The current status of dietary characteristics of outpatients with chronic obstructive pulmonary disease at Viet Tiep Friendship Hospital, Hai Phong in 2022

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ABSTRACT

A cross-sectional descriptive survey on 100 people with chronic obstructive pulmonary disease receiving outpatients at Viet Tiep Friendship Hospital in Hai Phong aims to describe the current status of dietary intake of patients. The study period was from December 2021 to June 2022. The dietary intake of patients was assessed by questioning and recording methods in the past 24 hours. Research results show that: The average dietary energy was 1770,2 ± 485,8 kcal/day, 26% higher than the recommended daily requirement. Substances that meet the recommended daily requirement consist of Energy-generated substances: Protein; Minerals: Na; K; Vitamins: C; B1. Substances that do not meet the recommended daily requirement consist of Lipid (181,6%); Glucid (115,5%); Canxi (50,0%); Vitamin A (33,0%); Vitamin B2 (66,7%). Patients should be encouraged to restrict starch, eat more plant-based fats, and foods rich in Calcium, vitamin A, and vitamin B2.

Keywords: Dietary intake; COPD; Hai Phong.

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INTRODUCTION

Chronic obstructive pulmonary disease (COPD) has become one of the major public health problems worldwide due to its high morbidity and mortality and has been the cause of death of more than 120,000 people each year [1]. World Health Organization (WHO) estimates that COPD will become the third leading cause of death and disease burden globally [2].

In a meta-analysis of 13 randomized controlled trials of nutritional supplementation, nutritional counseling, or tube feeding, there was a significant increase in the total protein and energy intake with improvements in body weight and muscle strength. Results from this meta-analysis indicate clearly that proper nutritional supplementation along with nutritional advice provides significant increases in body weight, and muscle strength and improves quality of life leading to reduced mortality in COPD patients [3]. It has been reported that nutritional supplementation therapies have not only improved nutritional deficiency in COPD patients but also have various other beneficial effects such as preventing the development, progression, or exacerbation of diseases. With the aim of improving nutritional deficiencies in COPD patients, efforts have been aimed at encouraging the intake of foods such as high-calorie foods, fruits, vegetables, and nutrients such as vitamins, amino acids, and unsaturated fatty acids [4]. In Vietnam, research at Thai Binh

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Lung Hospital indicated that the proportion of COPD patients with malnutrition was high at 62.2% (according to BMI), over 50% (according to the SGA tool), and 93.4% (according to the MNA tool). The average dietary energy just reached 50.05% than that of recommended demands [5]; Research at Bach Mai Hospital showed that the rate of malnutrition in inpatients and outpatients was 30 – 60% and 20 – 40%, respectively [6].

Viet Tiep Friendship Hospital manages and treats more than 300 COPD patients each year. However, there has been no research to evaluate the nutritional status and dietary characteristics of these patients. Starting from this situation, we researched this topic intending to describe the current status of diet characteristics of outpatients with chronic obstructive pulmonary disease at Viet Tiep Friendship Hospital, Hai Phong, in 2022.

METHODS

Research subjects

COPD patients diagnosed according to the standards of the Ministry of Health in 2018, have received outpatient treatment at Viet Tiep Friendship Hospital in Hai Phong and agreed to participate in the study [7]. Excluding patients who can not answer interview questions because of old age or mental illness.

Location and time frame of research

The study was conducted at Viet Tiep Friendship Hospital in Hai Phong. The study period was from 1st December 2021 to 1st June 2022. (time must include day, month, and year)

Research design: A cross-sectional and descriptive study.

Sample size

The sample size was calculated according to the estimated proportion of the population

$$n = \frac{Z^2_{1-\frac{\alpha}{2}}\ \sigma^2}{d^2}$$

In which, n is the minimum research sample size. Z is the reliability coefficient depending on the probability threshold α (choose α = 0.05 with 95% confidence interval, then $Z^2_{1-\frac{\alpha}{2}} = 1{,}96$). σ is the standard deviation. Referring to the previous research results of Pham Thi Mai Ngoc, the standard deviation of the average energy intake was 477.5 kcal [8]. d is the absolute acceptable error level, taking d = 100 kcal. Substituting into the formula to calculate the sample size for the dietary intake description is n = 88 patients. In fact, we conducted a study on 100 patients.

