NUTRITIONAL STATUS AND ACTIVITIES OF DAILY LIVING OF VIETNAMESE OLDER ADULTS

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This study aimed to evaluate the nutritional status and activities of daily living of older adults in a Vietnamese nursing home. A cross-sectional study included 100 older pepole aged ≥ 60 years old in a nursing home in Northern Vietnam in 2023. The nutritional status was estimated by the energy intake, protein intake, body mass index, and three scales containing the Mini nutritional assessment – short form (MNA-SF), the simlified Nutritional Appetite Questionnaire (SNAQ), the oral Health assessment tool (OHAT). The activities of daily living (ADL) was assessed by the Katz Index of Independence. The relationship between nutritional status and ADL was assessed in the regresstion model containing three scores of MNA-SF, SNAQ, OHAT, BMI, and the Katz Index of Independence. About 28% the subjects were totally dependent on the others' helps in ADL. The subjects in the age less than 75 group had the significantly higher ADL index, SNAQ score, and BMI than the age ≥ 75 group. The ADL had medium correlation with the energy intake. The nutritional status had correlation to the activities of daily living in older person.

Keywords: Older adults, nutritional status, ADL, SNAQ, OHAT.

I. INTRODUCTION

Population aging is not only a problem in developed countries but also in developing countries like Vietnam. In 2015, about 6,7% of the population (6,31 million pepoles) in Vietnam were 65 years or older. This prevalance was expected to be 18,1% (19,6 million pepoles) in 2049. This would made Vietnam becoming one of the fastest-aging countries in the world.[1] This is a big challenge for the healthcare system, especially in meeting the daily care needs of the elderly.[2]

While traditional family care has been the primary source of support for older adults in Vietnam, changing family dynamics and economic pressures have led to an increased demand for nursing homes and other forms of institutional care.[3] This is a global trend, with many countries experiencing a similar rise in the use of nursing homes for older adults.[4]

Nutrition is an essential aspect of maintaining health and wellbeing in older adults, yet malnutrition remains a common issue among this population in Vietnam.[5] Factors contributing to poor nutrition status include low income, limited access to nutritious food, and social isolation.[6] Malnutrition can have significant negative impacts on physical and cognitive function, as well as overall quality of life.[7]

The activity of daily living are classified into basic activities of daily living (ADLs) and Instrumental Activities of Daily Living (IADLs). Basic ADLs (BADL) or physical ADLs are skills required to manage one's basic physical needs, including personal hygiene or grooming, dressing, toileting, transferring or ambulating,

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Received: 07/04/2024
Accepted: 22/04/2024

and eating. The Instrumental Activities of Daily Living (IADLs) include more complex activities related to the ability to live independently in the community. This would include activities such as managing finances and medications, food preparation, housekeeping, and laundry.[8] Therefore, maintaining the ability to perform activities of daily living (ADLs) is crucial for older adults to sustain their independence and quality of life. A decline in functional ability to perform ADLs is commonly associated with aging and can be affected by different factors, such as chronic health conditions, cognitive impairment, and inadequate nutrition.[9]

The purpose of this study is to investigate the nutritional status and the activity of daily living performance in older residents in a Vietnamese nursing home. By understanding how these two factors are related, healthcare providers can better develop interventions to improve the overall health and wellbeing of this population. This research could become a premise for deeper and broader researches in the community when assessment tools and methods are standardized.

II. SUBJECTS AND METHODS

1. Subjects

One hundred older persons aged ≥ 60 years old in a nursing home in Northen Vietnam were enrolled in a cross-sectional study. All the data was recorded by the questionaires in 2023. Subjects were classified into 2 groups which was based on age group <75 years old (youngest-old) and 75 years old (middle-old and oldest-old). The inclusion criteria: (a) older adults aged 60 or over, (b) oral intake (The subjects could eat on their own and did not need to be fed through intravenous fluids or through a tube). The exclusion criteria included: (a) use tube feeding or parenteral nutrition, (b) lack of ability to answer questionnaires.

