

RELATIONSHIPS BETWEEN NUTRITIONAL STATUS AND QUALITY OF LIFE AMONG DIABETIC PATIENTS AT THE GENERAL HOSPITAL OF VINH CITY

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ABSTRACT

Aims: This study aimed to determine the nutritional status and quality of life among diabetic patients and assess the relationships between the two aspects.

Methods: A cross-sectional study was conducted on 151 diabetic patients aged 40 years and older, who were being treated at the General Hospital of Vinh City from February to September 2024. Nutrition status was assessed using the body mass index (BMI), waist-hip ratio (WHR), and the Subjective Global Assessment (SGA) tool. Quality of life was assessed by EQ-5D-5L.

Results: The rate of overweight/obesity was relatively high among the study population (45.03%). A large majority (80.13%) of the participants were well-nourished according to SGA. Both male and female diabetic patients had a waist-hip ratio higher than the recommended level at a very high rate (male: 75% and female: 95.18%). Mobility and pain/discomfort were the 2 dimensions in which most patients had to deal with. Median EQ-5D-5L and EQ-VAS scores were respectively 0.7787 and 60. SGA and BMI categories were negatively associated with participants' quality of life.

Conclusion: Nutritional status is associated with quality of life among diabetic patients. Therefore, it is necessary to take great action to improve nutritional care for patients with the disease.

Keywords: *nutritional status, quality of life, diabetes*

I. INTRODUCTION

Chronic diseases such as diabetes, hypertension, cardiovascular diseases, etc, are highly associated with aging people and impact their quality of life (QoL). As life expectancy has improved globally [1], it is important to determine and manage factors related to those patients' QoL to increase the prevalence of healthy aging.

According to the International Diabetes Federation, approximately 537 million people in the world and 3.99 million people in Vietnam aged 20-79 are

currently living with diabetes (2021) [2]. Middle-aged and elderly are the age group with the highest rate of the diseases [3]. Diabetes is also determined as a burden throughout the lifetime of the patients because it is the cause of cardiovascular disease, malnutrition, diabetic neuropathy, nephropathy, retinopathy, etc. Therefore, assessing QoL and associated factors plays an important role in the process of diabetic patient care.

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Along with age, years of disease evolution, drug regimen, glycaemic control, and many other factors, patients' nutritional status can affect their QoL, due to the impact on the progression of disease complications and other comorbidities. A large number of diabetic patients are overweight - obese, or facing the risk of malnutrition [4]. It may expand morbidity and a greater number and

duration of hospital admissions, all of which may cause a low QoL. Despite that, there was not much research before evaluating the relationship between nutritional status and diabetic patients' QoL. Thus, we conducted this study in order to assess the relationship on patients with diabetes at the General Hospital of Vinh City in 2024.

II. METHODS

2.1. Study design and subjects

A cross-sectional study was conducted from February to September 2024 in the Department of Cardiovascular & Endocrinology in the General Hospital of Vinh City. All inpatients in the General Hospital of Vinh City were invited to assess their eligibility against the selection criteria. *Selection criteria:* Being diagnosed with diabetes, and having sufficient physical and mental capacity to understand and answer the interview questions. *Exclusion criteria:* Being incapable of communicating

(mute/deaf, etc.), having mental illness/disorders, being pregnant, being at the acute phase of the disease (COPD, gout, acute infection, etc.), or refusing to participate in the study. At the end of the sample size selection, 151 participants agreed to take part in the research. Patients diagnosed with diabetes, aged 40 years and older, are currently being treated at the Department of Cardiovascular and Endocrinology in the General Hospital of Vinh City during the study duration.

2.2. Data collection

A questionnaire was used for the data collection with 4 sections: general information, anthropometric indices, nutritional assessment, and QoL assessment. Tanita weight scale and height rod were used to collect

participants' anthropometric indices, following the National Institute of Nutrition's standard procedure [5]. Both interview and anthropometric measurements were conducted by clinical nutritionists in the hospital.

Classifications

The International Diabetes Federation and Western Pacific Region's standard was applied to classify participants' BMI: Underweight (<18.5), Normal (18.5 - 22.9), Overweight (23 - 24.9), Obese (≥ 25) and WHO's standard for waist-hip ratio (WHR): Male (≥ 0.90), Female (≥ 0.85) [6, 7].

