

Risk screening, nutrition assessment and associated factors of malnutrition among elderly inpatients in Hue University of Medicine and Pharmacy Hospital

Che Thi Len Len^{1*}, Hoang Thi Bach Yen², Nguyen Minh Tam¹

(1) Family Medicine Center, University of Medicine and Pharmacy, Hue University

(2) Faculty of Public Health, University of Medicine and Pharmacy, Hue University

Abstract

Background: Undernutrition is a significant risk factor for mortality, complications, hospital infections, length of hospital stay, quality of life, and prognosis. Patients with proper nutrition will help prevent undernutrition, prevent the development of the disease, and improve the effectiveness of treatment. Nutrition is an integral part of the comprehensive treatment process. Nutritional risk screening is one criterion that shows the hospital's nutritional care capacity. Assessing nutritional status plays an essential role in treating and recovering health. This study aims (1) to screen and assess the nutritional status of inpatients aged from 60 years old in Hue University Medicine and Pharmacy Hospital and (2) to identify some factors related to malnutrition. **Methods:** A cross-sectional study was carried out on 389 inpatients at two departments of internal medicine, Hue University of Medicine and Pharmacy Hospital, from 11/2020 - 03/2021. We used the mini nutritional assessment tool for screening nutrition risks. The subjective global assessment tool was used to assess nutritional status and questionnaires to understand some related factors. **Results:** There were 68.9% of patients at risk of malnutrition and 38.8% of patients had malnutrition. There were significant relationships between the nutrition status of patients with re-admitted status ($p < 0.05$), including diseases ($p < 0.05$), oral pathology ($p < 0.05$), decreased taste ($p < 0.05$). **Conclusion:** The prevalence of inpatients with nutritional risk in two departments of internal medicine was relatively high. It is necessary to conduct nutrition screening in all inpatients to improve the effectiveness of treatment and comprehensive care.

Keywords: malnutrition, inpatients, nutrition treatment, subjective global assessment tool, mini nutritional assessment tool.

1. INTRODUCTION

Eating, nutritional status, health, and disease in an individual or population are all recognized to be related. Additionally, insufficient nutrition or a deficiency impacts a patient's capacity to recuperate from an illness or surgery. If the patient has a diet full of nutrients suitable for the disease, the effectiveness of treatment will increase. A healthy diet can stop the progression of the disease when it is still in the latent stage of development. Malnutrition in patients is a factor that significantly affects complications, hospital-acquired infections, length of hospital stay, quality of life, and disease prognosis. Older people will be more severely affected by healing, higher mortality, and expensive costs for individuals, families, and society. A popular nutritional screening technique, the primary nutritional assessment, is endorsed and advised by national and international scientific and clinical organizations to support older people. The most frequently accepted and validated [1,

2]. The subjective global assessment is a measure to evaluate patients' nutritional status, commonly utilized in international and Vietnamese clinical nutrition research studies [3].

According to research by Kang M.C. et al. (2018), hospitalized patients have a malnutrition rate of 22.0% [4]. Patients at Quang Nam Central General Hospital have a malnutrition rate of 26.1%, according to research done by Dang Thi Hoang Khue in 2019 [5]. In 2017, a study by Hoang Thi Bach Yen at Hue University of Medicine and Pharmacy Hospital revealed that 28.1% of patients were malnourished and 37.4% were at risk for malnutrition [6]. In these investigations, malnutrition was quite common among hospitalized patients. Each patient needs a pathologically appropriate diet and exercise program to maintain excellent health and prevent malnutrition. In an integrated treatment plan, nutrition is crucial because it keeps the condition stable, reduces complications, and shortens hospital stays and overall care. To avoid the disease's

potentially fatal side effects, screening and assessing the nutritional status of patients as soon as they are admitted to the hospital is essential. Therefore, screening and assessing nutritional status right from the early stages of admission to the hospital not only detect patients at nutritional risk to have a treatment regimen and healthy regimen suitable to the condition of the disease but also limits the severe complications caused by the disease.

