

**MALNUTRITION AND RELATED FACTORS IN PATIENTS
WITH GASTROINTESTINAL CANCERS
AT CAN THO ONCOLOGICAL HOSPITAL IN 2020**

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ABSTRACT

Background: Malnutrition has been becoming a common health issue and has shown a negative effect on gastrointestinal cancer patients. Therefore, nutritional intervention plays a crucial role in improving treatment effectiveness and quality of life for patients with gastrointestinal cancer. **Objectives:** To identify the prevalence of malnutrition in patients with gastrointestinal cancers and some factors related to malnutrition. **Materials and methods:** A cross-sectional study was performed on 217 patients from 18 years old at Can Tho Oncological Hospital from 08/2020 to 01/2021. Data were collected by interviewing, measuring anthropometric indicators, and retrospectively looking up medical records. **Results:** The prevalence of malnutrition according to PG-SGA was 77%. The severely malnourished group (PG-SGA C) held the highest position at 39.7%, followed by the moderate/suspected malnutrition group (PG-SGA B) accounted for 37.3%, and the well-nourished group (PG - SGA A) was 23%. The percentage of the subjects who had a PG-SGA point score > 9 was the largest at 82.9. The high risk of malnutrition increased among patients with esophageal-gastric cancer (OR=3.5, p=0.018) and end-stage cancer (OR= 2.5, p=0.025). Patients who had symptoms, including vomiting, dry mouth, pain, and fatigue were more likely to lose $\geq 5\%$ weight within a month than the group without the above symptoms (2 times) with $p<0.05$. There was a significant association regarding a weight loss of $\geq 10\%$ in 6 months among patients having anorexia, nausea, vomiting, taste changes, and pain ($p<0.05$). **Conclusions:** The malnutrition in patients with gastrointestinal cancer should be assessed from the beginning of hospitalization evaluated by PG-SGA, especially for end-stage cancer. Taking care of the patient's gastrointestinal symptoms to improve the patient's nutritional status and weight loss should be considered during the treatment process.

Keywords: Gastrointestinal cancer, malnutrition, patient-generated subjective global assessment (PG-SGA).

I. INTRODUCTION

According to International Agency for Research on Cancer (2019), cancer was the second leading cause of death globally (17.8%). Of all the five most common cancers in the world, gastrointestinal cancers contributed to the 3 sorts of cancers which were liver cancer, colorectal cancer, and stomach cancer [5]. Cancer patients were susceptible to reduce muscle mass - a feature of malnutrition and cancer cachexia that may appear before weight loss. Additionally, weight loss had a strong negative effect on the prognosis [11]. The number of malnourished cancer patients reported by The European Society of Clinical Nutrition (ESPEN) varies from 20-70% depending on age, type of cancer, and stage of cancer [1]. Because of the influence of malignant tumor complications and cancer treatment toxicity, patients' eat-ability reduces which may result in patients having nutritional deficiencies and food intake reduction. Consequently, the patient's immune system, physical activity, muscle function, and quality of life were impaired. Therefore, nutritional intervention plays a crucial role in improving the effective treatment quality of life for patients with gastrointestinal cancer

[2], [8]. According to the guidance of the Ministry of Health, nutrition screening and nutritional intervention turned into compulsory work in hospitals [6]. Therefore, we have carried out a study on "Malnutrition and related factors in patients with gastrointestinal cancers at Can Tho Oncological Hospital in 2020" to identify the prevalence of malnutrition in patients with gastrointestinal cancers and some factors related to malnutrition.

II. MATERIALS AND METHODS

2.1. Study population and setting: The participants of this study were patients from 18 years old hospitalized at Can Tho Oncological Hospital from August 2020 to January 2021.

2.2. Study design: A cross-sectional study was conducted among 217 hospitalized patients from 18 years old and older with a convenient sampling method at the Department of Surgery 2, Department of Radiation, Department of Internal Medicine 1, Department of Internal Medicine 2 at Can Tho Oncological Hospital from August 2020 to January 2021.

Data were collected by interviewing, measuring anthropometric indicators, and retrospectively looking up medical records.

