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Risk of Malnutrition during Hospital Admission: A Comparison of Two Nutritional Screening Tools in the Vietnamese Context

Son Van Nguyen[1], Huong Thi Lan Nguyen[1*], Ngoc Huy Nguyen[2], Hanh Duc Nguyen[1], Hung Trong Nguyen[3]
[1]Phu Tho Provincial General Hospital, Phu Tho Province 290000, Vietnam
[2]Department of Health, Phu Tho Province 290000, Vietnam.
[3]National Institute of Nutrition, Hanoi 100000, Vietnam.
*** Corresponding author:** Nguyen Thi Lan Huong (MSc.)
Phu Tho Provincial General Hospital, Phu Tho Province 290000, Vietnam.
Address: Nguyen Tat Thanh Street, Viet Tri City, Phu Tho Province 290000, Vietnam.
Email: lanhuong387@gmail.com

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ABSTRACT

Objectives: The aim of this study was to use two nutritional screening tools to explore the prevalence of malnutrition in a provincial hospital setting in Vietnam.

Methods: This prospective research recruited adult patients admitted to the case hospital for participation in a survey on the prevalence and associated risk factors of hospital malnutrition. The participants were assessed by nurses and doctors using the malnutrition screening tool (MST) and subjective global assessment (SGA). The malnourished patients received nutritional interventions and were reassessed after three and seven days. Continuous variables were expressed as mean (SD), while categorical variables were expressed as frequency (%).

Result: Of 2900 patients assessed for suitability as participants, those aged over 60 years accounted for the highest proportion (45.3%), and males accounted for more than half (55.6%) of the sample. The MST evaluation identified 1441 patients (49.7%) as malnourished and 1459 patients (50.3%) as well-nourished. The SGA categorized 1735 (59.8%) as well-nourished and 1165 (40.2%) as malnourished, among whom 212 (7.3%) were severely malnourished, and 953 (32.9%) were moderately malnourished or suspected of being malnourished. The hospitalized patients that were appropriately screened and evaluated in terms of nutritional status constituted 71.7% of the sample. However, only 67.9% were administered nutritional intervention in accordance with their medical conditions.

Conclusion: Hospitalized patients must be screened and evaluated with respect to nutritional status.

Keywords: malnutrition, SGA, MST, Vietnam, screening tools.

Correspondence:
Nguyen Thi Lan Huong
Phu Tho Provincial General Hospital, Phu Tho Province, Nguyen Tat Thanh Street, Viet Tri City, Vietnam
E-mail: lanhuong387@gmail.com

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INTRODUCTION

Malnutrition refers to an inadequate nutritional status that is highly prevalent in hospitals and should therefore be addressed to provide complete treatment to inpatients. This deterioration of nutritional well-being has negative consequences on almost every organ or system of the human body. Malnutrition in healthcare systems exerts significant clinical and economic effects as it can translate into increased morbidity and a long length of stay (LOS).[1] Numerous studies suggested that compared with well-nourished patients, malnourished ones suffer from worse outcomes, such as prolonged LOS, increased readmission, and mortality.[2,3] Documented evidence also implied that malnourished patients incur greater hospitalization costs that are related to longer LOS, readmissions, and more considerable usage of hospital resources.[3,4] Because continued suboptimal food intake can eventually degrade nutritional status, an important requirement is to evaluate the effects of poor nutritional consumption on health-related outcomes. The link between poor food intake during hospitalization and mortality has been explored in previous studies.[2,5]

Despite the high prevalence and adverse health consequences of the above-mentioned condition, protein–energy malnutrition among hospitalized patients continues to be under-recognized and undertreated.[6,7] Malnutrition screening is recommended as the first step in nutritional care to enable early identification and treatment.[6,8,9] A screening tool should be simple and should quickly generate results as well as accurately identify patients with possible malnutrition to allow the efficient targeting of resources for nutritional assessment.[10,11] Ideally, such a tool should pinpoint all malnourished patients for assessment (high sensitivity), with a positive screen indicating the absence of well-nourished patients (high positive predictive value).[12] Studies showed that nutritional status declines during hospitalization[13] and that nutritional intake is suboptimal.[5,7,14] Many well-nourished inpatients engage in inferior dietary habits, constituting a group of patients who should be identified early on hospital admission to prevent malnutrition. This requirement highlights the importance of screening and rescreening patients to determine not only those with existing malnutrition but also individuals at risk of poor intake during hospitalization. Although malnutrition screening tools are commonly used to identify the presence of the condition,[15,16] none advance the proactive identification of patients at risk of poor nutritional intake in the course of hospital stay.