Considering patients who have limitations on mobility, we determined height and weight by the formula for

calculating body height according to knee height and BMI according to mid-upper arm circumference (MUAC) [8, 9]:

$$\begin{aligned} \text{Height: Male: } & 2.12 \times \text{knee height (cm)} \\ & + 59.06 \quad - \quad \text{Female: } 2.09 \times \text{knee} \\ & \text{height (cm)} + 57.37 \end{aligned}$$

$$\text{BMI} = 0.873 \times \text{MUAC (cm)} - 0.042$$

$$\text{Weight (kg)} = \text{BMI} \times \text{Height}^2 \text{ (m)}$$

The nutrition assessment tool is the Subjective Global Assessment (SGA). Participants will be categorized into 3

groups: Well-nourished (SGA-A), mild-moderately malnourished (SGA-B), severely malnourished (SGA-C) [10].

QoL assessment tool is EQ-5D-5L which comprises 5 dimensions: mobility, self-care, usual activities,

pain/discomfort, and anxiety/depression. Each dimension has 5 levels: no problems, slight problems, moderate problems, severe problems, and extreme problems [11].

2.3. Statistical analysis

The data was entered into the Google Form Application and processed using Stata 16.0. Descriptive statistics are performed by mean value, standard deviation for quantitative variables and proportion, and percentage for qualitative variables.

Regression was performed to determine the associations between participants' EQ-5D-5L, EQ-VAS score, and nutritional status. Kruskal-Wallis test was used to assess the differences between participants' QoL and BMI, SGA classification, and WHR.

III. RESULTS

One hundred and fifty-one patients with an average age of 69.51 were enrolled in our study. Approximately 73% of the participants were over 65 years old. The proportion of men and women

participating in the study was 54.97% and 45.03%, respectively. Up to 70% of the patients have been diagnosed with diabetes for 5 years or more.

3.1. Participants' nutritional status

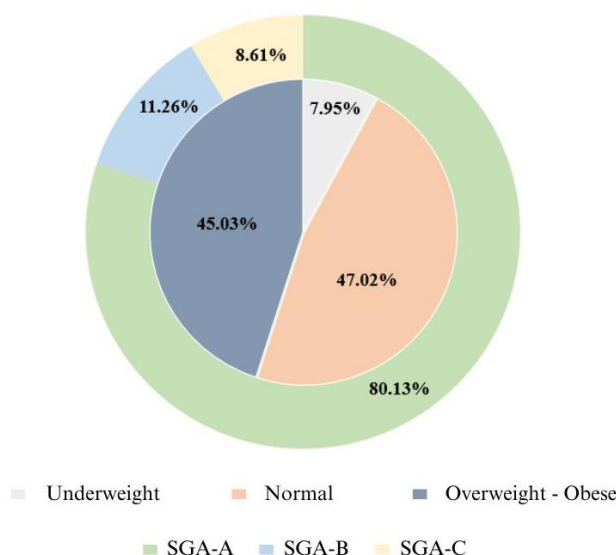


Figure 1. Nutritional status according to BMI and SGA classification (n=151)

Although a large number of patients (47.02%) were in the normal range of BMI, 45.03% of the patients reported overweight/obese. According to the SGA classification, a large majority of diabetic

patients were well-nourished. In Table 1, seventy-five percent of male participants had a WHR higher than WHO's recommendation. The rate was even higher for females (95%).

Table 1. Nutritional status according to WHR categories (n=151)

	Frequency (n)	Percentage (%)
Male		
≥ 0.90	51	75.00
< 0.90	17	25.00
Female		
≥ 0.85	79	95.18
< 0.85	4	4.82

3.2. Participants' nutritional status

Table 2. Percentage of respondents for levels 1–5 by dimension (n=151).