In Vietnam, there are limited studies on nutritional status in inpatients utilizing the mini nutritional and subjective global assessment tools. We conducted the study on *“Risk screening, nutrition assessment and associated factor of malnutrition among elderly inpatients in Hue University of Medicine and Pharmacy Hospital”* with two objectives:

1. *Risk screening and nutrition assessment among elderly inpatients in Hue University of Medicine and Pharmacy hospital.*

2. *To identify some factors related to malnutrition in research subjects.*

2. METHODS

2.1. Subjects

Elderly inpatients treat as inpatients in internal departments (General Pediatric – Endocrinology Department and Cardiology Department) at Hue University of Medicine and Pharmacy Hospital.

2.2. Methods

Study Design: A cross-sectional descriptive study.

Sampling method: Select the whole sample. Select all patients 60 years of age who received inpatient treatment from November 2020 to March 2021 and met the inclusion criteria. The final sample size of the study was 389 patients.

2.3. Data collection

Demographic information was extracted from health records. Face-to-face interviews using questionnaires and anthropometric measurements were conducted at the patient room.

Risk screening of research subjects was conducted using the mini nutritional assessment tool (MNA), with normal nutritional status (24 - 30 points), at risk of malnutrition (17 - 23.5 points), and malnourished (less than 17 points). Nutritional status, according to the Subjective global assessment tool (SGA), as follows: History: Weight change, eating ability, gastrointestinal symptoms, ability to live, metabolic level related to pathological stress; Clinical examination: Thickness of subcutaneous fat, muscle mass, edema/ascites. SGA is divided into three levels: SGA-A (normal nutritional status),

SGA-B (mild/moderate malnutrition or suspected malnutrition), and SGA-C (severe malnutrition).

Patients admitted to the hospital within 36 hours were screened for nutritional risk, and those at risk were assessed for nutritional status. We screened and assessed the nutritional situation of older people in this study. The enumerators participating in data collection are trained in measuring anthropometric indicators. As for the MNA tool, it's a toolkit that doesn't require special training. However, with the SGA tool, the person assessing nutritional status is a Doctor at the Department of Clinical Nutrition and Dietetics who has been trained and experienced in assessing SGA.

2.4. Data analysis

Data entry using Epidata 3.1 software, data processing, and analysis using SPSS 20.0 software, results are described by frequency and percentage tables. We used descriptive statistical analysis using frequency and percentage tables, the Chi-square test (χ^2), and a binary logistic regression model to identify related factors. We choose the $p < 0.05$ value to find the level of statistical significance.

2.5. Research ethics

The study was approved by Hue University of Medicine and Pharmacy Hospital and the consent forms were collected from patients.

3. RESULTS

3.1. General characteristics

Of 389 research subjects, 52.2% were 60 - 74 years old, 47.8% were 75 or older, and 44.2% were male. Most of them are Kinh (98.5%), and the patient educational level is illiterate but can read and write (accounting for 54.5%). There 36.0% of patients have a career in agriculture/forestry/fishery before retirement. Most patients are not religious (accounting for 74.6%), and most have average economic conditions and are well-off, but still, 11.3% are poor/near-poor households. Most patients lived with their spouses (66.3%); widows account for a reasonably high percentage (30.9%).

3.2. Risk screening, assessment of the nutritional status of research subjects

Risk screening using the MNA tool in 389 patients found that 69.2% were at risk of malnutrition. Assessment of nutritional status by the SGA tool found that 38.8% of patients were malnourished, of which 37.3% had SGA-B grade and 1.5% had SGA-C grade (Table 1). Table 2 presents the nutritional status of patients assessed by MNA compared with SGA. All patients with SGA - C grade have a risk of malnutrition according to the

MNA tool; besides, 97.9% of patients with SGA - B grade have a risk of malnutrition according to the MNA tool. This difference is statistically significant ($p < 0.01$). According to MNA, 98.0% of patients at risk of malnutrition are malnourished according to

SGA, and 50.8% of patients at risk of malnutrition according to MNA but not malnourished according to SGA. This difference is statistically significant ($p < 0.01$). It shows that MNA has Se = 98.0% and Sp = 49.2% compared to SGA.