An example of such tools is subjective global assessment (SGA), which is a validated method of identifying and categorizing malnutrition status[17] and has previously been used to assess the illness in Vietnamese surgical[18] and general inpatients.19 SGA is based on data relating to weight change, recent dietary intake, nutritional impact symptoms, and a physical examination of subcutaneous fat loss and muscle wasting.[17] Despite these merits, however, the time and training required for SGA use and the limited Vietnamese workforce devoted to nutrition and dietetics mean there is a need for simple nutritional screening methods. This requirement can be addressed using the malnutrition screening tool (MST), which is a straightforward, validated tool[20] that has been used previously in the inpatient settings

of Vietnam.[19,21] The tool has 78% sensitivity and 86% specificity compared with the gold standard SGA.[19,21]

Changes such as the advent of an aging population and advanced healthcare technology have quadrupled per capita health expenditure in Vietnam. The country is also grappling with the dual burden stemming from the incidence of underweight and rising rates of overweight and obesity.[22] Consequently, improving the efficiency of the Vietnamese healthcare system is an important challenge - one that prompted the government to develop a national nutrition agenda designed to enhance the health status of the population.[23] All these factors suggest that investment in assessing and preventing hospital malnutrition in Vietnam is both essential and timely. With consideration for these issues, this study explored the prevalence of malnutrition in a hospital in Vietnam with the use of the MST and SGA.

METHODS

Participants

The participants in this study were adult patients from Phu Tho Provincial General Hospital (Phu Tho Province), where the subsample was administered a survey on the prevalence and associated risk factors of hospital malnutrition from April to November 2018. The final sample consisted of patients older than 18 years, inpatients with a LOS longer than 48 h, patients that could be weighed, and those that signed informed consent forms. Pregnant women or patients admitted to intensive care units, outpatients, and inpatients with a LOS no longer than 48 h were excluded from the research. Nutritional status was recorded during the medical assessment implemented by physicians after participant recruitment.

Screening tools for the risk of malnutrition

The MST consists of two questions about patient intake and weight.[20,24] The total scores possible to classify each patient according to nutritional status are <2 points and ≥2 points, indicating patients without risk of malnutrition and patients who are malnourished, respectively. The outcome variable of interest was malnutrition status, as assessed via SGA. Although SGA has not been thoroughly validated for use in evaluating patients in Vietnam, it has been verified for application in a range of patient populations and is simple, non-invasive and accessible even to inexperienced professionals. It also exhibits a high interrater reproducibility. SGA is based on a patient's medical history, including weight loss, changes in oral intake, the presence of gastrointestinal symptoms (nausea, vomiting, diarrhea, and anorexia), functional level, and physical characteristics (loss of subcutaneous fat, muscle wasting, presence of edema or ascites). Findings regarding medical and physical aspects are combined for an overall assessment or global rating, expressed as follows: well-nourished (SGA-A), moderate or suspected malnutrition (SGA-B), and severe malnutrition (SGA-C).[17]

Several anthropometric measures were taken at bedside. Weight and height were measured using a TZ-120 mechanical scale with an accuracy of 0.1 kg, which corresponds with the standards of clinical departments. Body mass index (BMI) was calculated using the following formula: current weight (kg) / [height (m) × height (m)]. Patients with a rating of SGA-B or SGA-C were assigned nutritional intervention in accordance with their medical conditions. The nutritional status of these patients was reassessed after three and seven days of invention.

Statistical analysis

Data were analyzed using the STATA statistical package (version 10.0). Continuous variables were expressed as mean (SD), while categorical variables were expressed as frequency (%).

Ethics approval

The study protocol was approved by the Council of Medical Ethics of Phu Tho Provincial General Hospital. All the patients were informed about the purpose of the study and were asked to signify consent on written forms.

RESULTS

Participant characteristics

A total of 2900 patients were assessed for suitability as participants, whose mean (min–max) age was 55.4 years (over the range 18–95 years). The highest proportion of the sample was accounted for by patients who were over 60 years old (45.3%), followed by those who were 30 to 60 years old (43.0%). The patients below 30 years of age accounted for 11.7% of the sample (339 individuals). Among the participants, 55.6% were male and 44.4% were female. The patients' characteristics are shown in Table 1.

Table 1: Characteristics of the participating patients

Characteristics	n	Percentage (%)
Age group (year) [(Min–Max)] 55.4 (18–95)		
<30	339	11.7
30–60	1247	43.0
>60	1314	45.3
Gender		
Male	1613	55.6
Female	1287	44.4

Nutritional assessment

The categories of malnutrition were compared (actual scores: all categories). The categorization of malnutrition using the PG-SGA and MST is presented in Table 2. The estimated percentage of patients at risk for malnutrition varied between 7.3% and 49.7% of the total sample, depending on the screening tools used (Table 2). More specifically, the MST uncovered the highest prevalence of malnutrition risk, whereas the SGA found the lowest. The MST identified 1441 (49.7%) patients as malnourished and 1459 (50.3%) patients as well-nourished. The SGA categorized 1735 patients (59.8%) as well-nourished and 1165 (40.2%) as malnourished, of whom 212 (7.3%) were severely malnourished, and 953 (32.9%) were moderately malnourished or suspected of being malnourished. In the group of patients who had an MST score <2, the SGA estimated malnutrition at 23.0%, with 275 patients categorized as belonging to Class A (19.1%), 953 belonging to Class B (66.2%), and 212 belonging to Class C (14.7%) (Figure 1).