Sampling method

The simple random sampling method. Step 1: Make a list of all patients currently managing outpatient COPD treatment at Internal Medicine Clinic 2 at Viet Tiep Friendship Hospital (list extracted from patient management software). As of March 2022, the total number of patients participating in treatment management was 150 patients. Step 2: Use a random number table, and randomly draw 100 patients from the pre-established list of 150 patients. In case the patients were absent, a replacement would be selected. The replacement patients were the adjacent patients below in the pre-established list.

Research variables

Demographic information: Age group, gender, education level, occupational characteristics. Energy and nutrients in the diet: dietary structure of energy-producing substances, dietary structure of non-energy-producing substances, dietary nutritional value according to nutritional status.

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Dietary response level compared to recommended demands: response level of energy-producing substances, response level of non-energy-producing substances.

Information collection methods

Information was collected by direct interview methods (asking and recording) in the past 24 hours: Patients recounted in detail what they ate the previous day or 24 hours before the interview. Describe all foods and drinks consumed by the patient, including how they were prepared, food names, and food brand names if it was processed foods.

Evaluate dietary intake:

Using a photo book of 500 common dishes for Vietnamese people to investigate 24-hour portions, helping patients describe the sizes of foods used. [9].

Evaluate recommended demands: According to the standard of ESPEN (European Society of Clinical Nutrition) in 2021 and the standard of Vietnam National Institute of Nutrition in 2016 for Vietnamese adults [10-11].

Evaluate the balance of the dietary: According to the standard of the Vietnam National Institute of Nutrition for Vietnamese adults in 2016 [10].

Data processing and analysis

The data were entered through Epidata 3.1 software and analyzed through Stata 14 software. Using the vitality coefficient to convert the patient's 24-hour diet into raw food, then import into Eiyokun software to calculate the nutritional value of 24-hour dietary portions [12].

Using descriptive statistical algorism: Quantitative variable values were presented as mean value, standard deviation, minimum value, and maximum value; qualitative variable values were presented as frequencies and percentages. Using medical statistical tests: T-test for comparing 2 average values; Paired t-test for comparing actual dietary intake and recommended ones of patients; Chi-square test; Calculate OR values, and 95% Confidence Interval to evaluate the association between independent variables and dependent variable. The difference is statistically significant when $p < 0.05$.

Research ethics

The study complied with the protocol approved by the Scientific Council of Hai Phong University of Medicine and Pharmacy according to decision No.2811/QĐ-YHDP and was approved by the Board of Directors and Head of the Department of Respiratory Medicine of Viet Tiep Friendship Hospital. Patients participating in the study were clearly explained the purpose of the study and voluntarily participated in the study. All patient information is completely confidential and is only used for research purposes.

RESULTS

Table 1. *Demographic characteristics of patients (n = 100)*

Variables		**n**	**%**
Age group	< 49	2	2.0

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	50 – 59	12	12.0
	60 – 69	39	39.0
	70 – 79	33	33.0
	≥ 80	14	14.0
	Mean ± SD: 69,1 ± 9,1 Min – Max: 34 – 87 years old		
Gender	Male	74	74.0
	Female	26	26.0
Educational level	Don't go to school	1	1.0
	Elementary	8	8.0
	Secondary school	47	47.0
	High school	31	31.0
	College - University	12	12.0
	After university	1	1.0
Occupational characteristics	Exposure to dust and smoke	18	18.0
	No	82	82.0

Table 1 shows that the age of patients from 60-69 years old accounted for the highest rate of 39,0%, the lowest rate was < 49 years old (2.0%). The average age of the patients was 69,1 ± 9,1 years old; the lowest age was 34 years old, and the highest age was 87 years old. The proportion of male patients was 74%, and female patients were 26%. Patients with secondary school level made up 47%, followed by 31% of patients with high school level. 18,0% of patients were exposed to dust and smoke.