Table 1. Nutritional status of research subjects (n = 389)

MNA	n	%	SGA	n	%
At the risk of malnutrition	269	69.2	Malnourished	151	38.8
There is no risk of malnutrition	120	30.8	Not malnourished	238	61.2

Table 2. Nutritional status of patients assessed by MNA compared with SGA (n = 389)

SGA	MNA	At the risk of malnutrition		There is no risk of malnutrition		Total	p
		n	%	n	%		
Evaluation according to each specific classification of SGA							
	SGA - C	6	100.0	0	0.0	6	< 0.001*
	SGA - B	142	97.9	3	2.1	145	
	SGA - A	121	50.8	117	49.2	238	
	Total	269	69.2	120	30.8	389	
Evaluation when grouping SGA							
	Malnourished	148	98.0	3	2.0	151	< 0.001
	Not malnourished	121	50.8	117	49.2	238	
	Total	269	69.2	120	30.8	389	

* Fisher's Exact Test

3.3. Some factors related to malnutrition of research subjects

3.3.1. Some factors related to the nutritional status of research subjects according to the mini nutritional assessment tool

Analyses were conducted to determine some factors related to the nutritional status according to the MNA tool. The differences in demographic information are shown in Table 3. The rate at risk of malnutrition in the age group 75 years and older (79.0%) is higher than in the group 60 - 74 years old (60.1%). The risk of malnutrition in women is higher (75.1%) than in men (61.6%). The risk of malnutrition was highest in the illiteracy and literacy group (75.9%); the risk decreased gradually in patients with higher education levels, $p < 0.01$.

Table 3. Relationship between some common characteristics of patients and nutritional status according to the MNA tool (n = 389)

Variable	MNA	At the risk of malnutrition		There is no risk of malnutrition		Total	p
		n	%	n	%		
Age group							
60 - 74 years old		122	60.1	81	39.9	203	0.001
≥ 75 years old		147	79.0	39	21.0	186	
Gender							
Female		163	75.1	54	24.9	217	0.004
Male		106	61.6	66	38.4	172	

Academic level						
Illiterate, can read and write	161	75.9	51	24.1	212	0.006
Elementary	67	64.4	37	35.6	104	
Junior high school	17	63.0	10	37.0	27	
High school and above	24	52.2	22	47.8	46	
Economic status						
Poor/near-poor	34	77.3	10	22.7	44	0.216
Average, well-off	235	68.1	110	31.9	345	
Marital status						
Widows	91	75.8	29	24.2	120	0.160
Single	7	63.6	4	36.4	11	
Lived with their spouse	171	66.3	87	33.7	258	

Table 4. Some factors related to nutritional status, according to the MNA tool (n = 389)

MNA	At the risk of malnutrition		There is no risk of malnutrition		Total	p
	n	%	n	%		
Re-hospitalization						
Yes	204	70.8	84	29.2	288	0.225
No	65	64.4	36	35.6	101	
Drink alcohol/beer						
Yes	118	84.3	22	15.7	140	< 0.001
Used to drink	63	56.8	48	43.2	111	
No	88	63.8	50	36.2	138	
Smoke						
Yes	116	80.6	28	19.4	144	< 0.001
Used to smoke	88	69.8	38	30.2	126	
No	65	54.6	54	45.4	119	
Comorbidities						
Yes	180	73.8	64	26.2	244	0.011
No	89	61.4	56	38.6	145	
Dental disease						
Yes	239	71.1	97	28.9	336	0.033
No	30	56.6	23	43.4	53	
Decreased taste						
Yes	99	94.3	6	5.7	105	< 0.001
No	170	59.9	114	40.1	284	
Mentality						
Yes	63	80.8	15	19.2	78	0.013
No	206	66.2	105	33.8	311	

Patients who are drinking alcohol have a higher risk of malnutrition (84.3%) than patients who do not drink alcohol and beer (63.8%), with $p < 0.01$. Current smokers have a higher risk of malnutrition (80.6%) than non-smokers (54.6%). This rate is also high in patients who have smoked but quit (69.8%), $p < 0.01$. Patients with comorbidities had a higher risk of malnutrition (73.8%) than those without comorbidities. The proportion of patients with oral disease at risk of malnutrition accounts for a high rate (71.1%), a statistically significant difference compared to the group without oral disease ($p < 0.05$). 94.3% of older people with decreased taste are at risk of malnutrition ($p < 0.01$), and 80.8% of patients at risk of malnutrition have psychological changes compared to before hospital stays with $p < 0.05$ (Table 4).

