Nutritional Status and Feeding Practice among Dysphagic Older Adult Inpatients in Vietnam

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Summary The Vietnamese older adult population has increased rapidly on an annual basis and dysphagia has become a common issue. The nutritional status of older adults in general and of dysphagic older adults in particular has not received adequate attention. The automatic solution for cases of serious choking/aspiration is still a prescription for tube feeding. In developed countries, oral intake is a priority alternative for dysphagia and has positive consequences. This study aimed to investigate the nutritional status of and feeding practices for dysphagic older adult inpatients in some Vietnamese hospitals. The study was designed as a cross-sectional study and was conducted in three large hospitals in northern Vietnam. The data for 1007 older inpatients (58.3% were females, mean age was 75.5 ± 7.3 y) about their dysphagic status, nutritional status and feeding practices were collected by dietitians. About 29% of the older adult inpatients suffered from malnutrition and 54% had a risk of malnutrition. Half of the dysphagia group had malnutrition and 42% were at risk of malnutrition. About 78% of the dysphagic older adults had oral intake of soft foods/regular foods and the remainder had tube feeding. Almost all dysphagic patients had reduced food intake over the prior 3 mo. The rate of pneumonia was quite high among dysphagic patients. The nutritional status of Vietnamese older adult inpatients in general and of dysphagic older adults specifically was poor. Oral intake of a texture-modified diet should be a method with priority over tube feeding or soft foods/regular foods for dysphagic patients.

Key Words elderly, patients, hospital, dysphagia, malnutrition, MNA, water swallowing test

Older adults are the fastest growing segment of the population in Vietnam. The number of Vietnamese aged 65 and older is projected to increase from 7.8% in 2015 to 17.8% in 2050 (1). Older adults often have many health problems, among which malnutrition is quite common. Malnutrition is associated with increasing risk of infections, delayed wound healing, muscle weakness, depression, increasing mortality risk and length of hospital stay (2). Therefore, finding out the nutritional status of older adults in Vietnam is necessary to have a suitable nutrition intervention strategy for the community in general and hospitals in particular.

According to a systematic review, there are many significant risk factors leading to malnutrition in older adults. Among these, swallowing difficulty is a common risk factor (3). Swallowing is a complex neuromuscular activity that consists of oral, pharyngeal, and esophageal phases, and involves the coordinated function of many muscles. Thus, many adverse health conditions can influence swallowing function. Neurological diseases, head/neck and esophageal cancer, and metabolic deficits are broad categories of diseases that might

contribute to dysphagia. In previously published data, more than one thousand older adult inpatients in three large Vietnamese hospitals were screened for dysphagia through the use of quick and simple tools. The results showed that the rate of dysphagia was quite high, about 16.5% (4). In developed countries, nutrition for dysphagia patients is a matter of concern. Texture-modified diets (puree, jelly) and thickened liquids have been effective in the management of chronic and acute dysphagia (5). At present, in Vietnam, dysphagia patients lack suitable dietary management. In mild dysphagia situations, soft foods such as porridge or noodles is served to patients. The soft food is intended for patients with chewing difficulties. Characteristic of soft foods is that the water still has the ability to separate from the solid foods so it is not safe with dysphagic patients. Choking still can happen but oral intake of soft foods is a more comfortable choice compared to tube feeding. When the dysphagia status becomes serious and patients complain to the doctor, tube feeding is prescribed automatically as soon as dysphagia is diagnosed. There are reports that the risk of pneumonia with tube feeding for dysphagia patients was higher than with oral intake of dysphagia food (6, 7). Moreover, Leibovitz et al. found that there

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is a high prevalence of oropharyngeal colonization with gram-negative bacteria in patients with tube feeding (both nasogastric and Percutaneous Endoscopic Gastrostomy tube) compared to orally-fed patients (7). In this study, we also collected more information about the pneumonia rate based on current feeding practices for dysphagic patients.

Vietnamese dysphagia older adult inpatients may have a high risk of malnutrition. Therefore, this study aimed to investigate the nutritional status of and feeding practices for dysphagic older adult inpatients in some Vietnamese hospitals.

MATERIALS AND METHODS

Settings and Sample.