Level	Mobility	Self-care	Usual activities	Pain/discomfort	Anxiety/depression
1	55 (36.42)	108 (71.52)	80 (52.98)	40 (26.49)	107 (70.86)
2	27 (17.88)	16 (10.60)	21 (13.91)	46 (30.46)	15 (9.93)
3	25 (16.56)	3 (1.99)	17 (11.26)	36 (23.84)	12 (7.95)
4	35 (23.18)	18 (11.92)	16 (10.60)	18 (11.92)	15 (9.93)
5	9 (5.96)	6 (3.97)	17 (11.26)	11 (7.28)	2 (1.32)
Total (%)	63.58	28.48	47.03	73.51	29.14

Level 1: no problem. Data are shown in n (%).

The median EQ-5D-5L index was 0.7787 (IQR=0.4481) while the median EQ-VAS score was 60 (IQR=25). Table 2 shows that the two dimensions with the highest proportion of patients “having problems” were mobility and pain/discomfort. In usual activities, 17 patients, accounting

for 11.26%, experienced extreme problems. The percentages of “no problems” differed for each dimension, and reached the highest at 71.52% for self-care and 70.86% for anxiety/depression.

3.3. The relationship between nutritional status and quality of life among study participants

Multivariate multiple linear regression model

As shown in Table 3, the stepwise method produced the 2 following multivariate linear regression models for EQ-5D-5L and EQ-VAS scores with adjusted R^2 of 0.1795 and 0.1824, respectively. Factors associated with the

EQ-5D-5L index among the participants were SGA classification and WHR. According to EQ-VAS scores, related factors were SGA classification and patients' BMI. All the factors were negatively correlated.

Table 3. Coefficients of two multiple linear regression models (n=151).

Model	Regression coefficient	95% confidence interval		p
EQ-5D-5L				
(Constant)	1.916242	1.263995	2.568489	<0.001
SGA	-0.2471962	-0.3265657	-0.1678267	<0.001
WHR	-1.003546	-1,663318	-0.3437741	0.003
EQ-VAS				
(Constant)	151.9388	120.1545	183.723	<0.001
BMI	-3.280958	-4.471538	-2.090378	<0.001
SGA	-14.77001	-20.64425	-8.895772	<0.001

Correlations of QoL scores between subgroups

Table 4. Differences between the EQ-5D-5L index of the participants in each subgroup (n=151).

Nutritional status	Median (IQR)	Mean rank	p
SGA classification			
Well-nourished	0.8005 (0.2859)	83.46	<0.001*
Mild/moderate malnourished	0.5368 (0.7731)	54.35	
Severe malnourished	0.2031 (0,4740)	34.84	
WHR classification			
Above the recommendation	0.7787 (0.3793)	77.08	0.435*
Normal	0.7665 (0.6235)	68.90	

* *Kruskal-Wallis test*

Table 4 shows a statistically significant association between the median EQ-5D-5L scores among the SGA-A, B, and C groups. The median QoL scores of the

participants decreased gradually from the well-nourished to the severe malnourished groups.

Table 5. Differences between the EQ-VAS scores of the participants in each subgroup (n=151).

Nutritional status	Median IQR)	Mean rank	p
BMI classification			
Underweight	45 (30)	44.67	<0.001*
Normal	70 (25)	96.31	
Overweight/Obese	50 (25)	60.32	
SGA classification			
Well-nourished	60 (25)	78.24	0.016*
Mild/moderate malnourished	65 (25)	84.85	
Severe malnourished	40 (30)	43.58	

* *Kruskal-Wallis test*

As shown in Table 5, a statistically significant association was reported between the median EQ-VAS scores among every subgroup classified by BMI and SGA. The median QoL score of the group having normal BMI was

remarkably higher than the underweight and the overweight/obese group. Severe malnourished participants had a significantly lower QoL score than the SGA-A and B group.

IV. DISCUSSION

4.1. Study participants' nutritional status

According to BMI, the rate of “overweight/obese” in our study is approximately as high as the rate of patients with normal BMI. Generally, in previous studies, the group of patients with normal BMI accounted for the highest rate. In particular, our study recorded a significantly higher proportion of “overweight/obese” than other authors in Vietnam, but significantly lower than studies abroad [12]. This difference might be caused by the differences in sample size, study location, participants' age, disease status, and demographic and racial factors. Overall, the prevalence of overweight and obesity in diabetic patients is consistently high.

