalization can cause new problems when the patient is discharged from the hospital, including in patients who are less than 50% in their intake or when they only receive enteral or parenteral nutrition. This can be one of the causes of the risk of postnatal malnutrition [2].

Elderly patients are a group of patients at the highest risk of malnutrition and malnutrition. Malnutrition problems occur in all categories of elderly conditions. In elderly patients who are hospitalized the incidence rate reaches 60%. Many factors can cause malnutrition including the aging process, lack of food intake, and acute and chronic diseases [3].

Nutritional screening is the first step to detect the risk of malnutrition in patients who have either recently entered or who have been hospitalized.

The ESPEN consensus has recommended several nutritional screening methods that can be used in hospitals especially for elderly patients including NRS-2002, MNA-SF and MST. These screening methods have weaknesses due to subjectivity problems. To assess the accuracy of various screening methods can be compared with the results of objective measurements such as anthropometry, body composition, biochemistry and food intake [4]. MNA-SF (Mini Nutritional Assessment Short Form) is a nutrition screening tool that is most widely used to detect malnutrition in elderly patients. Accuracy rates are very high, reported to reach 92% when compared with the results of clinical evaluation of two nutritionists and 98% when compared with a comprehensive nutritional assessment which includes biochemical tests, anthropometric measurements, and assessment of food intake [5]. MST (Malnutrition Screening Tool) is the fastest and easy screening tool but has considerable subjectivity problems. Even so it was reported that this method had a fairly high accuracy and was widely used in various hospitals in Indonesia [6] [7] [8]. Therefore it is very interesting to study the comparison of the accuracy of the risk assessment of malnutrition between MST and MNA-SF.

2. METHODS

The cross-sectional study was conducted in the Inpatient Room of RSUD dr. Soediran Mangun Soemarmo Wonogiri. The subjects of the study were geriatric or elderly patients who had just entered within a period of 24 hours before being observed, were treated in the class 3 treatment room, and had signed an informed consent. Patients with the following criteria are excluded, namely: getting nutritional assistance such as enteral and parenteral; diagnosed with sepsis, shock, coma, malignancy, severe kidney failure, liver disease and other multi-organ failure; experience hospitalization or post-surgery in the past month; and undergo routine HD. A total of 50 patients were taken as samples.

Filling out the MST and MNA-SF questionnaires was conducted through interviews with patients accompanied by their guardians. Weight and height were measured to calculate BMI. The BMI value $<18.5 \text{ kg} / \text{m}^2$ was used as the standard criterion for the risk of malnutrition according to the ESPEN consensus [4]. Chi-square test and OR value were used to determine the accuracy of MST and MNA-SF measurements based on BMI criteria and also to compare the results of measurements of the two screening methods. Statistical testing was performed at a significance level of 5%. Data processing procedures performed with the SPSS for Windows 16 program

3. RESULTS AND DISCUSSION

Data obtained from observations included the results of MST and MNA-SF measurements, BMI numbers, and several characteristics such as age, sex, LLA size (Upper Arm Circumference), Hb level (Hemoglobin), and blood pressure. The description of each of these variables can be seen in **Table 1**.

Table 1. Description of Characteristics of Research Subjects

Variable	Mean±SD	n (%)
Age (years)	67.04 ± 6.66	
Gender		
Men		33 (66.0)
Women		17 (34.0)

Upper arm circumference (cm)	24.39± 4.35	
Haemoglobin (gr/dl)	11.6± 2.80	
Systolic blood pressure (mmHg)	137.92± 26.65	
Diastolic blood pressure (mmHg)	73.97± 14.10	
BMI score (kg/m ²)	20.83 ±3.40	
Malnutrition according to BMI		
At risk (BMI < 18.5 kg/m ²)		12 (24.0)
Not risk (BMI ≥ 18.5 kg/m ²)		38 (76.0)
MST score		
Malnutrition according to MST	0.82± 1.06	
At risk (MST ≥ 2)		16 (32.0)
Not risk (MST < 2)		34 (68.0)
MNA-SF score	9.44±2.93	
Malnutrition according to MNA-SF		
At risk (MNA-SF < 12)		32 (64.0)
Not risk (MNA-SF ≥12)		18 (36.0)

The study subjects had an average age of 67.04 years in which the number of male patients (66.0%) was almost double the number of female patients (34.0%). According to ESPEN criteria based on IMT values, the prevalence of malnourished research subjects is 24.0%. This number is smaller than the prevalence of the risk of malnutrition from the results of MST and MNA-SF assessment. The MNA-SF questionnaire detected the risk of malnutrition in 64.0% of the study subjects, twice as much as MST.

