



Research Article

THE EFFECTS OF POOR ORAL HEALTH ON NUTRITIONAL STATUS IN VIETNAMESE OLDER ADULTS

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ABSTRACT

Background: The number of Vietnamese older adults is increasing rapidly. Malnutrition and oral health problem are problems of concern. The purpose of this study is to compare nutritional status in Vietnamese older adult inpatients with healthy oral and those with changes/unhealthy oral.

Methods: The study was designed as cross-sectional and was conducted in three large hospitals in northern Vietnam, 2021. The data about nutritional status and oral health status assessed by Oral Health Assessment Tool (OHAT) for 344 older adult inpatients were collected by dietitians.

Results: The results show that about one fourth of subjects had oral changes/unhealthy conditions. The rate of malnutrition in the oral changes/unhealthy group (49.4%) was two times higher than in the oral healthy group (21.8%) with $p < 0.05$. The main oral health problems were related to natural teeth and cleanliness. Protein intake of the oral changes/unhealthy group was lower than for the healthy group, about 3g with $p < 0.05$.

Conclusion: The nutritional status among older adult inpatients with oral changes/unhealthy was poorer than for those with oral health. The food texture of the hospital meal should be improved.

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INTRODUCTION

Vietnam is one of the fastest-aging countries in the world. The proportion of the population aged 65 and over increased the fastest (accounting for 7.7%). By 2050, the number of people 60 years and over will more than double from 11.9 million to 29 million people, making up almost one-third of the total population (1). Malnutrition is a concerning problem for this population. In a previous study, the result of malnutrition screening by the Mini Nutritional Assessment - Short Form (MNA-SF) showed that about 70% of older adult inpatients suffer from malnutrition and risk of malnutrition at hospital admission (2). Recently, the Global Leadership Initiative on Malnutrition (GLIM), which is used to assess nutritional status, was established. Many countries have been using this tool to assess nutritional status in their own countries. It is necessary to update the data about nutritional status in Vietnamese older adults by using the GLIM criteria.

Besides malnutrition, oral health problems are also an issue of concern in older adults. There are many risk factors for oral diseases in older adults, for example reduced saliva secretion, side effects of medication, chronic diseases such as diabetes

mellitus, chronic respiratory diseases, cardiovascular diseases and cancer (3). The oral cavity is the first part of the digestive tract, responsible for biting the food, chewing, adding saliva for bolus formation, and transporting it into the stomach. Oral health problems may lead to difficulty in eating and reduced food intake. In addition, poor oral health at hospital admission is a potential higher mortality risk predictor and also can have an increasingly negative impact on general health and quality of life of older adults (4).

Some studies related to oral health status in Vietnam were implemented in the community. A study indicated a high prevalence of tooth loss and a high number of lost teeth among Vietnamese older adults. In detail, the mean tooth loss was 7.6 ± 7.0 teeth. 27.1% of participants had lost 1–3 teeth, 23.6% 4–6 teeth, 27.1% 7–16 teeth and 13.6% >16 teeth (5). A report implemented in Vietnam showed there were 48.4% of older adults who brushed their teeth at least twice a day, 34% had never visited a dentist, and 27.8% often had difficulty chewing food (6). Based on these data, oral health issue on Vietnamese older adults should be a matter of concern.

Nutrition and diet also can affect the development and integrity of the oral cavity and the progression of oral

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diseases. Besides, oral health status on older adults related to modify dietary treatment in hospital. As knowledge of the link between oral and nutrition health increases, dietetics practitioners and oral health care professionals must learn to provide screening, education, and referrals as part of comprehensive patient care. This also includes in International Dietetic and Nutrition Terminology (7).

Consideration of tooth loss alone is not sufficient for proper dietary treatment and a complex tool is necessary to evaluate oral health status. A systematic review showed that in measurement properties of oral health for non-dental healthcare professionals, the Oral Health Assessment Tool (OHAT) is one of the most complete in oral health items and has the best methodological quality in combination with positive quality criteria on measurement properties⁽⁸⁾. In this study, OHAT was used by dietitians to screen and assess oral health status.

We would like to determine whether present nutrition practice in hospitals is appropriate for older adult inpatients with poor oral health. Therefore, the purpose of this study is to compare nutrition status in older adult Vietnamese inpatients with healthy oral and those with changes/unhealthy oral.