Table 2: Results of the screening tools

Characteristics	n	Percentage (%)
BMI		
≤18.5	631	21.8
18.5–<23	1890	65.2
≥23	379	13.0
MST		
<2	1459	50.3
≥2	1441	49.7
SGA		
SGA-A	1735	59.8
SGA-B	953	32.9
SGA-C	212	7.3

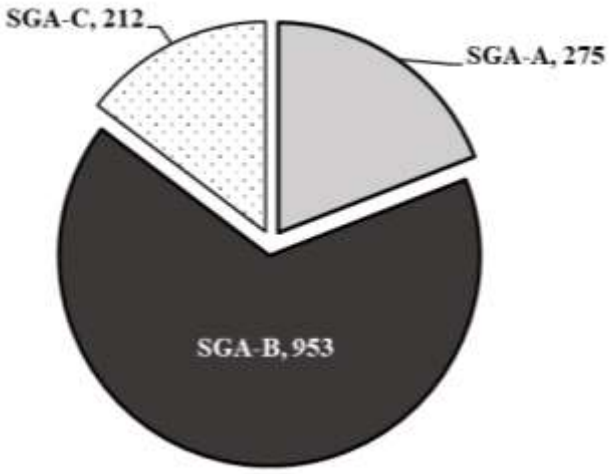

Figure 1: SGA of patients with an MST score <2

The proportions of patients who were re-assessed after three and seven days were 52.1% and 45.7%, respectively (Table 3). Table 4 shows that 71.7% of the patients were assessed in accordance with the correct process, and 67.9% were assessed on the grounds of medical conditions. The rest were often assigned the wrong diet code or classified under indications of deficiency.

Table 3: Distribution of at-risk patients reevaluated after three and seven days

Characteristics	n	Percentage (%)
Reassessment after 3 days (N=1165)	608	52.1
Reassessment after 7 days (N=275)	126	45.7

Table 4: Distribution of patients who were appropriately assessed and received intervention under the right medical conditions

Characteristics	n	Percentage (%)
Number of patients who received sufficient assessment	2080	71.7

Number of patients who experienced improved nutrition	1970	67.9

DISSCUSION

Malnutrition is a fairly common condition among hospitalized patients, but its consequences are related to an increased risk of complications, death, prolonged hospital stay, and increased treatment costs. During medical examinations in many hospitals, however, the assessment of nutritional status is left unaddressed for many reasons, such as overcrowding and the workloads of doctors and nurses.[25] Patients should be screened and assessed in this regard right from hospital admission as well as during treatment so that cases of malnutrition can be detected in time. Intervention measures should involve early support for nutrition to improve the quality of patient examination and treatment.

Table 2 shows that 49.7% of the patients were at a risk of developing malnutrition, as determined by the MST. Among the patients assessed on the basis of BMI, 21.8% were malnourished, and 13% were overweight and obese. These rates are equivalent to the 24% rate of malnutrition among patients hospitalized at Bach Mai Hospital; this rate was determined also on the basis of BMI.[26] Table 2 indicates that 40.2% of the patients in the current work were malnourished (32.9% SGA-B and 7.3% SGA-C), similar to the results of derived by Huy in a hospital in Hai Duong Province in 2012.[27] The author reported that the rates of malnutrition among hospitalized patients under and over 65 years of age accounted for 40% to 43%. Another comparable study is that conducted by Hai et al. at Tien Hai District General Hospital,[28] where the incidence of malnutrition as reflected by BMI was 21.3%. According to the SGA assessment carried out by the author, the malnutrition rates were 39.2% in the inpatient department and 62% in the outpatient department. In the current research, the percentages of patients who were reassessed after three and seven days were 52.1% and 45.7%, respectively. All the doctors and nurses involved in this study agreed on the importance of screening and evaluating hospital patients. The findings reflected that 71.7% of the hospitalized patients were appropriately screened and evaluated for nutritional status but that only 67.9% of patients were administered intervention under the right conditions.