2. Methods

Data collection

Data such as age, gender, diagnosed disease and length of nursing home stay were collected from medical records. The investigators interviewed the subjects. The subjects answered the questionnaires on their own. The questionnaires were filled out by the investigators. The investigators were dietitians who were graduated with a Bachelor of Nutrition at Hanoi Medical University. The researchers carried out training for the investigators on research data collection. Before implementing the actual study, we conducted a pilot study on 10 patients to revise the instruments.

Nutritional status

The nutritional status was evaluated by the body mass index (BMI), the Mini Nutritional Assessment – Short Form (MNA-SF), the Simplified Nutritional Appetite Questionnaire (SNAQ), the Oral Health Assessment Tool (OHAT), the dietary survey.

Body mass index (BMI) was calculated using base weight and height. 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 toiletting. Patients removed their shoes and wore only hospital clothes. If the patients could not stand, we used the circumference of the leg as an indicator to screen nutrition by MNA-SF.[10] Furthermore, we also measured knee height to estimate the subjects' height.[11]

Mini nutritional assessment – short form (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 Simplified Nutritional Appetite Questionnaire (SNAQ) containing four questionnaires 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.[12]

The Oral Health Assessment Tool (OHAT) is non-dental healthcare professionals tool 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 those with dementia.[13]

Dietary survey. The nursing home diet was supplied by the chef. There was no dietitian in this nursing home. In this study, the researchers calculated the energy and protein requirement based on 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 kcal/kg IBW for energy, 1g/kg IBW for protein. Dietary intake of patients was conducted by the 24-hour dietary record and calculated based on pictures before and after eating. Based on the Vietnamese Food Composition Table 2017, the patients diet were calculated by the dietitians.[14]

Activities of Daily Living (ADL)

Activities of Daily Living (ADL) was assessed by The Katz Index of Independence. The Katz Index assesses the individual‘s ability to perform activities such as bathing, dressing, using the toilet, transferring, continence, and feeding independently. The Katz Index assigns a score of 0-6, with a score of 6 indicating complete independence and a score of 0 indicating complete dependence on others for all activities. This index is frequently used in hospitals and long-term care facilities to assess patients‘ functional abilities and track changes over time.[15]

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 meanstandard deviation (SD) such as age, BMI. Comparisons between groups were made using the Chi-square test or Fisher exact 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. Because this research exploited information through interviews and observations of research subjects‘ activities, errors from subjective assessments could not be avoided. Therefore, the research team had standardized the assessment tools such as the questionaires by conducting pilot studies. At the same time, the investigators were also trained, standardized and unified in performing the assessment to reduce errors.

3. Statement of Ethics

This research was conducted in accordance with the Declaration of Helsinki and approved by the Hanoi Medical University's ethical committee, number 807/GCN-HĐĐĐNCYSH-ĐHYHN. Accordingly, written informed consent was taken from all participants before any intervention.

III. RESULTS

1. The characteristic of the subjects

Table 1 shows the general information of the subjects. Around 60% of older adults in

the nursing home were over 75 years old, and the proportion of females in the age group ≥75 years old (73.8%) was higher than the age group <75 years old (48.7%) with p=0.01. There was no significant difference in chronic disease prevalence between the two age groups.