Methods

MATERIALS AND METHODS

Setting and Sample

The study was designed as a cross-sectional study and was conducted in 2021. This research was conducted in accordance with the Declaration of Helsinki and approved by the Hanoi Medical University's ethical committee, number 512/GCN-HĐĐNCYSH-ĐHYHN. The study population consisted of older adult inpatients being treated in three large general hospitals in northern Vietnam.

Subjects were recruited for the study from all newly admitted patients, i.e., patients in the first 48-72 hours after admission, by random selection (using a random number table) from admission registers.

The sample size was 344 subjects who met the inclusion criteria: (a) hospitalized older adults aged 65 or over, (b) consuming hospital diets with no need to control nutrients because of disease. The exclusion criteria included: (a) refusal to participate in this study, (b) lack of ability to answer questionnaires. All subjects received written information explaining the purpose of the research and signed consents were obtained in accordance with ethical requirements.

Data collection

All the questionnaires were filled out by investigators. The investigators were dietitians who are responsible staff members in the nutritional department of each hospital. Researchers carried out training for investigators about research data collection. Before implementing the actual study, we conducted a pilot study on 20 patients to revise the instruments and adapt the model for each hospital. Below is the information that we obtained.

Demographic data

Data such as age, gender were collected from medical records.
Nutrition parameters

Anthropometric measurement. If patients could stand, weight and height were measured with a Tanita scale BC-760-WH (Tanita, Tokyo, Japan) and Seca Germany. Weight was collected 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 the circumference of the leg as an indicator to screen nutrition by MNA-SF(9).

Mini nutritional assessment – short form (MNA-SF). Various scales have been used to perform a quick initial nutritional assessment. The 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. 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.

The Global Leadership Initiative on Malnutrition (GLIM). Malnutrition was assessed using the criteria of the GLIM definition, which is based on phenotypic criteria including change in body weight, low BMI, and reduced muscle mass, as well as etiologic criteria including reduced food intake or assimilation, and disease burden. The GLIM definition includes 2 steps. First, a validated nutritional risk screening tool is used to identify individuals at risk of malnutrition; in this study we used the MNA-SF. Second, for people at risk of malnutrition, malnutrition is defined by the detection of at least 1 phenotypic and 1 etiologic criterion⁽¹⁰⁾.

Dietary survey. The hospital diet had been supplied through 7-day cyclic menus. Normal hospital diets were constructed to meet at least the Vietnamese Recommendation Dietary Allowance (RDA) for low activity level. Based on height of the individual, ideal body weight (IBW) was calculated. An individual diet was calculated based on 30-35 kcal/kg IBW for energy, 1-1.2g/kg IBW for protein.

Dietary intake of patients was conducted by the 24-hour dietary record. Patients recorded all food intake including the rate of staple food, main dish and side dish intake from hospital meals and outside snacks in one day at admission. Based on the Vietnamese Food Composition Table 2017, diets of patients were calculated by dietitians.

Eating assistance levels were recorded with 3 levels: independent, partially assisted and fully assisted. The independent level meant that patients were able to eat without any assistance. The partially assisted level meant that patients received partial support from medical staff such as holding a patient's hand to help them guide food to their mouth. The fully assisted level meant that the medical staff fed the patient with complete support.

The Oral Health Assessment Tool (OHAT)

The OHAT is a tool for non-dental healthcare professionals with an eight category screening tool that includes the lips, tongue, gums and tissue, natural teeth, dentures, oral cleanliness and dental pain to assess oral health, including for those with dementia⁽¹¹⁾.

Each item is coded 0, 1 or 2. A score of 0 corresponds to absence of disorder, a score of 1 indicates a noticeable but not

pathological change in the criterion assessed, and a score of 2 indicates pathological features. The total OHAT score ranges from 0 to 16 and can be classified into three categories:

- [0; 3], healthy mouth, to be maintained by usual care.
- [4; 8], changes observed and monitoring required, as there are areas of weakness.
- [9; 16], unhealthy mouth: care needs to be planned and the specialized opinion of a dental surgeon should be recommended.

In this study, the oral change group and the unhealthy group were combined in the tables in the result section.

