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ORIGINAL RESEARCH

Assessment of nutritional status in older diabetic outpatients and related factors in Hanoi, Vietnam

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Purpose: Nutritional status is an important element for the wellness among older diabetic outpatients. This study aimed to assess the nutritional status of the older diabetic outpatient by using the Mini-Nutrition Assessment Short Form (MNA-SF) tool, and describe the relationship among related factors in older diabetic outpatients in the National Geriatric Hospital, Hanoi, Vietnam.

Patients and methods: A cross-sectional study was conducted from June to September 2015 in the National Geriatric Hospital. A total of 158 diabetic patients aged ≥60 years at the Outpatient Department were included in this study. Patients were interviewed face-to-face to evaluate their nutritional status by using the MNA-SF. Socio-demographic, diabetic treatment information, frailty, exhaustion, cognitive function, hand grip strength and 4 m walk test were collected. Multivariate regression was used to determine factors associated with nutritional status.

Results: The mean age was 69.52 (SD=6.758) with 31% patients malnourished and at risk of malnutrition. A significant association was found between the nutritional status and exhaustion, cognitive impairment, and frailty. In multiple logistic regression, the study found that risk of malnutrition was associated with frailty (OR=8.45; 95%CI=1.91–37.39) and cognitive impairment (OR=2.21; 95%CI=1.01–4.84).

Conclusion: The results suggest that frailty was significantly associated with risk of malnutrition in older diabetic outpatients. Thus, early screening by nutritional assessment, and other interventions might improve the nutritional status of older outpatients with diabetes to prevent this complication and its effects.

Keywords: elderly, nutritional status, outpatients, Vietnam

Introduction

According to the WHO, the number of people aged 60 or older is predicted to nearly double from 11% to 22% between 2000 and 2050.[1] Vietnam will enter the "aged phase" in the next 20 years, and the aging index that is defined as "the number of persons 60 years old or over per hundred persons under age 15 (or children)" is projected to rise from 35.5 in 2009 to more than 100 in 2032.[2,3] The aging population in developing countries such as Vietnam increases demands on the health care system and social services due to the reduced number of workers and increased retirees. There are multiple problems relating to the health condition of older people including functional ability, mental health, health-related quality of life and nutritional status in which malnutrition in old people is rather common and often leads to serious consequences.[4] The double burden of malnutrition in ASEAN countries ranges

from 5.0% in Vietnam to 30.6% in Indonesia at the household level.[5] Undernutrition is caused by some of the following factors: polypharmacy, insufficient access to food, food choices, inadequate food intake, and comorbidity that restrict the nutrient absorption, the nutrient loss or a combinination of these factors.[6,7] Furthermore, nutritional inadequacy in older adults is highly associated with risks of reduced functional status, reduced cognitive function, and increased mortality.[7]

Additionally, functional ability and socio-economic status are major factors related to nutritional status.[8] The cost of medical services and other living expenses indirectly affect the cost of daily nutrition in diabetic elderly people. In developing countries, the considerable poverty prevalence could severely impact the nutritional status of the older people. However, there has not been any published study assessing nutritional status in the elderly in Vietnam.[9] The identification of malnutrition-associated factors among older diabetic outpatients is a first step to appreciate the scale and measure the health issue in Vietnam in order to develop appropriate prevention programs.

Therefore, the assessment of poor nutritional status among older people is critical. There are many screening tools that have been validated for conducting assessments of older people.[10] The Mini Nutrition Assessment (MNA) is used widely.[11,12] The MNA has an accuracy of 92% compared with a clinical evaluation by two specialist physicians in nutrition.[12] Thus, the study was conducted to assess the nutritional status of older diabetic outpatients by using the Mini Nutrition Assessment Short Form (MNA-SF) tool[13] and assessing the relationship among factors related to nutritional status among older diabetic outpatients in the National Geriatric Hospital.