Table 1. General information of subjects

Variable	Total (n = 100)	Age<75 (n = 39)	Age75 (n = 61)	*p*-value
Age, years (mean ± SD)	77.5 ± 9.2	68.4 ± 5.1	83.4 ± 5.7	0.00 ð
Female, n (%)	64 (64.0)	19 (48.7)	45 (73.8)	0.01†
Diagnosed chronic disease				
None, n (%)	21 (21.0)	8 (20.5)	13 (21.3)	0.92†
Hypertension, n (%)	51 (51.0)	21 (53.9)	30 (49.2)	0.65†
Diabetes, n (%)	24 (24.0)	12 (30.8)	12 (19.7)	0.21†
Heart disease, n (%)	10 (10.0)	3 (7.7)	7 (11.5)	0.40#
Cerebro-vascular disease, n (%)	29 (29.0)	12 (30.8)	17 (27.9)	0.76†
BMI (kg/m^2) (mean ± SD)	20.1 ± 3.2	21.0 ± 3.4	19.5 ± 2.9	0.02ð
MNA-SF score (mean ± SD)	8.3 ± 2.6	8.7 ± 2.6	8.0 ± 2.6	0.18 ð
0-7: Malnutrition, n (%)	37 (37.0)	12 (30.8)	25 (41.0)	0.48†
8-11: Risk of malnutrition, n (%)	49 (49.0)	20 (51.3)	29 (47.5)	
12-14: Normal nutrition status, n (%)	14 (14.0)	7 (18.0)	7 (11.5)	
ADL (mean ± SD)	3.1 ± 2.6	3.8 ± 2.6	2.6 ± 2.5	0.02 ð
SNAQ (mean ± SD)	10.7 ± 1.6	11.2 ± 1.7	10.4 ± 1.6	0.02 ð
OHAT score (mean ± SD)	2.8 ± 2.6	2.4 ± 2.3	3.0 ± 2.7	0.22 ð
0-3: healthy, n (%)	65 (65.0)	27 (69.2)	38 (62.3)	0.46#
4-8: changes, n (%)	32 (32.0)	12 (30.8)	20 (32.8)	
9-16: unhealthy, n (%)	3 (3.0)	0 (0.0)	3 (4.9)	
Years of nursing home stay (mean ± SD)	2.52 ± 1.93	2.39 ± 1.82	2.60 ± 2.01	0.79§

† Chi-square test, # Fisher exact test, ð Student's *t*-test and § Mann-Whitney *U*-test were used to compare age group < 75 and 75 years old.

2. The nutritional status

The BMI of the age group ≥ 75 years old (19.5 ± 2.9 kg/m2) was lower than the age group < 75 years old (21.0 ± 3.4 kg/m2) with p < 0.05. However, there was no clear difference observed between the two groups according to the MNA-SF. The age group < 75 years old (3.8

± 2.6) was more independent in ADL than the age group ≥75 years old (2.6 ± 2.5) with p < 0.05. The appetite of the age group ≥ 75 years old was worse than the age group < 75 years old with an SNAQ score of 10.4 ± 1.6 and 11.2 ± 1.7, respectively (p < 0.05). No difference in oral health (OHAT) was observed between the two groups, and there was no difference in the length of nursing home stay (Table 1).

Table 2 indicates the energy and protein requirements, supply, and intake of the < 75 years old group and ≥ 75 years old group. In general, the energy and protein requirements, supply, and intake of the < 75 years old group were higher than those of the ≥ 75 years old group. The energy intake of both groups was lower than the energy supply and requirement. However, the protein intake of both groups met the requirement.

Table 2. Energy, protein requirement, supply and intake.

		Total (n = 100)	Age < 75 (n = 39)	Age75 (n = 61)	*p*-value
Energy	Requirement	1465 ± 290	1611 ± 293	1372 ± 247	0.00 ð
	Supply	1324 ± 237	1372 ± 194	1293 ± 258	0.04§
	Intake	1212 ± 266	1297 ± 254	1157 ± 261	0.01 ð
Protein	Requirement	48.8 ± 9.7	53.7 ± 9.8	45.7 ± 8.2	0.00 ð
	Supply	54.5 ± 11.6	56.9 ± 10.0	53.0 ± 12.4	0.04§
	Intake	48.8 ±13.0	53.0 ±12.6	46.2 ±12.7	0.00§

ð Student's *t*-test and

§ Mann-Whitney *U*-test was used to compare age group <75 and 75 years old.