Table 2. *Dietary structure of nutrients (n=100)*

Nutritional index		**Male** $\bar{X} \pm SD$	**Female** $\bar{X} \pm SD$	**Both** $\bar{X} \pm SD$	**p**
Energy-produced substances					
Energy	kcal/day	1835.1 ± 478.8	1585.7 ± 466.1	1770.2 ± 485.8	**0.012**
	kcal/kg/day	32.7 ± 9.4	31.4 ± 9.6	32.4 ± 9.4	0.561
Protein	Total (g)	77.3 ± 23.3	66.2 ± 24.1	74.4 ± 23.9	**0.020**
	Vegetable (g)	33.1 ± 12.4	27.8 ± 9.9	31.8 ± 12.0	**0.026**
	Animal (g)	44.1 ± 18.1	38.3 ± 19.3	42.6 ± 18.5	0.170
	Total (g/kg/day)	1.4 ± 0.4	1.3 ± 0.5	1.4 ± 0.4	0.568
Lipid	Total (g)	58.5 ± 25.7	50.6 ± 25.8	56.5 ± 25.9	0.179
	Vegetable (g)	27.9 ± 16.1	24.9 ± 13.8	27.2 ± 15.6	0.397

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	Animal (g)	30.6 ± 18.5	25.7 ± 17.4	29.3 ± 18.2	0.128
Glucid		250.9 ± 64.4	218.0 ± 57.1	242.4 ± 63.9	**0.012**
Non-energy-produced substances					
Fiber (g)		7.9 ± 4.7	7.7 ± 4.0	7.9 ± 4.5	0.826
Minerals	Na (mg)	2021.8 ± 926.8	2112.0 ± 911.1	2045.2 ± 919.0	0.669
	K (mg)	2098.9 ± 598.2	2030.2 ± 687.3	2081.1 ± 619.9	0.629
	P (mg)	984.1 ± 290.3	899.3 ± 687.8	962.1 ± 291.0	0.203
	Ca (mg)	591.3 ± 283.7	626.6 ± 295.1	600.5 ± 285.6	0.591
	Fe (mg)	13.7 ± 4.6	12.6 ± 4.6	13.4 ± 4.6	0.298
	Zn (mg)	7.6 ± 2.8	6.7 ± 2.0	7.3 ± 2.6	0.142
Vitamins	A (µg)	207.6 ± 265.2	234.4 ± 273.8	214.5 ± 266.3	0.661
	PP (mg)	13.4 ± 5.8	12.2 ± 6.7	13.1 ± 6.0	0.375
	C (mg)	157.1 ± 113.8	145.1 ± 95.2	153.9 ± 108.9	0.630
	B1 (mg)	1.3 ± 0.5	1.1 ± 0.4	1.3 ± 0.5	**0.012**
	B2 (mg)	1.0 ± 0.5	1.0 ± 0.4	1.0 ± 0.5	0.799

Table 2 shows that the average dietary energy of patients was 1770.2 ± 485.8 kcal/day. The amount of protein in the diet was 74.4 ± 23.9, of which the amount of protein from animals was 42.6 ± 18.5, and the amount of protein from vegetables was 31.8 ± 12.0. The average amount of lipids in the diet was 56.5 ± 25.9, of which the amount of lipids from animals was 29.3 ± 18.2, and the amount of lipids from vegetables was 27.2 ± 15.6. The amount of glucid in the diet was 242.4 ± 63.9. The difference in energy level, total protein, protein from vegetables, and glucid between males and females was statistically significant with $p < 0.05$. The average fiber in the diet was 7.9 ± 4.5.

Table 3*. The level response of substances compared to recommended demands (n=100)*

Variables		**Results**	**Recommended demands**	**Level meets demand (%)**
Energy (kcal/day)		1770.2 ± 485.8	1398.7	126.5
Energy-produced substances				
Protein (g)		74.4 ± 23.9	69.9	106.4
Lipid (g)		56.5 ± 25.9	31.1	181.6
Glucid (g)		242.4 ± 63.9	209.8	115.5
Non-energy-produced substances				
Minerals	Na (mg)	2045.2 ± 919.0	< 2000	102.3

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	K (mg)	2081.1 ± 619.9	2000 – 2500	104.1
	P (mg)	962.1 ± 291.0	700	137.4
	Ca (mg)	600.5 ± 285.6	1200	50.0
Vitamins	A (µg)	214.5 ± 266.3	650 – 850	33.0
	PP (mg)	13.1 ± 6.0	14 - 16	93.6
	C (mg)	153.9 ± 108.9	110	140.0
	B1 (mg)	1.3 ± 0.5	1.2 – 1.3	108.3
	B2 (mg)	1.0 ± 0.5	1.5	66.7

Table 3 shows that the amount of protein, Na, K, P, Vitamin C, and B1 in the diet of the patients was consistent with the recommended demands. However, the amount of Ca, Vitamin A, PP, and B2 in the diet of the patients was not consistent with the recommended demands.