Materials and methods

Study design and participants

A cross-sectional study was conducted from June to September of 2015 in the National Geriatric Hospital. Convenience sampling was adopted to recruit participants. Inclusion criteria were: 1) patient aged 60 and older in the outpatient diabetes management program; (2) agreeing to participate in the study; and 3) being able to communicate verbally. Among 183 patients initially recruited, 16 people declined to participate because they had a short time at the hospital and they felt uncomfortable and nine people were excluded due to missing information. Finally, a total of 158 older diabetic outpatients were included.

The Institutional Review Board of National Geriatric Hospital approved this study design and protocol. All participants were asked to give their written informed consents and in accordance with the Declaration of Helsinkibefore joining in this research. All data were secured and only the principal investigator had access in order to keep the patients' confidentiality.

Variables and assessment

Nutritional status was assessed using the Mini Nutritional Assessment-Short Form (MNA-SF).[13] There are six items about weight loss, food intake, neuropsychological problems, psychological stress or acute disease, mobility and Body Mass Index (BMI). The total score ranges from 0 to 14. Patient results were divided into three groups: malnourished (0–7 points), at risk of malnutrition (8–11 points) and normal nutritional status (12–14 points).[12] Height (cm) and weight (kg) were measured, and BMI was calculated.[14] The MNA-SF was translated into Vietnamese by a medical doctor then translated back to English by another doctor. After this step, the final version of MNA-SF in Vietnamese was used for interviewing in a pilot study with 10 patients. The questionnaire was delivered verbally to these patients.

Frailty syndrome was assessed using the Fried Frail Criteria[15] including five items: weight loss, low physical activity, exhaustion, slowness, and weakness. Participants were assigned to three groups: frail (≥3 characteristics), pre-frail (1–2 characteristics), and robust (none of the characteristics). Weight loss was defined as unintentional loss of 4.5 kg or more over the last year. Low physical activity was defined as needing assistance with these activities: walking for 1 km, doing housework, and walking up and down stairs to the second floor. Exhaustion was based on self-reported "tired all the time". Slowness was identified using the "4 m walk test": participants who spent more than 5 seconds to walk 4 m at their usual pace were classified as slow. Weakness was identified by grip strength (Jamar 5030J1 hydraulic dynamometer (Sammons Preston, Bolingbrook, IL, USA) in the lowest 20% at baseline, adjusted for gender and BMI.[16]

We used the simplified "Mini Cog"[17] to assess cognitive status and this simple test was validated and in use at the National Geriatric Hospital, Vietnam. Participants were asked to draw a clock which indicated a time of "ten after eleven". Making a minor spacing error or other errors was classified as impaired cognition.

Information of several potential associated factors was also obtained through questionnaires, including demographic factors (age, gender, educational level, living situation and frequency of hospital admission in the past 12 months), frailty syndrome, having stress, cognitive function, poly-pharmacy (using more than 5 drugs), duration of diagnosed with diabetes, and treatment therapy.

Statistical analysis

All computational analysis was carried out using SPSS version 21.0 (IBM Incorporation, Armonk, NY, USA). Frequency distribution table was constructed for qualitative variables; mean, variance; maximum value and minimum value were used for quantitative variables. Univariate and multivariate logistic regression were used to correlate nutritional status and other factors. The test was considered statistically significant if the resulting *P*-value was less than <0.05.

Results

Table 1 shows the socio-demographic characteristic of the participants. Mean age was 69.52 (SD=6.758). The proportion of female participants was 62% (n=98). The majority of the participants (93%) were living in the city or province. Most (77.9%) of the participants had been diagnosed with diabetes for more than 5 years, and 48.1%

Table 1 Characteristics of participants (n=158)