The study was designed as a cross-sectional study and was conducted for 6 mo, from August 2018 through January 2019. This research was conducted in accordance with Declaration of Helsinki and approved by the Hanoi Medical University's ethical committee, number 1318. The study population consisted of older adult inpatients being treated in three large general hospitals in Vietnam: Hanoi Medical University Hospital (500 beds), Dong Da General Hospital (800 beds) and National Geriatric Hospital (500 beds).

Subjects were recruited for the study from all newly admitted patients, i.e., patients in the first 48 h after admission, by random selection (using a random number table) from admission registers.

The sample size was about one thousand subjects who met the inclusion criteria: (1) hospitalized older adults in the above three hospitals, (2) age 65 or over. The exclusion criteria included: (1) refusal to participate in this study, (2) mute, deaf or psychotic and (3) suffering from ventilator, coma, trauma or injury. All potential subjects completed questionnaires and were screened using swallowing tests.

Data collection

All the questionnaires were carried out by investigators. The investigators were dietitians who were trained to collect the study data. Before carrying out the actual study, we conducted a pilot study on 50 patients to revise the instruments.

Below is the information that we obtained.

Demographic data

Data such as age, gender, diagnosed diseases were collected from medical records.

Dysphagia screening

Repetitive saliva swallowing test (RSST). Patients were asked to swallow their own saliva as many times as possible in 30 s; the examiner determined the absence of laryngeal elevation during swallow by observing and/or feeling laryngeal movement. If a patient was unable to perform three consecutive swallows with two retests, he/she suffered from dysphagia. If a patient was able to swallow 3 times or more, then the Water Swallowing Test would be administered (8).

Water Swallowing Test (WST). The examiner would offer 3 mL water for the subject to drink; if patients choked or their voice changed, patients suffered from

dysphagia. If there was no choking or voice change, subjects continued to drink 30 mL water. Subjects who had choking or voice change were dysphagic. If there was no choking or voice change, patients were normal (8).

Nutritional parameters

Anthropometric measurement. If patients could stand, weight and height were measured by Tanita scale BC-760-WH (Tanita, Tokyo, Japan) and Seca Germany. Weight was gathered in the morning before eating and after toilet. Patients removed their shoes and wore only hospital clothes. Body mass index (BMI) was calculated using base weight and height. If patients could not stand, we used circumference of the leg as an indicator to screen nutrition by MNA-SF (9).

Mid-upper arm circumference (MUAC). MUAC was measured by dedicated tape. MUAC is the circumference of the arm (usually measured on the non-dominant side) in centimeters at the mid-point between the acromion (the lateral extension of the spine of the scapula, forming the highest point of the shoulder) and the olecranon (the bony projection of the ulna at the elbow) (10).

Mini nutritional assessment-short form (MNA-SF). Various scales have been used to perform a quick initial nutritional assessment. The Mini Nutritional Assessment Short Form (MNA-SF) is used globally. Although it does not require special equipment, it has high sensitivity and specificity for assessing malnutrition risk in older adults in multiple settings, including hospitals (11, 12). MNA-SF consists of six sections: appetite or eating problems, recent weight loss, mobility impairment, acute illness/stress, dementia or depression, and BMI. It contains a total of 14 points; a score of 12–14 is within the normal range, 8–11 indicates risk of malnutrition, and ≤ 7 indicates malnutrition. All assessments were performed per the MNA-SF user guide (9).

Statistical analysis

All statistical analyses were performed using the Stata version 12.0 software. Categorical variables were expressed as the number of patients (percentage), and quantitative variables, including parametric and non-parametric values evaluated by the histogram, were expressed as mean $\pm$ standard deviation (SD) such as age, MUAC. Comparisons between groups were made using the Chi square test and Student's *t*-test for categorical variables and quantitative variables, respectively. *p*-values of less than 0.05 were considered statistically significant for all the analyses.

RESULTS

Table 1 shows the characteristics of 1007 older adult inpatients (420 males and 587 females, mean age 75.5 ± 7.3 y). 24% of subjects suffered from neurologic disorders or esophageal disorders or respiratory & iatrogenic disorders. The mean BMI of subjects was 21.7 ± 3.7 kg/m². By using MNA-SF questionnaires, we observed that about one third (29%) of older adult inpatients had malnutrition, more than half (54%) had risk of malnutrition and only 17% of them had normal

Table 1. Characteristics of subjects enrolled in this study ($n=1,007$).