2.3. Study contents: The investigated information was divided into 2 parts: The first one was characteristics of participants (consist of ages, genders, types of disease, stages of disease), and the other was PG-SGA assessment (including weight changes, nutrient intake level, changes in functional activities, gastrointestinal symptoms, the evaluation of 3 aspects of body composition: fat, muscle, and fluid)

2.4. Statistical Analysis: Descriptive statistics were used for qualitative variables: frequency, percentage. Comparisons between 2 or more categorical variables were performed using chi-squared tests. A chi-squared test was also used to examine the association between weight loss and the presence of symptoms ($\alpha = 0.05$). Multivariate logistic regression with entering method was used to assess factors associated with malnutrition in clinical features, including types of cancer, stages of cancer, and time of initiative diagnosis. Data analysis was performed using the SPSS program version 20.0. The statistical tests were considered significant when the significant level was less or equal to 0.05.

2.5. Ethics Approval: Ethical permission obtained from Can Tho University of Medicine and Pharmacy and Can Tho Oncology Hospital. The participants gave their consent to take part in this study.

III. RESULTS

3.1. Prevalence of malnutrition in gastrointestinal cancer patients

The proportion of male patients (59.4%) was higher than that of women (40.6%). The participants in the group of ≥ 60 years old were the most significant at 55.8%. Colorectal cancer ranked first with 69.1%, hepatobiliary cancer was followed by 12.4%, stomach cancer occupied 11.1%, and esophageal cancer was 7.4%. Although the time of detecting the disease under 12 months accounted for the majority (81.6%), up to 40.6% of patients reached the terminal stage (stage IV).

The prevalence of malnutrition according to PG-SGA was 77%. The severely malnourished group (PG-SGA C) held the highest position at 39.7%, followed by the moderate/suspected malnutrition group (PG-SGA B) accounted for 37.3%, and the well-nourished group (PG - SGA A) was 23%. The percentage of the subjects who had PG-SGA point score > 9 was the largest at 82.9%, the group of 4-8 followed by 11.1%, the group of 2-3 accounted for 5.5%, and the group of 0-1 was the smallest at 0.5%.

Table 1. General characteristics of patients with gastrointestinal cancer

Characteristics (n = 217)		Frequency	Percentage (%)
Gender	Male	129	59.4
	Female	88	40.6
Age	18 – 40 years old	17	7.8
	41 – 59 years old	79	36.4
	≥ 60 years old	121	55.8
	Mean ± SD years old	60.5 ± 12.2 years old	
Types of cancers	Esophagus cancer	16	7.4
	Stomach cancer	24	11.1
	Hepatobiliary pancreatic cancer	27	12.4
	Colorectal cancer	150	69.1
Stages of cancer	Stage I	10	4.6
	Stage II	43	19.8
	Stage III	76	35
	Stage IV	88	40.6
Time of initiative diagnosis	≤ 12 months	177	81.6
	13 months - < 5 years	33	15.2
	≥ 5 years	7	3.2

Table 2. Malnutrition status of patients with gastrointestinal cancers according to PG - SGA

Malnutrition status (n = 217)		Frequency	Percentage (%)
PG-SGA global assessment categories	Level A (PG-SGA A)	50	23
	Level B (PG-SGA B)	81	37.3
	Level C (PG-SGA C)	86	39.7
PG-SGA scores	0 - 1	1	0.5
	2 – 3	12	5.5
	4 – 8	24	11.1
	> 9	180	82.9

3.2. Some related factors with malnutrition in patients with gastrointestinal cancer

Table 3. The relationship between nutritional status according to PG-SGA with types of cancer and stages of cancer

Clinical features		PG-SGA B/C n (%)	PG-SGA A n (%)	OR (CI 95%)	P
Types of cancers	Gastroesophageal cancer	36 (90)	4 (10)	3.5 (1.17 – 10.44)	0.018
	Hepatobiliary pancreatic cancer	23 (85.2)	4 (14.8)	2.2 (0.73 – 6.85)	0.15
	Colorectal cancer	108 (72)	42 (28)	-	-
Stages of cancer	IV	74 (84.1)	14 (15.9)	2.5 (1.11 – 5.62)	0.025
	III	57 (75)	19 (25)	1.4 (0.65 – 3.08)	0.428
	I & II	36 (67.9)	17 (32.1)	-	-
Time of initiative diagnosis	≤ 12 months	6 (85.7)	1 (14.3)	1.99 (0.23 – 16.9)	1
	13 months - < 5 years	28 (84.8)	5 (15.2)	1.85 (0.67 – 5.1)	0.226
	≥ 5 years	133 (75.1)	44 (24.9)	-	-

Patients with cancer of the upper gastrointestinal tract (esophageal - stomach cancer) and hepatobiliary pancreatic cancer (cancer of the liver, the bile duct, and pancreas) have a higher rate of malnutrition compared to cancer of the lower gastrointestinal tract (colorectal cancer) 3.5 times and 2.2 times, respectively ($p < 0.05$). According to PG-SGA, malnourishment in end-stage cancer of patients outnumbered 2.5 times higher than stages I and II ($p < 0.05$). The study has not found an association of malnutrition status with the time of disease detection.