Characteristics	Normal nutrition status (n=109) (69%)		Malnourished & risk of malnutrition (n=49) (31%)		Total		*P*-value
	n	%	n	%	n	%	
Age					Mean 69.52	SD 6.758	
Gender							
Male	47	43.1	13	26.5	60	38.0	**0.047**
Female	62	56.9	36	73.5	98	62.0	
Age group							
60–69	60	56.6	24	46.2	84	53.2	0.267
70–79	39	36.8	22	42.3	61	38.6	
≥80	7	6.6	6	11.5	13	8.2	
Living situation							
City/province	103	94.5	44	89.8	147	93.0	0.283
Countryside	6	5.5	5	10.2	11	7.0	
Education							
Below high school	11	10.1	10	20.4	21	13.3	0.077
High school and higher	99	89.9	39	79.6	137	86.7	
Body mass index (BMI)							
Underweight	0	0.0	5	10.2	5	3.2	
Normal	31	28.4	29	59.2	60	38.0	**<0.001**
Overweight	78	71.6	15	30.6	93	58.8	
>3 hospitalization	2	1.8	3	6.1	5	3.2	0.154
Duration of diagnosed with diabetes							
=<5 years	20	18.3	15	30.6	35	22.1	0.086
>5 years	89	81.6	34	68.4	123	77.9	
Insulin treatment							
Yes	57	52.3	19	38.8	76	48.1	0.116
No	52	47.7	30	61.2	82	51.9	

Notes: Bold data indicate prevalence of malnourished and risk of malnutrition in females in comparision to males. Patients with overweight body mass index was higher than underweight when comparing proportion of malnourished and risk of malnutrition.

Table 2 Related factors to nutritional status in elderly patients (n=158)

Items	Normal nutrition status (n=109)		Malnourished & risk of malnutrition (n=49)		Total		*P*-value
	n	%	n	%	n	%	
Exhaustion							
Normal	95	89.6	36	69.2	131	82.9	**<0.01**
Exhausted	11	10.4	16	30.8	27	17.1	
Cognitive impairment							
No	79	72.5	23	46.9	102	64.6	**0.002**
Yes	30	27.5	26	53.1	56	35.4	
Frail							
No	106	97.2	39	79.6	145	91.8	**<0.001**
Yes	3	2.8	10	20.4	13	8.2	
Polypharmacy							
No	59	54.1	32	65.3	91	57.6	0.189
Yes	50	45.9	17	34.7	67	42.4	
Having stress							
No	83	75.2	32	65.3	114	72.2	0.198
Yes	27	24.8	17	34.7	44	27.8	

Notes: Bold data indicate higher risk of exhaustion, cognitive impairment and frailty than normal nutrition status group.

patients had been treated with insulin. A total of 49 participants had scores of 11 points or less in the MNA-SF screening, 26.5% were male and 73.5% were female. There was a statistically significant difference between nutritional status by body mass index and gender.

The majority of participants suffering from malnourishment and at risk of malnutrition (53.1%) had cognitive impairment. Significant differences in exhaustion, cognitive impairment, and frailty were found between normal nutritional status and malnourished or at risk of malnutrition status (Table 2).

Table 3 shows the results of univariate logistic regression. Gender, cognitive impairment, and frailty were associated with risk of malnutrition.

Table 4 presents factors associated with the risk of malnutrition. In multivariable logistic regression, the study found that risk of malnutrition was associated with frailty (OR=8.45; 95%CI=1.91–37.39) and cognitive impairment (OR=2.21; 95%CI=1.01–4.84)

Discussion

This study aimed to assess the nutritional status of older diabetic outpatients by using MNA-SF tools and identify any association among related factors including age, gender, stress, hospitalization more than 3 times, frailty, living

Table 3 Univariable logistic regression between the risk of malnutrition and characteristic of the participant (n=158)

		OR	*P*-value	95% CI
Gender	Male	1	**0.049**	—
	Female	**2.1**		**1.003–4.39**
Age group	60–69	1		—
	70–79	1.48	0.285	0.72–3.03
	≥80	2.42	0.148	0.73–7.97
Low education	No	1	0.083	—
	Yes	0.48		0.17–1.11
Living situation	City/province	1		—
	Countryside	1.95	0.290	0.57–6.73
>3 Hospital admission	No	1		—
	Yes	3.49	0.179	0.56–21.58
Having stress	No	1		—
	Yes	1.61	0.200	0.78–3.35
Polypharmacy	No	1		—
	Yes	0.63	0.190	0.31–1.26
Cognitive impairment	No	1		—
	Yes	**2.98**	**0.002**	**1.48–6.00**
Frailty	No	1		—
	Yes	**9.06**	**0.001**	**2.37–34.65**

Notes: Bold data indicate higher risk of malnutrition than male and non-groups.