Dysphagia screening

Eating assessment tool questionnaire (EAT-10). EAT-10, a self-reported validated questionnaire that assesses perception of swallowing difficulty was used to evaluate dysphagia risk. There are 10 simple questions with a total score of 40 points and the cut-off point is 3. If total score ≥ 3 points, it means the patient may have problems swallowing efficiently and safely(12).

The Simplified Nutritional Appetite Questionnaire (SNAQ)

The SNAQ was developed as a self-assessment screening tool with four questions including appetite, how full after eating, food tastes and number of meals per day. SNAQ score <15 indicates significant risk of at least 5% weight loss within six months(13).

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±standard deviation (SD) such as age, BMI, or median (interquartile range) (IQR) such as energy wastage. Comparisons between groups were made using the Chi-square test for categorical variables and Student’s t-test or Mann-Whitney U-test for quantitative variables. P-values of less than 0.05 were consider statistically significant for all the analyses.

RESULTS

Table 1 Relationship between oral health status and some indicators (n=344)

Indicators	Total (n=344)	Oral healthy (n=257)	Oral changes/unhealthy (n=87)	p-value
Age (years), (mean ± SD)	74.7 ± 6.8	74.5 ± 6.9	75.3 ± 6.9	0.95 [†]
Female, n (%)	182 (52.9)	134 (52.1)	48 (55.1)	0.57 [‡]
EAT-10 (>3 scores), n (%)	69 (20.1)	39 (15.2)	30 (34.5)	<0.05 [‡]
SNAQ (<15 scores), n (%)	212 (61.6)	148 (57.6)	64 (73.6)	<0.05 [‡]
BMI(kg/m ²) (mean ± SD)	21.1 ± 3.0	21.4 ± 2.9	20.5 ± 3.0	<0.05 [†]
MNA-SF (scores), (mean ± SD)	9.8 ± 2.6	10.3 ± 2.4	8.7 ± 2.7	<0.05 [†]
Malnutrition (GLIM), n (%)	99 (28.8)	56 (21.8)	43 (49.4)	<0.05 [‡]
Mealtime independence				
Independent, n (%)	306 (89.0)	238 (92.6)	68 (78.2)	
Partial assistance, n (%)	30 (8.7)	16 (6.2)	14 (16.1)	
Total dependence, n (%)	8 (2.3)	3 (1.2)	5 (5.7)	

[†]Unpaired Student’s t-test, [‡]Chi-square test

Table 1 shows the relationship between oral health status and some indicators. We didn’t observe any difference between age and gender between the two groups. The dysphagia and appetite reduction prevalence in the oral changes/unhealthy group were higher than in the healthy group with p<0.05. For nutritional status, BMI and MNA-SF scores the in oral healthy group were higher than for the oral changes/unhealthy group

with p<0.05. The malnutrition rate in the oral healthy group (21.8%) was less than in the oral changes/unhealthy group (49.4%) with p<0.05. The oral healthy group had a mealtime independence rate higher than the oral changes/unhealthy group.

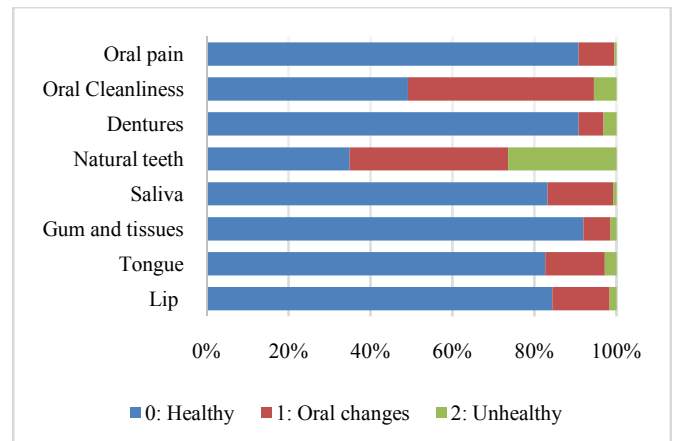


Figure 1 OHAT category scores for older adult inpatients

Figure 1 indicates OHAT category scores for older adult inpatients. The items for lip, tongue, gum and tissues, denture and oral pain had a healthy rate which was higher than 80%. The healthy rate for the natural teeth and oral cleanliness items reached only about 35% and 50%, respectively. This means oral cleanliness and natural teeth problems (decayed or broken teeth/roots) were the most concerning problems in this population.