Table 4. Relationship between the rate of weight loss and gastrointestinal symptoms in the past 2 weeks among patients with gastrointestinal cancers

Symptoms	% Weight loss			
	Lose $\geq 5\%$ weight a month		Lose $\geq 10\%$ weight in 6 month	
	OR (CI 95%)	p	OR (CI 95%)	p
Loss of appetite	1.45 (0.75 – 2.79)	0.264	1.81 (1.05 – 3.16)	0.033
Nausea	1.36 (0.7 – 2.62)	0.364	1.8 (1.01 – 3.19)	0.044
Vomiting	2.1 (1.04 – 4.2)	0.036	1.9 (1 – 3.6)	0.047
Constipation	1.12 (0.58 – 2.16)	0.73	1.37 (0.78 – 2.39)	0.272
Dry mouth	2.6 (1.23 – 5.15)	0.006	1.46 (0.78 – 2.75)	0.236
Food tastes strange or tastes of nothing	1.84 (0.96 – 3.52)	0.064	2.23 (1.25 – 3.96)	0.006
Diarrhea	1.98 (0.9– 4.33)	0.085	1.44 (0.7 – 2.98)	0.319
Swallowing problems	1.02 (0.46 – 2.24)	0.97	1.83 (0.93 – 3.6)	0.076
Fatigue	2.35 (1.23 – 4.49)	0.008	1.4 (0.81 – 2.4)	0.224
Pain	1.99 (1.04 – 3.78)	0.035	1.81 (1.03 – 3.18)	0.037
Feeling full quickly	1.2 (0.55 – 2.58)	0.659	1.02 (0.52 – 2)	0.95

Patients who had symptoms including vomiting, dry mouth, pain, and fatigue lost their weight within 1 month were more than the group without the above symptoms approximately 2 times ($p < 0.05$). The data also illustrated that the rate of weight loss $\geq 10\%$ in 6 months was associated with participants who had symptoms of anorexia, nausea, vomiting, changes in taste, and pain.

IV. DISCUSSION

4.1. Prevalence of malnutrition in gastrointestinal cancer patients

Our study was conducted on 217 patients, the number of male participants (59.4%) outweighed the number of female ones (40.6%). These results were similar to the study of Pham Thi Thanh Hoa (Ha Noi, 2018), which showed men had a higher position at 71.2% and women accounted for 28.8% [9]. The finding of Pham Thi Tuyet Chinh (Ha Noi, 2017) also showed that male patients, which made up 56.9%, were more than the female ones (43.1%) [10]. The results were consistent with the worldwide data on Globocan 2018 which reported the differences of cancer incidence by gender due to some factors of genes and unhealthy life behaviors among men like smoking or drinking [3], [4].

On average, gastrointestinal cancer patients had the age of 60.5 and older. Most of them were middle-aged from 40 years to older (92.2%). The results were similar to the study of Pham Thi Thanh Hoa (Ha Noi, 2018) and Pham Ngoc Hong (Can Tho, 2016), the number of patients over 40 years old was 95.9% and 91.7% respectively [8], [9]. Thus, middle-aged subjects from 40 years old and over were the majority group had gastrointestinal cancers. Besides, the incidence of cancers among patients under 40 years old was gradually increasing.

The National Cancer Institute identified that the rate of cancer among adolescents and young adults in America increased 29.6% from 1973 to 2015, with a mean of annual percentage change per 100,000 people of 0.537 (CI 95 %; 0.426-0.648; $p < 0.001$); hence, early screening for gastrointestinal cancer should be considered. [12].

According to the results, patients diagnosed within a year occupied 81.6%, most of the participants were in the end-stage, in particular, stage III accounted for 35%, and stage IV made up 40.6%. The proportion of colorectal cancer ranked first with 69.1%. The study of Pham Thi Thanh Hoa (Ha Noi, 2018) also documented that the highest rate belonged to colorectal cancer (47.8%) and mainly patients in stage III (46.6%) [9]. This rate in Angel Segura's study on cancer patients was 13.2% in which the highest part belonged to the gastrointestinal cancer group. The study also noted more than half of the research population having metastasis, with colorectal cancer accounted for 89.5% [13]. An explanation in our study is that the incidence of males took advantage, being late diagnosed because cancer in the early stage was vague and nonspecific symptoms [3], [7].