The prevalence of malnutrition by 24% according to BMI based on ESPEN criteria is in the range of the prevalence of malnutrition by 20-60% in hospitalized patients mentioned by Leipold et al (2018) and Jaroch et al (2017) [8] [9]. The detection of a higher risk of MST and MNA-SF malnutrition can be caused because in addition to the IMT the two questionnaires also detected malnutrition with weight loss in the last few time periods. The MNA-SF has a higher detection rate associated with a greater number of indicators than MST.

Table 2. Comparison of the Effectiveness of Malnutrition Risk Assessment between MST and SF- MNA Based on BMI Criteria

	MNA-SF		p	BMI		p	OR
	< 12	≥12		< 18.5	≥ 18.5		
MST							
≥ 2	13	3	0.081	7	9	0.025	4.511
< 2	19	15		5	29		
MNA-SF							
<12				11	21	0.022	8.905
≥ 12				1	17		

Table 2 shows the estimation (OR) and chi-square test of the effectiveness of the risk assessment of MST and MNA-SF malnutrition and the comparison of the two. The results of the risk assessment of MST malnutrition questionnaire (score ≥ 2) were significantly associated with the risk of malnutrition based on BMI criteria (BMI <18.5 kg / m²) (p = 0.025). The results of the risk assessment of MNA- SF questionnaire malnutrition (score <12) were also significantly associated with the risk of malnutrition based on BMI criteria (BMI <18.5 kg / m²) (p = 0.022). This shows that both screening methods are statistically proven to be effective tools in assessing the risk of malnutrition in geriatric patients.

Comparison of the results of the OR estimation shows that the effectiveness of MNA-SF (OR = 8.905) is higher than the effectiveness of MST (OR = 4,511). Statistical tests show that MST measurement results are only marginally related ($p = 0.081$) with MNA-SF measurement results, proving that statistically the effectiveness of the MST assessment still does not match MNA-SF

The results of this study provide additional empirical evidence of the effectiveness of MST and MNA-SF as a screening tool to detect the risk of malnutrition as reported in several previous studies [5] [7] [8]. Although the OR estimation shows a relatively clear difference in effectiveness between the two methods, the statistical test provides marginal probability. This gives an indication of the possibility of MST assessment results that are directly proportional to MNA-SF. Further research needs to be done to get clearly conclusions about the comparison between MST and MNA-SF

4. CONCLUSION

The results of the study have not been able to prove the ability of MST to match the prognostic accuracy possessed by MNA-SF in detecting the risk of malnutrition in hospitalized geriatric patients. However, given its ease of use, it is recommended to consider MST as an alternative screening method in certain conditions that require rapid detection.

REFERENCES

- [1] Higashiguchi T, Arai H, Claytor LH, Kuzuya M, Kotani J, Lee SD, Michel JP, Nogami T, & Peng N. Taking action against malnutrition in Asian healthcare settings: an initiative of a Northeast Asia Study Group. *Asia Pacific journal of clinical nutrition*. 2017;26(2):202-211.
- [2] Krumholz HM. Post-hospital syndrome – an acquired, transient condition of generalized risk. *New England Journal of Medicine*. 2013;368(2): 100-102.
- [3] Sauer AC, Alish CJ, Strausbaugh K, West K, & Quatrara B. Nurses needed: identifying malnutrition in hospitalized older adults. *NursingPlus Open*. 2016; 2: 21-25.
- [4] Cederholm T, Bosaeus I, Barazzoni R, Bauer J, Van Gossum A, Klek S, Muscaritoli M, Nyulasi I, Ockenga J, Schneider SM, de van der Schueren MA & Singer P. Diagnostic criteria for malnutrition an ESPEN consensus statement. *Clinical nutrition*. 2015; 34(3): 335-340.
- [5] Aziz NASA, Teng NIMF, Hamid MRA & Ismail NH. Assessing the nutritional status of hospitalized elderly. *Clinical interventions in aging*. 2017;12: 1615.
- [6] Neelemaat F, Meijers J, Kruizenga H, van Ballegooijen H, & van Bokhorst-de van der Schueren M. Comparison of five malnutrition screening tools in one hospital inpatient sample. *Journal of Clinical Nursing*. 2011; 20(15-16): 2144-2152.
- [7] Herawati H, Sarwiyata T, & Alamsyah A. Metode skrining gizi di rumah sakit dengan MST lebih efektif dibandingkan SGA. *Jurnal Kedokteran Brawijaya*. 2014; 28(1): 68-71.
- [8] Leipold CE, Bertino SB, L'huillier HM, Howell PM, & Rosenkotter M. Validation of the malnutrition screening tool for use in a community rehabilitation program. *Nutrition & dietetics*. 2018; 75(1): 117-122.
- [9] Jaroch A, Głowczewska-Siedlecka E, Jaroch K, & Kędziora-Kornatowska K. Application of Nutritional Risk Score-2002 questionnaire and other nutritional status parameters among hospitalized elderly. *International Journal of Gerontology*. 2017;11(3):134-137.