4.2. Study participants' quality of life

In terms of self-care and anxiety/depression, the proportion of “no problem” was relatively high. Meanwhile, another study in early 2024 reported that the proportion of respondents who did not have problems in any of the EQ-5D-5L dimensions was negligible (from 0% to 11.0%) [14]. This difference might be caused by the fact that the study was conducted on patients with severe polyneuropathy complications. In our study, mobility and pain/discomfort are the 2 dimensions in which most patients had problems to deal with. In usual activities, 11.26% of patients had severe problems.

The median EQ-5D-5L score in our study was 0.78 (IQR = 0.45), higher than results reported in Vuong Tien Nam's study (0.44) [14]. Considering studies in other countries, a study conducted in Canada reported a median of 0.85. Patients' QoL differed for each study, due

Considering SGA categories, the majority of our participants had good nutritional status. The proportion of patients with mild/moderate malnourished and severe malnourished were 11.26% and 8.61%, respectively. A study conducted in Pakistan reported a rate of severe malnourishment that was not much different from ours; but 48.2% of their patients were mild/moderate malnourished [13]. In reality, nutritional status is affected by many different factors, including energy intake, eating habits, and physical activity. Moreover, nutritional status worsens as the severity of complications increases. Those situations might be an explanation for the study results.

to some factors such as study participants' characteristics, demographic factors, as well as the disease status and nutritional status. In addition, using different conversion scales for QoL scores might also create differences in study results. In general, the QoL of inpatients with diabetes is lower than outpatients, as shown by the QoL score and also by each dimension.

The median EQ-VAS score of diabetic patients participating in our study was 60 (IQR = 25). It is consistent with the correlation of EQ-5D-5L indices. Our participants' EQ-VAS score was higher than Vuong Tien Nam's study but lower than Vo Duc Tri's study [12, 13]. This is reasonable, as outpatients and patients who do not have severe complications of diabetes are more likely to have better feelings about their health status.

4.3. The relationship between nutritional status and quality of life among study participants

Identifying the related factors plays an important role in determining patients who need to receive special care to improve QoL. A large number of previous studies have conducted on factors associated with QoL among diabetic patients. However, not many studies have assessed the relationship between this aspect and the participants' nutritional status.

In our study, based on the results of the multivariate linear regression model and statistical testing, factors related to diabetic patients' QoL were identified as statistically significant, including SGA classification and BMI.

SGA classification is reported to be related to the QoL of the participants. The QoL score of patients decreased significantly from the well-nourished group to the severely malnourished group. SGA is a relatively comprehensive nutrition assessment tool, including 5 clinical factors related to nutrition: reduced food intake, unwanted weight loss, symptoms affecting oral feeding, oral function, functional capacity, and metabolic demand. Besides, SGA also

assesses several physical factors such as subcutaneous fat thickness, muscle loss, and edema. Therefore, the SGA has the ability to predict the outcome of the patient. It can be explained that the more nutritional status declines, the more it will affect both physical and mental health; thereby reducing the patient's QoL. This is consistent with the results of other studies in the world [16].

Additionally, nutritional status according to BMI is related to the patient's QoL. Patients with normal BMI had better QoL compared to the overweight/obese and also underweight group. A study conducted by R. Apple confirmed that BMI has a significant relationship with physical and mental QoL [17]. However, another study enrolling 22,827 elderly people in the US concluded that the greatest negative impacts of the various BMI categories on QoL were on physical rather than mental aspects, especially for those in the underweight and obese categories [18]. This is consistent with the results of our study that the majority of the participants had no problem with anxiety/depression (70.86%).

V. CONCLUSION

This research found that diabetic patients faced high levels of overweight/obesity: 45.03% by BMI and high WHR: 75% with male and 95.18% with female. Nutritional status and QoL are negatively associated. The QoL score of patients decreased significantly from the well-nourished to the severe malnourished group and from normal BMI to the

overweight-obese and underweight group.

Recommendations: Medical staff should place greater emphasis on the nutritional care of diabetic patients, particularly in managing malnutrition and addressing overweight/obesity, in order to improve patients' quality of life.

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