3. The activities of daily living

Figure 1 shows the distribution (%) of subjects based on the ADL score. The study found that 28% of the subjects were dependent on others, while 37% were independent. The dependency ratio for four to five activities was 9% and 13%, respectively. The dependent rates for the remaining three, two, and one activity (ADL score = 3, 4, 5, respectively) were approximately equal.

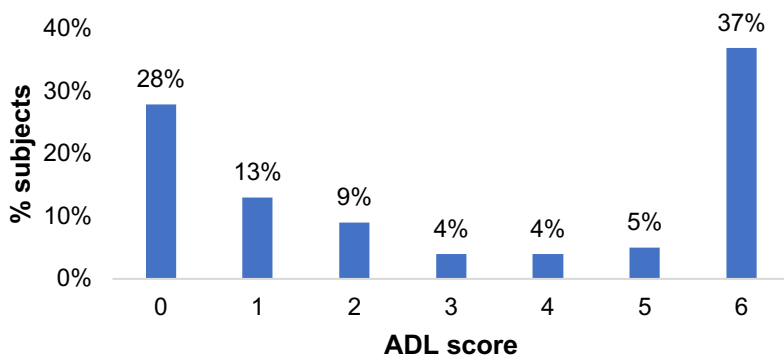

Figure 1. Distribution (%) of subjects according to the ADL score

Note: This figure showed the distribution of the subjects to the ADL score. Activities of Daily Living (ADL) was assessed by The Katz Index of Independence. The Katz Index assigns a score of 0-6, with a score of 6 indicating complete independence and a score of 0 indicating complete dependence on others for all activities.

Table 3 shows the percentage of independent ADLs. For bathing, dressing, and toileting, the age group <75 years old was more independent than the age group ≥75 years old. We did not observe a difference between the two groups in transferring, continence, and feeding.

Table 3. Independent percentage of ADL

Activity (%)	Total (n = 100)	Age < 75 (n = 39)	Age ≥ 75 (n = 61)	*p*-value
Bathing	41 (41.0)	22 (56.4)	19 (31.2)	0.01
Dressing	46 (46.0)	25 (64.1)	21 (34.4)	0.00
Toileting	44 (44.0)	23 (59.0)	21 (34.4)	0.02
Transferring	47 (47.0)	23 (59.0)	24 (39.3)	0.06
Continence	63 (63.0)	28 (71.8)	35 (57.4)	0.15
Feeding	65 (65.0)	28 (71.8)	37 (60.7)	0.26

Chi-square test was used to compare age group <75 and 75 years old.

The relationship between the nutritional status and the activities of daily living

Energy intake and ADL score had a positive correlation with p <0.001. (Figure 2)

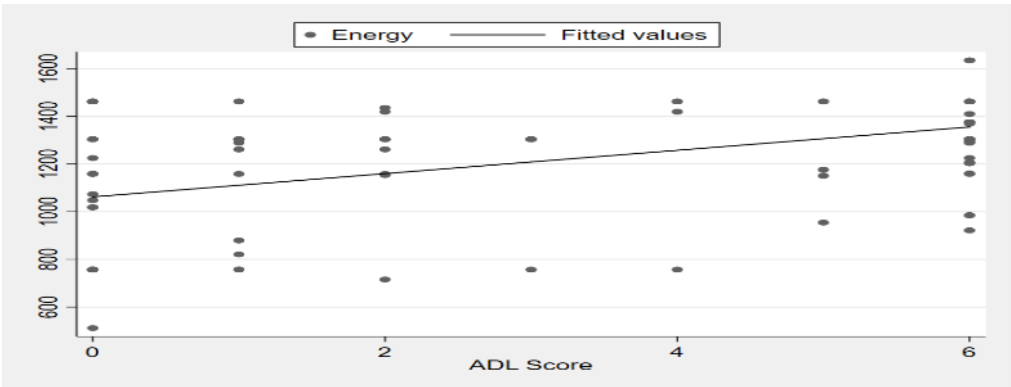

Figure 2. Correlation between energy intake and ADL score
(r= 0.4670, p= 0.000)

Table 4 shows the model of estimation with the ADL as an dependent variables. The age, BMI, OHAT, and SNAQ had significant impact on the ADL (*R=0,68; p<0.001*).