Bảng 4. *The balance of 24-hour diet (n = 100)*

Variables	**Results**	**Recommended demands**	**Balance evaluation**
P: L: G ratio	18.6: 14: 60.6	13: 20: 20 - 25: 55: 65	No
*Pđv/Pts (%)	57.3	≥ 50%	Yes
*Ltv/Lts (%)	48.1	≥ 40%	Yes
Ca/P	0.62	> 0.8	No
B1/1000 kcal	1.3	0.5	Yes
B2/1000 kcal	1.0	0.6	Yes
PP/1000 kcal	13.1	8.0	Yes

Pđv/Pts: Protein from animals/Protein from total

Ltv/Lts: Lipid from vegetables/Lipid from total

The proportion of P: L: G; Ca/P was not consistent with the recommended demands. The percentage of Pđv/Pts; Ltv/Lts; B1/1000 kcal; B2/1000 kcal; PP/1000 kcal were consistent with the recommended demands.

DISCUSSIONS

The study was conducted on 100 COPD outpatients at Viet Tiep Friendship Hospital, Hai Phong City. Our results indicate that regarding energy in the diet: The average total dietary energy of COPD patients in a day was 1770,2 ± 485.8 kcal. Our findings are consistent with similar research by Nguyen Thi Mai Nhien and colleagues conducted in 2019 at Duc Giang General Hospital on 155 COPD patients receiving outpatient treatment, the average total dietary energy of the study group was 1724 ± 372.4 kcal/day; energy by weight was 30.7 ± 5.5 kcal/day [13] and higher than the study of Nguyen Thi Hong Tien and Pham Duy Tuong in 2017 at the Respiratory Center of Bach Mai Hospital, Ha Noi conducted on 130 COPD patients, the results of the study

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revealed that the average total dietary energy was 1198 ± 355.2 kcal/day with $p < 0.05$. Research in 2017 by author Nguyen Thi Thuy Linh was carried out at Thai Binh Lung Hospital on 114 research subjects resulting in an average dietary intake of 843.3 ± 255.4 kcal/day. Our results are higher and statistically significant with $p < 0.05$. It could be explained that COPD patients in our study were receiving stable treatment at home while the COPD inpatients in the study of the author were in the hospital for treatment from the second day onward [5]. Dietary protein amount: the average amount of protein in the diet was 74.4 ± 23.9 g/person/day which was consistent with the recommended demands. This result is higher than the average amount of protein in the diet of patients in a study Do Thi Luong and colleagues conducted in 2017 at Bach Mai Hospital, Ha Noi with 62.0 ± 20.0 g/person/day [6]; research by author Ingadottir AR and colleagues (2018) at Landspitali University Hospital also showed that the average total protein intake in 24 hours of patients is lower than ours, which was 56.2 g/person/day [14]. Dietary lipid amount: The average amount of lipid in the diet was 56.5 ± 25.9/g/person/day, exceeding the demands. This result is higher than the average dietary lipid content in the study of Nguyen Thi Mai Nhien (2019) and colleagues at Duc Giang General Hospital which was 51.1 ± 20.6 g/person/day [13] and lower than the study by author Makel D and colleagues conducted in 2021 at the Department of Pulmonary Diseases and Respiratory Allergies No.1 of Voivodeship, the average lipid amount was 68.2 ± 33.7 g/person/day [15]. Dietary glucid amount: Our research showed that the average dietary glucid amount reached 242.4 ± 63.9 g/person/day, meeting recommended demands. This result was higher than the study of Nguyen Thi Hong Tien and colleagues in 2017 at the Department of Respiratory Center of Bach Mai Hospital, Ha Noi which was 182.2 ± 64.9 g/person/day [16]. and lower than the research results of Do Thi Luong and colleagues in 2017 in COPD patients receiving outpatient management at Bach Mai Hospital with an average glucid amount of 254 ± 212 g/person/day [6]. For patients with chronic obstructive pulmonary disease, the demand for glucid should be maintained at a balanced level and limit its increase because a diet rich in glucid causes an increase in CO_2 in the blood, causing patients to have increased shortness of breath or causing illness conditions worse [17]. Vitamins, fiber, minerals: Although the human body needs a very small number of micronutrients every day, they play an important role in maintaining and improving health. Our research results showed that the average dietary fiber was 7.9 ± 4.5g. The average amount of minerals: Zinc was 7,3 ± 2,6mg; Iron 13,4 ± 4,6mg; Natri was 2045,2 ± 919,0mg, meeting the recommended demands; Potassium was 2081,1 ± 619,9mg, meeting the recommended demands; Phosphorus was 962,1 ± 291,0mg, meeting the recommended demands; Canxium was 600,5 ± 285,6mg, reaching 50% of recommended demands. Vitamins: Vitamin A 214,5 ± 266,3µg, reaching 33% of recommended demands; Vitamin PP was 13,1 ± 6,0mg, reaching 93,6% of recommended demands; Vitamin B1 was 1,3 ± 0,5mg, meeting the recommended demands; Vitamin B2 1,0 ± 0,5mg, reaching 66,6% of recommended demands; and Vitamin C was 153,9 ± 108,9mg, meeting the recommended demands. According to research by Pham Thi Mai Ngoc (2021) at the Central Lung Hospital, the majority of