Table 2 The relationship between oral health status and dietary intake (hospital meals and outside snack)

Dietary intake	Total (n=344)	Oral healthy (n=257)	Oral changes/unhealthy (n=87)	p-value
Energy intake (kcal)	1444 ± 229	1456 ± 227	1410 ± 236	0.10
Protein intake (g)	62 ± 10	63 ± 9	60 ± 10	<0.05
Lipid (g)	36 ± 9	37 ± 9	35 ± 10	0.09
Carbohydrate (g)	218 ± 43	219 ± 44	215 ± 41	0.38

Unpaired Student’s t-test

Table 2 shows the relationship between oral health status and dietary intake (hospital meals and outside snack). In total, the oral healthy group and the oral changes/unhealthy group had the same energy, lipid and carbohydrate intake. Only in protein intake, the oral changes/unhealthy group was lower than the healthy group with p<0.05.

Table 3 Hospital-served meals and wastage

	Total (n=344)	Oral Healthy (n=257)	Oral Changes/unhealthy (n=87)	p-value
Energy serve (kcal) (Mean ± SD)	1736 ± 144	1730 ± 140	1756 ± 155	0.16 [†]
Energy wastage (kcal) (Median (IQR))	402 (227-610)	400 (217-577)	462 (299-633)	<0.05 [‡]
Protein serve (g) (Mean ± SD)	67 ± 4	67 ± 4	67 ± 4	0.12 [†]
Protein wastage (g) (Median (IQR))	5 (0-15)	5 (0-15)	8 (2-20)	<0.05 [‡]

[†]Unpaired Student’s t-test

[‡] Mann-Whitney U-test

Table 3 indicates the hospital-served meals and wastage. There was no difference between the two groups about served energy and protein from the hospital diet but energy and protein wastage in the oral healthy group was less than in the oral changes/unhealthy group.

DISCUSSION

This study investigated the relationship between oral health status and nutritional status in older adult inpatients. This study shows that the oral changes/unhealthy group had poorer nutritional status than the healthy group by BMI, MNA-SF and GLIM. Although energy and macronutrient from hospital-served meals were the same for both groups, we observed a difference in protein intake; in the oral changes/unhealthy group it was lower than in the healthy group, with $p < 0.05$. The energy and the other macronutrient intake in the oral changes/unhealthy group were also a little lower than in the healthy group but there was no significant difference. In Vietnamese hospital food, the sources supplying carbohydrate for patients are usually rice, porridge, noodles. These are quite soft and easy to chew. In addition, meat such as pork, chicken, beef or fish is preferred as a protein source. Boiled, stir-fried, fried are common as the cooking method for the main dish. For patients with chewing difficulties, normal food is cut into small pieces. Special soft food cooking methods have not been developed in hospitals yet. If methods such as freeze-thawing (with/without enzyme infusion), enzyme impregnation, high-pressure technology, pulsed electric fields, and sonication are used, color and flavor can be maintained while adjusting the soft texture to various needs (14). Because of masticatory ability problems, a lack of protein intake for a long time may lead to muscle loss, sarcopenia and frailty (15, 16). A study showed that the prevalence of sarcopenia was quite high with about 55% among Vietnamese older adult outpatients (17). It is necessary to choose suitable cooking methods to improve the texture of hospital food.

The results of the oral health assessment with OHAT show that natural teeth and oral cleanliness problems are the worst items for older adult inpatients. With Vietnamese older adult patients, oral care behavior was still not good and the dentist visit rate was low (6). In the past, the custom of eating betel nuts or dyeing teeth black to clean them may have affected the oral care habits of older adults (18). Besides, various factors affect oral health problems, including diseases. Another study on cancer patients indicates the main oral health problems are tongue and saliva (19). However, the subjects in this study did not have diseases and did not need to adjust nutrients in their diet, so the result is representative for normal older adult inpatients. It is necessary to have more strategies for motivating oral care in older adults specifically and in the community in general in Vietnam (5, 6).

In conclusion, the nutritional status in older adult inpatients with changes/unhealthy oral was poorer than in those with healthy oral. The food texture of hospital meals should be improved.

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