Table 4. The result of model estimation with the Activities of Daily Life score as the dependent variable

effect	Coefficient	Standard error	df	t value	Pr>ltl
	-2.753749	2.929445	4		
Age	-.0506308	.0225407	95	-2.25	0.027
OHAT	-.1857424	.0888923	95	-2.09	0.039
SNAQ	.5137835	.1443652	95	3.56	0.001
BMI	.2372222	.0663075	95	3.58	0.001

R = 0,68

ADL= -2,753749-0,506308*Age – 1,857424*OHAT+ 0,5137835*SNAQ + 0,237222*BMI

IV. DISCUSSION

This study reported on the nutritional status and ADL and significant health differences between older adults aged ≥75 and <75. The proportion of females in the ≥75 years old group was higher than the <75 years old group. Research has consistently shown that women usually live longer than men, and this happens in many countries due to different reasons such as biology, behaviour, and social factors. A study found that the gap in life expectancy between men and women tends to get bigger as they aged and is seen in almost every country in the world.[16] This disparity in life expectancy is thought to arise from hormonal and immune function differences, as well as lifestyle factors such as smoking and drinking, and societal norms related to caregiving and health-seeking behaviours.

In addition, the finding that the ≥75 years old group has a lower BMI than the <75 years old group has also been observed in several studies. For example, a study found that BMI tends to decline with age.[17] This decline in BMI may be due to changes in body composition, including loss of muscle mass and increased fat mass.

Furthermore, the study revealed that the ≥75 years old group had a lower independence rate in ADL compared to the <75 years old group, particularly in personal hygiene such as bathing, dressing, and toileting. This finding is consistent with previous studies that showed a decline in functional ability with aging.[18,19] Additionally, the study found that the ≥75 years old group had worse appetite compared to the <75 years old group, as assessed by the SNAQ questionnaire. This result may be attributed to the decreased sense of taste and smell, as well as various medical conditions that can affect appetite in older adults.[20]

Regarding dietary intake, both groups consumed enough protein. However, the lack of energy intake reported by the participants suggests that they may not be meeting their energy needs, which could lead to malnutrition and functional decline.[21] Vietnam has undergone a significant nutrition transition in recent decades, with many people moving away from traditional diets towards a more globalized diet that includes more meat and processed foods and less whole grains, fruits, and vegetables.[22] Therefore, healthcare professionals should be

aware of these dietary patterns and provide appropriate recommendations to ensure that older adults meet their nutritional needs.

This study had limitations. First of all, the sample size of the study is small. In addition, due to limitations in the research conditions, we had to use BMI to reflect the nutritional status. BMI might not entirely reflect the nutritional status of older people because this index is only based on weight and height. Meanwhile, many nutritional factors are not reflected through this index but have a lot of influence on older people, such as trace elements, vitamins, and inflammatory factors which might affect the metabolism and general health. . More profound nutritional interventions, as well as more detailed assessment tools to cover additional factors, will contribute to the improvement of the nutritional status and the quality of life for older people.

IV. CONCLUSION

The nutritional status, including age, BMI, energy intake, and three scores of MNA-SF, SNAQ, and OHAT, significantly impacted the activities of older persons in daily living. Further research needs to improve the nutritional assessment model on these factors, understand the mechanisms, and develop effective interventions for healthy aging.

Acknowledgements

The authors would like to thank all the participants for their cooperation and the dietitians who provide assistance in the collection of data in Vietnam.

Conflict of Interest Statement

All the authors have no conflicts of interest to declare.

Funding Sources

This study was not supported by any sponsor or funder.

Data Availability Statement

All data generated or analyzed during this study are included in this article. Further enquiries can be directed to the corresponding author.

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