Characteristics	Overall ($n=1,007$)	Non-dysphagia ($n=841$)	Dysphagia ($n=166$)	<i>p</i> -value
Age, y	75.5 ± 7.3	75.0 ± 7.1	78.0 ± 7.7	$<0.05^{\#}$
Female, <i>n</i> (%)	587 (58.3)	483 (57.4)	104 (62.7)	0.21*
Male, <i>n</i> (%)	420 (41.7)	358 (42.6)	62 (37.3)	
Disease groups				
Neurologic disorders, <i>n</i> (%)	113 (11.2)	68 (8.0)	45 (27.1)	
Esophageal disorders, <i>n</i> (%)	63 (6.3)	31 (3.7)	32 (19.3)	
Respiratory & iatrogenic disorders, <i>n</i> (%)	65 (6.5)	46 (5.5)	19 (11.4)	
Other, <i>n</i> (%)	766 (76)	696 (82.8)	70 (42.2)	
BMI, kg/m^2	21.7 ± 3.7	21.8 ± 3.6	21.0 ± 4.2	0.98
MNA-SF score	9.5 ± 2.8	10 ± 2.5	7.3 ± 3.1	
Normal nutrition status	286 (17)	273 (32.5)	13 (7.8)	$<0.05^*$
Risk of malnutrition	547 (54)	478 (56.8)	69 (41.6)	
Malnutrition	174 (29)	90 (10.7)	84 (50.6)	
MUAC (cm)	24.7 ± 2.9	24.8 ± 2.9	23.9 ± 2.7	$<0.05^{\#}$

Data presented as mean $\pm$ standard deviation or *n* (%).

* Chi square test.

Student *t*-test.

Table 2. Feeding practices for older adult inpatients with and without dysphagia ($n=1,007$).

Feeding practice	Dysphagia status		<i>p</i> -value
	Non-dysphagia ($n=841$)	Dysphagia ($n=166$)	
Oral intake by soft foods/regular foods	98.6%	78.3%	$<0.05^*$
Tube feeding	1.4%	21.7%	

* Chi square test.

Fig. 1. The feeding practices and declining food intake over the prior three months for dysphagia elderly inpatients ($n=166$).

nutritional status. Half of dysphagic older adult inpatients suffered from malnutrition and about 42% had risk of malnutrition. These rates were higher than in the non-dysphagia group and the difference is statistically significant ($p<0.05$). Using MUAC indicators to compare the dysphagia and non-dysphagia groups showed differing results. The dysphagia groups had MUAC smaller than the non-dysphagia group and had a significant difference with $p<0.05$.

Table 2 indicates the feeding practice for older adult inpatients with and without dysphagia. 78.3% of dysphagic older adults had oral intake by soft foods/regular foods and 21.7% of the dysphagia group had tube feeding. Only 1.4% had tube feeding in the non-dysphagia group. The difference is statistically significant ($p<0.05$).

Figure 1 indicates the feeding practices and the decline in food intake over the prior three months for dysphagia older adult inpatients. Almost all dysphagia patients experienced reduced food intake. In particular, all dysphagia patients who were using tube feeding at the time of this research had experienced reduced oral food intake previously and so had been prescribed tube feeding.

Table 3 shows the relationship between pneumonia status and feeding practice in dysphagic older adult patients. About one third of oral intake by soft foods/regular foods and about two thirds of tube feeding dysphagic older adults suffered from pneumonia.

DISCUSSION

In this study, more than one thousand older inpatients

Table 3. Pneumonia status and feeding practices in dysphagic older adult inpatients ($n=166$).

Pneumonia status	Feeding practice	
	Oral intake by soft foods/regular foods ($n=130$)	Tube feeding ($n=36$)
Yes	32%	67%
No	68%	33%

in Vietnamese hospitals were screened for nutritional status by MNA-SF questionnaires. The results indicated that about 83% of older adult inpatients were malnourished (29%) or at risk of malnutrition (54%). The malnutrition rate in this study was higher than in studies in some countries in Northeast Asia (Japan, China, Taiwan) with results showing that about 50% were malnourished or at risk of malnutrition (13). These are alarming numbers about the nutritional status of older adult inpatients.

Malnutrition and dysphagia have a close relationship (14, 15). It is understandable that this study showed that half of the dysphagia group were suffering from malnutrition and nearly half (42%) were at risk of malnutrition according to the MNA-SF. The results also show that the dysphagia group had MUAC less than that of the non-dysphagia group with $p<0.05$. This is similar to another study in Japan that concluded that MUAC correlated with dysphagia in hospitalized older adult patients (16). To help patients get out from the vicious cycle of dysphagia and malnutrition, besides rehabilitation, nutrition plays an essential role. A report concluded that it is important to provide an adequate amount of nutrients to maintain body weight and muscle during rehabilitation in patients with dysphagia (17).