In **Table 3**, malnourished prevalence (PG-SGA B and PG-SGA C) in gastrointestinal cancer patients according to PG-SGA was noticeable (77%). It was higher than two studies of Pham Thi Thanh Hoa (Ha Noi, 2008) and Pham Thi Tuyet Chinh (Ha Noi, 2007) conducted on gastrointestinal cancer patients having chemotherapy, which had 58.6% and 59.3% of malnutrition, respectively [9], [10]. Besides, The European Society for Clinical Nutrition and Metabolism reported that the proportion of malnutrition patients fluctuated from 20% to 70% depending on ages, types of cancer, and stages of cancer, which was quite similar to our results [1]. The malnourished prevalence differences among research can be explained by the variety of study populations. In particular, the study of Pham Thi Thanh Hoa (Ha Noi, 2008) and the study of Pham Thi Tuyet Chinh (Ha Noi, 2007) mainly focused on patients who used chemotherapy while in our study, the participants were under all kinds of treatment. The information in table 4 also illustrated that PG-SGA point score > 9 contributed to 82.9%, consistent with the high rate of malnutrition and weight loss. It is the rationale for the essence of nutritional interventions in patients with gastrointestinal cancer.

4.2. Some related factors to malnutrition in patients with gastrointestinal cancer

In the late stages of cancer, tumors had mostly metastasized, putting pressure on other organs, affecting nutrient absorption and toxins to the body. Therefore, stage III and IV cancer patients had a higher risk of malnutrition than stage I and II. Furthermore, gastrointestinal cancer had a higher risk of malnutrition than other types of cancer [7]. Regarding the stages of cancer, the figures presented an association between malnutrition and the advanced stages. Specifically, the malnutrition of gastrointestinal cancer in stage IV (84.1%) was much higher than those in stages I and II (67.9%), with OR = 2.5 and $p < 0.05$. These results were homologous to Pham Thi Tuyet Chinh's study with malnourished status that was mainly in stage IV patients (58.3%), which was higher than stage I and II (9.4%) with $p < 0.05$ [10].

Patients with gastroesophageal cancer and hepatobiliary pancreatic cancer have a higher risk of malnutrition than colorectal cancer with OR = 3.5, $p = 0.018$ and OR = 2.2, $p = 0.15$, respectively. Identically, the study of Pham Thi Tuyet Chinh (Ha Noi, 2007) noticed people with stomach cancer had a risk of malnutrition 2.2 times higher than colorectal cancer ones ($p < 0.05$) [10]. The above variance due to cancer of the upper digestive tract (esophagus-stomach) directly affected the patient's eat-ability and nutrients absorption. Therefore, the initial nutritional assessment, counseling nutrition, and provision of

reasonable diets during the treatment process for end-stage cancer patients and upper gastrointestinal cancer people should be deployed from scratch and made detail.

The study of Pham Thi Thanh Hoa (Ha Noi, 2008) on gastrointestinal cancer showed that patients accompanied by vomiting were on the verge of losing weight three times higher compared to the non-vomiting group [9]. Similarly, our results documented that the groups with vomiting symptoms had lost $\geq 5\%$ weight within 1 month as 2 times as the non-symptoms ($p < 0.05$). The figures also indicated that the patients who had symptoms (consisted of mouth sores, pain, and fatigue) lose more than 5% weight within 1 month, 2 times higher than in the group without the above symptoms ($p < 0.05$). Additionally, several symptoms (including loss of appetite, nausea, vomiting, changes in taste, and pain) were associated with the loss of 10% weight within 6 months ($p < 0.05$). Therefore, the initial monitoring of the patients' weight changes and the improvement of some symptoms related to eating were essential in stabilizing the patients' weight.

V. CONCLUSIONS

The prevalence of malnutrition in patients with gastrointestinal cancers according to PG-SGA was 77%. Several factors were associated with malnutrition and weight loss, including types of cancer, stages of cancer, and digestive symptoms. Malnutrition has been becoming a common health issue and has shown a negative effect on patients with gastrointestinal cancers. Therefore, there was a demand to conduct an initial nutritional assessment by using the PG-SGA tool, nutritionists' counseling, and provide an appropriate diet to improve the nutritional status of hospitalized patients.

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