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patients had a diet that did not meet the recommended needs for micronutrient content. Specifically, less than 43% of research subjects did not meet the demands for Canxium, Iron, Magnesium, Zinc, Sodium, and Potassium. Only Manganese and Phosphorus had the rate of reaching above 50% of recommended demands. Most water-soluble and oil-soluble vitamins responded poorly, only about under 50%. Only one research subject (accounted for 0,9%) reached the recommended demand for fiber. [8].

Regarding the balanced diet, our study revealed that the amount of protein: lipid: glucid in the diet was 74.4 g: 56.5g: 242.4g respectively and the average protein by weight was 1.4g/kg/day. The above energy-producing substances made up 16.8%: 28.6%: and 45.4%, respectively. According to the demands of ESPEN and the Vietnam National Insitute of Nutrition, the dietary structure of patients should have 1.0 – 1.5g protein/kg/person, 15 – 20% lipid, and 55 – 65% glucid. Thus, the dietary structure of patients in our study was not balanced. Besides, the ratio of animal protein/ total protein ratio was 57.3%, this proportion meets the recommended of ESPEN [10-11]. This result was higher than in the study of Do Thi Luong (2017) at Bach Mai Hospital which had an animal protein/ total protein ratio was 47.0%, and the research of Nguyen Thi Hong Tien and Pham Duy Tuong also at Bach Mai Hospital in 2017 on 130 COPD inpatients, the animal protein/ total protein ratio was 44.8% [16]. Our research results showed that the Calcium/Phosphorus in the diet of the study subjects was 0.62, higher than the study of Nguyen Thi Mai Nhien (2019) at Duc Giang General Hospital, which was 0.56 [13]. The Calcium/Phosphorus ratio plays an important role in calcium absorption into the body. Therefore, if the Calcium/Phosphorus ratio is balanced and reasonable according to recommended demands, the amount of calcium would be absorbed better into the body. According to recommendations of the Viet Nam National Institute of Nutrition in 2016, the Calcium/Phosphorus ratio should be more than 0.8. Therefore, the results of our study did not meet the recommended demands.

CONCLUSIONS

Research conducted on 100 COPD patients showed that the average dietary energy was 26% higher than the recommended daily requirement. Substances that meet the recommended daily demands include Energy-producing substances: Protein; Minerals: Na, K; Vitamins: C, B1. Substances that did not meet the recommended daily demands include Energy-producing substances: Lipid (181.6%); Glucid (115.5%); Calcium (50.0%); Vitamin A (33.0%); Vitamin B2 (66.7%). The average protein/lipid/glucid and Ca/P ratios in the 24-hour diet were not balanced compared to recommended needs. Patients should be encouraged to limit starch, eat fats from vegetables, and eat more foods rich in calcium, vitamin A, and vitamin B2.

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