During the period of this research, with dysphagic patients in Vietnam, the two common feeding practices were oral intake of soft foods/regular foods and enteral nutrition by nasogastric tube feeding. The results show that about 78.3% of dysphagia patients eat soft foods/regular foods and the remainder use tube feeding. In addition, the results of the study also indicated almost all dysphagia older adult patients with oral intake by soft foods/regular foods and all dysphagic patients who used tube feeding at research time had reduced food intake over the prior 3 mo so they were prescribed tube feeding. Many dysphagic patients cannot eat well, have reduced energy intake and become malnourished.

Oral intake by a texture-modified diet is known as a priority choice for dysphagic patients in developed countries. It is extremely helpful if dysphagia patients can enjoy eating orally like normal people. The other study showed that oral intake with a dysphagic diet helps to improve Quality of Life and decreases the use of tube feeding for dysphagic patients (18). A dysphagic diet is safe for patients with swallowing difficulties and is advised by systematic review (5). Swallowing function is also significantly improved by oral intake (19). In addition, tube feeding carries a hidden risk of pneumonia, even higher than with oral intake of a texture-modi-

fied diet (7). In this study, we also observed that about two thirds of tube feeding and one third of oral intake of soft foods/regular foods dysphagic older adults suffered from pneumonia. A study by Iwamoto et al. (17) showed the relationship between route of feeding and outcome in dysphagic patients. The patients who had oral intake with a texture-modified diet did not die (discharge or hospital transfer) and the patients with tube feeding had a high death rate. Early oral intake also helps dysphagic patients to be discharged from the hospital sooner (20). In addition, there is a strong relationship between dysphagia, malnutrition and pneumonia as shown by Sura and co-workers' study (21).

Dysphagia screening and dietary management have not been established in Vietnamese hospitals and communities. This lack may lead to poor nutritional status and may delay treatment in dysphagic older adult patients. To improve this situation, dysphagia detection skills using simple methods such as RSST, WST, as well as a special texture-modified diet, should become widespread. Dietitians can provide instruction on how to prepare a texture-modified diet for patients and patients' families. The dysphagic patients can receive a better diet at home. In this way, malnutrition and pneumonia in dysphagic older adults may be alleviated. In hospitals, Nutrition Support Teams for dysphagia should be established to assess the swallowing function of dysphagic patients and to evaluate whether the provided meals are appropriate for them. It is time for priority to be given to Vietnamese dysphagia patients being treated with oral consumption of a texture-modified diet instead of soft foods/regular foods or tube feeding.

In this study we found some points of concern. First, malnutrition issues make treatment in the hospital more difficult, patients' treatment can be delayed, there is increased risk of complications, delayed rehabilitation, and increased risk of mortality, as is well-known. Many older adults may be malnourished before admission. Through this data, Vietnam and Asian countries which have the same situation as Vietnam need to pay attention to the nutritional status of older adults by screening nutritional status through the local health center. Furthermore, dietitians need to have nutrition education appropriate to this population. Second, by using simple screening tools such as MNA-SF, RSST and WST, not only hospitals but also community health centers can screen nutritional status and dysphagia. Finally, dysphagia is a common issue with older adults but many countries including Vietnam haven't yet developed a proper nutrition diet for them. It is time to improve nutritional

status in older adults in general and dysphagia patients in particular.

The limitation in this study is that it is a cross-sectional study which was conducted in three large hospitals in the northern area of Vietnam so the results are not representative for the entire country. But with a sample size of more than one thousand patients, we expect that the difference from rates for the whole country would not be great.

In conclusion, the nutritional status of Vietnamese older adult inpatients in general and of dysphagic older adults specifically was poor. At present, feeding practices for dysphagic patients are not optimal and priority must soon be given to oral intake of a texture-modified diet.

Authorship

Research conception and design: TPT, LTN, JK, FS, and SY; experiments: TPT and LNT; statistical analysis of the data: TPT; interpretation of the data: TPT; writing of the manuscript: TPT.

Disclosure of state of COI

No conflicts of interest to be declared.

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