3.3.2. Some factors related to the nutritional status of research subjects according to the subjective global assessment tool

The demographic characteristics and nutritional status according to the SGA tool are presented in Table 5. The malnutrition rate in the age group 75 and older is higher than that in the age group 60 - 74 years old, 48.4% and 30.0%, respectively. The malnutrition rate is highest in the illiteracy and literacy group (46.2%); this rate is similar to that of the lower secondary school group (44.4%), $p < 0.01$. The rate of malnourishment in the group with poor/near poor economic status is higher than in the group with average and well-off economic status (59.1% compared to 26.2%). The widowed and single groups had the highest malnutrition rates (48.3% and 45.5%); this rate was low in those living with a spouse with $p < 0.05$.

Table 5. Relationship between some characteristics of patients and nutritional status according to the SGA tool (n = 389)

SGA	Malnourished		Not malnourished		Total	p
	n	%	n	%		
Age group						
60-74 years old	61	30.0	142	70.0	203	< 0.001
≥ 75 years old	90	48.4	96	51.6	186	
Gender						
Female	91	41.9	126	58.1	217	0.156
Male	60	34.9	112	65.1	172	
Academic level						
Illiterate, can read and write	98	46.2	114	53.8	212	0.003
Elementary	30	28.8	74	71.2	104	
Junior high school	12	44.4	15	55.6	27	
High school and above	11	23.9	35	76.1	46	
Economic status						
Poor/near-poor	26	59.1	18	40.9	44	0.003
Average, well-off	125	26.2	220	63.8	345	
Marital status						
Widows	58	48.3	62	51.7	120	0.027
Single	5	45.5	6	54.5	11	
Lived with their spouse	88	34.1	170	65.9	258	

Table 6 shows the relationship between re-hospitalization and lifestyle characteristics with nutritional status.

Table 6. Some factors related to nutritional status, according to the SGA tool (n = 389)

SGA	Malnourished		Not malnourished		Total	p
	n	%	n	%		
Re-hospitalization						
Yes	124	43.1	164	56.9	288	0.004
No	27	26.7	74	73.3	101	
Drink alcohol/beer						
Yes	62	44.3	78	55.7	140	0.159
Used to drink	36	32.4	75	67.6	111	
No	53	38.4	85	61.6	138	
Smoke						
Yes	65	45.1	79	54.9	144	0.046
Used to smoke	50	39.7	76	60.3	126	
No	36	30.3	83	69.7	119	
Comorbidities						
Yes	105	43.0	139	57.0	244	0.027
No	46	31.7	99	68.3	145	
Dental disease						
Yes	138	41.1	198	58.9	336	0.022
No	13	24.5	40	75.5	53	
Decreased taste						
Yes	75	71.4	30	28.6	105	< 0.001
No	76	26.8	208	73.2	284	
Mentality						
Yes	47	60.3	31	39.7	78	< 0.001
No	104	33.4	207	66.6	311	

The re-hospitalization rate in malnourished patients was 43.1%, $p < 0.01$. The malnutrition rate in current smokers was the highest (45.1%), 14.8% higher than in non-smokers (30.3%). The malnutrition rate in patients with comorbidities accounted for 43.0%, a statistically significant difference from those without comorbidities ($p < 0.05$). The percentage of patients with dental disease accompanied by malnutrition accounted for the highest rate (41.1%), a statistically significant difference compared with the other group ($p < 0.05$). 71.4% of older people had decreased taste, and 60.3% of malnourished patients had psychological changes during hospitalization, $p < 0.01$.

3.3.3. Relationship with nutritional status according to the binary logistic regression model

Table 7. Some factors related to nutritional status according to the binary analysis regression model (n = 389)

Variable	OR	p	95%CI	OR	p	95%CI
	MNA			SGA		
Gender						
Female	32.83	< 0.001	10.84 - 99.47	3.01	0.004	1.41 - 6.40
Male	1	-	-	1	-	-
Economic status						
Poor/near-poor	0.89	0.818	0.32 - 2.45	2.57	0.022	1.14 - 5.79
Average, well-off	1	-	-	1	-	-