The proportion of malnourished inpatients may have changed in recent years, and the use of ambulatory treatment has increased significantly, with many patients who would have otherwise been admitted to hospital now remaining as outpatients and day cases. Increasingly, those who are admitted to hospital are likely to have a substantial dependency on health care and may exhibit a higher risk of developing malnutrition. In addition, weight loss during admission is linked to increased LOS.[29] Nutritional risk screening is a procedure aimed at identifying patients at risk of having a poor nutritional status and referring these individuals for dietary assessment and potential nutritional intervention. Many scientific committees have proposed such a screening as a standard procedure for any patient availing of healthcare services because malnutrition is an independent prognostic factor for most diseases and nutritional risk is considered a condition that negatively affects survivals.[23,30] Nutritional screening is also intended to facilitate the prediction of the probability of a better or worse outcome due to nutritional factors and whether nutritional treatment is likely to influence this outcome.[8] The components of a nutritional screening tool are therefore crucial to ensuring that at-risk patients are suitably identified. Recent weight loss has been pinpointed as perhaps the single most important indicator of nutritional status, although simple anthropometric parameters alone, such as weight, may underestimate malnutrition rates, particularly in an increasingly heavy population.[29] Acutely unwell cancer inpatients may experience changes in water distribution because of ascites, edema, and dehydration that results from fluid loss or retention.[31,32] Body weight may also be influenced in extreme cases by tumor mass and response to treatment. These factors render weight, on its own, a fairly unreliable indicator of malnutrition.

SGA was considered the gold standard for nutritional assessment in the present study because it exhibits validity for use in both acute and outpatient settings and assesses anthropometric, dietary, functional, gastrointestinal, and physical changes for malnutrition diagnosis.[17] Currently in Vietnam, doctors with nutritional expertise are the healthcare professionals who are predominantly responsible for the nutritional management of patients. However, the first population of specifically trained dietitians are scheduled to graduate from university in Vietnam in 2018. This is a huge milestone for the profession of dietetics in a country of approximately 92 million and is likely to significantly affect the nutritional care that patients receive. Because the completion of SGA requires time and trained individuals, the primary aim of this work was to explore the utility of alternative nutritional screening methods. Given the importance of routine nutritional screening in advancing the early initiation of nutritional support, the selection of a sensitive screening tool is of clinical importance.[9]

Vietnam is a country undergoing socio-economic transition and experiencing concurrent states of undernutrition and growing levels of overnutrition. The sensitivity of a BMI-based approach as a screening method for malnutrition diminishes with increasing body fat, thus rendering the physical assessment of muscle stores more difficult. In such a case, directly measuring muscle stores is preferable using technologies such as dual-energy X-ray absorptiometry and bioelectrical impendence analysis. The problem is that implementation in Vietnam is confronted with availability and cost issues. The current cohort had a mean BMI of 21.9 kg/m^2, and less than 11% were identified as being overweight or obese. Thus, the identification of muscle depletion was easier and pointed to a strong correlation between BMI and muscle wasting. The clinical utility of BMI as a means of highlighting nutritional risk will likely continue to be debated, particularly in elderly populations and those with chronic wasting diseases. However, with the growing prevalence of overnutrition in Vietnam, a comprehensive assessment of fat-free mass will be needed in the future.

LIMITATIONS

The absence of a gold standard for undernutrition is a barrier in every study on this topic, thereby presenting the risk for

bias. Nutritional assessment via the SGA in this work was generally considered a standardized, widely known, and valid reference method for evaluating the concurrent validity of screening tools.[33] Thus, it was chosen as the tool for nutritional status assessment in this research. Potential limitations include errors associated with the incorrect weighing of residents, but adherence to facility protocols would have minimized this risk. Although one facility showed that the residents included in the study were representative, this information was unavailable from the other facility. Residents who were unwell or had dementia were less likely to participate in the study; hence, the prevalence of malnutrition may have been underestimated. Nevertheless, this should not affect the primary aim of the study in determining effective nutritional screening tools for long-term-care residents. Another limitation is the absence of data on nonparticipation as some of the patients could have been too ill to participate and may have been at a high risk of malnutrition. The sample size could have hindered the effectiveness in detecting true associations given insufficient power. Lastly, this study only measured malnutrition in medical inpatients; therefore, the results may not be generalizable to patients in broader hospital inpatient settings. Further study of other patient groups should be a priority in future research, particularly to determine whether similar or differing factors drive malnutrition-driven burdens.

CONCLUSION

The results showed that 49.7% of the patients were at risk of developing malnutrition, as assessed by the MST. In particular, the proportions of patients with malnutrition on the basis of BMI and SGA were 21.2% and 40.2%, respectively. The patients who were appropriately screened and evaluated for nutritional status constituted 71.7% of the sample, but only 67.9% were administered nutritional intervention in accordance with their medical conditions. The screening and evaluation of nutritional status among hospitalized patients are necessary. The challenges impeding the efficiency of such implementation are the limited number of health workers in Vietnam, work overload, and the lack of regulations on nutritional care for health workers.

LIST OF ABBREVIATIONS

BMI: body mass index, LOS: length of stay, MST: malnutrition screening tool, SGA: subjective global assessment.

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CONFLICTS OF INTEREST

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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