Table 4 Multivariable logistic regression between the risk of malnutrition and characteristics of the participant s (n=158)

		OR	95% CI
Gender	Male	ref	—
	Female	1.26	0.63–3.36
Age group	60–69	ref	—
	70–79	1.02	0.45–2.28
	≥80	0.82	0.19–3.66
Low education	No	ref	—
	Yes	0.59	0.21–1.70
>3 Hospitalization	No	ref	—
	Yes	2.26	0.25–20.16
Having stress	No	ref	—
	Yes	1.36	0.59–3.13
Polypharmacy	No	ref	—
	Yes	0.50	0.23–1.12
Cognitive impairment	No	ref	—
	Yes	**2.21***	**1.01–4.84**
Frailty	No	ref	—
	Yes	**8.45***	**1.91–37.39**

Notes: *$P<0.05$. Bold data indicate higher risk of malnutrition than non-groups.

in rural areas, poor education, polypharmacy, and cognitive impairment. There was also a strong association between risk of malnutrition and frailty.

This study found that 31.0% of the participants were malnourished and at risk of malnutrition according to the MNA-SF scoring. Agarwalla et al[18] showed that 70% of the older people were malnourished and at risk of malnutrition in Kamrup district, Assam, India. The difference can be explained that the majority of the participants in our study (93%) came from urban areas whereas most of the study population in the Indian study came from rural areas[18] the living conditions in urban areas were likely to be generally better than those in rural areas, consequently leading to a better nutrition situation. In our study, the prevalence of malnourished and at risk was more common in females than males, consistent with the finding of a study previously done by Shivraj et al.[19] The numbers suggest that there is an emerging health issue when Vietnam enters an aging population, and the nutritional condition in older people should be managed and prevented.

Diabetic condition in the elderly increases the risk of hospitalization, nursing home admissions, physical disability, and substantially suboptimal nutrition.[20,21] Similar to other studies,[22,23,24] malnutrition was adversely associated with cognitive impairment.[25] A Swedish study found possible malnutrition in older people being associated with mild cognitive impairment.[26] According to results from Vellas et al[27] undernourishment was associated with the severity of Alzheimer's disease and predicted disease progression. Frailty was associated with the risk of malnutrition in the present study. This finding was in line with a Vietnamese study[9] showing that poor nutritional status was found to be associated with frailty defined by either REFS or Fried phenotype in older patients in Vietnam. People with poor grip strength might encounter difficulties with meal preparation thus they were in a possible malnutrition group.

In developing countries, there is a lack of health services that focus on the well-being of the elderly regarding functional capacity and nutritional status.[8,28,29] It is difficult for older people to prepare meals and cook due to frailty and low financial status. Additionally, many participants might have a lack of knowledge of proper nutrition, especially diet for diabetes disease. Out-patients may have difficulties in seeking regular advice or recommendations for healthy meals from health professionals or nutritionists. Nutritional status assessment could provide a window of opportunity to prevent malnutrition in this population and other geriatric syndromes such as falls, frailty, or low physical activity.

The findings of this study should be viewed in light of several limitations. First, the cross-sectional design limits the ability to reach any conclusion regarding causal associations between factors. Second, the sample size was relatively small and was recruited by a convenience sampling scheme, thus cannot be said to be representative of the population of Vietnam. Third, the study was only conducted with diabetic outpatients. Moreover, this study lacks consideration of other related factors that may have affected the nutritional status assessment such as the use of dietary supplements, smoking, and alcohol consumption. This calls out for more researches in the future which address the sample size issue and nutritional assessment in other populations.

Conclusion

This study underlines the association between nutritional status and related factors in older diabetic outpatients. Nearly one third of the population studied was malnourished and at risk of malutrition. This number is high thus it is important for health care providers to focus on managing the diet of diabetic patients. The results suggest that frailty and cognitive impairment were significantly associated with risk of malnutrition. Early screening, assessment and intervention can improve the nutritional status of elderly diabetics. These findings also support the need for further studies on the assessment of the

nutrition status in old people in rural areas of Vietnam and in non-diabetic Vietnamese people.

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Disclosure

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