Marital status						
Widows	0.43	0.045	0.19 - 0.98	0.89	0.726	0.47 - 1.68
Single	1.20	0.867	0.14 - 10.55	1.69	0.481	0.40 - 7.19
Lived with their spouse	1	-	-	1	-	-
Re-hospitalization						
Yes	1.20	0.593	0.62 - 2.34	2.17	0.015	1.16 - 4.05
No	1	-	-	1	-	-
Drinking alcohol/beer						
Yes	18.75	< 0.001	5.75 - 61.17	1.60	0.262	0.70 - 3.64
Used to drink	1.43	0.425	0.59 - 3.44	0.80	0.525	0.40 - 1.60
No	1	-	-	1	-	-
Smoking						
Yes	8.71	< 0.001	3.06 - 24.79	2.46	0.029	1.10 - 5.51
Used to smoke	7.36	< 0.001	2.83 - 19.14	2.06	0.044	1.02 - 4.15
No	1	-	-	1	-	-
Decreased taste						
Yes	9.62	< 0.001	3.38 - 27.38	6.30	< 0.001	3.54 - 11.21
No	1	-	-	1	-	-
Mentality						
Yes	2.30	0.054	0.98 - 5.39	2.91	0.001	1.55 - 5.50
No	1	-	-	1	-	-

Binary logistic regression analysis showed that several factors are associated with the risk of malnutrition, including gender, marital status, drinking alcohol/ beer, smoking, and decreased taste. The risk of malnutrition was 32.83 times higher in women, 8.71 times higher in the smoking group, 18.75 times higher in the group with alcohol and beer consumption, and 9.62 times higher in the group with decreased taste.

Some of the factors associated with malnourished include gender, economic status, re-hospitalization, smoking, decreased taste, loss of vision and hearing, source of income, and change the mentality. Malnutrition was 3.01 times higher in women, 2.57 times higher in poor/near poor economic status, 2.17 times higher in re-hospitalization, 2.46 times higher in smoking group, 6.30 times higher in the group with decreased taste, 3.25 times higher in the group receiving economic support and 2.91 times higher in the group with psychological changes during inpatient treatment at the hospital.

4. DISCUSSION

4.1. Risk screening, assessment of the nutritional status of research subjects

Screening for nutritional risk by the MNA tool revealed that 69.2% of patients were at risk of malnutrition. Our results are lower than that of Donini M et al. (2018) of 226 patients referred to General Practitioner's offices in Italy across the country, eligible participants aged 65 years or older, and the results showed that 76% of patients were at risk of malnutrition (of which 11.9% of patients classified as malnourished, 64.1% of patients are at risk of malnutrition) [7]. Evaluation of nutritional status by the SGA tool found that 38.8% of patients were malnourished. Our results are equivalent to the study of Dang Thi Hoang Khue (2019) (34.8%) [5]; this rate is higher than the study of Trinh Thanh Xuan et al. (2020) on cancer patients being treated at Viet Tiep Hospital, Hai Phong (29.4%) [8].

Research by Verlan S et al. (2017) indicates that 2 out of 3 malnourished older adults were physically frail [9]. According to the Criminal Code of Vietnam 2015, the elderly age is from 75 years or older, compared to the age group 60-74; this group is called the elderly group (according to the Law on Elderly 2009), the aging in the elderly group 75 years of age occurs more strongly, aging is one of the causes of the condition that is at risk

of malnutrition. Our study shows that the risk of malnutrition is highest in the illiteracy and literacy group (75.9%); the risk decreases gradually in patients with higher education levels. Patients with low levels of education have inadequate knowledge and attitudes about nutrition, and their knowledge and attitudes influence poor behaviour regarding using a complete and balanced diet. For hospital stays and even when they go home, illiteracy makes them less likely to contact the media; they cannot read, so indirect communication through the mass media is ineffective. As a result, their knowledge improves. Besides, older people often believe in their accumulated experience, so direct communication about nutritious meals suitable for people's diseases is also difficult.

Table 3 shows that patients drinking alcohol/beer have a higher risk of malnutrition (84.3%) than patients who do not drink alcohol/beer (63.8%). People who often drink alcohol or beer are also prone to deviations in nutrition (they can drink a lot but eat less or eat a lot of some favorite foods). Nutrients are not fully absorbed from the digestive tract into the bloodstream and are not used efficiently by the body's cells. According to Bala S et al. (2014), in cirrhotic patients, ethanol directly impairs absorption, leading to defective intestinal permeability and altered gut microbiota, all contributing to impaired absorption and transport of essential nutrients [10]. Current smokers have a higher risk of malnutrition than non-smokers. Nicotine and other toxins in tobacco cause dry mouth and reduce nutrient absorption, thus indirectly causing weight loss in smokers. Smoking is the reason why smokers are at a higher risk of malnutrition. According to the research results of Ngo Thi Khanh Trang (2017), the rate of malnourished patients 20.7% had comorbidities [11]; the results of our study were higher (73.8%) than this study because the subjects selected by the author are 18 years old or older and have chronic kidney disease, while our subjects are elderly people (from 60 years old or older), the characteristics of body structure and function such as muscle mass, bone mass decreases, energy requirements decrease, eyesight decreases, cognitive ability changes. Hence, older people are at risk of more comorbidities, leading to older people with worse nutritional status. The proportion of patients with oral disease at risk of malnutrition is similar to the study of Rajlakshmi Banerjee et al. (2018); as per MNA, 70% were at risk of malnutrition, and the remaining 19.5% of participants were malnourished. There was a

significant correlation between GOHAI (Geriatric Oral Health Assessment Index) and MNA score [12].

4.2. Some factors related to malnutrition of research subjects

According to research by Wei et al. (2018), among the elderly and weak, the rate of malnutrition is 16.1%; the rate increases to two-thirds if people are at risk of malnutrition; this result is lower than our study, the reason is the study of Wei et al. used a population-based cohort study, due to a long time, the research environment may be changed or disturbed, affecting the factors of interest, reducing the number of individuals in the study sample due to the long study period, thus reducing the representativeness and validity of the conclusions [13]. The malnutrition rate was highest in the illiteracy and literacy group (46.2%), with the lowest rate in the group with a high school education or higher. This result is similar to that of Senger et al. (2019) studied nutritional status and cognitive decline among very older people in a community sample from Southern Brazil [14]. The rate of malnourishment in the group with poor/near poor economic status is higher than in the group with average and well-off economic status. This result is consistent with the study of Ali Mohammad Mosadeghrad et al. (2019), which shows that poverty leads to food insecurity, which has a major impact on premature death from chronic health conditions and causes undernutrition leading to increased susceptibility and reduced susceptibility to non-communicable diseases due to impaired nutrition [15].

Hospitalized individuals frequently have malnutrition, especially those who have experienced numerous hospital readmissions. This finding differs from Luong Thi Bich Trang's (2017) study, in which our study shows that the rate of re-hospitalization in malnourished patients is 43.1%, $p < 0.01$. The author's study, which used BMI rather than SGA, found that undernutrition was 23.0% of the population [16]. Statistically significantly different from the group of patients without comorbidities, patients with comorbidities had a malnutrition rate of 43.0%; our results were lower than those of patients with comorbidities. In Doan Duy Tan's (2016) study, patients with comorbidities had malnutrition rates up to 90.48% higher than those of patients without comorbidities ($p < 0.05$) [17]. This discrepancy results from the fact that the author Doan Duy Tan's research subjects were gastrointestinal surgery patients who, after surgery are at a significant risk of malnutrition for various reasons, including the depletion of dietary reserves.

The prevalence of malnutrition in patients increases due to comorbidities, poor absorption, inadequate nutrition, worries about intestinal blockage after surgery, and the safety of anastomosis.

5. CONCLUSIONS

The proportion of patients at risk of malnutrition in the Internal Medicine Department following the MNA is 68.9%. The overall rate of malnourished patients following the SGA was 38.8%. Analysis using the MNA tool shows a statistically significant relationship between age group, academic level,

drinking alcohol/beer, smoking, comorbidities, dental diseases, decreased taste, and nutritional status. There is a statistically significant relationship between age group, academic level, economic status, re-hospitalization, smoking, comorbidities, dental diseases, decreased taste, and nutritional status when using the SGA tool.

The results raise a strong call for early screening and evaluation of the nutritional status of inpatients to provide necessary nutritional interventions. Strengthening communication and guidance on nutrition in caring for elderly patients are recommended, especially the smoking and drinking behaviour.

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